ADDENDUM No. 2

RFP No. 24-19

Miller Avenue Rehabilitation

Due Date and Time: May 6, 2024 at 11:00 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 No. 2 includes Two hundred and seven (207) pages.

The Proposer is to acknowledge receipt of this Addendum No. 2 by signing and submitting Attachment B, 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 B – General Declaration
- 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.

<table>
<thead>
<tr>
<th>Section/Page(s)</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addendum-2-1 to Addendum-2-2</td>
<td>Addendum No. 2 New Content and Replaced RFP Sections</td>
</tr>
<tr>
<td>Addendum-2-3 to Addendum-2-4</td>
<td>Questions and Answers</td>
</tr>
<tr>
<td>Addendum-2-5 to Addendum-2-7</td>
<td>Pre-Proposal Meeting Minutes</td>
</tr>
</tbody>
</table>

Addendum-2-1
Addendum-2-8  SD_W-1; Fire Hydrant Assembly
Addendum-2-9  SD_W-3; Precast Gate Well (Water Mains 16 Inch and Smaller)

**Replace Schedule of Prices**
Sheets 15 – 17  Replace with Sheets BID FORM-1 through BID FORM-4
Quantity updates to reflect plan sheet additions and previously neglected pay items

**Replace Detailed Specifications**
DS-1 to DS-8  Replace with DS-1 to DS-63

- PROJECT SCHEDULE AND PAYMENT, Revised for General Conditions Maximum Unit Price
- PERMANENT SIGN AND SUPPORT, Updated
- IN-STREET PEDESTRIAN CROSSING SIGN, New
- CHAMBERMAXX SYSTEM, New
- WATER STRUCTURES, Unchanged
- AGGREGATE BASE CONDITIONING, New
- MONOLITHIC CURB AND GUTTER, New
- DETECTABLE DIRECTIONAL TILE, New
- MODULAR CURB SYSTEM, New
- BIKEWAY DELINEATOR POST, New
- STEEL POST, New
- GROUND MOUNTED SIGN SUPPORTS, REMOVE, New
- TRAFFIC, PEDESTRIAN, AND BIKE SIGNAL, New
- LIGHT STANDARD ARM, INSTALL SALVAGED, New
- PUSHBUTTON AND SIGN, SALVAGE, New
- ACCESSIBLE PEDESTRIAN SIGNAL SYSTEM, New
- WIRELESS VEHICLE DETECTION SYSTEM, New
- HEMISPHERICAL VIDEO DETECTION, New
- TRAFFIC SIGNAL BACKPLATE, New
- TRAFFIC SIGNAL MAST ARM POLE AND MAST ARM, New
- MAST ARM POLE FOUNDATION, New
- LONG LIFE LIGHT EMITTING DIODE TRAFFIC SIGNAL, New
- TRAFFIC SIGNAL CONTROLLER, New
- TRAFFIC SIGNAL CABINET, New
- TWO-WAY ILLUMINATED STREET NAME SIGNS, LIGHT EMITTING DIODE, New
- ROADSIDE UNIT, REMOVE AND SALVAGE, New

**Replace Plan Set in its entirety**
Plan Sheets 1-130  Replace with Plan Sheets 1-131

- Sheet 64; Not Needed, Replaced with Signal Sheets
- Sheet 89; Replotted for Points Column
- Sheet 101:HMA Application Table Addresses Hand Patching
- Sheets 104-107 (Originally Bid): Deleted for Duplicate Details
- Sheets 111-116: Construction Key No. 3 Changed for Hand Patching
- Sheets 127-131: New Signal Sheets

Addendum-2-2
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: What is the engineer’s estimate (for bonding purposes)? Can you provide an engineer’s estimate for the project?
Answer 1: $6,815,062.75

Question 2: After initial review of the plans and proposal documents, it appears that there is a significant amount of missing pay items and Detailed Specifications. Do you know when these missing items will be issued?
Answer 2: Tuesday, April 30, 2024

Question 3: Due to the above missing items, the specialty scopes involved and the current bid schedule, is there any opportunity to extend the bid date? Lots of specialty work that needs to be farmed out to Specialty Subs. Moving bid date would help.
Answer 3: The Bid has been extended to Monday, May 6, 2024 at 11:00am.

Question 4: Can the pay items associated with the Cycle Track (Phase 3) be broken out from Phase 1 and 2 quantities?
Answer 4: No. Like items of work can be done concurrently as the traffic control covers the extended limits and there is not a prescribed start date to Phase 3 work.

Question 5: Considering that this is a multi-year project, will the City consider paying for stored materials off-site?
Answer 5: No. Phase 2 and 3 materials can be ordered in 2025.

Question 6: From conversations in the pre-proposal meeting, new and revised pay items will be issued along with potential revisions to the bid plans. Can consideration be made to extend the bid date beyond 5/1/24, to incorporate the anticipated changes?
Answer 6: Yes, see Answer 3.

Question 7: Are RRFBs a separate contract and are not in these plans?
Answer 7: A set of RRFBs near Red Oak is part of this contract; Other RRFBs will have foundations and ramp work as part of this contract and grading was supplied in this plan set; The RRFBs themselves between N. Maple Rd. and Newport Rd. will be a separate contract.

Question 8: Will signal work plans and quantities will be a part of the 2nd addendum (Thursday)?
Answer 8: The New Signal Sheets are part of the Replaced Plan Set; Sheets 127-135

Question 9: Is there electrical work needed at Red Oak for RRFB?
Answer 9: RRFBs at Red Oak will be solar powered, but electrical work needed at N. Seventh Street and N. Maple Road. Electrical work for all three of these intersections will be a part the Addendum No. 2.

Question 10: There are missing pay items: Machine Grading, Hand Patching, and Temporary Water Main Line Stop, Additional Rental Day.
Answer 10: These items will be included in an Addendum. Machine Grading is covered under Aggregate Base Conditioning.
Question 11: Concrete work for cycle track will be in Phase 2 and cut into the existing pavement if not otherwise addressed on the plans. Will all of these be issued with the Addendum?

Answer 11: Concrete pay items are used in Phase 1 through Phase 3. Some updates to pay items have been addressed in this Addendum No. 2.

Question 12: Will an Excel version of the Bid Form be provided?
Answer 12: Yes, one can be provided. Send e-mail to jallen2@a2gov.org for Excel version.

Question 13: Can we get clarification on what is all in the scope of the 30 days to complete the cycle track work?
Answer 13: The intent of the Project Schedule was to have the Phase 2 utility work done by Oct. 15, 2025 and final items for the cycle track (Phase 3) by Nov. 15, 2025 but there wasn’t a start date to Phase 3. Work can be done to the cycle track, outside of the utility limits, at the same time Phase 2 pay items are schedule, like concrete, as the traffic control is the same.

Question 14: I assume that all of the work for the cycle track inside of the two watermain phases, at least the concrete portions can be done during the watermain phases?
Answer 14: Yes, Correct. See Answer 15.

Question 15: The remaining area past the watermain limits, there is a considerable amount of removal and concrete work, and then pavement marking, and bollards to put up. 30 days seems very tight. Is the intention that you only get 30 days or that you get until 11/15/25 to get phase 2 and the cycle track done?
Answer 15: Work can be done to the cycle track, Phase 3, concurrently with Phase 2, but all of Phase 2 shall be complete October 15, 2025, whereas Phase 3 work has a completion date of November 15, 2025.

Question 16: On sheet 20, the cross section between STA 68+75 and 72+85 show full depth removal. The removal sheets 42-43 do not reflect this; nor would the quantities add up. Which is correct?
Answer 16: The Removal Sheets 42-43 are correct. They also represent removals for the intersection realignment at N. Seventh Street.

Question 17: On sheet 20, the cross section between STA 72+85 and POE conflict with the cross sections shown on sheet 21 (STA 79+00 to POE). Which is correct?
Answer 17: The POE on the top Typical Section on Sheet 20 in the should be 79+00, whereas the two Typical Sections on Sheet 21 are 79+00 to 82+50 and 82+50 to POE

Question 18: Cross sections shown on sheet 21 do not match the removal sheets 44-45. Which is correct?
Answer 18: The Typical Sections on Sheet 21 are representative of Removal Sheets 44 & 45. The Watermain trench is along the South side of Miller Ave and the entire width is getting 4.5" HMA, see Sheet 17 for HMA Application Table, after 4 HMA Cold-Milling. Hatching on the Typical Sections have been revised for clarification.

Question 19: There are no underdrain pay items in the schedule of values. I assume these were overlooked, correct?
Answer 19: Correct. Underdrain, Subgrade, 6 in. is now included, See Schedule of Prices, Addendum No. 2.

Offerors are responsible for any conclusions that they may draw from the information contained in the Addendum.
Pre-Proposal Meeting
Miller Avenue Rehabilitation
April 19, 2024 via Microsoft Teams

I. Introductions
   a. Jane Allen – City of Ann Arbor Project Manager
   b. Tulio Decan and Doug Egeler - City of Ann Arbor Inspection
   c. Construction Staking by City of Ann Arbor
   e. In attendance:
      1. Jane Allen, City of Ann Arbor
      2. Trevor Brydon, City of Ann Arbor
      3. Cynthia Redinger, City of Ann Arbor
      4. David Fiegel, City of Ann Arbor
      5. Tulio Decan, City of Ann Arbor
      6. Douglas Engler, City of Ann Arbor
      7. Allison Bennett, City of Ann Arbor
      8. Dean Wozniak, City of Ann Arbor
      9. Nick Nicita, Hubbell, Roth & Clark, Inc
     10. Mike Haeussler, Miller Bros. Const., Inc.

II. Project Overview
   a. Work components – Multi-Year / Unit Prices remain effective over Two Years
      i. Phase 1 – Miller Ave., Newport Rd. to S. Seventh St.
         1. Watermain Replacement and Stormwater Improvements
         2. Miller Ave. / Red Oak Rd. Intersection Realignment
         3. New Crosswalk with Rectangular Rapid Flashing Beacon (RRFB)
         4. Concrete; curb replacement, ramps, foundations, bus pad relocations
         5. Road Resurfacing & Temp Pav’t Mrkg
      ii. Phase 2 – Miller Ave., S Seventh St. to Chapin St.
         1. Watermain Replacement and Service Transfers
         2. Stormwater Improvements and Retention System in West Park
         3. Miller Ave. / S. Seventh St. Intersection Realignment
            a. Alternate schedules will be entertained to complete this intersection during the 2024 construction season in order to start before school lets out 2025.
         4. Concrete; curb replacement, foundations for RRFBs, ramps, bus pad relocations
         5. Road Resurfacing
      iii. Phase 3 Cycle Track; Similar pay items from Phase 2 can be done concurrently.
1. Signal Improvements
   a. Miller Ave. / N. Maple Rd.
   b. Miller Ave. / S. Seventh St.
2. Modular Curb System with Delineators and Signs
3. Concrete buffers and speed tables – concrete cut into existing pavement.
4. Pavement Markings
   iv. (Phase 4) RRFBs
      1. Done by Others but need concrete work done this contract.
      b. Engineer’s estimate - $ 6,815,062.75

III. General Items
a. Standard Specifications – NEW
   i. Tracer wire
   ii. Bulkheading manholes is included in sewer removal
b. Detailed Specifications
   i. Schedule and Phasing - Multi-Year / Unit Prices remain effective over Two Years
   ii. Permanent Signs & Supports, Signal Upgrades
   iii. Stormwater Management – Retention System
   iv. Modular Curb System
c. Misc. construction items
   i. Stormwater Management – Oversized In-line Pipe
      1. Vortex valves
   ii. Curb relocations
   iii. Relocate Crosswalks (with new foundations) and bus stops
d. Accessibility
   i. Detour – Inbound Local Traffic – 1 Lane
   ii. Ann Arbor Open School
      1. June 13 – August 26
e. Davis Bacon Wage Decisions
   i. 10 days before proposals are due (Pull Friday April 26, 2024)
f. Addendum(s)
   i. Answer all Questions Received
   ii. New Pay Items and Detailed Specifications
   iii. Updated Bid Form – All Items and Updated Quantities
      1. Updated Excel File will be provided when requested.
   iv. Minor Plan Clarifications/Details
   v. New Plans - Signals

IV. Project Schedule
a. Written Questions due Monday, April 22, 2024 by 12:00PM
b. Addendum anticipated Tuesday, April 23, 2024 Friday, April 26, 2024
   Addendum-2-6
   Addendum-2-6
   c. Proposal Due, Monday, May 6, 2024 by 11:00AM
d. Anticipated Council Award, Monday, June 3, 2024

e. Construction Start, Monday, June 17, 2024

Important items not discussed in the pre-proposal meeting:

- Garbage day is Friday along Miller Avenue. The contractor will be responsible for making sure that resident carts are able to be picked up weekly. This may include moving them to and from a location that the waste collection truck is able to access them. This cost is incidental to General Conditions.

- Mail service is walked door to door. Contractor shall ensure that USPS has sufficient space to pass to make their daily deliveries.

- Ann Arbor Open School has high traffic for pickup and drop off during the school year. This included buses and passenger vehicles for 15-20 minutes in the morning and the afternoon. Nearby Miller Avenue intersections are at Red Oak and S. Seventh, and at least one these intersections shall be open to traffic during the school year. School starts the week of August 26th, 2024 and lets out again around June 12, 2025 and will start again the week of August 25, 2025.

Notes by:
Jane Allen, PE
Jallen2@a2gov.org
NOTES:
1. ALL D.I.P. PIPE, FITTINGS, AND HYDRANT BARREL TO BE POLYWRAPPED PER AWWA C105.
2. ALL HYDRANTS SHALL HAVE ONE 5" STORZ CONNECTION AND ONE 3 3/8" THREADED PUMPER CONNECTION.
NOTES:

1. PRECAST MANHOLE PER ASTM C-478.

2. REINFORCING IN WALLS TO BE ONE LAYER OF 2" X 8" W3/W2.9 WELDED WIRE MESH. CIRCUMFERENTIAL REINFORCEMENT = 0.18 SQ. IN./VERT. FT.

3. BASE SLAB TO BE REINFORCED WITH ONE LAYER OF #4 REBAR AT 12" C-C, E.W. AREA/STEEL = .20 SQ. IN./FT E.W.
### E. Schedule of Pricing/Cost – 20 Points

**Company:** 

**Project:** Miller Avenue Rehabilitation

**File #: 2022-034**

**RFP#: 24-19**

**Engineer’s Estimate**

<table>
<thead>
<tr>
<th>ITEM NUMBER</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>ESTIMATED QUANTITY</th>
<th>UNIT PRICE</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000.00</td>
<td>General Conditions, Max. $300,000.00</td>
<td>LS</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1001.00</td>
<td>Project Supervision, Max. $150,000.00</td>
<td>LS</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1002.00</td>
<td>Project Clean-Up and Restoration</td>
<td>LS</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1003.00</td>
<td>Digital Audio Visual Coverage</td>
<td>LS</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1021.00</td>
<td>Erosion Control, Inlet Protection, Fabric Drop</td>
<td>Ea</td>
<td>94</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1030.00</td>
<td>Tree Protection Fence</td>
<td>Ft</td>
<td>1837</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1040.00</td>
<td>Minor Traffic Control, Max. $75,000.00</td>
<td>LS</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1041.00</td>
<td>Traffic Regulator Control</td>
<td>LS</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1050.00</td>
<td>Sign, Type B, Temp, Prismatic, Furn &amp; Oper</td>
<td>Sft</td>
<td>1477.25</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1051.00</td>
<td>Sign, Type B, Temp, Prismatic, Special, Furn &amp; Oper</td>
<td>Sft</td>
<td>473</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1052.00</td>
<td>Temporary &quot;No Parking&quot; Sign</td>
<td>Ea</td>
<td>208</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1060.00</td>
<td>Lighted Arrow, Type A, Furn &amp; Oper</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1070.00</td>
<td>Sign, Portable, Changeable Message, Furn &amp; Oper</td>
<td>Ea</td>
<td>8</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1080.00</td>
<td>Plastic Drum, High Intensity, Lighted, Furn &amp; Oper</td>
<td>Ea</td>
<td>459</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1081.00</td>
<td>Channelizer Cone, High Intensity, 42 In., Furn &amp; Oper</td>
<td>Ea</td>
<td>25</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1092.00</td>
<td>Barricade, Type III, High Intensity, Double Sided, Lighted, Furn &amp; Oper</td>
<td>Ea</td>
<td>75</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1100.00</td>
<td>Pedestrian Type II Barricade, Temp, Furn &amp; Oper</td>
<td>Ea</td>
<td>231</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1102.00</td>
<td>Temporary Pedestrian Ramp, Furn &amp; Oper</td>
<td>Ea</td>
<td>11</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1103.00</td>
<td>Temporary Pedestrian Mat, Furn &amp; Oper</td>
<td>Ft</td>
<td>55</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1112.00</td>
<td>Pavt Mrkg, Cover, Type R, Black</td>
<td>Ft</td>
<td>1017</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1127.00</td>
<td>Pavt Mrkg, Wet Reflective, Type R, Tape, 6 In., White, Temp</td>
<td>Ft</td>
<td>13723</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1128.00</td>
<td>Pavt Mrkg, Wet Reflective, Type R, Tape, 6 In., Yellow, Temp</td>
<td>Ft</td>
<td>5183</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1146.00</td>
<td>Pavt Mrkg, Wet Reflective, Type R, Tape, Thru and Lt Turn Arrow Sym</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1160.71</td>
<td>DS_Band, Sign</td>
<td>Ea</td>
<td>5</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1160.72</td>
<td>DS_Sign, Type IIIA</td>
<td>Sft</td>
<td>342.75</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1160.73</td>
<td>DS_Sign, Type IIIB</td>
<td>Sft</td>
<td>12</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1160.74</td>
<td>DS_Sign, Type III, Rem</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1160.75</td>
<td>DS_Perforated Steel Square Breakaway System</td>
<td>Ea</td>
<td>74</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1160.76</td>
<td>DS_Mast Arm Cable Mount</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>1160.77</td>
<td>DS_In-Street Pedestrian Crossing Sign</td>
<td>Ea</td>
<td>25</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

#### 2000 Removels

<table>
<thead>
<tr>
<th>ITEM NUMBER</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>ESTIMATED QUANTITY</th>
<th>UNIT PRICE</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000.01</td>
<td>Tree, Rem, 6 In. - 12 In.</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>2000.02</td>
<td>Tree, Rem, 13 In. - 19 In.</td>
<td>Ea</td>
<td>3</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>2020.00</td>
<td>HMA, Any Thickness, Rem</td>
<td>Syd</td>
<td>6760</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>2021.00</td>
<td>HMA Surface, Rem</td>
<td>Syd</td>
<td>1511</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>2023.00</td>
<td>Cold-Milling HMA Surface</td>
<td>Syd</td>
<td>15993</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>2025.00</td>
<td>Concrete Pavt, Any Thickness, Rem</td>
<td>Syd</td>
<td>180</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>2030.00</td>
<td>Curb, Gutter, and Curb and Gutter, Any Type, Rem</td>
<td>Ft</td>
<td>2175</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>2040.00</td>
<td>Sidewalk, Sidewalk Ramp, and Driveway Approach, Any Thickness, Rem</td>
<td>Sft</td>
<td>8810</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>2050.00</td>
<td>Sign, Rem, Salv</td>
<td>Ea</td>
<td>177</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

#### 3000 Earthwork

<table>
<thead>
<tr>
<th>ITEM NUMBER</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>ESTIMATED QUANTITY</th>
<th>UNIT PRICE</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3021.00</td>
<td>Subgrade Undercutting, Type II</td>
<td>Cyd</td>
<td>200</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>3030.01</td>
<td>Exploratory Excavation, SD-TD-1, (0-10’ Deep)</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>3030.03</td>
<td>Exploratory Excavation, SD-TD-2, (0-10’ Deep)</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>3040.00</td>
<td>Earth Excavation</td>
<td>Cyd</td>
<td>81</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>3050.00</td>
<td>Embankment</td>
<td>Cyd</td>
<td>48</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

#### 4000 Sanitary Sewer

<table>
<thead>
<tr>
<th>ITEM NUMBER</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>ESTIMATED QUANTITY</th>
<th>UNIT PRICE</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4060.00</td>
<td>Sanitary Structure Cover</td>
<td>Ea</td>
<td>23</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>4061.00</td>
<td>Sanitary Structure Cover, Adjust</td>
<td>Ea</td>
<td>23</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

#### 6000 Storm and Drainage

<table>
<thead>
<tr>
<th>ITEM NUMBER</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>ESTIMATED QUANTITY</th>
<th>UNIT PRICE</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>6000.01</td>
<td>12 In., CL IV RCP Storm Sewer, SD-TD-1</td>
<td>Ft</td>
<td>828</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6000.03</td>
<td>18 In., CL IV RCP Storm Sewer, SD-TD-1</td>
<td>Ft</td>
<td>42</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6000.05</td>
<td>24 In., CL IV RCP Storm Sewer, SD-TD-1</td>
<td>Ft</td>
<td>315</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6000.09</td>
<td>48 In., CL IV RCP Storm Sewer, SD-TD-1</td>
<td>Ft</td>
<td>380</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6003.04</td>
<td>12 In., PE Storm Sewer, SD-TD-2</td>
<td>Ft</td>
<td>78</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6003.06</td>
<td>18 In., PE Storm Sewer, SD-TD-2</td>
<td>Ft</td>
<td>77</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6003.71</td>
<td>DS_ChamberMaxx System</td>
<td>LS</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6030.04</td>
<td>Storm Sewer Tap, 12 In. Dia.</td>
<td>Each</td>
<td>15</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>ITEM NUMBER</td>
<td>DESCRIPTION</td>
<td>UNIT</td>
<td>QUANTITY</td>
<td>UNIT PRICE</td>
<td>TOTAL PRICE</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------</td>
<td>-------</td>
<td>----------</td>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>6050.01</td>
<td>Storm Manhole, 48 In. Dia. (0'-8' deep)</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6050.02</td>
<td>Storm Manhole, 48 In. Dia., Additional Depth</td>
<td>Ft</td>
<td>0.77</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6050.05</td>
<td>Storm Manhole, 72 In. Dia. (0'-8' deep)</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6050.06</td>
<td>Storm Manhole, 72 In. Dia., Additional Depth</td>
<td>Ft</td>
<td>8.07</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6060.01</td>
<td>Storm Inlet-Junction, 36 In. Dia., (0'-8' deep)</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6060.03</td>
<td>Storm Inlet-Junction, 48 In. Dia., (0'-8' deep)</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6060.04</td>
<td>Storm Inlet-Junction, 48 In. Dia., Additional Depth</td>
<td>Ft</td>
<td>1.31</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6070.01</td>
<td>Storm Single Inlet, 24 In. Dia., (0'-8' deep)</td>
<td>Ea</td>
<td>22</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6070.02</td>
<td>Storm Single Inlet, 24 In. Dia., Additional Depth</td>
<td>Ft</td>
<td>0.55</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6080.01</td>
<td>Storm High Capacity Inlet, 48 In. Dia., (0'-8' deep)</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6090.01</td>
<td>Storm Manhole with Weir, 72 In. Dia. (0'-8' deep)</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6090.02</td>
<td>Storm Manhole with Weir, 72 In. Dia., Additional Depth</td>
<td>Ft</td>
<td>2.34</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6100.01</td>
<td>Storm Manhole Over Existing (&quot;Doghouse&quot;), 48 In. Dia.</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6100.02</td>
<td>Storm Manhole Over Existing (&quot;Doghouse&quot;), 60 In. Dia.</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6110.03</td>
<td>Storm Sewer Pipe, 12 In. Dia., Abandon</td>
<td>Ft</td>
<td>642</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6120.03</td>
<td>Storm Sewer Pipe, 12 In. Dia., Rem</td>
<td>Ft</td>
<td>526</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6130.00</td>
<td>Storm Sewer Structure, Abandon</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6140.00</td>
<td>Storm Sewer Structure, Rem</td>
<td>Ea</td>
<td>6</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6150.00</td>
<td>Storm Sewer Drop Structure, Rem</td>
<td>Ea</td>
<td>15</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6160.01</td>
<td>Storm Structure Cover</td>
<td>Ea</td>
<td>48</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6160.02</td>
<td>Storm Structure Cover, Adjust</td>
<td>Ea</td>
<td>48</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6160.03</td>
<td>Storm Structure Adjust, Additional Depth</td>
<td>Ft</td>
<td>5</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6180.02</td>
<td>Underdrain, Subgrade, 6 In.</td>
<td>Ft</td>
<td>1155</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

**7000 Water Mains**

<table>
<thead>
<tr>
<th>ITEM NUMBER</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>UNIT PRICE</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>7000.02</td>
<td>6 In., PC 350 DIP w/polywrap, SD-TD-1</td>
<td>Ft</td>
<td>103</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7000.03</td>
<td>8 In., PC 350 DIP w/polywrap, SD-TD-1</td>
<td>Ft</td>
<td>692</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7000.05</td>
<td>12 In., PC 350 DIP w/polywrap, SD-TD-1</td>
<td>Ft</td>
<td>2886</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7001.01</td>
<td>16 In., PC 250 DIP w/polywrap, SD-TD-1</td>
<td>Ft</td>
<td>19</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7011.01</td>
<td>8 In. 90° DIP Bend</td>
<td>Ea</td>
<td>3</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7011.02</td>
<td>8 In. 45° DIP Bend</td>
<td>Ea</td>
<td>45</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7011.03</td>
<td>8 In. 22.5° DIP Bend</td>
<td>Ea</td>
<td>5</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7011.04</td>
<td>8 In. 11.25° DIP Bend</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7013.02</td>
<td>12 In. 45° DIP Bend</td>
<td>Ea</td>
<td>15</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7013.03</td>
<td>12 In. 22.5° DIP Bend</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7013.04</td>
<td>12 In. 11.25° DIP Bend</td>
<td>Ea</td>
<td>4</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7014.02</td>
<td>16 In. 45° DIP Bend</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7020.03</td>
<td>8 In. X 6 In. DIP Reducer</td>
<td>Ea</td>
<td>9</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7020.14</td>
<td>16 In. X 12 In. DIP Reducer</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7030.12</td>
<td>12 In. X 12 In. X 6 In. DIP Tee</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7030.13</td>
<td>12 In. X 12 In. X 8 In. DIP Tee</td>
<td>Ea</td>
<td>19</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7030.18</td>
<td>16 In. X 16 In. X 12 In. DIP Tee</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7050.01</td>
<td>DS_Gate Valve in Box, 6 In.</td>
<td>Ea</td>
<td>9</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7050.02</td>
<td>DS_Gate Valve in Box, 8 In.</td>
<td>Ea</td>
<td>4</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7050.04</td>
<td>DS_Gate Valve in Box, 12 In.</td>
<td>Ea</td>
<td>6</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7050.05</td>
<td>DS_Gate Valve in Box, 16 In.</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7060.02</td>
<td>DS_Gate Valve in Well, 8 In.</td>
<td>Ea</td>
<td>5</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7060.04</td>
<td>DS_Gate Valve in Well, 12 In.</td>
<td>Ea</td>
<td>3</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7060.05</td>
<td>DS_Gate Valve in Well, 16 In.</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7071.04</td>
<td>Tapping Sleeve &amp; Valve in Well, 12 In.</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7080.00</td>
<td>Excavate &amp; Backfill For Water Service Tap and Lead</td>
<td>Ft</td>
<td>822</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7090.00</td>
<td>Water Structure Cover</td>
<td>Ea</td>
<td>3</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7091.00</td>
<td>Water Structure Cover, Adjust</td>
<td>Ea</td>
<td>3</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7100.00</td>
<td>Fire Hydrant Assembly, Complete</td>
<td>Ea</td>
<td>9</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7102.00</td>
<td>Fire Hydrant Assembly, Rem</td>
<td>Ea</td>
<td>6</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7110.01</td>
<td>Sacrificial Anode, 17-pound</td>
<td>Ea</td>
<td>19</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7110.02</td>
<td>Sacrificial Anode, 32-pound</td>
<td>Ea</td>
<td>4</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7120.00</td>
<td>Gate Box, Adjust</td>
<td>Ea</td>
<td>3</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7121.00</td>
<td>Curb Box, Adjust</td>
<td>Ea</td>
<td>3</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7130.01</td>
<td>Temporary Water Main Line Stop, 8 In. or less</td>
<td>Ea</td>
<td>11</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7130.03</td>
<td>Temporary Water Main Line Stop, 12 In.</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7130.04</td>
<td>Temporary Water Main Line Stop, 16 In.</td>
<td>Ea</td>
<td>4</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7131.00</td>
<td>Temporary Water Main Line Stop, Additional Rental Day</td>
<td>Ea</td>
<td>5</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7140.02</td>
<td>Water Main Pipe, 6 In. Dia., Abandon</td>
<td>Ft</td>
<td>2636</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7140.03</td>
<td>Water Main Pipe, 8 In. Dia., Abandon</td>
<td>Ft</td>
<td>415</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7140.05</td>
<td>Water Main Pipe, 12 In. Dia., Abandon</td>
<td>Ft</td>
<td>14</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7140.07</td>
<td>Water Main Pipe, 16 In. Dia., Abandon</td>
<td>Ft</td>
<td>7</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7160.02</td>
<td>Gate Valve in Box, 6 In. Dia., Abandon</td>
<td>Ea</td>
<td>8</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7160.03</td>
<td>Gate Valve in Box, 8 In. Dia., Abandon</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7160.05</td>
<td>Gate Valve in Box, 12 In. Dia., Abandon</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>ITEM NUMBER</td>
<td>DESCRIPTION</td>
<td>UNIT</td>
<td>QUANTITY</td>
<td>UNIT PRICE</td>
<td>TOTAL PRICE</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
<td>------</td>
<td>----------</td>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>7180.02</td>
<td>Gate Valve in Well, 6 In. Dia., Abandon</td>
<td>Ea</td>
<td>5</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7180.03</td>
<td>Gate Valve in Well, 8 In. Dia., Abandon</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7180.06</td>
<td>Gate Valve in Well, 16 In. Dia., Abandon</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

**8000 Streets, Driveways, & Sidewalks**

<table>
<thead>
<tr>
<th>ITEM NUMBER</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>UNIT PRICE</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8000.00</td>
<td>Subbase, CIP</td>
<td>Cyd</td>
<td>279</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8010.00</td>
<td>Aggregate Base Course, 21AA, CIP</td>
<td>Cyd</td>
<td>43</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8010.01</td>
<td>Aggregate Base, 4 In., 21AA, CIP</td>
<td>Syd</td>
<td>3394</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8010.02</td>
<td>Aggregate Base, 6 In., 21AA, CIP</td>
<td>Syd</td>
<td>1219</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8010.03</td>
<td>Aggregate Base, 8 In., 21AA, CIP</td>
<td>Syd</td>
<td>6762</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8010.71</td>
<td>DS_Aggregate Base, Conditioning</td>
<td>Syd</td>
<td>1600</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8060.00</td>
<td>Hand Patching</td>
<td>Ton</td>
<td>110</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8070.15</td>
<td>HMA, 4EML</td>
<td>Ton</td>
<td>2273</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8070.19</td>
<td>HMA, 5EML</td>
<td>Ton</td>
<td>1844</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8080.02</td>
<td>Conc Pavt, Non-Reinf, 7 In.</td>
<td>Syd</td>
<td>9</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8080.03</td>
<td>Conc Pavt, Non-Reinf, 8 In.</td>
<td>Syd</td>
<td>156</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8080.04</td>
<td>Conc Pavt, Non-Reinf, 9 In.</td>
<td>Syd</td>
<td>371</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8110.00</td>
<td>Conc, Curb or Curb &amp; Gutter, All Types</td>
<td>Ft</td>
<td>4843</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8110.71</td>
<td>DS_Conc, Curb or Curb &amp; Gutter, Monolithic</td>
<td>Ft</td>
<td>211</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8120.01</td>
<td>Concrete Driveway Opening, Type M</td>
<td>Ft</td>
<td>174</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8130.01</td>
<td>Conc, Sidewalk, 4 In.</td>
<td>Sft</td>
<td>4675</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8131.01</td>
<td>Conc, Sidewalk, Drive Approach, or Ramp, 6 In.</td>
<td>Sft</td>
<td>2307</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8150.00</td>
<td>Detectable Warning Surface</td>
<td>Ft</td>
<td>331</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8151.71</td>
<td>DS_Detectable Directional Tile</td>
<td>Ea</td>
<td>16</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8190.01</td>
<td>Pavt Mrkg, Polymer Cement Surface, Bike, Large Sym</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8190.02</td>
<td>Pavt Mrkg, Polymer Cement Surface, Bike, Small Sym</td>
<td>Ea</td>
<td>36</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8190.03</td>
<td>Pavt Mrkg, Polymer Cement Surface, Bike Thru Arrow Sym</td>
<td>Ea</td>
<td>29</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8190.04</td>
<td>Pavt Mrkg, Polymer Cement Surface, Bike Lt Turn Arrow Sym</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8190.05</td>
<td>Pavt Mrkg, Polymer Cement Surface, Bike Rt Turn Arrow Sym</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8190.06</td>
<td>Pavt Mrkg, Polymer Cement Surface, Bike Lane Green</td>
<td>Sft</td>
<td>10734</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8190.07</td>
<td>Pavt Mrkg, Polymer Cement Surface, Tan</td>
<td>Sft</td>
<td>820</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.05</td>
<td>Pavt Mrkg, Polyurea, 12 In., Cross Hatching, White</td>
<td>Ft</td>
<td>162</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.07</td>
<td>Pavt Mrkg, Polyurea, 12 In., Crosswalk</td>
<td>Ft</td>
<td>3493</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.09</td>
<td>Pavt Mrkg, Polyurea, 24 In., Stop Bar</td>
<td>Ft</td>
<td>496</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.12</td>
<td>Pavt Mrkg, Polyurea, 4 In., Yellow</td>
<td>Ft</td>
<td>4770</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.13</td>
<td>Pavt Mrkg, Polyurea, 6 In., White</td>
<td>Ft</td>
<td>11156</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.14</td>
<td>Pavt Mrkg, Polyurea, 6 In., Yellow</td>
<td>Ft</td>
<td>14900</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.15</td>
<td>Pavt Mrkg, Polyurea, Lt Turn Arrow Sym</td>
<td>Ea</td>
<td>3</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.17</td>
<td>Pavt Mrkg, Polyurea, Rt Turn Arrow Sym</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.18</td>
<td>Pavt Mrkg, Polyurea, Thru Arrow Sym</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.30</td>
<td>Pavt Mrkg, Polyurea, Yield Triangle Sym</td>
<td>Ea</td>
<td>36</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.31</td>
<td>Pavt Mrkg, Polyurea, Speed Hump Chevron, White</td>
<td>Ea</td>
<td>36</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.73</td>
<td>DS_Continuous Base Mid Span L50</td>
<td>Ea</td>
<td>1103</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.74</td>
<td>DS_Continuous Base Front Span L61</td>
<td>Ea</td>
<td>75</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.75</td>
<td>DS_Continuous Base Rear Span L62</td>
<td>Ea</td>
<td>75</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.76</td>
<td>DS_Big Bollard MASH L125SHM</td>
<td>Ea</td>
<td>913</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.77</td>
<td>DS_Bikeway Delineator Post Black</td>
<td>Ea</td>
<td>89</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8200.78</td>
<td>DS_Bikeway Delineator Post Yellow</td>
<td>Ea</td>
<td>20</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8251.00</td>
<td>Recessing Pavt Mrkg, Longit</td>
<td>Ft</td>
<td>24598</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8252.00</td>
<td>Recessing Pavt Mrkg, Transv</td>
<td>Sft</td>
<td>4531</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8300.00</td>
<td>Monument Box, Adjust</td>
<td>Ea</td>
<td>12</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

**9000 Lighting and Electrical**

<table>
<thead>
<tr>
<th>ITEM NUMBER</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>UNIT PRICE</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>9013.02</td>
<td>Conduit, Schedule 80 HDPE, 3 In., Directional Drill</td>
<td>Ft</td>
<td>40</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9020.00</td>
<td>Handhole, Rem</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9030.01</td>
<td>Handhole Assembly, 17 In X 30 In X 18 In.</td>
<td>Ea</td>
<td>6</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9122.00</td>
<td>Light Fixture, Rem and Salvage</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9123.00</td>
<td>Light Fixture, Reinstall</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9200.71</td>
<td>DS_Post, Steel, 3 lb</td>
<td>Ft</td>
<td>17</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9200.72</td>
<td>DS_Ground Mtd Sign Support, Rem</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9210.71</td>
<td>DS_Conduit, Directional Bore, 2, 3 inch</td>
<td>Ft</td>
<td>150</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9210.72</td>
<td>DS_Conduit, DB, 1, 1 1/2 inch</td>
<td>Ft</td>
<td>140</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9210.73</td>
<td>DS_Conduit, DB, 1, 3 Inch</td>
<td>Ft</td>
<td>10</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9210.74</td>
<td>DS_Conduit, DB, 2, 3 Inch</td>
<td>Ft</td>
<td>75</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9210.75</td>
<td>DS_Conduit, DB, 4, 3 Inch</td>
<td>Ft</td>
<td>10</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9211.71</td>
<td>DS_Cable Pole, TS and Sec, Disman</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9211.72</td>
<td>DS_Cable, Sec, 600V, 1/3/C16</td>
<td>Ft</td>
<td>100</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9211.73</td>
<td>DS_Wood Pole, Rem</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9211.74</td>
<td>DS_Serv Disconnect</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9211.75</td>
<td>DS_Serv Disconnect, Rem</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9211.76</td>
<td>DS_Wood Pole, Fit Up, TS and Sec Cable Pole</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>ITEM NUMBER</td>
<td>DESCRIPTION</td>
<td>UNIT</td>
<td>QUANTITY</td>
<td>UNIT PRICE</td>
<td>TOTAL PRICE</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------</td>
<td>------</td>
<td>----------</td>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>9220.71</td>
<td>DS_Light Std Arm, Install Salv</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9220.72</td>
<td>DS_Light Std Arm, Rem and Salv</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9230.71</td>
<td>DS_Controller and Cabinet, Rem</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9230.72</td>
<td>DS_Controller Fdn, Base Mount</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9231.71</td>
<td>DS_Pedestal, Alum</td>
<td>Ea</td>
<td>6</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9231.72</td>
<td>DS_Pedestal, Fdn</td>
<td>Ea</td>
<td>8</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9231.73</td>
<td>DS_Pedestal Fdn, Rem</td>
<td>Ea</td>
<td>3</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9231.74</td>
<td>DS_Pedestal, Rem</td>
<td>Ea</td>
<td>4</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9231.75</td>
<td>DS_Pushbutton, Pedestal, Alum</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9231.76</td>
<td>DS_Pushbutton, Rem</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9231.77</td>
<td>DS_Pushbutton and Sign, Salv</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9231.78</td>
<td>DS_Push Button Station and Sign</td>
<td>Ea</td>
<td>6</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9232.71</td>
<td>DS_Span Wire, Rem</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9232.72</td>
<td>DS_TS, Pedestrian, Bracket Arm Mtd, Rem</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9232.73</td>
<td>DS_TS, Pedestrian, Pedestal Mtd, Rem</td>
<td>Ea</td>
<td>4</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9232.74</td>
<td>DS_TS, Span Wire Mtd, Rem</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9232.75</td>
<td>DS_TS, Pedestrian, One Way Pedestal Mtd, Salv</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9232.76</td>
<td>DS_Pedestrian Signal System, Accessible</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9232.77</td>
<td>DS_TS, Pedestrian, One Way Pedestal Mtd (LED) Countdown</td>
<td>Ea</td>
<td>4</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9232.78</td>
<td>DS_TS, Pedestrian, Two Way Pedestal Mtd (LED) Countdown</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9233.71</td>
<td>DS_Bracket, Truss, With 12 Foot Arm</td>
<td>Ea</td>
<td>2</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9233.72</td>
<td>DS_Wireless Vehicle Sensor Node, Rem</td>
<td>Ea</td>
<td>15</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9233.73</td>
<td>DS_Hemispherical Video Detection Camera</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9233.74</td>
<td>DS_Hemispherical Video Detection System</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9234.71</td>
<td>DS_Casing</td>
<td>Ft</td>
<td>15</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9234.72</td>
<td>DS_Backplate, TS</td>
<td>Ea</td>
<td>7</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9235.71</td>
<td>DS_Mast Arm Pole, Cat III</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9235.72</td>
<td>DS_Mast Arm, 25 foot, Cat III</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9235.73</td>
<td>DS_Mast Arm, 40 foot, Cat III</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9235.74</td>
<td>DS_Mast Arm Pole Fdn, Modified</td>
<td>Ft</td>
<td>18</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9235.75</td>
<td>DS_TS, One Way Bracket Arm Mtd (LED), Long Life</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9235.76</td>
<td>DS_TS, One Way Mast Arm Mtd (LED), Long Life</td>
<td>Ea</td>
<td>6</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9235.77</td>
<td>DS_TS, One Way Mast Arm Mtd, FYA (LED), Long Life</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9235.78</td>
<td>DS_TS, One Way Pedestal Mtd (LED), Long Life</td>
<td>Ea</td>
<td>3</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9236.71</td>
<td>DS_Controller, NEMA, ATC Type, Modified</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9236.72</td>
<td>DS_Cabinet, NEMA Type, Modified</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9240.71</td>
<td>DS_St Name Sign, Two Way, LED, 6 foot</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9240.72</td>
<td>DS_St Name Sign, Two Way, LED, 8 foot</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9240.73</td>
<td>DS_Roadside Unit, Rem and Salv</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9240.74</td>
<td>DS_Roadside Unit, Install Salv</td>
<td>Ea</td>
<td>1</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10000</th>
<th>Landscaping</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10060.00</td>
<td>Turf Restoration</td>
<td>Syd</td>
<td>1243</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

**TOTAL BID AMOUNT**

$
### DETAILED SPECIFICATIONS

An item number ending in X.7X and an item’s description starting with “DS_” indicates a detailed specification.

<table>
<thead>
<tr>
<th>Detailed Specification</th>
<th>No. of Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROJECT SCHEDULE AND PAYMENT</td>
<td>3; DS-2</td>
</tr>
<tr>
<td>PERMANENT SIGN AND SUPPORT</td>
<td>2; DS-5</td>
</tr>
<tr>
<td>IN-STREET PEDESTRIAN CROSSING SIGN</td>
<td>1; DS-7</td>
</tr>
<tr>
<td>CHAMBERMAXX SYSTEM</td>
<td>8; DS-8</td>
</tr>
<tr>
<td>WATER STRUCTURES</td>
<td>1; DS-16</td>
</tr>
<tr>
<td>AGGREGATE BASE CONDITIONING</td>
<td>1; DS-17</td>
</tr>
<tr>
<td>MONOLITHIC CURB AND GUTTER</td>
<td>1; DS-18</td>
</tr>
<tr>
<td>DETECTABLE DIRECTIONAL TILE</td>
<td>1; DS-19</td>
</tr>
<tr>
<td>MODULAR CURB SYSTEM</td>
<td>1; DS-20</td>
</tr>
<tr>
<td>BIKEWAY DELINEATOR POST</td>
<td>1; DS-21</td>
</tr>
<tr>
<td>STEEL POST</td>
<td>1; DS-22</td>
</tr>
<tr>
<td>GROUND MOUNTED SIGN SUPPORTS, REMOVE</td>
<td>1; DS-23</td>
</tr>
<tr>
<td>TRAFFIC, PEDESTRIAN, AND BIKE SIGNAL</td>
<td>2; DS-24</td>
</tr>
<tr>
<td>LIGHT STANDARD ARM, INSTALL SALVAGED</td>
<td>1; DS-26</td>
</tr>
<tr>
<td>PUSHBUTTON AND SIGN, SALVAGE</td>
<td>1; DS-27</td>
</tr>
<tr>
<td>ACCESSIBLE PEDESTRIAN SIGNAL SYSTEM</td>
<td>6; DS-28</td>
</tr>
<tr>
<td>WIRELESS VEHICLE DETECTION SYSTEM</td>
<td>6; DS-34</td>
</tr>
<tr>
<td>HEMISPHERICAL VIDEO DETECTION</td>
<td>7; DS-40</td>
</tr>
<tr>
<td>TRAFFIC SIGNAL BACKPLATE</td>
<td>2; DS-47</td>
</tr>
<tr>
<td>TRAFFIC SIGNAL MAST ARM POLE AND MAST ARM</td>
<td>4; DS-49</td>
</tr>
<tr>
<td>MAST ARM POLE FOUNDATION</td>
<td>2; DS-53</td>
</tr>
<tr>
<td>LONG LIFE LIGHT EMITTING DIODE TRAFFIC SIGNAL</td>
<td>2; DS-55</td>
</tr>
<tr>
<td>TRAFFIC SIGNAL CONTROLLER</td>
<td>1; DS-57</td>
</tr>
<tr>
<td>TRAFFIC SIGNAL CABINET</td>
<td>2; DS-58</td>
</tr>
<tr>
<td>TWO-WAY ILLUMINATED STREET NAME SIGNS, LIGHT EMITTING DIODE</td>
<td>3; DS-60</td>
</tr>
<tr>
<td>ROADSIDE UNIT, REMOVE AND SALVAGE</td>
<td>1; DS-63</td>
</tr>
</tbody>
</table>
Description

Examination of Plans, Specifications, and Work Site

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

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

1. The Contractor shall begin the work of this project on or before June 17, 2024, and only upon receipt of the fully executed Contract and Notice to Proceed. Appropriate time extensions shall be granted if the Notice to Proceed is delayed beyond this date.

2. This Contract requires water main, storm sewer, sidewalk replacement, road resurfacing, cycle track installation, and turf establishment, in three (3) phases: Phase 1 will include all work required on Miller Avenue from Newport Road to S. Seventh Street, with the exception of the cycle track and associated pavement markings and shall be substantially complete by November 15, 2024. (No longer than one hundred fifty-one (151) consecutive calendar days.) Phase 2 shall begin June 16, 2025 and includes all work required on Miller Avenue from S. Seventh Street to Chapin Street, with the exception of the cycle track and associated pavement markings, and shall be substantially complete by October 15, 2025. (No longer than one hundred twenty-one (121) consecutive calendar days.) Phase 3 includes the cycle track installation and final pavement markings and shall begin after Phase 2 work is substantially complete and shall be complete by November 15, 2025. (No longer than thirty-one (31) consecutive calendar days.) The total calendar days for this contract is three hundred three (303) days.

3. Contractor shall sequence the water and storm sewer installation in a way that does not interrupt service of other utilities.

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

5. No work shall be performed during Holiday weekends as follows, unless approved by the City of Ann Arbor:
   - Fourth of July, from 3:00 p.m. Wednesday July 3, 2024, through 7:00 a.m. Friday July 5, 2024
   - Labor Day, from 3:00 p.m. Friday August 30, 2024 through 7:00 a.m. Tuesday September 3, 2024
   - Memorial Day, from 3:00 p.m. Friday May 23, 2025, through 7:00 a.m. Tuesday
May 27, 2025

- **Fourth of July**, from 3:00 p.m. Thursday July 3, 2024, through 7:00 a.m. Saturday July 5, 2024
- **Labor Day**, from 3:00 p.m. Friday August 29, 2025 through 7:00 a.m. Tuesday September 2, 2025

6. No work shall be performed during University of Michigan home football games.

City Council approval is expected on or before **June 3, 2024**. The Contractor shall not begin the work without approval from the Project Engineer, and in no case before the receipt of the Notice to Proceed.

Contractor will be furnished with two (2) copies of the Contract, for his/her execution, before the aforementioned City Council meeting. The Contractor shall properly execute both copies of the Contract and return them, with the required Bonds and Insurance Certificate, to the City within **ten (10) days**.

Time is of the essence in the performance of the work of this contract. The Contractor is expected to mobilize sufficient personnel and equipment and work throughout all authorized hours to complete the project by the final completion date. Should the Contractor demonstrate that they must work on some Sundays in order to maintain the project schedule, they may do so between the hours of 9:00 a.m. and 5:00 p.m. with prior approval from the City. There will be no additional compensation due to the Contractor for work performed on Sundays.

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

**Liquidated Damages**

Failure to complete all work as specified herein within the times specified herein, including time extensions granted thereto as determined by the Engineer, shall entitle the City to deduct from the payments due the Contractor, **$2,000.00** in Liquidated Damages, and not as a penalty, for delays in the completion of the work for each and every calendar day beyond the times for each sub-phase, as required by this Detailed Specification.

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

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

Costs for the Contractor to organize, coordinate, and schedule all of the work of the project, will not be paid for separately, but shall be included in the bid price of the Contract Item “General Conditions, Max $300,000.00“.
a. Description

This work consists of removing or furnishing all components for the Permanent Sign and Support as shown on the plans or as directed by the Engineer. The Sign and Support shall be in accordance with the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction and as specified herein.

b. Materials

The Contractor shall remove or furnish materials in accordance with Section 810 and 919 of the MDOT 2020 Standard Specifications for Construction, except where otherwise noted.

All materials for the Permanent Sign and Support shall be manufactured using design standards from the Michigan Manual on Uniform Traffic Control Devices (MMUTCD) and/or engineering judgment. The model includes the Sign Panel (Type IIIA or Type IIIB), Support (Perforated Steel Square Tube Breakaway System, Sign Band, or Mast Arm Cable Mount), Reflective Panel, and all associated hardware, that includes, but not limited to, bolts, nuts, washers, and plates.

Sign Type IIIA and Sign Type IIIB shall meet the requirements as stated in Section 919 of the MDOT Standard Specifications for Construction.

Ground Mounted Sign Support shall meet the requirement as stated in Section 810 of the MDOT Standard Specifications for Construction and MDOT Standard Plan SIGN-200-X (latest plan).

The Perforated Steel Square Tube Breakaway System shall meet the requirements as stated in Section 810 of the MDOT Standard Specifications for Construction and MDOT Standard Plan SIGN-207-X (latest plan).

The Sign Band and Reflective Panel shall meet the requirements as stated in Section 810 of the MDOT Standard Specifications for Construction.

The Mast Arm Cable Mount shall be manufactured by Pelco Products, Inc. or an approved equal by the Engineer. The model includes the Galaxy Sign-Brac with stainless cable mount and formed tube (AG-0142), the clamp kit (AG-3055), and sign bracket with hardware (AB-0507).

c. Construction

The Contractor shall deliver the Permanent Sign and Support to the City of Ann Arbor Public Works Wheeler Service Center at 4251 Stone School Road, Ann Arbor, MI 48108. The Contractor shall coordinate with the Signs and Signals Supervisor at (734) 794-6350 for delivery. The Contractor shall not be entitled to any extra compensation due to coordination or installation delays caused by the City of Ann Arbor personnel.
d. Measurement and Payment

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

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Sign, Type III, Rem</td>
<td>Ea</td>
</tr>
<tr>
<td>DS_Sign, Type IIIA</td>
<td>Sft</td>
</tr>
<tr>
<td>DS_Sign, Type IIIB</td>
<td>Sft</td>
</tr>
<tr>
<td>DS_Ground Mtd Sign Support, Rem</td>
<td>Ea</td>
</tr>
<tr>
<td>DS_Perforated Steel Square Tube Breakaway System</td>
<td>Ea</td>
</tr>
<tr>
<td>DS_Band, Sign</td>
<td>Ea</td>
</tr>
<tr>
<td>DS_Mast Arm Cable Mount, Rem</td>
<td>Ea</td>
</tr>
<tr>
<td>DS_Mast Arm Cable Mount</td>
<td>Ea</td>
</tr>
<tr>
<td>DS_Reflective Panel for Permanent Sign Support, 3 foot</td>
<td>Ea</td>
</tr>
<tr>
<td>DS_Reflective Panel for Permanent Sign Support, 6 foot</td>
<td>Ea</td>
</tr>
</tbody>
</table>

DS_Sign, Type __, Rem; DS_Sign, Type __; DS_Ground Mtd Sign Support, Rem; DS_Perforated Steel Square Tube Breakaway System; DS_Band, Sign; DS_Mast Arm Cable Mount, Rem; DS_Mast Arm Cable Mount and DS_Reflective Panel for Permanent Sign Support, __ will be measured by the quantity shown on the plans and as specified herein and includes payment for all materials to be delivered to the City of Ann Arbor Public Works Wheeler Service Center. Payment for accessories and mounting hardware required for installation shall not be paid separately but shall be included in the corresponding pay item.
a. Description

This work consists of furnishing and installing all components for the In-Street Pedestrian Crossing Sign as shown on the plans or as directed by the Engineer. The In-Street Pedestrian Crossing Sign shall be in accordance with the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction and as specified herein.

b. Materials

The Contractor shall furnish materials in accordance with Sections 810 and 919 of the MDOT 2020 Standard Specifications for Construction, except where otherwise noted.

All materials for the In-Street Pedestrian Crossing Sign shall be manufactured by Qwick Kurb, Inc. or an approved equal by the Engineer. The model includes the Mega Marker (L104), Stand Alone Base Unit (L50) or Base Unit (L54), two (2) Reflective Arcs (L65), and all associated hardware that includes, but not limited to, screws, nuts, washers, bolts, flex boots, marker mounts, pavement anchors, and connection hooks.

The face of Mega Marker shall include the legend of the R1-6a In-Street Pedestrian Crossing Sign on both sides. The legend shall read, LOCAL LAW STOP FOR PEDESTRIANS WITHIN CROSSWALK. The legend shall be surrounded by a fluorescent yellow-green background on both sides. The sign support shall be designed to bend over and bounce back to its normal vertical position if it is struck by a vehicle.

c. Construction

The In-Street Pedestrian Crossing Sign shall be laid out for approval by the Engineer before installation. The In-Street Pedestrian Crossing Sign shall be placed in the roadway or median island at the crosswalk location as shown on the plans. The Mega Marker, Base Unit, and Reflective Arcs shall be installed per manufacturer recommendations.

d. Measurement and Payment

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

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_In-Street Pedestrian Crossing Sign</td>
<td>Ea</td>
</tr>
</tbody>
</table>

DS_In-Street Pedestrian Crossing Sign will be measured by the quantity shown on the plans and as specified herein and includes payment for all labor, equipment, and materials required to complete the work. Payment for accessories and mounting hardware required for installation shall not be paid separately but shall be included in the corresponding pay item.
a. **Description.** This work consists of installing stormwater management as shown on the plans or as directed by the Engineer. Stormwater Retention Systems with ground infiltration are best management practices (BMPs) which are designed to capture stormwater and store it until some, or all, of the stormwater filters into the surrounding soil. This system is effective for removing fine grained pollutants. The removal of suspended solids from the runoff will improve the quality of the captured runoff. In addition, the retention system with infiltration will store water over the underlying soils and provide the potential for improving the infiltration while also decreasing the volume of stormwater entering the stormwater system at one time which also decreases flooding.

**General**

1. This item shall govern the furnishing and installation of ChamberMaxx underground detention and infiltration chamber systems.

2. Contractor shall furnish all labor, materials, equipment and incidentals necessary to install the ChamberMaxx system, appurtenances and incidentals in accordance with the Drawings and as specified herein.

3. The containment row of the ChamberMaxx system is recommended as the appropriate means of pretreating for the purpose of extending the maintenance interval on the ChamberMaxx system and reducing the life cycle cost. The containment row shall consist of a row of chambers which lays upon 2 layers of AASHTO M288 Class I woven geotextile between the chamber and stone bedding.

4. Applicable provisions of any Division shall govern work in this section.

5. Related Standards:
   
   
   b. ASTM F-2787 “Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers”

6. Site layout drawings, product specifications, materials, hydraulic storage data and supported calculations of proposed alternatives shall be submitted to the Engineer of Record (EOR) for review at a minimum of 10 working days prior to bid closing.

7. Shop drawings shall be annotated to indicate all materials to be furnished and installed under this section, and all applicable standards for materials, required tests of materials and design assumptions for structural analysis:

8. Before installation of the ChamberMaxx system, Contractor shall obtain the written approval of the EOR for the stormwater system and the installation drawings.
9. All proposed alternatives to the ChamberMaxx system shall conform to applicable above referenced ASTM specifications.

b. Materials. The Contractor shall provide all labor, materials, tools, equipment, and incidentals as shown, specified, and required to furnish and install the retention system with infiltration as specified on the Drawings and manufactured by Contech as ChamberMaxx, or Engineer approved equivalent, as detailed in the Specifications.

1. The chamber shall be constructed of injection molded polypropylene copolymer formulated for high impact and stress cracking resistance and sustained structural performance during high temperatures. The chamber shall be designed and manufactured in accordance with ASTM F-2418 and F-2787.

2. The chamber shall be designed to AASHTO LRFD Bridge Design Specifications (Section 12), as applied to material and performance requirements for buried thermoplastic pipes. Design live load shall be the AASHTO HS-20 and HS-25 truck, including multiple lane presence factors, over a minimum cover of 18 inches and chamber row spacing of 5 inches or greater.

3. The chamber system shall be comprised of three chamber configurations: The MIDDLE chambers shall be open-ended to allow unobstructed hydraulic flow, inspection, and maintenance. The START and END chambers shall each have an integral end wall designed to resist loading at the start and end of the chamber rows. The chambers within a row shall be installed with overlapping end corrugations.

4. The nominal dimensions of the START chamber shall be 51.4 inches wide, 30.3 inches tall, and 98.4 inches long. The nominal dimensions of the MIDDLE chamber shall be 51.4 inches wide, 30.3 inches tall, and 91.0 inches long. The nominal dimensions of the END chamber shall be 51.4 inches wide, 30.3 inches tall, and 92.0 inches long. The nominal storage volume inside the chamber shall be 75 cubic feet when utilizing 6" of stone above and below chamber with 40% stone porosity per ChamberMaxx standard detail.

5. The chamber shall have a continuously-curved, arch-shaped section profile.

6. The START and END chamber integral end wall shall be structurally suitable for cutting and inserting inlet pipes and shall provide a range of pipe diameter indicants up to 24" diameter as cutting templates.

7. The chamber shall be a corrugated, open-bottom design and top vent orifices for hydraulic pressure equalization. Corrugation valleys and crests shall be sub-corrugated to increase stiffness.

8. The chamber shall have a circular cut line for an optional reinforced inspection port configured to accept a 4" Schedule 40 pipe.
9. The END chambers shall be capable of being cut to shorter lengths to accommodate site specific requirements.

10. The chamber shall be supported by integral structural footings comprised of load dispersing toe ribs and longitudinally aligned stiffening ribs.

11. The manufacturer of the ChamberMaxx system shall be one that has regularly been engaged in the engineering design and production of these systems for at least eight (8) years and which has a history of successful production, acceptable to the Engineer of Record (EOR). In accordance with the Drawings, the ChamberMaxx system shall be supplied by:

Contech Engineered Solutions
9025 Centre Pointe Drive
West Chester, OH, 45069
Tel: 1 800 338 1122

c. Performance.

1. The ChamberMaxx system proposal shall be sized in accordance with the design provided and approved by the Engineer of Record (EOR). Any Contractor deviating from the design shown on the plans, to include: material, footprint, etc., shall provide to the EOR a summary report on stage-storage curves, design calculations, HydroCAD modeling and engineering drawings.

2. ChamberMaxx row spacing, and stone base thickness cannot be altered with consultation from Contech Engineered Solutions, LLC.

3. The ChamberMaxx system shall be designed so as the hydraulic grade line will increase evenly throughout whereas transverse movement from one storage compartment to another shall not be permitted. All storage compartments shall be connected via manifold (or connecting pipe) versus by entirely transporting stormwater through stone.

4. The ChamberMaxx system shall include a containment row(s) for the collected of sediment in stormwater prior to flowing into the chamber array. The containment row shall be connected to a diversion structure with a 24-inch pipe. The initial flow of stormwater shall be diverted by a weir into the containment row. The containment row shall consist of a row of chambers which lays upon 2 layers of AASHTO M288 Class I woven geotextile between the chamber and stone bedding.

d. Execution

1. The ChamberMaxx system shall be installed per the Contech “ChamberMaxx Stormwater Retention System Standard Installation Detail”, available from local Contech representative or from www.conteches.com.
2. For temporary construction vehicle loads, an extra amount of compacted cover may be required over the top of the chambers. The Height-of-Cover shall meet the minimum requirements shown in the Contech “ChamberMaxx Stormwater Retention System Standard Installation Detail”. The use of heavy construction equipment necessitates greater protection for the chambers than finished grade cover minimums for normal highway traffic.

3. The contractor shall follow Occupational Safety and Health Association (OSHA) guidelines for safe practices in executing the installation process in accordance with the manufacturer/supplier installation recommendations.

4. Contractor is required to participate in an on-site preconstruction meeting with the supplier prior to the scheduled delivery date of the ChamberMaxx system.

The Contractor must notify the Engineer in advance when specific items are ready for observation. The construction shall not proceed without the approval of the Engineer at the specific points indicated below, unless the express consent of the Engineer is given to proceed. The Engineer may stop construction and/or have materials removed at the Contractor's expense if no notification or approval to proceed is given. Contractor responsibilities include:

- **Start of construction** – Locate utilities and layout sand filters, relocate utilities as required while providing the required separation of at least 2’, locate and install appropriate temporary erosion control measures.

- **Completion of excavation** – Excavate material and verify contours and that the base of the entire sand filter is level.

- **Placement of underdrain structures and gravel** – Place geofabric, underdrains, stormwater control structures, and stormwater storage chambers and make internal connections between stormwater control structures, place storage aggregate in compacted lifts with a middle geofabric layer, and place at least an additional 6” of storage aggregate above the middle geofabric. A top geofabric layers shall be installed on top of the final aggregate grade, or as specified in the manufacturer’s installation guide.

- **Install open cell pavers** – Place open cell pavers onto aggregate material for both curbs cut spillways and sand filter terraces. Install pavers according to manufacturer instructions.

- **Placement of filter soil** – Verify that material is approved prior to placement, install the filter soil and perform final grading to the needed contours.

- **Completion of construction** – Seeding of other restoration areas and installation of permanent erosion control measures, removal of excess or excavated materials, and general cleanliness and completeness of work areas.
e. Products

- **Geofabric**: Geofabric shall be constructed of a non-woven geotextile that meets AASHTO M288 Class 2. The geofabric shall be placed on the bottom, sides, and ends of the excavated sand filter with a minimum overlap of 2’ at all joints. Geofabric will also be placed above the stormwater storage chambers as shown on the drawings.

- **Perforated Pipe**: Underdrain piping will consist of perforated single wall HDPE highway pipe with geofabric sock unless otherwise noted on Drawings. The perforations shall be slits in the corrugations spaced every 4 inches or an equivalent approved by the Engineer. A perforated pipe shall be installed on the geofabric within the base of the storage aggregate and shall originate 1 foot short of the sand filter wall and terminate in the specified catch basin structure.

- **Stormwater Storage Chambers**: The chambers shall meet the ASTM F 2922-12 standard specification for polyethylene (PE) corrugated wall stormwater storage chambers. The installed chamber system shall provide the load factors specified in the ASSHTO LRFD bridge design specifications section 12.12 for earth and live loads with consideration for impact and possible vehicle presence. Chambers shall be ChamberMaxx or equal.

- **Storage Aggregate**: Storage aggregate shall consist of ¾” – 2” crushed angular stone. The material shall be washed and contain no more than 1% fines, including silt, clay or organic material. No PreCenozoic limestone, dolomite, or stone containing phosphate shall be used.

- **Filter Soil**: Filter soil shall be composed of 75% by weight of sand and 25% compost. Sand shall be clean construction sand, free of deleterious materials including but not limited to clay, silt, organics, woody debris, construction debris or other materials that may negatively affect infiltration. Clean construction sand or clean river-run sand is acceptable. A sample of the sand shall be made available to the Engineer prior to mixing the amended soils. Any deleterious materials in the sand will be screened at the expense of the Contractor.

- **Compost**: Compost shall be aged yard-leaf compost and shall be free of deleterious materials including but not limited to clay, silt, manure solids, woody debris, plastics, construction debris or other materials that may negatively affect infiltration. The pH shall be between 5.5 and 8.5. Particles shall be able to pass through a 1-inch screen or smaller. Compost that smells putrid, has an ammonia odor, or shows visible signs of mold is unacceptable. A sample of the compost shall be made available to the Engineer prior to mixing the amended soils.

- **Catch Basin Structure and Grate**: The catch basin (structure) shall consist of a 3’ x 3’ precast structure with a depth and grate size as indicated on the drawings, cast as a single unit consisting of the base and side walls and fit with a top slab frame and grate. Structure, frames and covers shall support an H20 loading. Structure shall have a 6” inlet cast into the catch basin chamber that extends 6” from the exterior of the structure and shall include
a breakout panel for installation of the catch basin lead to the stormwater drainage system. Pipe connection to storm sewer shall be sealed with a rubber boot to limit infiltration or approved equal.

For locations with turf, the appropriate turf seed blend shall be installed in all areas containing filter soil.

All curb cuts, overland flow or other hydrologic inputs shall not be brought online and allowed to enter sand filters for at least 14 days following seeding, or until turf establishment is verified and approved by Engineer.

f. Maintenance and Guarantee

The Contractor shall assume responsibility for maintaining work to the end of the guarantee period. During this period, the Contractor shall make a minimum of one maintenance trip every 4 weeks during the growing season and as many more as necessary to keep the plantings and turf in a thriving condition.

Maintenance activities generally include but are not limited to: prescribed burns, herbicide applications of invasive species, spot-spraying or hand-pulling undesirable weeds, irrigation, debris removal, and supplemental plantings as determined to be appropriate by the Engineer.

- Watering shall be the responsibility of the Contractor. Seed shall be kept moist for optimum growth (1 inch of water each week, including rainfall) for the first growing season. Any erosion resulting from watering shall be repaired by the Contractor.
- Weeding will be the responsibility of the Contractor. The sand filters will be kept free of species other than the prescribed seed.
- Trash removal and maintenance of the drainage structures will be the responsibility of the Contractor. The drainage structures and inlets will be kept free of debris that may block storm flows and cause an overflow of the sand filters. Protection from foot traffic, mowing, or herbicide application is the responsibility of the Contractor. Appropriate signage and/or fencing may be used following approval by the Engineer to protect the plantings until they are fully established.

The Contractor shall replace, at no cost to the Owner, all dead vegetation during the maintenance period, and will maintain the sand filters to ensure uniform healthy plant growth, in order for the site to be released by the Engineer so that the Contractor may be paid the final retainage.

Maintenance Plan

During the period of the contract, the contractor shall perform the elements of the Maintenance Plan, as described below. This plan requires the following bi-annual inspection (Fall and Spring) to be performed:

- **Inspect and maintain the sand filter catch basins** – Vegetation, grass, bark, mulch, and accumulated leaves from the fall season, and grit from the winter season will accumulate in the sand filters. Perform inspections in the fall and spring and clear and remove these materials from the catch basin and catch basin sumps using a Vactor or alternative
methods.

- **Inspect and maintain the curb cut energy dissipation pads** – Solids and grit may accumulate on the energy dissipation pads downstream from the curb cuts that enter each sand filter. Areas with accumulation should be swept or vactored to remove deposited solids.

- **Inspect and maintain the sand filter surfaces** – The sand filter surface should be inspected, and if necessary, any leaves, trash, or other material removed. A motorized vacuum methods used for leaf collection shall be employed.

- **Inspect the terraces for erosion** – Some sand filters may have terraces to make sure that surface water is evenly distributed. These terraces shall be inspected to verify that they have not eroded and that the spillway pavers have adequate soil to support vegetation. Any eroded areas shall be repaired to make sure that the terraces are continuous and vegetated.

- **Standing water and sediment inspection** – Should standing water be observed, or if the base of the sand filter is less than 4” below the catch basin grate elevation, the surface of the sand filter may need to be removed and replaced with appropriate filter soils and replanted. The use of 75% sand and 25% compost shall be used, and a low maintenance turf blend used to minimize the amount of mowing or watering needed in the sand filter areas. If the discharge orifice is plugged, this should be unblocked, and material removed so that it will discharge flow at the required rate.

**Guarantee**

By May 31st of the year following seeding, the sand filter and surrounding disturbed areas shall show a uniform density of healthy specimens of turf or native cover. The sand filters shall also be free of weeds and trash, and covered in a uniform layer of mulch, as determined by the Engineer.

Uniform density is deemed as 85% coverage of all sand filter areas, with no bare patches greater than 4 square feet within the sand filters, or bare patches greater than 1 square foot within the areas of turf grass.

Any area in the sand filters that fails to show a uniform density of plants shall be replanted with appropriate native seed mix, temporary stabilization seed mix, or turf. Any bare patches around the borders will be reseeded with fescue until a uniform density of turf grass is established.

**g. Measurement And Payment**

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

<table>
<thead>
<tr>
<th>PAY ITEM</th>
<th>PAY UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_CHAMBERMAXX SYSTEM</td>
<td>LS</td>
</tr>
</tbody>
</table>

The unit price includes all labor, equipment, materials, and documents necessary to install the sand filter, catch basin, stop gate and control orifice as detailed in the plans.
ChamberMaxx Project Details

Description
The ChamberMaxx corrugated, open-bottom plastic infiltration chamber system allows you to meet stormwater runoff reduction requirements and maximize available land space by providing economic infiltration below grade. ChamberMaxx maximizes storage volume in a small footprint, and its low-profile shape is ideal for sites with shallow footprints.

Project Information

<table>
<thead>
<tr>
<th>Project Name</th>
<th>47180 - West Park</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Ann Arbor, MI</td>
</tr>
<tr>
<td>Date</td>
<td>March 05 2024</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design Parameters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretreatment Method</td>
<td>Hydrodynamic Separator</td>
</tr>
<tr>
<td>Storage Volume</td>
<td>6712ft³</td>
</tr>
<tr>
<td>Limiting Length</td>
<td>80ft</td>
</tr>
<tr>
<td>Limiting Width</td>
<td>40ft</td>
</tr>
<tr>
<td>Invert Depth</td>
<td>6ft</td>
</tr>
<tr>
<td>Number of Headers</td>
<td>1</td>
</tr>
<tr>
<td>Header Diameter</td>
<td>18in</td>
</tr>
<tr>
<td>Spacing Between Chambers</td>
<td>5.6in</td>
</tr>
<tr>
<td>Porous Stone Width at Sides</td>
<td>12in</td>
</tr>
<tr>
<td>Porous Stone Width at Ends</td>
<td>12in</td>
</tr>
<tr>
<td>Porous Stone Width at Above</td>
<td>6in</td>
</tr>
<tr>
<td>Porous Stone Width at Below</td>
<td>6in</td>
</tr>
<tr>
<td>Porosity</td>
<td>40%</td>
</tr>
<tr>
<td>Include Porous Storage Between Chambers</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chamber Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Units</td>
<td>8</td>
</tr>
<tr>
<td>Middle Units</td>
<td>64</td>
</tr>
<tr>
<td>End Units</td>
<td>8</td>
</tr>
<tr>
<td>Required Chambers</td>
<td>80</td>
</tr>
<tr>
<td>Manifold Tees</td>
<td>7</td>
</tr>
<tr>
<td>Manifold Elbows</td>
<td>1</td>
</tr>
<tr>
<td>Number of Rows</td>
<td>8</td>
</tr>
<tr>
<td>Chambers per Row</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage Calculations</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chamber Storage</td>
<td>3792ft³</td>
</tr>
<tr>
<td>Header Storage</td>
<td>221.63ft³</td>
</tr>
<tr>
<td>Porous Stone Storage</td>
<td>2809.28ft³</td>
</tr>
<tr>
<td>Total Storage Provided</td>
<td>6712.68ft³</td>
</tr>
<tr>
<td>Percentage of Storage Provided</td>
<td>100.01%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System Dimensions and Other Mat’l</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectangular Footprint</td>
<td>78.41x39.53ft</td>
</tr>
<tr>
<td>Total Excavation</td>
<td>746.23y³</td>
</tr>
<tr>
<td>Stone Backfill</td>
<td>260.12y³</td>
</tr>
<tr>
<td>Remaining Backfill to Pavement</td>
<td>341.55y³</td>
</tr>
<tr>
<td>Woven Geotextile Qty</td>
<td>0y²</td>
</tr>
<tr>
<td>Non-Woven Geotextile Qty</td>
<td>344.42y²</td>
</tr>
<tr>
<td>Scour Protection Fitting</td>
<td>39.53x7.5ft</td>
</tr>
<tr>
<td>Approximate Truckloads</td>
<td>1</td>
</tr>
</tbody>
</table>
Description

This work shall consist of furnishing all labor, tools, equipment, and material to construct drainage structures in accordance with 2024 Public Services Standard Specifications Article 3 and Article 10, Section II.K., as shown on the plans, and as specified herein.

Measurement and Payment

The completed work, as described, will be measured and paid for at the approved price for the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Gate Valve in Well, ___ In.</td>
<td>................................................. Each</td>
</tr>
<tr>
<td>DS_Gate Valve in Box, ___ In.</td>
<td>................................................. Each</td>
</tr>
</tbody>
</table>

The gate well frame and cover shall be included in payment for DS_Gate Valve in Well, ___ In. and shall not be paid for separately.

The gate valve box shall be included in payment for DS_Gate Valve in Box, ___ In. and shall not be paid for separately.
a. Description

This work consists of compacting and grading the existing aggregate base as shown on plans or as directed by the Engineer. The aggregate base conditioning shall be in accordance with Section 302 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, except as specified herein.

b. Materials

The Aggregate material shall meet the aggregate series as shown on the plans.

c. Construction

Shall conform to subsections 302.03A and 302.03B of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction.

d. Measurement and Payment

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

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Aggregate Base, Conditioning</td>
<td>Square Yard</td>
</tr>
</tbody>
</table>

**DS_Aggregate Base, Conditioning** will be measured by the width and length shown on the plans and includes payment for all labor, equipment, and materials needed furnish, place, and compact the aggregate base.
a. Description

This work consists of constructing concrete curb and gutter on the prepared base in accordance with Section 802 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction as shown on plans, except as specified herein.

b. Materials

The materials shall meet the requirements as specified in Section 802 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction and specified herein:

All monolithic curb and gutter shall be grade 3500 with 6AA coarse aggregate. The Contractor may elect to add GGBFS to 3500 mixtures in accordance with the requirements of the contract documents. No additional payment will be made for concrete mixtures containing GGBFS.

c. Construction

DS_Conc, Curb or Curb & Gutter, Monolithic shall be constructed as shown on the plans.

Each section shall be poured as one continuous curb or curb and gutter and follow section 802.03 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, except as modified per the detail shown on the plans.

d. Measurement and Payment

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

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Conc, Curb or Curb &amp; Gutter, Monolithic</td>
<td>Foot</td>
</tr>
</tbody>
</table>

DS_Conc, Curb or Curb & Gutter, Monolithic will be measured by the unit installed and will be paid for at the contract unit price per Foot, for which price shall be payment in full for all labor, equipment, and materials.
CITY OF ANN ARBOR

SPECIAL PROVISION
FOR
DETECTABLE DIRECTIONAL TILE

HRC: NBN 1 of 1 4/26/2024

a. Description

This work consists of furnishing and installing all components for the Detectable Directional Tile as shown on the plans or as directed by the Engineer. The Detectable Directional Tile shall be in accordance with the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction and as specified herein.

b. Materials

The contractor shall furnish materials in accordance with Section 803 of the MDOT 2020 Standard Specifications for Construction, except where otherwise noted.

All materials for the Detectable Directional Tile shall be manufactured by Armor-Tile or an approved equal by the Engineer. The model includes the Detectable Bar Tile (ADD-504/ADA-D-448) and all associated hardware that includes, but not limited to, expansion anchors, adhesives, and sealants.

The Detectable Bar Tile shall be 6 inches by 48 inches, color Federal Yellow (#33538), and compliant with the Americans with Disabilities Act (ADA) standards. The Detectable Bar Tile consists of a polymer composite with a bar-like pattern.

c. Construction

The Detectable Directional Tile shall be laid out for approval by the Engineer before installation. The Detectable Directional Tile shall be placed adjacent to bus stop landings and perpendicular to the curb as shown on the plans. The Detectable Directional Tile shall be installed per manufacturer recommendations.

d. Measurement and Payment

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

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Detectable Directional Tile</td>
<td>Ea</td>
</tr>
</tbody>
</table>

**DS_Detectable Directional Tile** will be measured by the quantity shown on the plans and as specified herein and includes payment for all labor, equipment, and materials required to complete the work. Payment for accessories, mounting hardware, and adhesive required for installation shall not be paid separately but shall be included in the corresponding pay item.
a. Description

This work consists of furnishing and installing all components of the Modular Curb System as shown on the plans or as directed by the Engineer. The Modular Curb System shall be in accordance with the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction and as specified herein.

b. Materials

The Contractor shall furnish materials in accordance with Sections 810 and 919 of the MDOT 2020 Standard Specifications for Construction, except where otherwise noted.

All materials for the Modular Curb System shall be manufactured by Qwick Kurb, Inc. or an approved equal by the Engineer. The model includes the Continuous Base Mid Span (L60), Continuous Base Front Span (L61), Continuous Base Rear Span (L62), Big Bollard (L125SHM), and all associated hardware that includes, but not limited to, screws, nuts, washers, bolts, flex boots, marker mounts, pavement anchors, and connection hooks.

The Big Bollard shall be white with yellow reflective sheeting.

c. Construction

The Modular Curb System shall be laid out for approval by the Engineer before installation. The Modular Curb System shall be placed in the roadway and gapped out at intersections (cross streets and driveways) as shown on the plans. The Continuous Base and Big Bollard shall be installed per manufacturer recommendations.

d. Measurement and Payment

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

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Continuous Base Mid Span L60</td>
<td>Ea</td>
</tr>
<tr>
<td>DS_Continuous Base Front Span L61</td>
<td>Ea</td>
</tr>
<tr>
<td>DS_Continuous Base Rear Span L62</td>
<td>Ea</td>
</tr>
<tr>
<td>DS_Big Bollard MASH L125SHM</td>
<td>Ea</td>
</tr>
</tbody>
</table>

DS_Continuous Base __ Span __ and DS_Big Bollard MASH L125SHM will be measured by the quantity shown on the plans and as specified herein and includes payment for all labor, equipment, and materials required to complete the work. Payment for accessories and mounting hardware required for installation shall not be paid separately but shall be included in the corresponding pay item.
a. Description

This work consists of furnishing and installing all components for the Bikeway Delineator Post as shown on the plans or as directed by the Engineer. The Bikeway Delineator Post shall be in accordance with the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction and as specified herein.

b. Materials

The Contractor shall furnish materials in accordance with Section 807 of the MDOT 2020 Standard Specifications for Construction, except where otherwise noted.

All materials for the Bikeway Delineator Post shall be manufactured by Pexco or an approved equal by the Engineer. The model includes the City Post SM Surface Mount, Standard Top, Sheeting, and all associated hardware that includes, but not limited to, Anchor Bolts.

The Bikeway Delineator Post shall be 28 inches in height and 3 inches round with the bolt-down design. The color shall be black with white sheeting or yellow with gold sheeting as specified on the plans.

c. Construction

The Bikeway Delineator Post shall be laid out for approval by the Engineer before installation. The Bikeway Delineator Post shall be placed in the roadway, buffer space, bike lane, or cycle track as shown on the plans. The Bikeway Delineator Post shall be installed per manufacturer recommendations.

d. Measurement and Payment

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

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Bikeway Delineator Post Black</td>
<td>Ea</td>
</tr>
<tr>
<td>DS_Bikeway Delineator Post Yellow</td>
<td>Ea</td>
</tr>
</tbody>
</table>

**DS_Bikeway Delineator Post ___** will be measured by the quantity shown on the plans and as specified herein and includes payment for all labor, equipment, and materials required to complete the work. Payment for accessories and mounting hardware required for installation shall not be paid separately but shall be included in the corresponding pay item.
a. **Description.** This work consists of furnishing and installing foundation pedestals as shown on the plans or as directed by the Engineer. The foundation pedestals shall be in accordance with Section 810 and associated sections for materials of the *Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction.*

b. **Materials.** The Contractor shall furnish materials in accordance with Subsection 810.02, of the *Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction,* except where otherwise noted.

c. **Construction.** The **DS_Post, Steel, 3 lb** shall be installed in accordance Subsection 810.03 and of the *Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction,* except where otherwise noted.

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

<table>
<thead>
<tr>
<th>Contract Item (Pay Item)</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Post, Steel, 3 lb</td>
<td>Foot</td>
</tr>
</tbody>
</table>

The unit prices for fabricated items include the cost of providing dimensional information for the relevant fabricated item.

The Engineer will measure **DS_Post, Steel, 3lb** to the nearest commercial length required. The City will not pay for the portion of posts installed deeper than the depth shown on the plans, unless authorized by the Engineer.
a. **Description.** This work consists of removing each ground mounted sign support including but not limited to steel posts, wood posts and breakaway sign supports per section 810.03 Standard Specifications for Construction. Complete this work in accordance with this special provision, the plans, sections 810 and 919 of the Standard Specifications for Construction, and as directed by the Engineer.

b. **Materials.** None specified.

c. **Construction.** Once the existing sign has been removed and addressed per the contract remove the ground mounted sign support.

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:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Mtd Sign Support, Rem</td>
<td>Each</td>
</tr>
</tbody>
</table>

**Ground Mtd Sign Support, Rem** includes the cost of removing each support as shown on the plans or as directed by the Engineer.
a. Description

This work consists of furnishing and installing all components of the Traffic, Pedestrian, and Bike Signal as shown on the plans or as directed by the Engineer. The Traffic, Pedestrian, and Bike Signal shall be in accordance with the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction and as specified herein.

b. Materials

The Contractor shall furnish materials in accordance with Sections 820 and 921 of the MDOT 2020 Standard Specifications for Construction, except where otherwise noted.

All materials for the Traffic, Pedestrian, and Bike Signal shall be manufactured using MDOT standard plans (SIG-XXX-X) and/or engineering judgment. The model includes the Conduit, Cable, Service Disconnect, Light Standard Arm, Pedestal, Foundation, Signal, Casing, Mast Arm, and all associated hardware, that includes but not limited to, anchor bolts, fittings, mounting brackets, and wiring.

The Conduit, Cable, and Service Disconnect shall meet the requirements as stated in Section 818 of the MDOT Standard Specifications for Construction.

The Light Standard Arm Removal and Salvage shall meet the requirements as stated in Section 819 of the MDOT Standard Specifications for Construction.

The Pedestal, Foundation, Signal, Casing, and Mast Arm shall meet the requirements as stated in Section 820 of the MDOT Standard Specifications for Construction.

c. Construction

The Traffic, Pedestrian, and Bike Signal shall be placed, taken out, or saved in the intersection or road segment as shown on the plans. The Traffic, Pedestrian, and Bike Signal shall be installed, removed, or salvaged per MDOT 2020 Standard Specifications for Construction and standard plans (SIG-XXX-X).

d. Measurement and Payment

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

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Conduit, Directional Bore, 2, 3 inch</td>
<td>Ft</td>
</tr>
<tr>
<td>DS_Conduit, DB, 1, 1 1/2 inch</td>
<td>Ft</td>
</tr>
<tr>
<td>DS_Conduit, DB, 1, 3 inch</td>
<td>Ft</td>
</tr>
<tr>
<td>DS_Conduit, DB, 2, 3 inch</td>
<td>Ft</td>
</tr>
</tbody>
</table>
DS_Conduit, DB 4, 3 inch ................................................................. Ft
DS_Cable Pole, TS and Sec, Disman .................................................... Ea
DS_Cable, Sec, 600V, 1, 3/C#6 ......................................................... Ft
DS_Wood Pole, Rem ................................................................. Ea
DS_Serv Disconnect ........................................................................... Ea
DS_Serv Disconnect, Rem .......................................................... Ea
DS_Wood Pole, Fit Up, TS and Sec Cable Pole .................................. Ea
DS_Light Std Arm, Rem and Salv .................................................. Ea
DS_Controller and Cabinet, Rem .................................................. Ea
DS_Controller Fdn, Base Mount .................................................. Ea
DS_Controller Fdn, Rem .......................................................... Ea
DS_Pedestal, Alum ......................................................................... Ea
DS_Pedestal, Fdn ........................................................................... Ea
DS_Pedestal, Fdn, Rem .......................................................... Ea
DS_Pedestal, Rem ........................................................................... Ea
DS_Pushbutton, Pedestal, Alum ..................................................... Ea
DS_Pushbutton, Rem ........................................................................ Ea
DS_Span Wire, Rem ........................................................................ Ea
DS_TS, Pedestrian, Bracket Arm Mtd, Rem .................................. Ea
DS_TS, Pedestrian, Pedestal Mtd, Rem ........................................... Ea
DS_TS, Span Wire Mtd, Rem .......................................................... Ea
DS_TS, Pedestrian, One Way Pedestal Mtd, Salv .......................... Ea
DS_TS, Pedestrian, One Way Pedestal Mtd (LED) Countdown .......... Ea
DS_TS, Pedestrian, Two Way Pedestal Mtd (LED) Countdown .......... Ea
DS_Bracket, Truss, With 12 Foot Arm ........................................... Ea
DS_Casing ................................................................................... Ft

DS_Conduit, __, __, __; DS_Cable Pole, TS and Sec, Disman; DS_Cable, Sec, 600V, 1, 3/C#6; DS_Wood Pole, Rem; DS_Serv Disconnect; DS_Serv Disconnect, Rem; DS_Wood Pole, Fit Up, TS and Sec Cable Pole; DS_Light Std Arm, Rem and Salv; DS_Controller and Cabinet, Rem; DS_Controller Fdn, Base Mount; DS_Controller Fdn, Rem; DS_Pedestal Alum; DS_Pedestal, Fdn; DS_Pedestal, Fdn, Rem; DS_Pedestal, Rem; DS_Pushbutton, Pedestal, Alum; DS_Pushbutton, Rem; DS_Span Wire, Rem; DS_TS, Pedestrian, __, Rem; DS_TS, Span Wire Mtd, Rem; DS_TS, Pedestrian, One Way Pedestal Mtd, Salv; DS_TS, Pedestrian, __ Pedestal Mtd (LED) Countdown; DS_Bracket, Truss, With 12 Foot Arm; and DS_Casing will be measured by the quantity shown on the plans and as specified herein and includes payment for all labor, equipment, and materials required to complete the work. Payment for accessories and mounting hardware required for installation shall not be paid separately but shall be included in the corresponding pay item.
a. Description. This work consists of installing an existing, salvaged light standard arm as specified herein and as shown on the plans. Ensure this work is done in accordance with the requirements of section 819 of the Standard Specifications for Construction, the details shown on the plans, and this special provision.

b. Materials. Furnish material in accordance with subsection 819.02 of the Standard Specifications for Construction.


c. Construction. Install light standard arms and luminaires in accordance with subsections 819.03.B and 819.03.C of the Standard Specifications for Construction, respectively. Install the light standard arm and luminaire on the light standard shaft per the manufacturer’s recommendation. All electrical connections must meet the NEC requirements and any applicable local electrical codes.

Coat exposed portions of hardware with an epoxy and urethane coating system in accordance with subsection 715.03.D.1 of the Standard Specifications for Construction. Use a black colored urethane meeting color number 17038 of Federal Standard 595C from the Qualified Products List (915).

Repair any damages to the galvanized coatings of any product used per subsection 716.03 of the Standard Specifications for Construction. Any repair costs incurred for the repairs are the responsibility of the Contractor.

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:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Std Arm, Install Salv</td>
<td>Each</td>
</tr>
</tbody>
</table>

Light Std Arm, Install Salv includes the cost of the anchor bolts and other miscellaneous hardware to install the light standard arm. The foundation, luminaire, and light standard shaft will be paid for separately.
a. Description. This work consists of removing, storing, and reinstalling an existing pushbutton and sign at locations shown on the plans.

This work includes removal, storing and installation of interface equipment, mounting assembly, brackets, hardware, fittings, connectors, wiring, cable to controller, grounding, risers, conduit, and any other material required to ensure a complete removal and installation.


c. Construction. Complete this 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 an existing pushbutton and sign, store salvaged materials in a protected and clean environment, and re-install the materials.

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:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Pushbutton and Sign, Salv</td>
<td>Each</td>
</tr>
</tbody>
</table>

DS_Pushbutton and Sign, Salv includes removing a pushbutton, and sign if one is present, storing the removed materials on site and reinstalling materials at a location shown on the plans. This pay item includes removing and re-installing, as applicable, interface equipment, mounting assembly, brackets, hardware, fittings, connectors, wiring, cable to controller, grounding, risers, conduit and any other material required to ensure a complete removal and installation.
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 push button 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. Furnish an accessible pedestrian signal system including CCU and PBS meeting the requirements of this subsection. Furnish all hardware and other appurtenant materials in accordance with sections 918 and 921 of the Standard Specifications for Construction and this special provision.

1. Accessible Pedestrian Signal System.

A. Furnish an accessible pedestrian signal system from the following list.

(1) Polara Navigator.

(2) Approved equal (AE). Ensure the AE is evaluated, tested, and approved per the MDOT New Traffic Signal Device Product Review Guidelines. The review time is not justification to delay the project.

2. The system must:

A. Furnish 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. Furnish 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) ensuring one of which is 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).

3. 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 VAC/VDC peak with a 10 milli Ampere (mA) maximum.

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

   (3) Fault Output. Normally open and closed relay contacts, 125 VAC/VDC, 1 A maximum.
(4) Pedestrian Hand/Walking Person (Walk/Don’t Walk) Inputs. 80-150 VAC/VDC, 5 mA maximum.


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

(7) Line Power. 25 Watt (W) to 75 W typical, 120 W 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.

4. 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 15 W, 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 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 °F to 165 °F (-40 °C to 60 °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 10 W rms into 8 ohms.
(2) Volume control automatic adjustment range of 28 dB (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 880 Hz plus harmonic, 0.1 second duration, 1 second interval.

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

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

5. 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 LCD display, with two 16-character lines, with backlight and adjustable contrast;

D. Be powered by four AA 1.5 Volt 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 °F to 122 °F (0 °C to 50 °C).

6. Warranty. Furnish 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 818 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) points in the direction of pedestrian travel for the associated crosswalk.

2. Remove. Remove an accessible pedestrian signal system or a PBS 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:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Pedestrian Signal System, Accessible</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Push Button Station</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Push Button Station and Sign</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Pedestrian Signal System, Accessible, Rem</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Push Button Station, Rem</td>
<td>Each</td>
</tr>
</tbody>
</table>

1. **DS_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. **DS_Push Button Station** and **DS_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. **DS_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. **DS_Pedestrian Signal System, Accessible, Rem** also includes storage or disposal of removed material.

4. **DS_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. **DS_Push Button Station, Rem** also includes storage or disposal of removed material.
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.** Furnish materials, as directed by the Engineer, necessary to provide a complete and operating job. Furnish materials in accordance with sections 918 and 921 of the Standard Specifications for Constructions and this special provision.

1. **Vehicle Detection System** (VDS).

   A. Furnish a VDS from the following list.

      (1) Sensys Flexmag.

      (2) Approved equal (AE). Ensure the AE is evaluated, tested, and approved per the MDOT New Traffic Signal Device Product Review Guidelines. The review time is not justification to delay the project.
B. 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.

C. Furnish a VDS that:

(1) Detects and counts vehicles using battery powered magnetometers utilizing wireless communications to transmit detection information;

(2) Furnishes 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.

D. Furnish 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 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 °F to +176 °F (-38 °C to +80 °C);

(7) Furnishes 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.

E. Furnish 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.


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. Furnish 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 °F to +176 °F (-38 °C to +80 °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 APCC is powered up.


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. Furnish 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 °F to +176 °F (-38 °C to +80 °C).

4. Bus Interface Unit (BUI). Furnish a BUI that meets the requirements of Section 8 of the NEMA TS2-Specification. Furnish one 6 foot Port 1 communications cable to connect from the detector rack BUI to the controller unit.

5. Wireless Communication. Furnish a VDS, RP, or VSN that operates in the unlicensed Industrial, Scientific, and Medical (ISM) 2.4 GHz band. Ensure the SPP and VSN operate in any one of the 16 channels available in the band. Furnish two-way communication between the SPP and VSN to ensure integrity over the RP interface. Furnish 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. Furnish a VDS that can accept software and firmware upgrades. Furnish 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. Furnish 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 818 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 shown 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 shown 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:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Wireless Vehicle Detection System</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Wireless Vehicle Sensor Node</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Wireless Repeater</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Wireless Vehicle Detection System, Rem</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Wireless Vehicle Sensor Node, Rem</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Wireless Repeater, Rem</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Wireless Vehicle Detection System, Salv</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Wireless Repeater, Salv</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Wireless Vehicle Sensor Node, Salv</td>
<td>Each</td>
</tr>
</tbody>
</table>

1. **DS_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. **DS_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. **DS_Wireless Repeater** includes installing a wireless repeater including the RP, mounting brackets, hardware, and all appurtenant material required to complete the work.

4. **DS_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. **DS_Wireless Vehicle Detection System, Rem** also includes storage or disposal of removed material.

5. **DS_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;
6. **DS_Wireless Repeater, Rem** includes removing a wireless repeater including the RP, mounting brackets, hardware, and all appurtenant material required to complete the work. **DS_Wireless Repeater, Rem** also includes storage or disposal of removed material.

7. **DS_Wireless Vehicle Detection System, Salv** 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. **DS_Wireless Vehicle Detection System, Salv** also includes storage and reinstallation on the project;

8. **DS_Wireless Repeater, Salv** includes removing a wireless repeater including the RP, mounting brackets, hardware, and all appurtenant material required to complete the work. **DS_Wireless Repeater, Salv** also includes storage and reinstallation on the project;

9. **DS_Wireless Vehicle Sensor Node, Salv** includes:
   
   A. Removing a wireless vehicle sensor node including the sensor, epoxy, and all appurtenant material required to complete the work;
   
   B. Storage and reinstallation on the project;
   
   C. Core drilling a new 4 inch by 2¼ inch hole, as shown on the plans, or as directed by the Engineer, and encapsulating the VSN with orange epoxy; and
   
   D. Filling the old hole with black epoxy.
a. Description. This work consists of installing or removing a single hemispherical video detection system and/or camera which detects vehicles on multiple roadway approaches at an intersection using only video images of vehicle traffic and is compatible with solid state pre-timed or actuated traffic signal control equipment and cabinet environments.

As applicable, this work includes installing or removing the necessary wiring, mounting brackets, mounting hardware, conduit, cable connectors, grounding and any other material required to ensure a complete installation or removal as specified for a location.

b. Material. 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 Construction and this special provision.

1. System Requirements.

   A. System Hardware. Provide a hemispherical video detection system that is composed of these principal items:

      (1) Hemispherical camera(s);

      (2) A field communications link consisting of a single Category 5 (CAT5)e cable between each camera and the video imaging vehicle detection system (VIVDS) processor;

      (3) VIVDS processor along with a video monitor or associated equipment required to setup the VIVDS processor and software to communicate to the VIVDS processor.

   B. System Software. Provide a VIVDS processor that is either NEMA TS 2 TYPE 1 or NEMA TS 2 TYPE 2 with a recommended standard (RS) 485 synchronous data link control (SDLC). Ensure the VIVDS processor has at least four processing cores of 2.8 Gigahertz (GHz) or greater, a minimum of 3 Gigabyte (GB) random access memory (RAM), and at least 32GB of onboard storage.

2. Functional Capabilities.

   A. Provide system software that is able to detect either approaching or departing vehicles in multiple traffic lanes and have a minimum of 24 detector outputs per VIVDS processor. Ensure each zone and output is user definable through interactive graphics by drawing arbitrarily shaped polygons using the field setup computer or central control. Ensure the user is able to redefine previously defined detection zones.
B. Ensure the VIVDS processor provides real time vehicle detection (within 500 milliseconds (ms) of vehicle arrival).

C. Ensure the system can detect the presence of vehicles in up to 64 detection zones per camera.

D. Ensure detection zones are sensitive to the direction of vehicle travel and the direction to be detected by each detection zone is user programmable.

E. Ensure the VIVDS processor unit can compensate for minor camera movement (up to 2 percent of the field of view at 400 feet) without falsely detecting vehicles and that the camera movement is measured on the unprocessed video input to the VIVDS processor.

F. Provide a camera that operates while directly connected to VIVDS processor unit.

G. Ensure the video detection system operates with the monitoring equipment (monitor and/or laptop) disconnected or on-line once the detector configuration has been downloaded or saved into the VIVDS processor.

H. Ensure when the monitoring equipment is directly connected to the VIVDS processor, it can view vehicle detections in real time as they occur on the field setup computer's color video graphics adapter (VGA) display or the video monitor.

I. Provide a VIVDS processor that supports 1 or 2 omnidirectional view cameras. If equipped with 1 omnidirectional view camera, ensure the VIVDS processor is also capable of simultaneously supporting up to four more traditional view cameras for special needs such as advance detection or underpass detection.


A. Detection Zone Placement.

   (1) Provide a hemispherical video detection system with flexible detection zone placement anywhere within the combined field of view of the image sensors. Ensure that preferred presence detector configurations are arbitrarily shaped polygons, including simple boxes, drawn across lanes of traffic or placed in line with lanes of traffic.

   (2) Ensure a single detector is able to replace one or more conventional detector loops.

B. Detection Zone Programming.

   (1) Ensure that a graphical interface video image of the roadway is used for the placement of detection zones.

   (2) Ensure the monitor shows images of the detection zones superimposed outlined or filled, with a visible change indicating detection on the video image of traffic while the VIVDS processor is running verifying proper operation of the detection
system. Provide a VIVDS processor with a display that will indicate proper operation of the detection zones with the absence of video.

(3) Ensure the detection zones are created using the mouse or keypad to draw detection zones on the monitor and are capable of being sized and shaped to provide optimal road coverage and detection. Ensure that detector configurations can be uploaded to the VIVDS processor and that the detector configuration that is currently running can be retrieved from the VIVDS processor.

(4) Ensure that the mouse or keypad can be used to edit previously defined detector configurations so as to fine tune the detection zone placement, size and shape. Ensure that detection continues to operate from the detector configuration that is currently called while fine-tuning is being done.

(5) Ensure that the hemispherical video detection system is sensitive to the direction of vehicle travel with the direction to be detected by each detection zone to be user programmable. Ensure the vehicle detection zone does not activate from cross-street traffic, wrong way traffic, or from a vehicle traveling any direction other than the one specified for detection occupies the detection zone.

(6) Ensure detection zones have the option for the user to define that calls can be made with a side entrance (90 degrees or less angled entrance).

C. Design Field of View. Ensure the hemispherical video detection system can reliably detect vehicle presence in the design field of view. Ensure the design field of view is defined as the sensor view when the image sensor is mounted 30 feet or higher above the roadway, when the camera is adjacent (within 15 feet) to the edge of the nearest vehicle travel lane, and when the length of the detection area is not greater than 5 times the mounting height of the image sensor. Within this design field of view, ensure the VIVDS processor unit is capable of setting up a single detection zone for point detection (equivalent to the operation of a 6 foot by 6 foot inductive loop). Ensure a single camera, placed at the proper mounting height, is able to monitor up to and including 5 traffic lanes simultaneously. Ensure a single omnidirectional camera, placed at the proper mounting height, is able to monitor detection zones in at least intersection approaches.

D. Detection Performance. Ensure detection accuracy of the video detection system is comparable to properly operating inductive loops. Detection accuracy must include the presence of any vehicle in the defined detection zone regardless of the lane which the vehicle is occupying. Occlusion produced by vehicles in the same or adjacent lanes is not considered a failure of the VIVDS processor, but a limitation of the camera placement. Ensure detection accuracy (a minimum of 95 percent) is enforced for the entire design field of view on a lane by lane and on a time period basis. When specified on the plans, furnish up to 24 continuous hours of recorded video of all installed intersection cameras within the 30 day test period for verification of proper camera placement, field of view, focus, detection zone placement, processor setup and operation. The video from each camera must show vehicle detections for all zones.

4. VIVDS Processor.

A. Provide a VIVDS processor that is shelf mountable.
B. Provide a VIVDS processor that has a modular electrical design.

(1) The VIVDS processor must operate within a range of 89 to 135 volts alternating current (VAC), 60 Hertz (Hz) single phase. Ensure power to the VIVDS processor is from the transient protected side of the AC power distribution system in the traffic control cabinet in which the VIVDS processor is installed.

(2) Ensure communications to the field setup computer are through an Ethernet port. Ensure this port is able to download the real time detection information needed to show detector actuations.

(3) Ensure the VIVDS processor has an Ethernet connection on the front of the unit for the connection to the first camera. If a second camera is installed at the intersection, the camera will connect with the VIVDS processor through a connector mounted on the side of the processor.

(4) Provide a unit that is equipped with a single VGA video output. Ensure this output is capable of displaying the operation and detections of the VIVDS processor.

(5) Ensure the change log for all software upgrades and/or changes are presented on a readily assessable internet site with unencumbered public access.

(6) The unit software and the supervisor software must include diagnostic software to allow testing the VIVDS functions. This must include the capability to set and clear individual detector outputs and display the status of inputs to enable setup and troubleshooting in the field.

C. Provide camera interface panel capable of being mounted to sidewalls of a controller cabinet for protection of the VIVDS processor and camera CAT5e connection. The panel must consist of, as a minimum, two CAT5e cable surge protection connections.

D. Environmental Requirements.

(1) Provide a VIVDS processor that is designed to operate reliably in the adverse environment found in the typical roadside traffic cabinet.

(2) Ensure that the VIVDS processor meets the environmental requirements set forth by the latest NEMA TS1 and TS2 standards as well as the environmental requirements for Type 170, Type 179 and 2070 controllers.

(3) Ensure the operating temperature is from -30 degrees Fahrenheit (F) to +165 degrees F at 0 percent to 95 percent relative humidity, non-condensing.

5. Hemispherical Camera Assembly.

A. Provide a hemispherical camera that:

(1) Uses high resolution, color image sensors as the video source for real time vehicle detection;

(2) Uses cameras that are approved for use with the VIVDS processor unit by the
supplier of the hemispherical video detection system.

(3) As a minimum, provides the following capabilities:

(a) Ensure images are produced with a complementary metal-oxide semiconductor (CMOS) sensing element with horizontal resolution of at least 2580 lines and vertical resolution of at least 1920 lines. Ensure images are output in digital format as Motion Joint Photographic Experts Group (MJPEG) image.

(b) Ensure the useable video and resolvable features in the video image are produced when those features have luminance levels as low 1.0 lux for color, for night use and as high as 10,000 lux during the day.

(c) Ensure the camera includes an electronic shutter control based upon average scene luminance and is equipped with fixed field of view and fixed focus lens which does not require opening the camera enclosure. Ensure the fixed focus lens is always in focus without any required end-user adjustments.

B. Provide a camera and lens assembly that is housed in an environmental enclosure that provides the following capabilities:

(1) Ensure the enclosure is waterproof and dust tight to the NEMA 4 specifications.

(2) Ensure the enclosure allows the camera to operate satisfactorily over an ambient temperature range from -30 degrees F to +165 degrees F while exposed to precipitation as well as direct sunlight.

(3) Ensure the enclosure includes a provision for connection of the CAT5e cable. Ensure input power to the environmental enclosure is included in the Ethernet interface.

(4) Provides a thermostatically controlled heater at the front of the enclosure to prevent the formation of ice and condensation. The heater must not interfere with the operation of the camera electronics, and it must not cause interference with the video signal.

(5) Ensure the enclosure is light colored or unfinished and is designed to minimize solar heating. Any plastics used in the enclosure must include ultra violet inhibitors.

(6) Ensure the total weight of the image sensor in the environmental enclosure is less than 10 pounds.

(7) Provides waterproof quick disconnect connectors to the camera for the CAT5e connection.

(8) Provides camera mounting hardware that allows for vertical or horizontal mounting to the camera enclosure.

6. Field Communication Link.

A. Provide a field communications link that supports a two way communications
connection from the camera to the VIVDS processor.

B. In locations where the plans indicate CAT5e cable is required as the primary communications link, ensure this cable is burial grade as well as suitable for above ground direct sunlight applications.

C. Ensure all connection cables are continuous from the equipment cabinet to the camera connector.

D. Install lightning and transient surge suppression devices on the processor side of the field communications link to protect the peripheral devices. Ensure the suppression devices are all solid state. The devices must present high impedance to, and must not interfere with, the communications lines during normal operation. The suppression devices must not allow the peak voltage on any line to exceed 300 percent of the normal operating peak voltage at any time. The response time of the devices must not exceed 5 nanoseconds.

7. Warranty. Provide materials with a 3-year 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. Install and/or remove the hemispherical video detection system and/or hemispherical video detection camera as indicated on the plans or as directed by the Engineer. All work must comply with sections 819 and 820 of the Standard Specifications for Construction, the applicable “typical” signal construction detail, and this special provision. Storage and/or disposal of the removed material is included and must comply with section 204 of the Standard Specifications for Construction or as directed by the Engineer.

1. Ensure the hemispherical video detection system is installed as recommended by the manufacturer and documented in installation materials provided by the manufacturer.

2. Ensure the camera equipment is not installed until all other signal equipment has been installed and inspected for correctness. Premature installations of camera equipment that need to be moved in order to make the system operate will be moved at the Contractor’s cost. This movement will not qualify for extra payment or for time extensions. Deliver the VIVDS processor to the MDOT Statewide Signal shop or the inspecting agency representing MDOT for setup and installation in the controller cabinet.

3. Install or remove the hemispherical video detection system as indicated on the plans which includes the VIVDS processor, hardware, fittings, cable, connectors, grounding and all other material required to complete the work.

4. Install or remove the hemispherical video detection camera as indicated on the plans which includes the video detection camera, enclosure, mounting bracket, hardware, cable, connectors, and other 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
---|---
DS_Hemispherical Video Detection Camera | Each
DS_Hemispherical Video Detection System | Each
DS_Hemispherical Video Detection Camera, Rem | Each
DS_Hemispherical Video Detection System, Rem | Each
DS_Hemispherical Video Detection Camera, Salv | Each
DS_Hemispherical Video Detection System, Salv | Each

1. **DS_Hemispherical Video Detection Camera** includes everything necessary to ensure a complete and operating job, which detects vehicles on multiple roadway approaches at an intersection, as shown on the plans or as directed by the Engineer.

2. **DS_Hemispherical Video Detection System** includes everything necessary to ensure a complete and operating job, as shown on the plans or as directed by the Engineer.

3. **DS_Hemispherical Video Detection Camera, Rem** includes removing, storing and disposing of removed material for a hemispherical video detection camera.

4. **DS_Hemispherical Video Detection System, Rem** includes removing, storing and disposing of removed material for a hemispherical video detection system.

5. **DS_Hemispherical Video Detection Camera, Salv** includes removing an existing hemispherical video detection camera, storing the removed materials on site, and reinstalling materials at a location shown on the plans.

6. **DS_Hemispherical Video Detection System, Salv** includes removing an existing hemispherical video detection system, storing the removed materials on site, and reinstalling materials at a location shown on the plans.
a. Description. This work consists of completing one or more of the following work types at location(s) shown on the plans:

   1. Furnishing and installing a traffic signal backplate.

   2. Removing and disposing of an existing traffic signal backplate.

   3. Removing, storing and reinstalling an existing traffic signal backplate.

As applicable, this work includes removal or installation of hardware, connectors, fittings and all material necessary to complete the work.


   1. Provide a one-piece backplate for three or four section traffic signal heads as indicated on the plans or as directed by the Engineer. Ensure that five section (doghouse) signal head combinations are provided with no more than three vacuum formed pieces.

   2. Provide backplates that are designed to precisely fit the manufacturer’s signal heads and supplied with necessary hardware to attach the backplate to the signal.

   3. Provide backplates that are vacuum formed from 0.125 inch thick black acrylonitrile butadiene styrene (ABS) plastic with a hair cell finish on the front side (facing approaching traffic) to reduce glare.

   4. Provide backplates that are constructed with a minimum 5/8 inch flange on all sides to provide structural rigidity. Ensure the backplates are provided with a three inch corner radius.

   5. Ensure that all backplates extend approximately five inches around the perimeter of the traffic signal combinations after installation.

   6. Provide backplates with an ASTM Type IV reflective yellow tape border. Ensure that a one inch border is used with yellow signal heads and visors, and a two inch border is used with black signal heads and visors.

   7. Warranty. Provide materials with a manufacturer’s warranty/guarantee, transferable to MDOT, that the supplied materials will be free from all defects in materials and workmanship for the stated time period from the date of shipment. Supply the Engineer with any warranty or guarantee documents from the manufacturer and a copy of the invoice showing date of...
c. Construction. Complete this work in accordance with sections 819 and 820 of the Standard Specification 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 Specification for Construction.

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

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Backplate, TS</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Backplate, TS, Rem</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Backplate, TS, Salv</td>
<td>Each</td>
</tr>
</tbody>
</table>

1. **DS_Backplate, TS** includes installing the backplate on existing or new signal head(s) at location(s) shown on the plans where installation is specified. Furnish and install a traffic signal backplate, as indicated on the plans or as directed by the Engineer.

2. **DS_Backplate, TS, Rem** includes removing the existing backplate, hardware, and other appurtenances, required for a complete removal where removal is specified. Dispose of removed materials.

3. **DS_Backplate, TS, Salv** includes removing the existing backplate, hardware, and other appurtenances required for a complete removal, storing salvaged materials in a clean environment, and reinstalling the materials where salvage is specified. Complete reinstallation in accordance with subsection c. of this special provision.
a. **Description.** This work consists of furnishing, fabricating, and erecting a traffic signal mast arm pole and mast arm as shown on the plans, in accordance with the standard specifications, and as specified herein. This special provision is for an anchor base type steel mast arm pole, including mast arms, and other associated hardware required to complete the work.

b. **Material.** Furnish material in accordance with sections 906 and 908 (as modified by 20SP-908A - Miscellaneous Metal Products Revisions) of the Standard Specifications for Construction and this special provision.

Material specifications for the traffic signal mast arm pole and mast arm are included in Table 1.

<table>
<thead>
<tr>
<th>Component</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pole Tube</td>
<td>ASTM A595/A595M GR A or ASTM A572/A572M GR 50</td>
</tr>
<tr>
<td>Mast Arm Tube</td>
<td>ASTM A595/A595M GR A or ASTM A572/A572M GR 50</td>
</tr>
<tr>
<td>Mast Arm Clamp</td>
<td>ASTM A36/A36M</td>
</tr>
<tr>
<td>Gusset Plate</td>
<td>ASTM A36/A36M</td>
</tr>
<tr>
<td>Hand Hole Frame</td>
<td>ASTM A705/A705M or ASTM A572/A572M GR 50</td>
</tr>
<tr>
<td>Lifting Pipe</td>
<td>ASTM A53/A53M GR B or ASTM A501/A501M</td>
</tr>
<tr>
<td>Hand Hole Cover</td>
<td>ASTM A1011/A1011M GR 36</td>
</tr>
<tr>
<td>Pole Top</td>
<td>ASTM B26/B26M (356F or 43)</td>
</tr>
<tr>
<td>Stainless Steel Hardware</td>
<td>AISI 300 SERIES (18-8)</td>
</tr>
<tr>
<td>Luminaire Arm Bolts</td>
<td>ASTM F3125/F3125M GR A325</td>
</tr>
<tr>
<td>Mast Arm Studs</td>
<td>ASTM A449</td>
</tr>
<tr>
<td>Mast Arm Shear Bolts</td>
<td>ASTM F3125/F3125M GR A325</td>
</tr>
<tr>
<td>“ANCO” Lock Nuts or Equivalent</td>
<td>ASTM A563 GR DH</td>
</tr>
<tr>
<td>Flat Washers</td>
<td>ASTM F436/F436M</td>
</tr>
<tr>
<td>Lock Washers</td>
<td>ANSI B18.21.1</td>
</tr>
<tr>
<td>Base Plate</td>
<td>ASTM A36/A36M</td>
</tr>
<tr>
<td>Bottom Steel Template</td>
<td>ASTM A36/A36M</td>
</tr>
<tr>
<td>Back Plate</td>
<td>ASTM A36/A36M</td>
</tr>
<tr>
<td>Mast Arm Plate</td>
<td>ASTM A36/A36M</td>
</tr>
<tr>
<td>Steel Plate and Shape Finish</td>
<td>ASTM A123/A123M</td>
</tr>
<tr>
<td>Hardware Finish</td>
<td>ASTM A153/A153M</td>
</tr>
</tbody>
</table>
Use high strength bolts, nuts, and washers in accordance with subsection 906.07 of the Standard Specifications for Construction.

Blast clean fabricated components with a nominal thickness greater than 1/2 inch to remove mill scale and welding slab before galvanizing. For components with a nominal thickness of 1/2 inch or less, blast cleaning can be waived if the galvanizer inspects the material and provides a written statement to the fabricator that blast cleaning is not required. Otherwise blast cleaning is required.

Furnish a vibration mitigation device as shown on the plans. Ensure the device is an active, non-aerodynamic vibration damper system. Ensure the installed device can reduce the loaded maximum vertical movement at the tip of the arm to 8 inches measured from the highest to the lowest point of deflection at wind speeds of 5-20 mph. The device must furnish and the documentation must show an 85 percent or greater excitation reduction for the structures where the device is being installed. Ensure effectiveness is proven through an analytical model and approved by the Engineer. Test the device to withstand over 15 million large amplitude cycles with no deterioration of the dampening performance. Ensure the device can dampen large displacements and small displacements, be self-adapting, and not require structure-specific tuning.

Structural steel material used to fabricate the traffic signal mast arm pole and mast arm will be accepted based on “Fabrication Inspection” per the MQAP Manual. Mast arm studs, mast arm shear bolts, and luminaire arm bolts will be accepted based on “Test” per the MQAP Manual.

c. Fabrication. Fabricate and weld in accordance with section 707 of the Standard Specifications for Construction.

1. Fabricate structure in accordance with City Standard Plan 50400-B83.


3. Ensure the pole and arm tubes have a uniform taper.

4. Ensure the pole and mast arm tubes are single ply and round or 16-sided.

5. Tolerance for overall length of pole tube and arm tube(s) is ±1/8 inch. Tolerance for sweep and camber of pole tube and arm tube(s) is 1/8 inch per 10 foot. Tolerance for twist of pole tube and arm tube(s) is ±10 degrees.

6. The pole and mast arm tubes cannot have more than two longitudinal welds. Roll or grind flush the longitudinal seam weld. Transverse welds in the pole and arm tubes are prohibited.

7. Attach the arm tube to a mast arm plate by a full penetration weld. Shop drill holes in mast arm back plate and shop weld pipes to the mast arm back plate.

8. Ensure all welds are 100 percent VT inspected by an AWS CWI.

9. Ensure all fillet welds are MT inspected in accordance with subsection 707.03.D.12 of the Standard Specifications for Construction, except testing frequency must be 25 percent.
10. Ensure all PJP longitudinal seam welds are MT inspected in accordance with subsection 707.03.D.12 of the Standard Specifications for Construction, except testing frequency must be 10 percent.

11. Ensure all CJP welds are 100 percent UT inspected per subsection 819.03.D.2 of the Standard Specifications for Construction. Acceptance criteria for material thickness equal to or greater than 5/16 inch will be in accordance with the cyclically loaded nontubular connections in tension criteria stated in AWS Clause 6.

12. Evenly space the pole base plate holes so the pole may be bolted to a concrete foundation as shown on the plans. Finish the lower surface of the base plate flat and at 90 degrees to the pole axis.

13. Furnish a handhole opening and cover. Weld a reinforcing frame to the pole for the handhole opening. Ensure the placement of the hand hole does not reduce the strength of the pole. Securely fasten the handhole cover using stainless steel hex head cap screws or by an approved locking device.

14. Furnish a suitable pole top with means for securing it to the top of the pole.

15. Furnish a hook or other suitable device for the support of cable on the inside of the pole near the top.

16. Weld square stock that has been drilled and tapped to the inside of the handhole so that it is readily accessible from the handhole for grounding purposes.

17. Fabricate the arm to pole upright connection to compensate for mast arm deflection. Show this detail on shop drawings for approval by the Engineer.

18. The manufacturer must submit all the necessary documentation and testing of the vibration mitigation device to prove the device is effective for their structures.

19. Ensure steel plates and shapes are hot-dip galvanized in accordance with subsection 716.03.B.4 of the Standard Specifications for Construction. If mast arms are required to have a duplex coating, ensure the coating is in accordance with 20SP-716A - Coating of Galvanized Lighting, Signal, Sign, and Miscellaneous Support Structures.

20. Submit shop drawings in accordance with subsection 707.03.A of the Standard Specifications for Construction.

21. Ultrasonically test (UT) the toe of the weld connecting the upright to the transverse base plate after galvanizing at each corner of multi-sided uprights. Perform UT in accordance with AWS D1.1 using a small angle beam transducer capable of detecting shallow toe cracks.

d. Erection. Tighten anchor bolts in accordance with subsections 810.03.N.2 and 810.03.N.3 of the Standard Specifications for Construction (as modified by 20SP-810H - Permanent Traffic Signs and Supports Revisions).

Bolt the arm tube to the pole tube as shown on the plans. Field drill holes through the pole tube using the pipes shop welded to the mast arm back plate as guides. Do not field drill the mast arm back plate. Repair the galvanization coating after any field drilling. Control distortion of flange
plates for flatness to assure full contact between mating surfaces in an unbolted, relaxed condition.

Tighten pole cap, mast arm cap, and luminaire arm high strength bolts to a snug tight condition in accordance with 707.03.E.6.c of the Standard Specifications for Construction.

Furnish the Engineer 5 working days notification prior to the start of installation so they may witness or monitor the contractor's activities.

e. **Construction.** Ensure all work complies with sections 818, 820, and subsection 810.03 (as modified by 20SP-810H – Permanent Traffic Signs and Supports Revisions) of the Standard Specifications for Construction, the applicable signal construction plan sheets, and this special provision.

Perform repairs to galvanized surfaces in accordance with subsection 716.03.E of the Standard Specifications for Construction.

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

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Mast Arm Pole, Cat__</td>
<td>Each</td>
</tr>
<tr>
<td>DS_Mast Arm, __ foot, Cat__</td>
<td>Each</td>
</tr>
</tbody>
</table>

DS_Mast Arm Pole, Cat__ and DS_Mast Arm, __ foot, Cat__ includes furnishing all materials, fabrication, shop cleaning, galvanizing, shipping, and erection. Payment for providing and installing the vibration mitigation device where required and submitting all required information is included in the pay item DS_Mast Arm, __ foot, Cat__.

No extension of time or additional compensation will be granted due to obtaining the proper AISC certifications and/or endorsements required for this project.

Construction of the foundation will be included in other items.
a. Description

This work consists of furnishing and installing all components of the Mast Arm Pole Foundation as shown on the plans or as directed by the Engineer. The Mast Arm Pole Foundation shall be in accordance with the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction and as specified herein.

b. Materials

The Contractor shall furnish materials in accordance with Sections 718, 818, 819, and 820 of the MDOT 2020 Standard Specifications for Construction, except where otherwise noted.

All materials for the Mast Arm Pole Foundation shall be manufactured following the Traffic Signal Pole Foundation City Standard SD-SL-2.

c. Construction

The Mast Arm Pole Foundation shall be laid out for approval by the Engineer before installation. The Mast Arm Pole Foundation shall be placed at the intersection as shown on the plans. The Mast Arm Pole Foundation shall be installed per Traffic Signal Pole Foundation City Standard SD-SL-2.

d. Measurement and Payment

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

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Mast Arm Pole Fdn, Modified</td>
<td>Ft</td>
</tr>
</tbody>
</table>

**DS_Mast Arm Pole Fdn, Modified** will be measured by the quantity shown on the plans and as specified herein and includes payment for all labor, equipment, and materials required to complete the work. Payment for accessories required for installation shall not be paid separately but shall be included in the corresponding pay item.
NOTES:

1. HOLE TO BE AUGERED. MINIMIZE DISTURBANCE OF IN-SITU SOILS DURING AUGERING.

2. CONTRACTOR TO PROVIDE PREFABRICATED ANCHOR BOLT BUILD-UP.

3. THE CITY WILL INSPECT THE AUGERED HOLE AND THE ANCHOR BOLT BUILD-UP AND PROVIDE WRITTEN APPROVAL PRIOR TO THE PLACEMENT OF CONCRETE.

4. NO WATER IS TO BE IN HOLE AT TIME OF CONCRETE PLACEMENT.

5. CONCRETE SHALL BE VIBRATED DURING PLACEMENT.

6. CONTRACTOR WILL PROVIDE NECESSARY CONDUIT FOR CABLE ENTRY. THE CONDUIT WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THIS ITEM OF WORK.

* UNLESS OTHERWISE NOTED ON THE PLANS OR CONTRACT DOCUMENTS
a. **Description.** This work consists of installing long life LED traffic signals. Adhere to the standard specifications for all other requirements for traffic signals not specifically listed in the requirements of this special provision.

b. **Materials.** Ensure materials are in accordance with sections 918 and 921 of the Standard Specifications for Construction, the MMUTCD and the requirements of this special provision.

1. **LED Module.** Furnish LED modules consisting of high flux LEDs mounted on a metal core circuit board and LED electrical contacts soldered to the circuit board. Furnish all power supplies with conformal coating for additional protection and solid connections (no connectors) between driver and LED light engine. Furnish non-electrolytic capacitors to enhance long life.

Furnish green LEDs that use indium gallium nitride technology. Furnish green LED traffic signal modules that do not illuminate if the applied voltage is less than 35 VAC.

Furnish yellow LEDs that use indium gallium nitride technology, absorbing substrate or transparent substrate. Furnish yellow LED traffic signal modules that do not illuminate if the applied voltage is less than 35 VAC.

Furnish LED modules for traffic signals with the following maximum power consumption:

A. Eight inch and 12-inch red ball traffic signal modules with a maximum power consumption no greater than 8 watts and 9 watts respectively, at 120 VAC, at 77 °F;

B. Eight inch and 12-inch yellow ball traffic signal modules with a maximum power consumption no greater than 8 watts and 13 watts, respectively, at 120 VAC, at 77 °F;

C. Eight inch and 12-inch green ball traffic signal modules with a maximum power consumption no greater than 7 watts and 9 watts, respectively, at 120 VAC, at 77 °F;

D. Twelve inch red arrows with a maximum power consumption no greater than 7 watts at 120 VAC, at 77 °F;

E. Twelve inch yellow arrows with a maximum power consumption no greater than 14 watts at 120 VAC, at 77 °F; and

F. Twelve inch green arrows with a maximum power consumption no greater than 9 watts at 120 VAC, at 77 °F.
2. Lens. Furnish an LED signal module lens made from UV-stabilized polycarbonate. Use lenses that are color tinted red, yellow, and green. Furnish a hard-coated lens or a lens that otherwise complies with the material exposure and weathering effects requirements of SAE J576.

For arrows incorporate a black arrow mask behind the outer lens to define the arrow icon. Furnish an outer lens with raised optical detail on the inner surface to distribute the light rays to meet the intensity and distribution standards required by this subsection.

3. Operational Requirements. Furnish LED traffic signal modules that meet the minimum intensity requirements while operating from temperatures of -40 °F to 165 °F for 15 years.

4. Warranty. Furnish 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. Furnish and install the long life LED traffic signals as shown on the plans or as directed by the Engineer. All work must comply with sections 819 and 820 of the Standard Specifications for Construction and this special provision. Storage and/or disposal of removed material is included and must comply with section 204 of the Standard Specifications for Construction or as directed by the Engineer.

Install, direct, and mask the signal indication(s) in accordance with the manufacturer's recommendation and the visibility requirements 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 items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_TS, __ Way __ Mtd (LED), Long Life</td>
<td>Each</td>
</tr>
<tr>
<td>DS_TS, __ Way __ Mtd, __ (LED), Long Life</td>
<td>Each</td>
</tr>
</tbody>
</table>
CITY OF ANN ARBOR

SPECIAL PROVISION
FOR
TRAFFIC SIGNAL CONTROLLER

HRC: NBN 1 of 1 4/25/2024

a. Description

This work consists of furnishing and installing all components of the Traffic Signal Controller as shown on the plans or as directed by the Engineer. The Traffic Signal Controller shall be in accordance with the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction and as specified herein.

b. Materials

The Contractor shall furnish materials in accordance with Section 820 of the MDOT 2020 Standard Specifications for Construction, except where otherwise noted.

All materials for the Traffic Signal Controller shall be manufactured by Siemens or an approved equal by the Engineer. The model includes the Siemens m60 Series ATC for a NEMA-style cabinet and all associated hardware that includes, but not limited to, adaptor cables and connectors.

For further Traffic Signal Controller information, contact Shane Foster at Yunex Traffic, (586) 488-8073 or shane.foster@yunextraffic.com.

c. Construction

The Traffic Signal Controller shall be laid out for approval by the Engineer before installation. The Traffic Signal Controller shall be placed in the cabinet as shown on the plans. The Traffic Signal Controller shall be installed per manufacturer recommendations.

d. Measurement and Payment

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

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Controller, NEMA, ATC Type, Modified</td>
<td>Ea</td>
</tr>
</tbody>
</table>

DS_Controller, NEMA, ATC Type, Modified will be measured by the quantity shown on the plans and as specified herein and includes payment for all labor, equipment, and materials required to complete the work. Payment for accessories and mounting hardware required for installation shall not be paid separately but shall be included in the corresponding pay item. Furnishing and delivering the controller to the City of Ann Arbor Signs and Signals for controller timing setup and transporting the controller from the maintaining agency to the job site for installation is also included in the corresponding pay item. City of Ann Arbor Signs and Signals is located at the Wheeler Service Center, 4251 Stone School Rd, Ann Arbor, MI 48108. Contact Signs and Signals Supervisor, Marc Moreno at (734) 794-6350 x 43322 or mmoreno@a2gov.org.
a. Description

This work consists of furnishing and installing all components of the Traffic Signal Cabinet as shown on the plans or as directed by the Engineer. The Traffic Signal Cabinet shall be in accordance with the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction and as specified herein.

b. Materials

The Contractor shall furnish materials in accordance with Section 820 of the MDOT 2020 Standard Specifications for Construction, except where otherwise noted.

All materials for the Traffic Signal Cabinet shall be manufactured by Mobotrex or an approved equal by the Engineer. The model includes the Smart P Cabinet NEMA Size 6, and all associated hardware that includes, but not limited to, the PS-250 Heavy Duty Cabinet Power Supply from Eberle Design (EDI), BIU-700 NEMA TS-2 BUS Interface Unit from EDI, MMU2-16LEip with Ethernet Port Smart Monitor from EDI, SSS-87IO Data Sheet from PDC, SSF-87 Data Sheet from PDC, 295 Power Relay from Delta Controls, riser, and anchor bolt assembly.

For further Traffic Signal Cabinet information, contact Shane Foster at Yunex Traffic, (586) 488-8073 or shane.foster@yunextraffic.com.

c. Construction

The Traffic Signal Cabinet shall be laid out for approval by the Engineer before installation. The Traffic Signal Cabinet shall be placed at the intersection as shown on the plans. The Traffic Signal Cabinet shall be installed per manufacturer recommendations.

d. Measurement and Payment

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

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Cabinet, NEMA Type, Modified</td>
<td>Ea</td>
</tr>
</tbody>
</table>

**DS_Cabinet, NEMA Type, Modified** will be measured by the quantity shown on the plans and as specified herein and includes payment for all labor, equipment, and materials required to complete the work. Payment for accessories and mounting hardware required for installation shall not be paid separately but shall be included in the corresponding pay item. Furnishing and delivering the cabinet to the City of Ann Arbor Signs and Signals for cabinet setup and transporting the cabinet from the maintaining agency to the job site for installation is also included in the corresponding pay item. City of Ann Arbor Signs and Signals is located at the
Wheeler Service Center, 4251 Stone School Rd, Ann Arbor, MI 48108. Contact Signs and Signals Supervisor, Marc Moreno at (734) 794-6350 x 43322 or mmoreno@a2gov.org.
a. Description. This work consists of installing a LED illuminated street name sign, which includes the associated assembly, brackets, hardware, fittings, cable, connectors, wiring, grounding, and all other material required to complete the work.

b. Materials. Material must meet sections 918 and 921 of the Standard Specifications for Construction and this special provision.

1. General Requirements. The sign assembly must consist of a 6 or 8 foot aluminum body with white LEDs. The sign assembly must consist of two faces, as specified. Overall sign dimensions must be 72½ inches long by 229/16 inches high for the 6 foot sign and 96½ inches long by 225/16 inches high for the 8 foot sign. Signs must be 10¾ inches deep at the top (including the drip edge) and 5¾ inches deep at the bottom. The 6 foot sign must weigh no more than 75 pounds and the 8 foot sign must weigh no more than 90 pounds. When mounted, the sign must provide a five degree downward angle for increased visibility.

The body of the sign must consist of an aluminum housing. Extrude the top from 6063-T5 aluminum alloy with a minimum thickness of 0.140 inches. Ensure there are drip rails overhanging the sign face to prevent water from entering the electrical housing.

Extrude the bottom of the sign from 6063-T5 aluminum alloy with a minimum thickness of 0.09 inches. Cast the ends of the sign from 356 aluminum having a minimum thickness of 0.250 inches.

Continuously weld all seams for a weather tight seal. Locate four drain holes in the bottom of the body, two at each end of the sign.

Etch and prime the exterior of the sign in accordance with industry standards before receiving two color coats of industrial enamel. Ensure all fasteners and hardware are corrosion resistant.

Ensure the legend of the sign is as indicated on the plans.

Ensure the size of the sign is as indicated on the plans.

2. Door Requirements. The aluminum doors must have one side removable for access to the sign face. Each door must have a full length 0.040 inch by 1½ inch open stainless steel hinge on the bottom edge. Secure the door from opening by six quarter turn air lock fasteners. Install PVC foam gaskets or a neoprene gasket, 5/32 inch thick by 1 inch wide, to provide a watertight seal between the door and housing.

3. Sign Face Requirements. Construct the sign face of 0.125 inch thick Lexan (a transparent plastic (polycarbonate) of high impact strength) SG404-7329 white translucent
polycarbonate. Ensure letter style is Clearview Highway 2W font with 12 inch upper case and proportional lower case letters. Ensure the sign face legend background is translucent with vinyl green electrically cuttable film applied to the front of the sign face. Frame the legend by a white polycarbonate border.

4. Electrical. Design the LED case sign to operate on 120 Volt, 60 Hertz, single phase alternating current (AC) power. Ensure the input voltage is reduced and power-conditioning circuitry is provided so that the LED’s current will operate at the manufacturer’s recommended current.

The LED light module must consist of adequate LED’s to provide a minimum of 200 nits or an equivalence of 660 lux over a -40 °F to 165 °F ambient temperature consistent with the NEMA temperature specifications. Ensure there are a sufficient quantity of white LEDs to uniformly illuminate the viewing area.

The LED light module must consist of a circuit board comprised of an insulate aluminum substrate, with a minimum thickness of 0.050 inch.

The LED light module must operate for a minimum of 50,000 hour life with no more than 30 percent lumen depreciation. The LED supplier must provide operational documentation, if requested, based on actual temperature measurements (taken after 12 continuous hours of operation) correlated against lumen depreciation and LED mortality curves.

Ensure the LED light engine electronics are entirely coated not thinner than 0.002 inch (dry), to adequately protect the light engine from moisture and corrosion. Ensure the LED module is Reduction of Hazardous Substances (ROHS) compliant.

Provide a sufficient quantity of white LED’s to uniformly illuminate the view area. The failure of one LED must not reduce the light output by more than eight percent per foot of sign face.

Ensure circuit conductors and LED attachment adhesive is minimally 90 percent silver to ensure optimal electrical and thermal conductivity.

Attach the LED light module to the case sign housing in such a manner that it will remain properly in place during maintenance or retro-fit activities. The LED light module must pass the following tests per NEMA standards:

A. Thermal Shock Test. 85/-40 °F with 2 hour dwells for five cycles with a 2 hour presoak at -40 °F.

B. Salt Spray and Soak Test. The LED light module must endure 48 hours on continuous salt spray and 240 hours of salt-water soak.

Burn-in all LED light modules for 24 hours and certified for compliance by the manufacturer. Ensure the manufacturer’s name, date of manufacture, and a QC tracking sticker are mounted on the inside of the LED light module.

The LED light modules must not exceed a 59 °F (15 °C) temperature rise under continuous operating conditions.
Provide power supplies rated for 100 watts by UL for Class 2 operation (24 VDC) and IP66 rated for outdoor use. Ensure two power supply are used for two-way signs. Ensure the temperature rise of the LED panel does not exceed 59 ºF (15 ºC) under continuous operating conditions at the rated output.

5. Mounting Brackets. Mount the signs as specified on the plans.

6. Warranty. Provide materials with a manufacturer’s warranty/guarantee, transferable to MDOT, that the supplied materials will be free from all defects in materials and workmanship for the stated time period from the date of shipment. Supply the Engineer with warranty/guarantee documents from the manufacturer and a copy of the invoice showing the date of shipment.

c. Construction. Furnish and install, an LED street name sign, as indicated on the plans or as directed by the Engineer. Ensure work complies with sections 819 and 820 of the Standard Specifications for Construction and this special provision.

Design the wiring for 600 volts at 90 ºF using a minimum #18 AWG stranded soft annealed copper wire. Secure all wiring using insulated wire compression nuts. Furnish a wire entrance junction box with the sign assembly which provides a weather-tight seal. No wiring is allowed within the optical cavity.

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:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_St Name Sign, Two Way, LED, ___ foot</td>
<td>Each</td>
</tr>
</tbody>
</table>
CITY OF ANN ARBOR

SPECIAL PROVISION
FOR
ROADSIDE UNIT, REMOVE AND SALVAGE

HRC: NBN 1 of 1 4/25/2024

a. Description

This work consists of removing, storing, and reinstalling an existing Roadside Unit at the location shown on the plans.

This work includes removal, storing, and installation of interface equipment, mounting assembly, brackets, hardware, fittings, connectors, wiring, cable to controller, grounding, risers, conduit, and any other material required to ensure a complete removal and installation. The removal and salvage of the Roadside Unit shall be in accordance with the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction and as specified herein.

b. Materials

None specified.

c. Construction

The Roadside Unit shall be place on a pole as shown on the plans and as directed by the Engineer. Remove the existing Roadside Unit, store salvaged materials in a protected and clean environment, and reinstall the materials.

d. Measurement and Payment

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

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS_Roadside Unit, Rem and Salv</td>
<td>Ea</td>
</tr>
<tr>
<td>DS_Roadside Unit, Install Salv</td>
<td></td>
</tr>
</tbody>
</table>

**DS_Roadside Unit, Rem and Salv and DS_Roadside Unit, Install Salv** will be measured by the quantity shown on the plans and as specified herein and includes payment for all labor, equipment, and materials required to complete the work. Payment for accessories and mounting hardware required for installation shall not be paid separately but shall be included in the corresponding pay item.
### MILLER AVENUE REHAB BENCHMARKS

<table>
<thead>
<tr>
<th>BM #</th>
<th>ELEV</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>797.186</td>
<td>SET ANCHOR CHAIN IN SUPPORT PILE FOR SIGNALS @ N.W. CORNER OF MILLER AND SPRING</td>
</tr>
<tr>
<td>2</td>
<td>792.872</td>
<td>SET IR SPIKE IN N. SIDE OF U.P. ON S. SIDE OF MILLER AT CHAPIN</td>
</tr>
<tr>
<td>3</td>
<td>794.390</td>
<td>SET IR SPIKE IN N. SIDE OF U.P. ON S. SIDE OF MILLER AT MAPLE ST.</td>
</tr>
<tr>
<td>4</td>
<td>798.274</td>
<td>SET IR SPIKE IN N. SIDE OF U.P. ON S. SIDE OF MILLER AT 740 MILLER APARTMENTS</td>
</tr>
<tr>
<td>5</td>
<td>805.975</td>
<td>SET IR SPIKE IN N. SIDE OF U.P. ON S. SIDE OF MILLER AT 800 MILLER APARTMENTS</td>
</tr>
<tr>
<td>6</td>
<td>818.597</td>
<td>SET RR SPIKE IN S.W. SIDE OF L.P. @ N.E. CORNER OF MILLER AND FOUNTAIN</td>
</tr>
<tr>
<td>7</td>
<td>833.388</td>
<td>SET RR SPIKE IN N. SIDE OF U.P. ON S. SIDE OF MILLER ACROSS FROM HSE NO. 620</td>
</tr>
<tr>
<td>8</td>
<td>839.564</td>
<td>SET RR SPIKE IN S. SIDE OF U.P. @ N.W. CORNER OF MILLER AND MINER</td>
</tr>
<tr>
<td>9</td>
<td>845.877</td>
<td>SET RR SPIKE IN N. SIDE OF U.P. ON S. SIDE OF MILLER IN FRONT OF MILLER APARTMENTS</td>
</tr>
<tr>
<td>10</td>
<td>852.220</td>
<td>SET RR SPIKE IN N. SIDE OF U.P. ON S. SIDE OF MILLER AT RED OAK</td>
</tr>
<tr>
<td>11</td>
<td>855.314</td>
<td>SET RR SPIKE IN S.W. SIDE OF L.P. @ N.E. CORNER OF MILLER AND SEVENTH</td>
</tr>
<tr>
<td>12</td>
<td>858.980</td>
<td>SET RR SPIKE IN N. SIDE OF U.P. AT NW CORNER OF MILLER AND FOUNTAIN</td>
</tr>
<tr>
<td>13</td>
<td>872.353</td>
<td>SET RR SPIKE IN N. SIDE OF U.P. ON S. SIDE OF MILLER AT APARTMENT NO. 500 AND 504</td>
</tr>
<tr>
<td>14</td>
<td>876.953</td>
<td>SET RR SPIKE IN S. SIDE OF U.P. ON S. SIDE OF MILLER @ S.E. CORNER OF MILLER AND Architecture</td>
</tr>
<tr>
<td>15</td>
<td>881.960</td>
<td>FND 60D NAIL IN N. SIDE OF U.P. ON S. SIDE OF MILLER BETWEEN HSE NO'S 1305 AND 1309</td>
</tr>
<tr>
<td>16</td>
<td>889.525</td>
<td>FND BOAT SPIKE IN U.P. @ SE CORNER OF MILLER &amp; LINDA VISTA</td>
</tr>
<tr>
<td>17</td>
<td>900.375</td>
<td>SET RR SPIKE IN S. SIDE OF L.P. AT NE CORNER OF MILLER AND NEWPORT</td>
</tr>
</tbody>
</table>

### CONSTRUCTION NOTES:
- Delays and damage to buildings, road property, and the like shall not be excused from the City's contractor, even if the damage is attributable to the wrong, neglect, or carelessness of the contractor or any of the contractor's subcontractors, agents, employees, or invitees;
- The contractor is solely responsible for all property located on the site of the work, including any structures, equipment, or materials placed thereon;
- The contractor is responsible for all work performed, and for the work of all subcontractors and material suppliers. The contractor shall be responsible for all work performed by subcontractors, even if those subcontractors are not under the direct control of the contractor;
- The contractor shall be responsible for the performance of the work, and for the failure to complete the work on time. The contractor shall be responsible for all work performed by subcontractors, even if those subcontractors are not under the direct control of the contractor;
- The contractor shall be responsible for all work performed, and for the work of all subcontractors and material suppliers. The contractor shall be responsible for all work performed by subcontractors, even if those subcontractors are not under the direct control of the contractor;
- The contractor shall be responsible for all work performed, and for the work of all subcontractors and material suppliers. The contractor shall be responsible for all work performed by subcontractors, even if those subcontractors are not under the direct control of the contractor;
- The contractor shall be responsible for all work performed, and for the work of all subcontractors and material suppliers. The contractor shall be responsible for all work performed by subcontractors, even if those subcontractors are not under the direct control of the contractor;
- The contractor shall be responsible for all work performed, and for the work of all subcontractors and material suppliers. The contractor shall be responsible for all work performed by subcontractors, even if those subcontractors are not under the direct control of the contractor;
- The contractor shall be responsible for all work performed, and for the work of all subcontractors and material suppliers. The contractor shall be responsible for all work performed by subcontractors, even if those subcontractors are not under the direct control of the contractor;
- The contractor shall be responsible for all work performed, and for the work of all subcontractors and material suppliers. The contractor shall be responsible for all work performed by subcontractors, even if those subcontractors are not under the direct control of the contractor;
- The contractor shall be responsible for all work performed, and for the work of all subcontractors and material suppliers. The contractor shall be responsible for all work performed by subcontractors, even if those subcontractors are not under the direct control of the contractor;
- The contractor shall be responsible for all work performed, and for the work of all subcontractors and material suppliers. The contractor shall be responsible for all work performed by subcontractors, even if those subcontractors are not under the direct control of the contractor;
- The contractor shall be responsible for all work performed, and for the work of all subcontractors and material suppliers. The contractor shall be responsible for all work performed by subcontractors, even if those subcontractors are not under the direct control of the contractor;
GENERAL NOTES
When designing or locating signs or devices, the Contractor shall consult the prevailing transportation agency to determine the specific requirements of the project.

Temporary traffic control devices for pedestrians are shown; other devices may be necessary to control vehicle traffic. The width and height of the sign shall allow the assembly to be maintained by two persons. When two pedestrian signs are shown, they shall be provided at the same location and are intended to be activated at the same time.

If a pedestrian sign is shown with an alternate opposing side of street detour or detour with trailblazing signs, the contractor shall coordinate this work with the Engineer a minimum of 72 hours (not including weekends) and/or end dates) and a Project Contact Number for 24/7 questions or reporting hazards.

Specific Notes

1. Temporary curb ramps with detectable warnings shall be used.
2. Temporary pavement markings for crosswalks shall be used.
3. Ampitheater square signs shall be used.
4. Temporary traffic control devices for pedestrians are shown. Other devices shall not be paid for separately, but shall be considered a part of the item of work "minor traffic devices." Other traffic control devices shall not be paid for separately, but shall be considered a part of the item of work "minor traffic devices."

Specific Traffic Control Notes

1. The Contractor shall maintain pedestrian temporary traffic control plans and provide temporary signs to the satisfaction of the City Engineer. The Contractor shall not store or place any construction materials, equipment or signs in the pedestrian path of travel.
2. The Contractor shall not store or place any construction materials, equipment or signs in the pedestrian path of travel.
3. The Contractor shall advise the City of any construction materials, equipment or signs in the pedestrian path of travel.
4. The Contractor shall provide temporary signs to the satisfaction of the City Engineer.
5. The Contractor shall provide temporary signs to the satisfaction of the City Engineer.
6. The Contractor shall provide temporary signs to the satisfaction of the City Engineer.
7. The Contractor shall provide temporary signs to the satisfaction of the City Engineer.

Legend

- Detour
- Pedestrian Channelization Device
- Temporary Pavement Markings
- Sign
- Surface Barriers
- Direction of Traffic
- Traffic Control Device
- Pedestrian Temporary Traffic Control Notes
- PEDESTRIAN DETOUR USING OPPOSITE SIDE OF STREET
- PEDESTRIAN TEMPORARY TRAFFIC CONTROL NOTES
- OTHER SIDE OF STREET DETOUR OR DETOUR WITH TRAILBLAZING SIGNS

For Corner Sidewalk Closure with Optional Temporary Crosswalk

1. The contractor shall maintain pedestrian temporary traffic control plans and provide temporary signs to the satisfaction of the City Engineer. The Contractor shall provide temporary signs to the satisfaction of the City Engineer.
2. The Contractor shall provide temporary signs to the satisfaction of the City Engineer.
3. The Contractor shall provide temporary signs to the satisfaction of the City Engineer.
4. The Contractor shall provide temporary signs to the satisfaction of the City Engineer.
5. The Contractor shall provide temporary signs to the satisfaction of the City Engineer.
6. The Contractor shall provide temporary signs to the satisfaction of the City Engineer.
7. The Contractor shall provide temporary signs to the satisfaction of the City Engineer.

City of Ann Arbor - Public Services - Engineering
2022034
BYPASS ON ADJACENT AVAILABLE RIGHT OR LEFT OF ROADWAY

**Specific Notes**

1. **Temporary curb ramps with detectable warning.**
   - Provide a change in curb height of 1/8" minimum.
   - The change shall be detectable in the curb to the maximum extent possible by providing an AP in the following order of preference:
     1. Provide the AP on the side of the street as the disrupted route lies along an apron.
     2. Where it is not feasible to provide an apron, provide a curb on the other side of the street.

2. **Bypass on adjacent available right or left of roadway.**
   - Provide a smooth, continuous, hard surface through the length of the apron.
   - Provide a firm, stable, and slip-resistant temporary walkway surface to cover short segments of rough, soft, or uneven ground.

3. **Designated pedestrian bypass.**
   - Provide a smooth, continuous, hard surface through the length of the apron.
   - Provide a firm, stable, and slip-resistant temporary walkway surface to cover short segments of rough, soft, or uneven ground.

4. **Pedestrian bypass using parking or sidewalk bypass.**
   - Provide a smooth, continuous, hard surface through the length of the apron.
   - Provide a firm, stable, and slip-resistant temporary walkway surface to cover short segments of rough, soft, or uneven ground.

5. **Pedestrian bypass using bypass lane on high-speed roadway.**
   - Provide a smooth, continuous, hard surface through the length of the apron.
   - Provide a firm, stable, and slip-resistant temporary walkway surface to cover short segments of rough, soft, or uneven ground.

6. **Pedestrian bypass using bypass lane on high-speed roadway.**
   - Provide a smooth, continuous, hard surface through the length of the apron.
   - Provide a firm, stable, and slip-resistant temporary walkway surface to cover short segments of rough, soft, or uneven ground.

**General Notes**

When closure of a section of roadway or sidewalk is required, the contractor shall provide temporary traffic controls and devices. These controls and devices shall be delineated with flags or other engineer-approved devices at no closer than a distance of 25 feet. Provide a smooth, continuous, hard surface through the length of the apron. Compacted gravel, aggregate, or slag materials are not allowed. Provide a smooth, continuous, hard surface through the length of the apron. Compacted gravel, aggregate, or slag materials are not allowed. Provide a smooth, continuous, hard surface through the length of the apron. Compacted gravel, aggregate, or slag materials are not allowed. Provide a smooth, continuous, hard surface through the length of the apron. Compacted gravel, aggregate, or slag materials are not allowed.
SPECIFIC NOTES

1. CURB RAMPS SHALL BE 48" MIN. WIDTH WITH A FIRM, STABLE AND SLIP RESISTANT SURFACE. PROTECTION EDGING WITH A 2.5" MIN. HEIGHT SHOULD BE PLACED ALONG THE SIDE OF THE RAMPS OR PLATFORMS.
2. CURB RAMPS OR LANDINGS PLATFORMS HAVE A VERTICAL DROP OF 6" OR LESS WILL NOT REQUIRE A PROTECTIVE EDGING. A PROTECTIVE EDGING SHOULD BE CONSIDERED WHEN CURB RAMPS OR LANDINGS PLATFORMS HAVE A VERTICAL DROP OF 6" OR MORE.
3. DETECTABLE EDGING (SHOWN ABOVE) IS REQUIRED ANYTIME THE PATH CHANGES DIRECTION. THIS INCLUDES TURNING AT THE RAMP FROM THE PATH, DETECTABLE EDGING SHOULD BEGIN AT A MAXIMUM OF 2" ABOVE THE RAMP SURFACE AND EXTEND AT LEAST 6" ABOVE THE RAMP SURFACE. DETECTABLE EDGING MIGHT BE CONSIDERED IN CURB RAMPS OR LANDINGS WHERE THE WALKWAY CHANGES DIRECTION (TURNS).
4. CURB RAMPS AND LANDINGS HAVING A VERTICAL CROSS SLOPE OF 2% MAX. WILL NOT REQUIRE A PROTECTIVE EDGING. THE LEDGE MARKING IS NOT REQUIRED WHERE COLOR CONTRASTING EDGING IS USED. IN 2013 WATER FLOW IN THE GUTTER SYSTEM SHALL NOT BE IMPAIRED.
5. PROTECTIVE EDGING (SHOWN ABOVE) IS REQUIRED ANYTIME THE PATH CHANGES DIRECTION. THIS INCLUDES TURNING AT THE RAMP FROM THE PATH, DETECTABLE EDGING SHOULD BEGIN AT A MAXIMUM OF 2" ABOVE THE RAMP SURFACE AND EXTEND AT LEAST 6" ABOVE THE RAMP SURFACE. DETECTABLE EDGING MIGHT BE CONSIDERED IN CURB RAMPS OR LANDINGS WHERE THE WALKWAY CHANGES DIRECTION (TURNS).
6. CURB RAMPS AND LANDINGS HAVING A VERTICAL CROSS SLOPE OF 2% MAX. WILL NOT REQUIRE A PROTECTIVE EDGING. THE LEDGE MARKING IS NOT REQUIRED WHERE COLOR CONTRASTING EDGING IS USED. IN 2013 WATER FLOW IN THE GUTTER SYSTEM SHALL NOT BE IMPAIRED.
7. EDGE TREATMENT (SHOWN ABOVE) IS REQUIRED ANYTIME THE PATH CHANGES DIRECTION. THIS INCLUDES TURNING AT THE RAMP FROM THE PATH, DETECTABLE EDGING SHOULD BEGIN AT A MAXIMUM OF 2" ABOVE THE RAMP SURFACE AND EXTEND AT LEAST 6" ABOVE THE RAMP SURFACE. DETECTABLE EDGING MIGHT BE CONSIDERED IN CURB RAMPS OR LANDINGS WHERE THE WALKWAY CHANGES DIRECTION (TURNS).
8. CURB RAMPS AND LANDINGS HAVING A VERTICAL CROSS SLOPE OF 2% MAX. WILL NOT REQUIRE A PROTECTIVE EDGING. THE LEDGE MARKING IS NOT REQUIRED WHERE COLOR CONTRASTING EDGING IS USED. IN 2013 WATER FLOW IN THE GUTTER SYSTEM SHALL NOT BE IMPAIRED.
9. JOINT GAP TREATMENT (SHOWN ABOVE) IS REQUIRED ANYTIME THE PATH CHANGES DIRECTION. THIS INCLUDES TURNING AT THE RAMP FROM THE PATH, DETECTABLE EDGING SHOULD BEGIN AT A MAXIMUM OF 2" ABOVE THE RAMP SURFACE AND EXTEND AT LEAST 6" ABOVE THE RAMP SURFACE. DETECTABLE EDGING MIGHT BE CONSIDERED IN CURB RAMPS OR LANDINGS WHERE THE WALKWAY CHANGES DIRECTION (TURNS).
10. CURB RAMPS AND LANDINGS HAVING A VERTICAL CROSS SLOPE OF 2% MAX. WILL NOT REQUIRE A PROTECTIVE EDGING. THE LEDGE MARKING IS NOT REQUIRED WHERE COLOR CONTRASTING EDGING IS USED. IN 2013 WATER FLOW IN THE GUTTER SYSTEM SHALL NOT BE IMPAIRED.
11. CLEAR SPACE (SHOWN ABOVE) IS REQUIRED ANYTIME THE PATH CHANGES DIRECTION. THIS INCLUDES TURNING AT THE RAMP FROM THE PATH, DETECTABLE EDGING SHOULD BEGIN AT A MAXIMUM OF 2" ABOVE THE RAMP SURFACE AND EXTEND AT LEAST 6" ABOVE THE RAMP SURFACE. DETECTABLE EDGING MIGHT BE CONSIDERED IN CURB RAMPS OR LANDINGS WHERE THE WALKWAY CHANGES DIRECTION (TURNS).

TEMPORARY CURB RAMP

PARALLEL TO CURB

PERPENDICULAR TO CURB

SHOWN WITH PROTECTIVE EDGE

SHOWN WITH SIDE APRON

LIMITED EDITION OF 131
TEMPORARY PEDESTRIAN ACCESS

**Temporary Walkway Surface**
- 2% max. cross slope
- 2" max. aggregate
- 5' min. detectable edge
- 32' min. leading edge

**Pedestrian Channelizer**
- 1" max. leading edge
- 0.5" max. detectable edge
- Continuous and a minimum of 6" in height
- Color markings contrasting with walkway surface

**Hand Rail**
- 1.25" and 1.5" wide
- Configured to be a "graspable" cross-section

**General Notes**
- All devices shall be free of sharp or rough edges.
- All devices shall be non-exposed to vehicle traffic and have a total width greater than 12".
- 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.
- Ensure the handrail is 1.25 and 1.5 inches wide and configured to be a "graspable" cross-section.

**Sidewalk Barricade**
- 34" min. spacing from last passing space
- 200' max. spacing from last passing space

**Narrow Temporary Pedestrian Access Route Passing Detail**
- Detectable edge shall be continuous and a minimum of 6 inches high above the walkway surface
- Handrail shall be provided on both sides of the ramp if the ramp is not exposed to vehicle traffic and has a total rise greater than 6 inches.
Know what's below. Call before you dig.
KNOW WHAT'S BELOW. CALL BEFORE YOU DIG.
FLUIDIC-AMP VORTEX VALVE MODEL FA1012  
WITH SLEEVE ATTACHMENT FOR Ø6" OPENING  
FABRICATION DRAWING

UNDERGROUND STORMWATER STORAGE  
CONTROL STRUCTURE

TOP VIEW  
SECTION A-A VIEW

FRONT VIEW  
SECTION

PLAN

R401  
UNDERGROUND STORMWATER STORAGE  
CONTROL STRUCTURE

MISC. DETAILS - SPECIAL DETAIL

SECTION

R301 & R317  
UNDERGROUND STORMWATER STORAGE  
CONTROL STRUCTURE

NOTES:

1. ALL 3½" PIPE FITTINGS AND JOINTS MUST BE PLASTIC AND OF THE NBR TYPE.
2. ALL MOUNTING BRACKETS MUST BE 3½" IN DIAMETER, MADE OF STEEL, AND TYPED FOR USE WITH 3½" PIPE FITTINGS.
3. ALL MOUNTING BRACKETS MUST BE 3½" IN DIAMETER, MADE OF STEEL, AND TYPED FOR USE WITH 3½" PIPE FITTINGS.
4. ALL MOUNTING BRACKETS MUST BE 3½" IN DIAMETER, MADE OF STEEL, AND TYPED FOR USE WITH 3½" PIPE FITTINGS.
5. ALL MOUNTING BRACKETS MUST BE 3½" IN DIAMETER, MADE OF STEEL, AND TYPED FOR USE WITH 3½" PIPE FITTINGS.

CITY OF ANN ARBOR - PUBLIC SERVICES - ENGINEERING

CITY OF ANN ARBOR
PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734-794-6410
www.a2gov.org

11 OF 131
PROJECT SUMMARY

MILLER AVENUE REHABILITATION

CONTECH CHAMBERMAXX

City of Ann Arbor - Public Services - Engineering

301 East Huron Street
P.O. Box 8647
Ann Arbor, MI 48107-8647
734-794-6410
www.a2gov.org

12 of 131
Know what's below. Call before you dig.
GENERAL NOTES:
1. RAISED INTERSECTIONS SHALL FOLLOW THE SAME TAPER REQUIREMENT AS THE SPEED HUMPS DETAILED HEREIN.

2. PAYMENT FOR PAVEMENT MARKINGS FOR SPEED HUMPS AND RAISED INTERSECTIONS SHALL BE INCLUDED IN THE RESPECTIVE BID ITEMS AND SHALL NOT BE PAID FOR SEPARATELY.
### HMA Application Estimates

<table>
<thead>
<tr>
<th>Material</th>
<th>Type</th>
<th>Rate of Application ( tons/acre)</th>
<th>Thickness (inches)</th>
<th>Binder</th>
<th>Location/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA Pavement Top</td>
<td></td>
<td>220 lb/syd</td>
<td>2.0</td>
<td>2.0</td>
<td>MILLER (TOP)</td>
</tr>
<tr>
<td>HMA Pavement Leveling</td>
<td></td>
<td>275 lb/syd</td>
<td>2.5</td>
<td>2.5</td>
<td>MILLER LEVELING COURSE</td>
</tr>
<tr>
<td>HMA Approach Top</td>
<td></td>
<td>220 lb/syd</td>
<td>2.0</td>
<td>2.0</td>
<td>MILLER TOP COURSE</td>
</tr>
<tr>
<td>HAND PATCHING</td>
<td></td>
<td>0 - 440 lb/syd</td>
<td></td>
<td>0.05 - 0.15</td>
<td>INCLUDE IN COST OF HMA ITEM</td>
</tr>
<tr>
<td>ASPHALT EMULSION</td>
<td>SS-1h</td>
<td>0.05 - 0.15</td>
<td></td>
<td>0.05 - 0.15</td>
<td></td>
</tr>
</tbody>
</table>

**PLAN:**

1" = 4'

**PROFILE:**

1" = 4'
PLAN:
1" = 4'

PROFILE: 1" = 4'

Know what's below. Call before you dig.
Know what’s below. Call before you dig.
Know what's below. Call before you dig.
Know what's below. Call before you dig.
Red Oak Rd
Miller Ave
Arborview Blvd
Maple Ridge St
Brooks St
N Seventh St
Miller Ave

1" = 40'

Know what's below. Call before you dig.
Know what's below. Call before you dig.
Know what's below.
Call before you dig.
Know what's below.
Call before you dig.
Know what's below. Call before you dig.
Know what's below. Call before you dig.
Know what's below. Call before you dig.
Know what's below. Call before you dig.
Know what's below.
Call before you dig.
CALL BEFORE YOU DIG!

Know what's below.

CITY OF ANN ARBOR - PUBLIC SERVICES - ENGINEERING

CITY OF ANN ARBOR
PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734-794-6410
www.a2gov.org

42 OF 131
Know what's below. Call before you dig.
Know what's below. Call before you dig.

CITY OF ANN ARBOR - PUBLIC SERVICES - ENGINEERING
CITY OF ANN ARBOR
PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734-794-6410
www.a2gov.org

MILLER AVENUE REHABILITATION
PROPOSED WATER MAIN - NEWPORT TO N SEVENTH - PHASE I
POMONA AND WESLEY CONNECTIONS AND H1 PROFILE
Know what's below. Call before you dig.
PR WATER – N. SEVENTH TO CHAPIN
**STORM SEWER STRUCTURE TABLE**

<table>
<thead>
<tr>
<th>STRUCTURE</th>
<th>UTILTY STATION</th>
<th>TYPE</th>
<th>IBD</th>
<th>INVERTS</th>
<th>DEPTH (Ft.)</th>
<th>COMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>R=400</td>
<td>4+27</td>
<td>4&quot; NaN</td>
<td></td>
<td>855.00</td>
<td>7.28</td>
<td>0'</td>
</tr>
<tr>
<td>R=401</td>
<td>4+30</td>
<td>6&quot; NaN</td>
<td></td>
<td>852.44</td>
<td>4.48</td>
<td>3'</td>
</tr>
<tr>
<td>R=404</td>
<td>4+85</td>
<td>4&quot; NaN</td>
<td></td>
<td>853.86</td>
<td>11.95</td>
<td>0'</td>
</tr>
<tr>
<td>R=407</td>
<td>4+80</td>
<td>6&quot; NaN</td>
<td></td>
<td>860.75</td>
<td>3.12</td>
<td>3'</td>
</tr>
</tbody>
</table>

---

**Plan:** 1" = 20'

**Profile:** 1" = 4'

**Know what's below. Call before you dig.**

**City of Ann Arbor - Public Services - Engineering**

**Plan:**

- MILLER AVE
- RED OAK RD

**Profile:**

- PLAN: 1" = 20'
- PROFILE: 1" = 4'

---

**Storm Drainage District Table:**

- 92-63788 - R407

---

**City of Ann Arbor - Public Services - Engineering**

**City of Ann Arbor**

**Public Services**

**301 East Huron Street**

**P.O. Box 8647**

**Ann Arbor, MI 48107-8647**

**734-794-6410**

**www.a2gov.org**

---

**58 of 131**
STORM SEWER STRUCTURE TABLE

<table>
<thead>
<tr>
<th>STRUCTURE</th>
<th>SIZE</th>
<th>TYPE</th>
<th>RM</th>
<th>MATERIAL</th>
<th>DEPTH</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>R207</td>
<td>64.00</td>
<td>2</td>
<td>95</td>
<td>68400</td>
<td>6.92</td>
<td>2</td>
</tr>
<tr>
<td>R208</td>
<td>64.00</td>
<td>2</td>
<td>95</td>
<td>68400</td>
<td>6.92</td>
<td>2</td>
</tr>
<tr>
<td>R209</td>
<td>64.00</td>
<td>4</td>
<td>95</td>
<td>68400</td>
<td>6.92</td>
<td>2</td>
</tr>
<tr>
<td>R210</td>
<td>64.00</td>
<td>2</td>
<td>95</td>
<td>68400</td>
<td>6.92</td>
<td>2</td>
</tr>
<tr>
<td>R211</td>
<td>64.00</td>
<td>2</td>
<td>95</td>
<td>68400</td>
<td>6.92</td>
<td>2</td>
</tr>
</tbody>
</table>
STORM SEWER STRUCTURE TABLE

<table>
<thead>
<tr>
<th>STRUCTURE</th>
<th>TYPE</th>
<th>RM</th>
<th>LIVE/DEAD</th>
<th>DEPTH (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R201</td>
<td>2 WW</td>
<td>843.74</td>
<td>43.25</td>
<td>2.75</td>
</tr>
<tr>
<td>R202</td>
<td>2 WW</td>
<td>843.35</td>
<td>42.75</td>
<td>2.50</td>
</tr>
<tr>
<td>R204</td>
<td>2 WW</td>
<td>847.85</td>
<td>47.85</td>
<td>2.75</td>
</tr>
<tr>
<td>R205</td>
<td>2 WW</td>
<td>847.45</td>
<td>47.45</td>
<td>2.75</td>
</tr>
</tbody>
</table>

EXISTING STORM SEWER STRUCTURE REMOVAL TABLE

<table>
<thead>
<tr>
<th>STRUCTURE</th>
<th>TYPE</th>
<th>RM</th>
<th>DEPTH (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R201</td>
<td>2 WW</td>
<td>843.74</td>
<td>2.75</td>
</tr>
<tr>
<td>R202</td>
<td>2 WW</td>
<td>843.35</td>
<td>2.50</td>
</tr>
<tr>
<td>R204</td>
<td>2 WW</td>
<td>847.85</td>
<td>2.75</td>
</tr>
<tr>
<td>R205</td>
<td>2 WW</td>
<td>847.45</td>
<td>2.75</td>
</tr>
</tbody>
</table>
Know what's below. Call before you dig.
PLAN:
1" = 20'

PROFILE: 1" = 4'

Know what's below. Call before you dig.
Know what's below. Call before you dig.
Know what's below. Call before you dig.
PLAN: 1" = 20'
PROFILE: 1" = 4'

Know what's below. Call before you dig.

CITY OF ANN ARBOR - PUBLIC SERVICES - ENGINEERING
CITY OF ANN ARBOR
PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734-794-6410
www.a2gov.org

MILLER AVENUE REHABILITATION
ROAD PLAN & PROFILE
STA. 62+50 - STA. 66+00

CONSTRUCTION KEY

<table>
<thead>
<tr>
<th>KEY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA</td>
<td>HMA Application</td>
</tr>
<tr>
<td>HMA APP</td>
<td>HMA Application</td>
</tr>
<tr>
<td>HP</td>
<td>HP</td>
</tr>
<tr>
<td>CG</td>
<td>CG</td>
</tr>
<tr>
<td>DOM</td>
<td>DOM-HE</td>
</tr>
<tr>
<td>DG-6</td>
<td>DG-6</td>
</tr>
<tr>
<td>MGD</td>
<td>MGD</td>
</tr>
<tr>
<td>SW-4</td>
<td>SW-4</td>
</tr>
<tr>
<td>SWR-6</td>
<td>SWR-6</td>
</tr>
<tr>
<td>SW6-HE</td>
<td>SW6-HE</td>
</tr>
<tr>
<td>SW8</td>
<td>SW8</td>
</tr>
<tr>
<td>CP8</td>
<td>CP8</td>
</tr>
<tr>
<td>DWS</td>
<td>DWS</td>
</tr>
<tr>
<td>DDT</td>
<td>DDT</td>
</tr>
<tr>
<td>ABO</td>
<td>ABO</td>
</tr>
<tr>
<td>AMB</td>
<td>AMB</td>
</tr>
<tr>
<td>AGB</td>
<td>AGB</td>
</tr>
<tr>
<td>RSA</td>
<td>RSA</td>
</tr>
<tr>
<td>SSA</td>
<td>SSA</td>
</tr>
<tr>
<td>WSA</td>
<td>WSA</td>
</tr>
</tbody>
</table>

MILLER AVE
PLAN:
1" = 20'

PROFILE: 1" = 4'

Know what's below.
Call before you dig.

MILLER AVE REHABILITATION
ROAD PLAN & PROFILE
STA. 66+00 - STA. 69+50

CONSTRUCTION KEY

<table>
<thead>
<tr>
<th>KEY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA</td>
<td>HMA Approach</td>
</tr>
<tr>
<td>APP</td>
<td>HP</td>
</tr>
<tr>
<td>CG</td>
<td>CG</td>
</tr>
<tr>
<td>DOM</td>
<td>CG</td>
</tr>
<tr>
<td>DOM-HE</td>
<td>CG</td>
</tr>
<tr>
<td>DG-6</td>
<td>CG</td>
</tr>
<tr>
<td>MGD</td>
<td>CG</td>
</tr>
<tr>
<td>SW-4</td>
<td>CG</td>
</tr>
<tr>
<td>SWR-6</td>
<td>CG</td>
</tr>
<tr>
<td>SW6-HE</td>
<td>CG</td>
</tr>
<tr>
<td>SW8</td>
<td>CG</td>
</tr>
<tr>
<td>CP8</td>
<td>CG</td>
</tr>
<tr>
<td>DWS</td>
<td>CG</td>
</tr>
<tr>
<td>DDT</td>
<td>CG</td>
</tr>
<tr>
<td>ABO</td>
<td>CG</td>
</tr>
<tr>
<td>AMB</td>
<td>CG</td>
</tr>
<tr>
<td>AG8</td>
<td>CG</td>
</tr>
<tr>
<td>RSA</td>
<td>CG</td>
</tr>
<tr>
<td>SSA</td>
<td>CG</td>
</tr>
<tr>
<td>WSA</td>
<td>CG</td>
</tr>
</tbody>
</table>

CITY OF ANN ARBOR - PUBLIC SERVICES - ENGINEERING
CITY OF ANN ARBOR
PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734-794-6410
www.a2gov.org

70 OF 131
Know what's below. Call before you dig.

MILLER AVENUE REHABILITATION
ROAD PLAN & PROFILE
STA. 76+50 - STA. 80+00

CONSTRUCTION KEY

<table>
<thead>
<tr>
<th>KEY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA</td>
<td>HMA Approach</td>
</tr>
<tr>
<td>HMA APP</td>
<td>HMA App.</td>
</tr>
<tr>
<td>HP</td>
<td>HP - HMA Pavement</td>
</tr>
<tr>
<td>CG</td>
<td>CG - Concrete</td>
</tr>
<tr>
<td>DOM</td>
<td>DOM - Drainage Culverts</td>
</tr>
<tr>
<td>DOM-HE</td>
<td>DOM-HE - Drainage Culvert - High Energy</td>
</tr>
<tr>
<td>DG-6</td>
<td>DG-6 - Drainage Grate</td>
</tr>
<tr>
<td>MGD</td>
<td>MGD - Manhole</td>
</tr>
<tr>
<td>SW-4</td>
<td>SW-4 - Storm Sewer</td>
</tr>
<tr>
<td>SWR-6</td>
<td>SWR-6 - Storm Sewer - High Energy</td>
</tr>
<tr>
<td>SW6-HE</td>
<td>SW6-HE - Storm Sewer - High Energy</td>
</tr>
<tr>
<td>SW8</td>
<td>SW8 - Storm Sewer</td>
</tr>
<tr>
<td>CP8</td>
<td>CP8 - Catch Basin</td>
</tr>
<tr>
<td>DWS</td>
<td>DWS - Storm Drainage</td>
</tr>
<tr>
<td>DDT</td>
<td>DDT - Storm Drainage - Tape</td>
</tr>
<tr>
<td>ABO</td>
<td>ABO - Access Box</td>
</tr>
<tr>
<td>AMB</td>
<td>AMB - Access Box - Main</td>
</tr>
<tr>
<td>AGB</td>
<td>AGB - Access Box - Gutter</td>
</tr>
<tr>
<td>RSA</td>
<td>RSA - Roadside Access</td>
</tr>
<tr>
<td>SSA</td>
<td>SSA - Roadside Access - Shoulder</td>
</tr>
<tr>
<td>WSA</td>
<td>WSA - Roadside Access - Median</td>
</tr>
</tbody>
</table>

MILLER AVE
Know what's below. Call before you dig.
Know what's below. Call before you dig.
Know what's below. Call before you dig.

N SEVENTH ST

MILLER AVE

515

GOTT ST

738

MILLER AVE

CITY OF ANN ARBOR - PUBLIC SERVICES - ENGINEERING

CITY OF ANN ARBOR
PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734-794-6410
www.a2gov.org

78 OF 131
Know what's below.
Call before you dig.
Know what's below. Call before you dig.
Know what's below. Call before you dig.
MILLER AV
N MAPLE RD
FRANKLIN ST
FULMER ST

1" = 40'

Know what's below.
Call before you dig.

CITY OF ANN ARBOR - PUBLIC SERVICES - ENGINEERING
CITY OF ANN ARBOR
PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734-794-6410
www.a2gov.org

85 OF 131
2022034

MILLER AVENUE REHABILITATION
PERMANENT SIGNING
P.O.B. - STA 14+00
Know what's below.
Call before you dig.
Know what's below.
Call before you dig.

CITY OF ANN ARBOR - PUBLIC SERVICES - ENGINEERING
CITY OF ANN ARBOR
PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734-794-6410
www.a2gov.org

MILLER AVENUE REHABILITATION
PERMANENT SIGNING
STA. 30+00 - STA. 45+00
RED OAK RD
ARBORVIEW BLVD
MAPLE RIDGE ST
MILLER AVE
GOTT ST
BROOKS ST
N SEVENTH ST

Know what's below. Call before you dig.

CITY OF ANN ARBOR - PUBLIC SERVICES - ENGINEERING
CITY OF ANN ARBOR
PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734-794-6410
www.a2gov.org

MILLER AVENUE REHABILITATION
PERMANENT SIGNING
STA. 61+00 - STA. 77+00
CITY OF ANN ARBOR
PROJECT MANAGEMENT
MILLER AVENUE CYCLE TRACK
MAPLE ROAD TO NEWPORT ROAD
AND CHAPIN STREET TO FIRST STREET
ADDENDUM No. 2 PLANS - 04/29/24
Know what's below. Call before you dig.
Know what's below.
Call before you dig.
CONSTRUCTION KEY

MILLER AVE.
FULMER ST.

MILLER AVE.
HATCHER CRES.

CITY DR.

Call before you dig.

CITY OF ANN ARBOR - PUBLIC SERVICES - ENGINEERING
CITY OF ANN ARBOR
PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734-794-6410
www.a2gov.org

20230643-RM02

Know what's below.
CONSTRUCTION KEY

MILLER AVE.

PINE TREE DR.

CITY OF ANN ARBOR - PUBLIC SERVICES - ENGINEERING
CITY OF ANN ARBORT PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734-794-6410
www.a2gov.org

MILLER AVE.

MILLER ROAD CYCLE TRACK
REMOVAL PLAN SHEET
STA. 49+00 TO STA. 58+00

20230643-RM05

See above right

See above left

Know what's below.

Call before you dig.
Know what's below.
Call before you dig.

MILLER ROAD CYCLE TRACK REMOVAL PLAN SHEET
START (STA. 98+86) TO P.O.E. (STA. 104+07)

CONSTRUCTION KEY

1. Dark Solid Line = Existing
2. Dark Dash Line = New
3. Orange Dash Line = Temporary Change
4. Yellow Dash Line = Combination
5. Red Line = Roadway

734-794-6410
www.a2gov.org
Know what's below.
Call before you dig.
Know what's below.
Call before you dig.
MILLER ROAD CYCLE TRACK
TRAFFIC SIGNAL REMOVAL
SC02 - INTERSECTION OF 7TH ST. AND MILLER AVE.

Know what's below. Call before you dig.

CITY OF ANN ARBOR - PUBLIC SERVICES - ENGINEERING
CITY OF ANN ARBOR
PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734-794-6410
www.a2gov.org

20230643-SC02