# ADDENDUM No. 4

## ITB No. 4424: W.R. Wheeler (Swift Run) Service Center PUD Non-motorized Improvements – Phase 1

## Due: June 3, 2016 at 10:00 a.m. (local time)

The following changes, additions, and/or deletions shall be made to the Invitation to Bid for W.R. Wheeler (Swift Run) Service Center PUD Non-motorized Improvements – Phase 1, ITB No. 4424, on which proposals will be received on/or before June 3, 2016 at 10:00 a.m. (local time).

The information contained herein shall take precedence over the original documents and all previous addenda (if any), and is appended thereto. **This Addendum includes 199 page(s).**

**Bidder is to acknowledge receipt of this Addendum No. 4, including all attachments (if any) in its Bid by so indicating on Page ITB-1 of the ITB document. Bids submitted without acknowledgement of receipt of this addendum will be considered nonconforming.**

**The following forms provided within the ITB document must be included in submitted bids:**

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

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

# I. CORRECTIONS/ADDITIONS/DELETIONS

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

| Section/Page(s) | Change |
|---|---|
| All mentions | As provided in Addendum 3:<br>Bid Due Date: May 27, 2016 at 10:00 a.m.<br><br>As updated herein:<br>Bid Due Date: June 3, 2016 at 10:00 a.m. |

*Comment: The Due Date and Time for responses to this ITB has been extended to June 3, 2016 at 10:00 a.m. (local time). Note that all other dates are unchanged.*

| | |
|---|---|
| Notice of Pre-Bid Conference/NP-1 | Pre-Bid Conference Summary and Sign-In Sheet; insert pages ADD 4-4 thru 6 |

| | |
|---|---|
| Bid Forms/BF-1 thru 5 | Base Bid Forms; replace with pages ADD 4-7 thru 12 |
| Bid Forms/BF-8 thru 12 | Time Alternate Bid Forms; replace with pages ADD 4-13 thru 18 |
| Detailed Specifications/DS-11 thru 12 | Detailed Specification for Project Schedule; replace with pages ADD 4-19 thru 20 |
| Detailed Specifications/DS-22 | Detailed Specification for Sidewalk, Sidewalk Ramp, and Driveway Approach Grading; replace with page ADD 4-21 |
| Detailed Specifications/DS-24 thru 25 | Detailed Specification for Adjusting Structure Covers; replace with pages ADD 4-22 thru 23 |
| Detailed Specifications/DS-38 thru 39 | Detailed Specification for Sidewalk, Sidewalk Ramp, and Driveway Approaches; replace with page ADD 4-24 thru 25 |
| Detailed Specifications/DS-42 thru 48 | MDOT Standard Plan R-28-I (Sidewalk Ramp and Detectable Warning Details); delete these pages |
| Detailed Specifications/DS-49 thru 50 | Detailed Specification for Sidewalk Retaining Walls; replace with pages ADD 4-26 thru 27 |
| Detailed Specifications/DS-54 thru 60 | Detailed Specification for Maintenance of Traffic; insert MDOT Maintaining Traffic Typicals (M0020a, M0040a, M0110a, M0140a, M0240a), and MDOT Work Zone Device Details (WZD-100-A, and WZD-125-E) pages ADD 4-28 thru 51 |
| Detailed Specifications/DS-63 thru 64 | Detailed Specification for Slope Restoration; replace with pages ADD 4-52 thru 53 |
| Detailed Specifications/DS-67 thru 87 | Detailed Specification for Water Main and Appurtenances, and related Standard Details; delete these pages |
| Detailed Specifications/DS-88 thru 89 | Detailed Specification for Water Main and Appurtenances, Remove or Abandon; delete these pages |
| Detailed Specifications | Detailed Specification for Timber Boardwalk and Foundation System; insert pages ADD 4-54 thru 58 |
| APPENDIX/APDX-1 | Appendix title page; replace with page ADD 4-59 |
| APPENDIX/APDX-1 | MDOT Supplemental Specifications for Errata to the 2012 Standard Specifications; replace with pages ADD 4-60 thru 88 |

| | |
|---|---|
| APPENDIX | MDOT Special Detail R-28-I (Sidewalk Ramp and Detectable Warning Details); insert pages ADD 4-89 thru 95 |
| APPENDIX | MDEQ General Permit Authorization for Part 303, Wetlands Protection; insert pages ADD 4-96 thru 103 |
| APPENDIX | WCWRC Drain Use Permit – Ellsworth Road Drain; insert page ADD 4-104 |
| APPENDIX | WCWRC Drain Use Permit – Swift Run Drain; insert page ADD 4-105 |
| APPENDIX | Wetlands Permit Pittsfield Charter Township; insert pages ADD 4-106 thru 107 |
| APPENDIX | G-2 Consulting Group – Report of Geotechnical Investigation; insert pages ADD 4-108 thru 162 |
| Plans | Plans; replace originally issued “Out for Bid” plan set (sheets 1 thru 41) dated 4-15-16 with that issued for “Addendum #4” (sheets 1 thru 37) dated 4-20-16 |

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

**W.R. Wheeler (Swift Run) Service Center P.U.D.**
**Non-motorized Improvements - Phase 1 (ITB No. 4424)**

Pre-Bid Conference Summary
May 2, 2016
2:00 p.m., 4th Floor Conference Room, City Hall

I. Introductions

II. General

a. Project Overview

Bid Types – Base Bid & Time Alternate Bid (optional)

*It was noted that two bid types are being requested for this project, a base bid and an optional time alternate bid. The City will evaluate all of the bids types submitted, and select that which is in its best interest.*

Bid Opening – Tuesday, May 10, 2016, 10:00 a.m.

*It was noted that this date most likely will be extended.*

b. Standard Specifications and Detailed Specifications

i. Project Schedule

*The project schedule was discussed as outlined in the Detailed Specification for Project Schedule. It was noted that a recommendation to approve the award of the construction contract for this project is planned to be brought before City Council at its June 6, 2016, regularly scheduled meeting. It was noted that this date will change if the bid date is extended.*

- Starting Date – June 22, 2016
- Intermittent and Final Completion Dates
  - Base Bid – Sidewalk and Sidewalk Ramps Complete and Open for Use by August 31, 2016; Slope Restoration and Landscape Plantings Complete by October 10, 2016; Entire Project Complete by November 12, 2016
  - Time Alternate Bid (optional) – Sidewalk and Sidewalk Ramps Complete and Open for Use, and Slope Restoration and Landscape Plantings Complete All by October 10, 2016; Entire Project Complete by November 12, 2016
- Hours of Work: 7:00 am – 8:00 pm Monday thru Saturday (Sundays w/permission)

ii. Note Detailed Specifications for General Conditions & Project Supervision

*Attention was given to these Detailed Specifications, and those in attendance work were advised to review their requirements.*

iii. Special Concerns (MDEQ, WCWRC & Township permits, tree & wetland protection)

*It was noted that there are special requirements associated with the various permits that apply to this project, and attention needs to be given to these requirements during construction.*

III. Construction

a. Construction Influence Area (Ellsworth Rd & Stone School Rd)

*It was noted that there are two (2) separate construction influence areas for this project.*

b. Maintenance of Traffic (lane and shoulder closures, access to residents/businesses)

*The expectations for Maintenance of Traffic (MOT) related to the project were briefly discussed, and it was noted there are MOT plans together with MDOT Maintenance of Traffic Typicals and Work Zone Device Details that apply.*

IV. Addendum Items

*No addenda have been issued to date for this project; however, Addendum 1 is expected to be released by the end of the week (Friday, May 6, 2016). This addendum will include revisions to tree/landscape planting plans and associated pay items, addition of detailed specification for the timber boardwalk and related items of work/pay items, plan revisions to drainage items of work/pay items, addition of MDEQ, WCWRC and Pittsfield Twp permit documents, the most likely extension of the bid date, a soil boring log or geotechnical report for the wetland area on Stone School Rd, and revised bid forms.*

V. Other Items

*Inquiries were made regarding the following items:*

- *Which components of the timber boardwalk are to be composite wood; the details are unclear. The City indicated it would check on this and determined that the four (4) horizontal rail components including the kick plate and top rail cap should be constructed of composite material.*
- *Can the City provide the applicable general wage decision and/or pay scale? Bidders are required to obtain the wage information that applies to the project at the time of bidding, and should comply with both Prevailing Wage and Living Wage requirements of the City of Ann Arbor. See General Conditions: Section 4 – Wage Requirements, pages GC-1 and GC-2, and the Prevailing Wage and Living Wage Ordinance attachments in the bid document.*
- *Current Engineer's Estimated Opinion of Cost for the project. The City stated the amount is approximately $1.4 million.*

VI. Questions

*The following questions were received by interested bidders and answered as shown.*

1. ***What is the minimum installation torque for the helical piers (for ultimate load)?***
   *These requirements are identified in the Detailed Specification for Timber Boardwalk and Foundation System, which will be issued with Addendum No. 1.*
2. ***Do you have an estimated depth for the piers for bidding purpose, or do you have soil borings in the area of the boardwalk?***
   *These requirements are identified in the Detailed Specification for Timber Boardwalk and Foundation System, which will be issued with Addendum No. 1.*
3. ***Do we need to provide engineered calculations for the helical piers for the design loads?***
   *These requirements are identified in the Detailed Specification for Timber Boardwalk and Foundation System, which will be issued with Addendum No. 1.*
4. ***Are the horizontal 2x6 members for the railings and rail cap the only composite material, and are all other materials treated timber?***
   *Yes, that is correct. The railing detail on the plans will be modified to reflect this information. This plan revision will be addressed in Addendum No. 1*
5. ***Please clarify what the 3"x4" stanchions are on page 5, detail for "12' Boardwalk Framing Plan and Wall Approach Plan". These are not shown in the "Boardwalk Railing Detail".***
   *The stanchions shown the detail for "12' Boardwalk Framing Plan and Wall Approach Plan" do not apply and should not have been shown. The detail will be revised to accordingly. This plan revision will be addressed in Addendum No. 1.*

Contact Information:

David Dykman
Project Manager
Phone: (734) 794-6410 ext. 43685
Fax: (734) 994-1744
E-mail: ddykman@a2gov.org

# PREBID MEETING SIGN-IN SHEET

**W.R. Wheeler (Swift Run) Service Center PUD**
**Non-motorized Improvements - Phase 1 (ITB No. 4424)**

**05/02/2016**

**PLEASE PRINT**

| NAME | REPRESENTING | MAILING ADDRESS | TELEPHONE | EMAIL |
|---|---|---|---|---|
| David Dykman<br>Project Manager | City of Ann Arbor - Project Management | Address: 301 E. Huron Street, P.O. Box 8647<br>City, State: Ann Arbor, MI Zip: 48107-8647 | Office: (734) 794-6410, x43685<br>Mobile: (734) 645-6560<br>Fax: (734) 994-1744 | ddykman@a2gov.org |
| David Clemons<br>Supervisor - Civil Engineering Specialists | City of Ann Arbor - Project Management | Address: 301 E. Huron Street, P.O. Box 8647<br>City, State: Ann Arbor, MI Zip: 48107-8647 | Office: (734) 794-6410, x43612<br>Mobile:<br>Fax: (734) 994-1744 | dclemons@a2gov.org |
| John Jochom | L.J. Construction | Address: 5863 S. Kingston Rd.<br>City, State: Clio, MI Zip: 48727 | Office: (989) 761-0131<br>Mobile: ( )<br>Fax No. (989) 761-0132 | lj construction@yahoo.com |
| | | Address:<br>City, State: Zip: | Office: ( )<br>Mobile: ( )<br>Fax No. ( ) | |
| | | Address:<br>City, State: Zip: | Office: ( )<br>Mobile: ( )<br>Fax No. ( ) | |
| | | Address:<br>City, State: Zip: | Office: ( )<br>Mobile: ( )<br>Fax No. ( ) | |
| | | Address:<br>City, State: Zip: | Office: ( )<br>Mobile: ( )<br>Fax No. ( ) | |
| | | Address:<br>City, State: Zip: | Office: ( )<br>Mobile: ( )<br>Fax No. ( ) | |

# BID FORM

Section 1 - Schedule of Prices

**W.R. Wheeler (Swift Run) Service Center PUD Non-motorized Improvements – Phase 1**
**File No. 2014-031**
**Bid No. 4424**

**BASE BID** (Sidewalk and Sidewalk Ramps Complete and Open for Use by August 31, 2016; Slope Restoration and Landscape Plantings Complete by October 10, 2016; Entire Project Complete by November 10, 2016)

| Line No. | Item No. | Item Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|---|---|
| 10 | 1047051 | _General Conditions, Max $75,000.00 | LSUM | 1.000 | $ _____ | $ _____ |
| 20 | 1047051 | _Project Supervision, Max $10,000.00 | LSUM | 1.000 | $ _____ | $ _____ |
| 30 | 1047051 | _Audiovisual Tape Coverage | LSUM | 1.000 | $ _____ | $ _____ |
| 40 | 2020002 | Tree, Rem, 19 inch to 36 inch | Ea | 2.000 | $ _____ | $ _____ |
| 50 | 2020004 | Tree, Rem, 6 inch to 18 inch | Ea | 19.000 | $ _____ | $ _____ |
| 60 | 2030001 | Culv, Rem, Less than 24 inch | Ea | 3.000 | $ _____ | $ _____ |
| 70 | 2030011 | Dr Structure, Rem | Ea | 2.000 | $ _____ | $ _____ |
| 80 | 2030015 | Sewer, Rem, Less than 24 inch | Ft | 30.000 | $ _____ | $ _____ |
| 90 | 2047001 | _Curb, Gutter, and Curb and Gutter, Any Type, Rem | Ft | 137.000 | $ _____ | $ _____ |
| 100 | 2047011 | _Sidewalk, Sidewalk Ramp, and Driveway Approach, Any Thickness, Rem | Syd | 109.000 | $ _____ | $ _____ |
| 110 | 2047050 | _Exploratory Excavation (0-10' Deep) Tr Det I | Ea | 5.000 | $ _____ | $ _____ |
| 120 | 2050023 | Granular Material, Cl II | Cyd | 705.000 | $ _____ | $ _____ |
| 130 | 2057011 | _Grading, Driveway Approach | Syd | 360.000 | $ _____ | $ _____ |
| 140 | 2057011 | _Grading, Sidewalk | Syd | 6,070.000 | $ _____ | $ _____ |
| 150 | 2057011 | _Grading, Sidewalk Ramp | Syd | 30.000 | $ _____ | $ _____ |
| 160 | 2057011 | _Machine Grading, Special | Syd | 115.000 | $ _____ | $ _____ |
| 170 | 2057021 | _Subgrade Undercutting, Type IIA | Cyd | 50.000 | $ _____ | $ _____ |
| 180 | 2057021 | _Subgrade Undercutting, Type IIB | Cyd | 50.000 | $ _____ | $ _____ |

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| Line No. | Item No. | Item Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|---|---|
| 190 | 2080012 | Erosion Control, Check Dam, Stone | Ft | 330.000 | $ | $ |
| 200 | 2080036 | Erosion Control, Silt Fence | Ft | 2,153.000 | $ | $ |
| 210 | 2087050 | _Erosion Control, Inlet Filter | Ea | 21.000 | $ | $ |
| 220 | 2090001 | Project Cleanup | LSUM | 1.000 | $ | $ |
| 230 | 3020001 | Aggregate Base | Ton | 35.000 | $ | $ |
| 240 | 3060020 | Maintenance Gravel | Ton | 50.000 | $ | $ |
| 250 | 4020987 | Sewer, Cl IV, 12 inch, Tr Det B | Ft | 229.000 | $ | $ |
| 260 | 4021260 | Trench Undercut and Backfill | Cyd | 10.000 | $ | $ |
| 270 | 4030200 | Dr Structure, 24 inch dia | Ea | 2.000 | $ | $ |
| 280 | 4021204 | Sewer Tap, 12 inch | Ea | 4.000 | $ | $ |
| 290 | 4030035 | _Dr Structure Cover, Type E | Ea | 3.000 | $ | $ |
| 300 | 4030040 | _Dr Structure Cover, Type G | Ea | 2.000 | $ | $ |
| 310 | 4037001 | _Dr Structure, Adj, Add Depth, Modified | Ft | 5.000 | $ | $ |
| 320 | 4037050 | _Dr Structure Cover, Type B, Modified | Ea | 2.000 | $ | $ |
| 330 | 4037050 | _Dr Structure Cover, Type D, Modified | Ea | 1.000 | $ | $ |
| 340 | 4037050 | _Dr Structure Cover, Type K, Modified | Ea | 2.000 | $ | $ |
| 350 | 4037050 | _Dr Structure, Adj, Case 1, Modified | Ea | 1.000 | $ | $ |
| 360 | 4037050 | _Dr Structure, Adj, Case 2, Modified | Ea | 17.000 | $ | $ |

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**W.R. Wheeler (Swift Run) Service Center PUD Non-motorized Improvements – Phase 1**
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**BASE BID** (Sidewalk and Sidewalk Ramps Complete and Open for Use by August 31, 2016; Slope Restoration and Landscape Plantings Complete by October 10, 2016; Entire Project Complete by November 10, 2016)

| Line No. | Item No. | Item Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|---|---|
| 370 | 4037050 | _Dr Structure, Cleaning, Modified | Ea | 10.000 | $ | $ |
| 380 | 4047001 | _Underdrain, Subgrade, 6 inch, Special | Ft | 200.000 | $ | $ |
| 390 | 5010005 | HMA Surface, Rem | Syd | 7.500 | $ | $ |
| 400 | 5010025 | Hand Patching | Ton | 85.000 | $ | $ |
| 410 | 6030005 | Cement | Ton | 0.500 | $ | $ |
| 420 | 7057001 | Helical Pier | Foot | 550.000 | $ | $ |
| 430 | 7097001 | Timber Boardwalk | Foot | 360.000 | $ | $ |
| 440 | 7097001 | Safety Railing | Foot | 720.000 | $ | $ |
| 450 | 8017011 | _Driveway, Nonreinf Conc, 6 inch, Modified | Syd | 130.000 | $ | $ |
| 460 | 8017011 | _Driveway, Nonreinf Conc, 8 inch, Modified | Syd | 230.000 | $ | $ |
| 470 | 8027001 | _Curb and Gutter, Conc | Ft | 1,095.000 | $ | $ |
| 480 | 8037001 | _Detectable Warning Surface, Modified | Ft | 93.000 | $ | $ |
| 490 | 8037001 | _Fence, Protective, Modified | Ft | 5,153.000 | $ | $ |
| 500 | 8037010 | _Sidewalk Ramp, Conc, 6 inch, Modified | Sft | 260.000 | $ | $ |
| 510 | 8037010 | _Sidewalk Retaining Wall, Integral, 6 inch to 18 inch Height | Sft | 375.000 | $ | $ |
| 520 | 8037010 | _Sidewalk Retaining Wall, Integral, Greater than 18 inch Height | Sft | 1,550.000 | $ | $ |
| 530 | 8037010 | _Sidewalk, Conc, 4 inch, Modified | Sft | 53,660.000 | $ | $ |
| 540 | 8037010 | _Sidewalk, Conc, 6 inch, Modified | Sft | 595.000 | $ | $ |

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**BASE BID** (Sidewalk and Sidewalk Ramps Complete and Open for Use by August 31, 2016; Slope Restoration and Landscape Plantings Complete by October 10, 2016; Entire Project Complete by November 10, 2016)

| Line No. | Item No. | Item Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|---|---|
| 550 | 8037010 | _Sidewalk, Conc, 8 inch, Modified | Sft | 365.000 | $ _____ | $ _____ |
| 560 | 8067050 | _HMA Path Terminus | Each | 2.000 | $ _____ | $ _____ |
| 570 | 8070095 | Post, Mailbox | Ea | 4.000 | $ _____ | $ _____ |
| 580 | 8077050 | Post, Anchor, Mailbox | Ea | 2.000 | $ _____ | $ _____ |
| 590 | 8110049 | Pavt Mrkg, Ovly Cold Plastic, Direction Arrow Sym, Bike | Ea | 2.000 | $ _____ | $ _____ |
| 600 | 8110058 | Pavt Mrkg, Ovly Cold Plastic, Bike, Small Sym | Ea | 2.000 | $ _____ | $ _____ |
| 610 | 8110197 | Pavt Mrkg, Thermopl, 6 inch, Crosswalk | Ft | 12.000 | $ _____ | $ _____ |
| 620 | 8110198 | Pavt Mrkg, Thermopl, 6 inch, White | Ft | 1,080.000 | $ _____ | $ _____ |
| 630 | 8110218 | Pavt Mrkg, Thermopl, 24 inch, Stop Bar | Ft | 6.000 | $ _____ | $ _____ |
| 640 | 8117001 | _Pavt Mrkg, Thermopl, 24 inch, Crosswalk | Ft | 36.000 | $ _____ | $ _____ |
| 650 | 8120012 | Barricade, Type III, High Intensity, Double Sided, Lighted, Furn | Ea | 10.000 | $ _____ | $ _____ |
| 660 | 8120013 | Barricade, Type III, High Intensity, Double Sided, Lighted, Oper | Ea | 10.000 | $ _____ | $ _____ |
| 670 | 8120030 | Channelizing Device, 42 inch, Furn | Ea | 75.000 | $ _____ | $ _____ |
| 680 | 8120031 | Channelizing Device, 42 inch, Oper | Ea | 75.000 | $ _____ | $ _____ |
| 690 | 8120140 | Lighted Arrow, Type C, Furn | Ea | 2.000 | $ _____ | $ _____ |
| 700 | 8120141 | Lighted Arrow, Type C, Oper | Ea | 2.000 | $ _____ | $ _____ |
| 710 | 8120260 | Plastic Drum, High Intensity, Furn | Ea | 75.000 | $ _____ | $ _____ |
| 720 | 8120261 | Plastic Drum, High Intensity, Oper | Ea | 75.000 | $ _____ | $ _____ |

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| Line No. | Item No. | Item Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|---|---|
| 730 | 8120330 | Sign, Portable, Changeable Message, Furn | Ea | 2.000 | $ | $ |
| 740 | 8120331 | Sign, Portable, Changeable Message, Oper | Ea | 2.000 | $ | $ |
| 750 | 8120350 | Sign, Type B, Temp, Prismatic, Furn | Sft | 200.000 | $ | $ |
| 760 | 8120351 | Sign, Type B, Temp, Prismatic, Oper | Sft | 200.000 | $ | $ |
| 770 | 8120370 | Traf Regulator Control | LSUM | 1.000 | $ | $ |
| 780 | 8127051 | _Minor Traffic Control, Max $7,500.00 | LSUM | 1.000 | $ | $ |
| 790 | 8150002 | Watering and Culitvating, First Season, Min. $1,500.00 | LSUM | 1.000 | $ | $ |
| 800 | 8150003 | Watering and Culitvating, Second Season, Min. $1,500.00 | LSUM | 1.000 | $ | $ |
| 810 | 8152541 | Pachysandra terminalis, 3 inch pot | Ea | 1,600.000 | $ | $ |
| 820 | 8150780 | Celtis occidentalis, 2 inch | Ea | 2.000 | $ | $ |
| 830 | 8151409 | Fagus grandifolia, 2 inch | Ea | 2.000 | $ | $ |
| 840 | 8151409 | Gymnocladus dioicus, 2 inch | Ea | 1.000 | $ | $ |
| 850 | 8152742 | Picea abies, 6 foot | Ea | 5.000 | $ | $ |
| 860 | 8153044 | Quercus bicolor, 2 inch | Ea | 2.000 | $ | $ |
| 870 | 8167011 | _Slope Restoration | Syd | 8,915.000 | $ | $ |
| 880 | 8190132 | Conduit, DB, 2, 3 inch | Ft | 4,933.000 | $ | $ |
| 890 | 8197050 | _Handhole Assembly, 12 Inch X 18 Inch | Ea | 20.000 | $ | $ |
| 900 | 8197050 | _Handhole Assembly, 17 Inch X 30 Inch | Ea | 2.000 | $ | $ |

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| Line No. | Item No. | Item Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|---|---|
| 910 | 8197050 | _Handhole, Adj, Modified | Ea | 9.000 | $ _____ | $ _____ |
| 920 | 8200105 | Pedestal, Fdn | Ea | 1.000 | $ _____ | $ _____ |
| 930 | 8230096 | Hydrant, Relocate, Case 2 | Ea | 3.000 | $ _____ | $ _____ |
| 940 | 8507050 | _Monitoring Well, Adj | Ea | 11.000 | $ _____ | $ _____ |

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TOTAL FROM PAGE ADD 4-7 $ _____

TOTAL FROM PAGE ADD 4-8 $ _____

TOTAL FROM PAGE ADD 4-9 $ _____

TOTAL FROM PAGE ADD 4-10 $ _____

TOTAL FROM PAGE ADD 4-11 $ _____

**TOTAL BASE BID $** _____

# BID FORM

Section 1 - Schedule of Prices

**W.R. Wheeler (Swift Run) Service Center PUD Non-motorized Improvements – Phase 1**
**File No. 2014-031**
**Bid No. 4424**

**TIME ALTERNATE BID** (Sidewalk and Sidewalk Ramps Complete and Open for Use, and Slope Restoration and Landscape Plantings Complete All by October 10, 2016; Entire Project Complete by November 10, 2016)

| Line No. | Item No. | Item Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|---|---|
| 10 | 1047051 | _General Conditions, Max $75,000.00 | LSUM | 1.000 | $ | $ |
| 20 | 1047051 | _Project Supervision, Max $10,000.00 | LSUM | 1.000 | $ | $ |
| 30 | 1047051 | _Audiovisual Tape Coverage | LSUM | 1.000 | $ | $ |
| 40 | 2020002 | Tree, Rem, 19 inch to 36 inch | Ea | 2.000 | $ | $ |
| 50 | 2020004 | Tree, Rem, 6 inch to 18 inch | Ea | 19.000 | $ | $ |
| 60 | 2030001 | Culv, Rem, Less than 24 inch | Ea | 3.000 | $ | $ |
| 70 | 2030011 | Dr Structure, Rem | Ea | 2.000 | $ | $ |
| 80 | 2030015 | Sewer, Rem, Less than 24 inch | Ft | 30.000 | $ | $ |
| 90 | 2047001 | _Curb, Gutter, and Curb and Gutter, Any Type, Rem | Ft | 137.000 | $ | $ |
| 100 | 2047011 | _Sidewalk, Sidewalk Ramp, and Driveway Approach, Any Thickness, Rem | Syd | 109.000 | $ | $ |
| 110 | 2047050 | _Exploratory Excavation (0-10' Deep) Tr Det I | Ea | 5.000 | $ | $ |
| 120 | 2050023 | Granular Material, Cl II | Cyd | 705.000 | $ | $ |
| 130 | 2057011 | _Grading, Driveway Approach | Syd | 360.000 | $ | $ |
| 140 | 2057011 | _Grading, Sidewalk | Syd | 6,070.000 | $ | $ |
| 150 | 2057011 | _Grading, Sidewalk Ramp | Syd | 30.000 | $ | $ |
| 160 | 2057011 | _Machine Grading, Special | Syd | 115.000 | $ | $ |
| 170 | 2057021 | _Subgrade Undercutting, Type IIA | Cyd | 50.000 | $ | $ |
| 180 | 2057021 | _Subgrade Undercutting, Type IIB | Cyd | 50.000 | $ | $ |

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# BID FORM

Section 1 - Schedule of Prices

**W.R. Wheeler (Swift Run) Service Center PUD Non-motorized Improvements – Phase 1**
**File No. 2014-031**
**Bid No. 4424**

**TIME ALTERNATE BID** (Sidewalk and Sidewalk Ramps Complete and Open for Use, and Slope Restoration and Landscape Plantings Complete All by October 10, 2016; Entire Project Complete by November 10, 2016)

| Line No. | Item No. | Item Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|---|---|
| 190 | 2080012 | Erosion Control, Check Dam, Stone | Ft | 330.000 | $ | $ |
| 200 | 2080036 | Erosion Control, Silt Fence | Ft | 2,153.000 | $ | $ |
| 210 | 2087050 | _Erosion Control, Inlet Filter | Ea | 21.000 | $ | $ |
| 220 | 2090001 | Project Cleanup | LSUM | 1.000 | $ | $ |
| 230 | 3020001 | Aggregate Base | Ton | 35.000 | $ | $ |
| 240 | 3060020 | Maintenance Gravel | Ton | 50.000 | $ | $ |
| 250 | 4020987 | Sewer, Cl IV, 12 inch, Tr Det B | Ft | 229.000 | $ | $ |
| 260 | 4021260 | Trench Undercut and Backfill | Cyd | 10.000 | $ | $ |
| 270 | 4030200 | Dr Structure, 24 inch dia | Ea | 2.000 | $ | $ |
| 280 | 4021204 | Sewer Tap, 12 inch | Ea | 4.000 | $ | $ |
| 290 | 4030035 | _Dr Structure Cover, Type E | Ea | 3.000 | $ | $ |
| 300 | 4030040 | _Dr Structure Cover, Type G | Ea | 2.000 | $ | $ |
| 310 | 4037001 | _Dr Structure, Adj, Add Depth, Modified | Ft | 5.000 | $ | $ |
| 320 | 4037050 | _Dr Structure Cover, Type B, Modified | Ea | 2.000 | $ | $ |
| 330 | 4037050 | _Dr Structure Cover, Type D, Modified | Ea | 1.000 | $ | $ |
| 340 | 4037050 | _Dr Structure Cover, Type K, Modified | Ea | 2.000 | $ | $ |
| 350 | 4037050 | _Dr Structure, Adj, Case 1, Modified | Ea | 1.000 | $ | $ |
| 360 | 4037050 | _Dr Structure, Adj, Case 2, Modified | Ea | 17.000 | $ | $ |

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# BID FORM

Section 1 - Schedule of Prices

**W.R. Wheeler (Swift Run) Service Center PUD Non-motorized Improvements – Phase 1**
**File No. 2014-031**
**Bid No. 4424**

**TIME ALTERNATE BID** (Sidewalk and Sidewalk Ramps Complete and Open for Use, and Slope Restoration and Landscape Plantings Complete All by October 10, 2016; Entire Project Complete by November 10, 2016)

| Line No. | Item No. | Item Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|---|---|
| 370 | 4037050 | _Dr Structure, Cleaning, Modified | Ea | 10.000 | $ | $ |
| 380 | 4047001 | _Underdrain, Subgrade, 6 inch, Special | Ft | 200.000 | $ | $ |
| 390 | 5010005 | HMA Surface, Rem | Syd | 7.500 | $ | $ |
| 400 | 5010025 | Hand Patching | Ton | 85.000 | $ | $ |
| 410 | 6030005 | Cement | Ton | 0.500 | $ | $ |
| 420 | 7057001 | Helical Pier | Foot | 550.000 | $ | $ |
| 430 | 7097001 | Timber Boardwalk | Foot | 360.000 | $ | $ |
| 440 | 7097001 | Safety Railing | Foot | 720.000 | $ | $ |
| 450 | 8017011 | _Driveway, Nonreinf Conc, 6 inch, Modified | Syd | 130.000 | $ | $ |
| 460 | 8017011 | _Driveway, Nonreinf Conc, 8 inch, Modified | Syd | 230.000 | $ | $ |
| 470 | 8027001 | _Curb and Gutter, Conc | Ft | 1,095.000 | $ | $ |
| 480 | 8037001 | _Detectable Warning Surface, Modified | Ft | 93.000 | $ | $ |
| 490 | 8037001 | _Fence, Protective, Modified | Ft | 5,153.000 | $ | $ |
| 500 | 8037010 | _Sidewalk Ramp, Conc, 6 inch, Modified | Sft | 260.000 | $ | $ |
| 510 | 8037010 | _Sidewalk Retaining Wall, Integral, 6 inch to 18 inch Height | Sft | 375.000 | $ | $ |
| 520 | 8037010 | _Sidewalk Retaining Wall, Integral, Greater than 18 inch Height | Sft | 1,550.000 | $ | $ |
| 530 | 8037010 | _Sidewalk, Conc, 4 inch, Modified | Sft | 53,660.000 | $ | $ |
| 540 | 8037010 | _Sidewalk, Conc, 6 inch, Modified | Sft | 595.000 | $ | $ |

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# BID FORM

Section 1 - Schedule of Prices

**W.R. Wheeler (Swift Run) Service Center PUD Non-motorized Improvements – Phase 1**
**File No. 2014-031**
**Bid No. 4424**

**TIME ALTERNATE BID** (Sidewalk and Sidewalk Ramps Complete and Open for Use, and Slope Restoration and Landscape Plantings Complete All by October 10, 2016; Entire Project Complete by November 10, 2016)

| Line No. | Item No. | Item Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|---|---|
| 550 | 8037010 | _Sidewalk, Conc, 8 inch, Modified | Sft | 365.000 | $ _____ | $ _____ |
| 560 | 8067050 | _HMA Path Terminus | Each | 2.000 | $ _____ | $ _____ |
| 570 | 8070095 | Post, Mailbox | Ea | 4.000 | $ _____ | $ _____ |
| 580 | 8077050 | Post, Anchor, Mailbox | Ea | 2.000 | $ _____ | $ _____ |
| 590 | 8110049 | Pavt Mrkg, Ovly Cold Plastic, Direction Arrow Sym, Bike | Ea | 2.000 | $ _____ | $ _____ |
| 600 | 8110058 | Pavt Mrkg, Ovly Cold Plastic, Bike, Small Sym | Ea | 2.000 | $ _____ | $ _____ |
| 610 | 8110197 | Pavt Mrkg, Thermopl, 6 inch, Crosswalk | Ft | 12.000 | $ _____ | $ _____ |
| 620 | 8110198 | Pavt Mrkg, Thermopl, 6 inch, White | Ft | 1,080.000 | $ _____ | $ _____ |
| 630 | 8110218 | Pavt Mrkg, Thermopl, 24 inch, Stop Bar | Ft | 6.000 | $ _____ | $ _____ |
| 640 | 8117001 | _Pavt Mrkg, Thermopl, 24 inch, Crosswalk | Ft | 36.000 | $ _____ | $ _____ |
| 650 | 8120012 | Barricade, Type III, High Intensity, Double Sided, Lighted, Furn | Ea | 10.000 | $ _____ | $ _____ |
| 660 | 8120013 | Barricade, Type III, High Intensity, Double Sided, Lighted, Oper | Ea | 10.000 | $ _____ | $ _____ |
| 670 | 8120030 | Channelizing Device, 42 inch, Furn | Ea | 75.000 | $ _____ | $ _____ |
| 680 | 8120031 | Channelizing Device, 42 inch, Oper | Ea | 75.000 | $ _____ | $ _____ |
| 690 | 8120140 | Lighted Arrow, Type C, Furn | Ea | 2.000 | $ _____ | $ _____ |
| 700 | 8120141 | Lighted Arrow, Type C, Oper | Ea | 2.000 | $ _____ | $ _____ |
| 710 | 8120260 | Plastic Drum, High Intensity, Furn | Ea | 75.000 | $ _____ | $ _____ |
| 720 | 8120261 | Plastic Drum, High Intensity, Oper | Ea | 75.000 | $ _____ | $ _____ |

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# BID FORM

Section 1 - Schedule of Prices

**W.R. Wheeler (Swift Run) Service Center PUD Non-motorized Improvements – Phase 1**
**File No. 2014-031**
**Bid No. 4424**

**TIME ALTERNATE BID** (Sidewalk and Sidewalk Ramps Complete and Open for Use, and Slope Restoration and Landscape Plantings Complete All by October 10, 2016; Entire Project Complete by November 10, 2016)

| Line No. | Item No. | Item Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|---|---|
| 730 | 8120330 | Sign, Portable, Changeable Message, Furn | Ea | 2.000 | $ | $ |
| 740 | 8120331 | Sign, Portable, Changeable Message, Oper | Ea | 2.000 | $ | $ |
| 750 | 8120350 | Sign, Type B, Temp, Prismatic, Furn | Sft | 200.000 | $ | $ |
| 760 | 8120351 | Sign, Type B, Temp, Prismatic, Oper | Sft | 200.000 | $ | $ |
| 770 | 8120370 | Traf Regulator Control | LSUM | 1.000 | $ | $ |
| 780 | 8127051 | _Minor Traffic Control, Max $7,500.00 | LSUM | 1.000 | $ | $ |
| 790 | 8150002 | Watering and Culitvating, First Season, Min. $1,500.00 | LSUM | 1.000 | $ | $ |
| 800 | 8150003 | Watering and Culitvating, Second Season, Min. $1,500.00 | LSUM | 1.000 | $ | $ |
| 810 | 8152541 | Pachysandra terminalis, 3 inch pot | Ea | 1,600.000 | $ | $ |
| 820 | 8150780 | Celtis occidentalis, 2 inch | Ea | 2.000 | $ | $ |
| 830 | 8151409 | Fagus grandifolia, 2 inch | Ea | 2.000 | $ | $ |
| 840 | 8151409 | Gymnocladus dioicus, 2 inch | Ea | 1.000 | $ | $ |
| 850 | 8152742 | Picea abies, 6 foot | Ea | 5.000 | $ | $ |
| 860 | 8153044 | Quercus bicolor, 2 inch | Ea | 2.000 | $ | $ |
| 870 | 8167011 | _Slope Restoration | Syd | 8,915.000 | $ | $ |
| 880 | 8190132 | Conduit, DB, 2, 3 inch | Ft | 4,933.000 | $ | $ |
| 890 | 8197050 | _Handhole Assembly, 12 Inch X 18 Inch | Ea | 20.000 | $ | $ |
| 900 | 8197050 | _Handhole Assembly, 17 Inch X 30 Inch | Ea | 2.000 | $ | $ |

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# BID FORM

Section 1 - Schedule of Prices

**W.R. Wheeler (Swift Run) Service Center PUD Non-motorized Improvements – Phase 1**
**File No. 2014-031**
**Bid No. 4424**

**TIME ALTERNATE BID** (Sidewalk and Sidewalk Ramps Complete and Open for Use, and Slope Restoration and Landscape Plantings Complete All by October 10, 2016; Entire Project Complete by November 10, 2016)

| Line No. | Item No. | Item Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|---|---|
| 910 | 8197050 | _Handhole, Adj, Modified | Ea | 9.000 | $ _____ | $ _____ |
| 920 | 8200105 | Pedestal, Fdn | Ea | 1.000 | $ _____ | $ _____ |
| 930 | 8230096 | Hydrant, Relocate, Case 2 | Ea | 3.000 | $ _____ | $ _____ |
| 940 | 8507050 | _Monitoring Well, Adj | Ea | 11.000 | $ _____ | $ _____ |

TOTAL THIS PAGE $ _____

TOTAL FROM PAGE ADD 4-13 $ _____

TOTAL FROM PAGE ADD 4-14 $ _____

TOTAL FROM PAGE ADD 4-15 $ _____

TOTAL FROM PAGE ADD 4-16 $ _____

TOTAL FROM PAGE ADD 4-17 $ _____

**TOTAL BASE BID $** _____

CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
**PROJECT SCHEDULE**

AA:DAD 1 of 2 05/25/16

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

The Contractor is expected to be furnished with two (2) copies of the Contract, for its execution, on or before **June 10, 2016**. The Contractor shall properly execute both copies of the Contract and return them, with the required Bonds and Insurance documentation, to the City by **July 11, 2016**. The Contractor shall not begin the work before the applicable date(s) as described herein without approval from the Project Engineer, and in no case before the receipt of the fully executed Contract and Notice to Proceed.

By no later than **July 12, 2016** the Contractor shall submit a detailed schedule of work (progress schedule) for the Engineer's review and approval. The progress schedule must fully comply with the scheduling requirements contained in this Detailed Specification. Work shall not start until the progress schedule is approved in writing by the Engineer. The Contractor shall update the approved progress schedule each week, and present it to the Engineer at the weekly progress meeting.

The Contractor shall begin the work of this project on or before **July 14, 2015**, 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.

The Contract work shall be completed in accordance with either the BASE BID or TIME ALTERNATE BID requirements respectively described below, which requirements are dependent upon the bid type accepted.

BASE BID:
Complete and open for use the concrete sidewalk and sidewalk ramps along the entirety of Ellsworth Road by **August 31, 2016**, as shown on the plans. This includes, but is not limited to removal and grading work; storm drainage work; placement of base materials; placement of concrete curb and gutter, sidewalk, sidewalk ramps, retaining walls, and driveway approaches; and other related work as required. Complete the slope restoration and landscape planting work by **October 10, 2016**. Complete the entire project on or before **November 10, 2016**.

Failure to complete the work as specified, within the times specified, including time extensions granted thereto as determined by the Engineer, shall entitle the City to deduct from the payments due the Contractor **$500.00** in “Liquidated Damages”, and not as a penalty, for each and every calendar day the work remains incomplete beyond the date specified.

TIME ALTERNATE BID:
Complete and open for use the concrete sidewalk and sidewalk ramps along the entirety of Ellsworth Road by **October 10, 2016**, as shown on the plans. This includes, but is not limited to removal and grading work; storm drainage work; placement of base materials; placement of concrete curb and gutter, sidewalk, sidewalk ramps, retaining walls, and driveway approaches; slope restoration and landscape planting work; and other related work as required. Complete the entire project on or before **November 10, 2016**.

Failure to complete the work as specified, within the times specified, including time extensions granted thereto as determined by the Engineer, shall entitle the City to deduct from the

payments due the Contractor **$500.00** in “Liquidated Damages”, and not as a penalty, for each and every calendar day the work remains incomplete beyond the date specified.

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.

The Engineer may delay or stop the work due to threatening weather conditions. The Contractor shall not be compensated for unused materials or downtime due to rain, or the threat of rain. The Contractor is solely responsible for repairing all damages to the work and to the site, including road infrastructures, road subgrades, and any adjacent properties, which are caused as a result of working in the rain.

The Contractor shall not work in the dark except as approved by the Engineer and only when lighting for night work is provided as detailed elsewhere in this contract. The Engineer may stop the work, or may require the Contractor to defer certain work to another day, if, in the Engineer's opinion, the work cannot be completed within the remaining daylight hours, or if inadequate daylight is present to either properly perform or inspect the work. The Contractor will not be compensated for unused materials or downtime, when delays or work stoppages are directed by the Engineer for darkness and/or inadequate remaining daylight reasons. The Contractor is solely responsible for repairing all damages to the work and to the site, including road infrastructures, road subgrades, and any adjacent properties, which are caused as a result of working in the dark.

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.

If the construction contract is not completed within the specified period(s) 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 project work will not be paid for separately, but shall be included in the unit bid price for the contract pay item “General Conditions, Max. $___”

CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
**SIDEWALK, SIDEWALK RAMP, AND DRIVEWAY APPROACH GRADING**

AA:DAD 1 of 1 05/25/16

**a. Description.** Remove miscellaneous structures and materials and complete all earthwork required to construct the proposed cross sections within the limits shown on the plans or stated in this special provision. All lines and grades will be as shown on the plans and as directed by the Engineer. Complete this work according to the Standard Specifications for Construction, this special provision, and as directed by the Engineer.

**b. Materials.** Furnish and place required base and embankment materials conforming to the Standard Specifications for Construction as necessary to achieve the required typical cross sections. Excavated material, if suitable, may be used as embankment material as approved by the Engineer.

**c. Construction.** Complete this work according to applicable sections of the Standard Specifications for Construction. Grading for sidewalks, sidewalk ramp, and driveway approaches includes, but is not limited to, the following work:

1. Stripping and stockpiling topsoil for use in turf establishment as approved.
2. Sawcutting existing pavements and curbs.
3. Removing rocks or boulders less than 0.5 cubic yards in volume.
4. Excavating material to a depth necessary for construction.
5. Disposing of excess and unsuitable material according to Section 205.
6. Furnishing and placing embankment material to the grades necessary for construction.
7. Shaping, grading, and compacting the subgrade and embankment to proposed grades.
8. Shaping, grading, and compacting base/bedding material to proposed grades.
9. Matching new sidewalk, sidewalk ramp, and driveway approach grades with existing grades as required.

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

| **Pay Item** | **Pay Unit** |
|---|---|
| Grading, Driveway Approach | Square Yard |
| Grading, Sidewalk | Square Yard |
| Grading, Sidewalk Ramp | Square Yard |

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

CITY OF ANN ARBOR

SPECIAL PROVISION
FOR
**ADJUSTING STRUCTURE COVERS**

AA:DAD 1 of 2 05/25/16

**a. Description.** This work shall include the final adjustment of all drainage and utility structure covers in accordance with section 403 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, as shown on the plans, and as specified herein. Utility structures comprise gate valve wells/manholes, sanitary sewer manholes, gate valve boxes, monument boxes, monitoring wells, and electrical/traffic signal handholes.

The Contractor shall also be required to coordinate the adjustment of private utility structure covers and ensure that the adjustment has been properly performed with the respective utility prior to placing any final paving materials.

**b. Materials.** In bituminous pavement areas, adjustments shall be made using MDOT P-NC concrete (658 lbs/cyd) as specified in section 601 of the MDOT 2012 Standard Specifications for Construction. In areas of concrete pavement, adjustments shall be made at the time of paving and encased with the grade of concrete used in the roadway.

**c. Construction.** Structure covers, monument boxes, water valve boxes, monitoring wells, handholes, and all other public utility underground access or control point covers shall be adjusted to conform to the finished surface section and elevation. The adjusting of castings in lawn areas shall be performed in a one-step process. The adjusting of castings in a bituminous area shall be performed in two steps: step one is the lowering of the structure cover to below the subgrade elevation and plating of the structure; step two is the final adjustment to finish grade made prior to placing the bituminous wearing surface. In areas of concrete pavement, the final adjustment of the structure to finish grade shall be made at the time of concrete pavement forming. All structures in areas of concrete pavement shall be approved by the Engineer prior to the placement of any concrete pavement.

All structures final adjustment is to be to the elevation which results in their top surface being flush with the finished grade. The work is to be accomplished and checked by using a 10 foot straight edge that is placed parallel, and then perpendicular to, the pavement centerline. Failure to meet these conditions will result in the readjustment of the structure and finish patching of the area, as directed by the Engineer, at the Contractor's expense.

All private utility manholes and valve covers (Electric, Gas, Telecommunications, etc.) will be adjusted during this project by the Utility. It is the responsibility of the Contractor to coordinate with these private utilities by giving adequate notice and arranging for any adjustment of structures or valves by these utilities. It shall be the sole responsibility of the Contractor to ensure that this work is completed in a timely manner.

The Contractor shall replace all existing structures covers, top portions of valve boxes and monument boxes.

As directed by the Engineer and within two days of their removal, the Contractor shall stockpile on-site, in a location that is mutually agreeable to the Engineer and Contractor, the existing structure covers. The City of Ann Arbor’s forces will pick-up the structure covers at a time that is convenient to them and mutually agreeable to the Contractor. The Contractor shall provide

the equipment and manpower to load the castings on the City's vehicle(s) so that they can be removed from the site by the City.

All adjustments in areas of proposed bituminous pavement shall be backfilled with Grade P-NC concrete, from the depth of excavation necessary for adjustment, to an elevation 2 inches below the top flange or adjusted casting. This material shall be included in this item of work and will not be paid for separately.

Structure covers shall be adjusted to between flush and ¼ inch below final pavement surfaces.

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

| **Pay Item** | **Pay Unit** |
|---|---|
| Dr Structure Cover, Adj, Case 1, Modified | Each |
| Dr Structure Cover, Adj, Case 2, Modified | Each |
| Hh, Adj, Modified | Each |
| Monitoring Well, Adj | Each |

Dr Structure Cover, Adj, Case 1, Modified; Dr Structure Cover, Adj, Case 2, Modified; Hh, Adj, Modified; and Monitoring Well, Adj will be measured and paid for at the contract unit price for each structure that is adjusted, which price shall be payment in full for all labor, equipment and material needed to accomplish this work.

Where the required adjustment of a structure is more than 6 inches above/below the proposed finished grade of the structure, it will be measured and paid for as " Dr Structure Cover, Adj, Add Depth, Modified". This shall also cover the repair of manholes and structures where less than the substantial rebuilding of the structure, as determined by the Engineer, is required.

There is a possibility that the Contractor may find hidden utility structures during the work. It is the Contractor's responsibility to inform the respective utility owner(s) of the findings. In such instances, the City may direct the Contractor to adjust the structure(s) to grade. This work will be paid as either Dr Structure Cover, Adj, Case 1, Modified; Dr Structure Cover, Adj, Case 2, Modified; Hh, Adj, Modified; or Monitoring Well, Adj depending on the location and type of the hidden structure(s).

Payment for adjusting for new drainage structures, new manholes, new valves-in-wells, new valves-in-boxes, and new handholes shall be included in their respective items of work, and will not be paid for under this item. The work for adjusting these items, however, shall be performed in accordance with this detailed specification.

CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
**CONCRETE SIDEWALK, SIDEWALK RAMPS, AND DRIVEWAY APPROACHES**

AA:DAD 1 of 2 02/23/16

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

**b. Materials.** The materials shall meet the requirements as specified sections 801 and 803 of the MDOT 2012 Standard Specifications for Construction and as required herein. The concrete mixture for driveway approaches shall be Grade P-NC (658 lbs/yd$^3$ cement content) as specified in section 601 of the MDOT 2012 Standard Specifications.

The grade of concrete for all remaining items covered by this Detailed Specification shall be Grade P1 as specified in section 601 of the 2012 MDOT Standard Specifications for Construction. The Contractor may elect to add GGBFS to P1 mixtures in accordance with the requirements of the contract documents. No additional payment will be made for concrete mixtures containing GGBFS.

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

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

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

Where concrete is to be placed, it shall be placed on a minimum of 4 inches of Granular Material Class II compacted to 95% of its maximum dry density.

Prior to placing any concrete, the subgrade shall be completed and trimmed to final elevation. If a cold joint is required, the existing concrete is to be cleaned with compressed air to expose the aggregate in the concrete.

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

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

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

| **Pay Item** | **Pay Unit** |
|---|---|
| Driveway, Nonreinf Conc, 6 inch, Modified | Square Yard |
| Driveway, Nonreinf Conc, 6 inch, Modified | Square Yard |
| Sidewalk, Conc, 4 inch, Modified | Square Foot |
| Sidewalk, Conc, 6 inch, Modified | Square Foot |
| Sidewalk Ramp, Conc, 6 inch, Modified | Square Foot |

The above items will be measured by area in square feet and be paid for at their respective contract unit price, which price shall be payment in full for all labor, equipment and material needed to accomplish this work. The unit price shall also include all costs associated with sawcutting curbs to provide openings for sidewalk ramps as indicated on the plans.

Where the Engineer directs the use of high early strength concrete for pay items that are not specifically designated to use Grade “P-NC” concrete, the additional cement shall be paid for separately. No additional payment will be made for cement for pay items that are designated to use Grade “P-NC.” concrete.

Excavation for placement of Granular Material Class II or Aggregate Base bedding materials shall be included in the respective items of work for **Grading, Sidewalk; Grading, Sidewalk Ramp; or Grading, Driveway Approach**, and shall not be paid for separately.

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

CITY OF ANN ARBOR

DETIALED SPECIFICATION
FOR
**SIDEWALK RETAINING WALLS**

AA:DAD 1 of 2 05/25/16

**a. Description.** This work consists of constructing concrete retaining walls adjacent to sidewalks in accordance with the applicable standards plan and special detail included in the Contract documents, as specified herein, and as directed by the Engineer.

**b. Materials.** Provide concrete Grade P-NC, unless otherwise directed by the Engineer, meeting the requirements of section 602 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction.

**c. Construction.** Construct sidewalk retaining walls in accordance with the details shown on the plans.

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

The Contractor shall excavate, cut, remove stumps, remove brush, remove pavement, grade, and trim as needed and as directed, and shall import, furnish, fill, place, grade, and compact any materials needed to perform the work.

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

**The Contractor shall coordinate with the City Forester prior to the removal of any tree roots 2 inches in diameter or greater.**

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

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

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

| **Pay Item** | **Pay Unit** |
|---|---|
| Sidewalk Retaining Wall, Integral, Less than 6 inch Height | Square Foot |
| Sidewalk Retaining Wall, Integral, 6 inch to 18 inch Height | Square Foot |
| Sidewalk Retaining Wall, Integral, Greater than 18 inch Height | Square Foot |

The unit prices for these items of work shall include all labor, material, and equipment costs to perform all the work specified by this Detailed Specification. Quantity shall be measured by the

exposed face area of the retaining wall in square feet. The sidewalk section will be paid for separately.

## MINIMUM MERGING TAPER LENGTH "L" (FEET)

| OFFSET | POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FEET | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | |
| 1 | 10 | 15 | 20 | 27 | 45 | 50 | 55 | 60 | 65 | 70 | TAPER LENGTH "L" IN FEET |
| 2 | 21 | 30 | 41 | 53 | 90 | 100 | 110 | 120 | 130 | 140 | |
| 3 | 31 | 45 | 61 | 80 | 135 | 150 | 165 | 180 | 195 | 210 | |
| 4 | 42 | 60 | 82 | 107 | 180 | 200 | 220 | 240 | 260 | 280 | |
| 5 | 52 | 75 | 102 | 133 | 225 | 250 | 275 | 300 | 325 | 350 | |
| 6 | 63 | 90 | 123 | 160 | 270 | 300 | 330 | 360 | 390 | 420 | |
| 7 | 73 | 105 | 143 | 187 | 315 | 350 | 385 | 420 | 455 | 490 | |
| 8 | 83 | 120 | 163 | 213 | 360 | 400 | 440 | 480 | 520 | 560 | |
| 9 | 94 | 135 | 184 | 240 | 405 | 450 | 495 | 540 | 585 | 630 | |
| 10 | 104 | 150 | 204 | 267 | 450 | 500 | 550 | 600 | 650 | 700 | |
| 11 | 115 | 165 | 225 | 293 | 495 | 550 | 605 | 660 | 715 | 770 | |
| 12 | 125 | 180 | 245 | 320 | 540 | 600 | 660 | 720 | 780 | 840 | |
| 13 | 135 | 195 | 266 | 347 | 585 | 650 | 715 | 780 | 845 | 910 | |
| 14 | 146 | 210 | 286 | 374 | 630 | 700 | 770 | 840 | 910 | 980 | |
| 15 | 157 | 225 | 307 | 400 | 675 | 750 | 825 | 900 | 975 | 1050 | |

THE FORMULAS FOR THE MINIMUM LENGTH OF A MERGING TAPER IN DERIVING THE "L" VALUES SHOWN IN THE ABOVE TABLES ARE AS FOLLOWS:

$"L" = \frac{W \times S^2}{60}$ WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 40 MPH OR LESS

"L" = S x W WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 45 MPH OR GREATER

L = MINIMUM LENGTH OF MERGING TAPER
S = POSTED SPEED LIMIT IN MPH PRIOR TO WORK AREA
W = WIDTH OF OFFSET

| TYPES OF TAPERS | TAPER LENGTH |
|---|---|
| UPSTREAM TAPERS | |
| MERGING TAPER | L - MINIMUM |
| SHIFTING TAPER | 1/2 L - MINIMUM |
| SHOULDER TAPER | 1/3 L - MINIMUM |
| TWO-WAY TRAFFIC TAPER | 100 ' - MAXIMUM |
| DOWNSTREAM TAPERS (USE IS OPTIONAL) | 100 ' - MINIMUM (PER LANE) |

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TABLES FOR "L", "D" AND "B" VALUES

| | | | |
|---|---|---|---|
| DRAWN BY: CON:AE:djf | JUNE 2006 PLAN DATE: | M0020a | SHEET 1 OF 2 |
| CHECKED BY: BMM | | | |
| FILE: K:/DGN/TSR/STDS/ENGLISH/MNTTRF/M0020a.dgn | REV. 08/21/2006 | | |

## DISTANCE BETWEEN TRAFFIC CONTROL DEVICES "D" AND LENGTH OF LONGITUDINAL BUFFER SPACE ON "WHERE WORKERS PRESENT" SEQUENCES

| "D" DISTANCES | POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 |
| D (FEET) | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 |

## GUIDELINES FOR LENGTH OF LONGITUDINAL BUFFER SPACE "B"

| SPEED* MPH | LENGTH FEET |
|---|---|
| 20 | 33 |
| 25 | 50 |
| 30 | 83 |
| 35 | 132 |
| 40 | 181 |
| 45 | 230 |
| 50 | 279 |
| 55 | 329 |
| 60 | 411 |
| 65 | 476 |
| 70 | 542 |

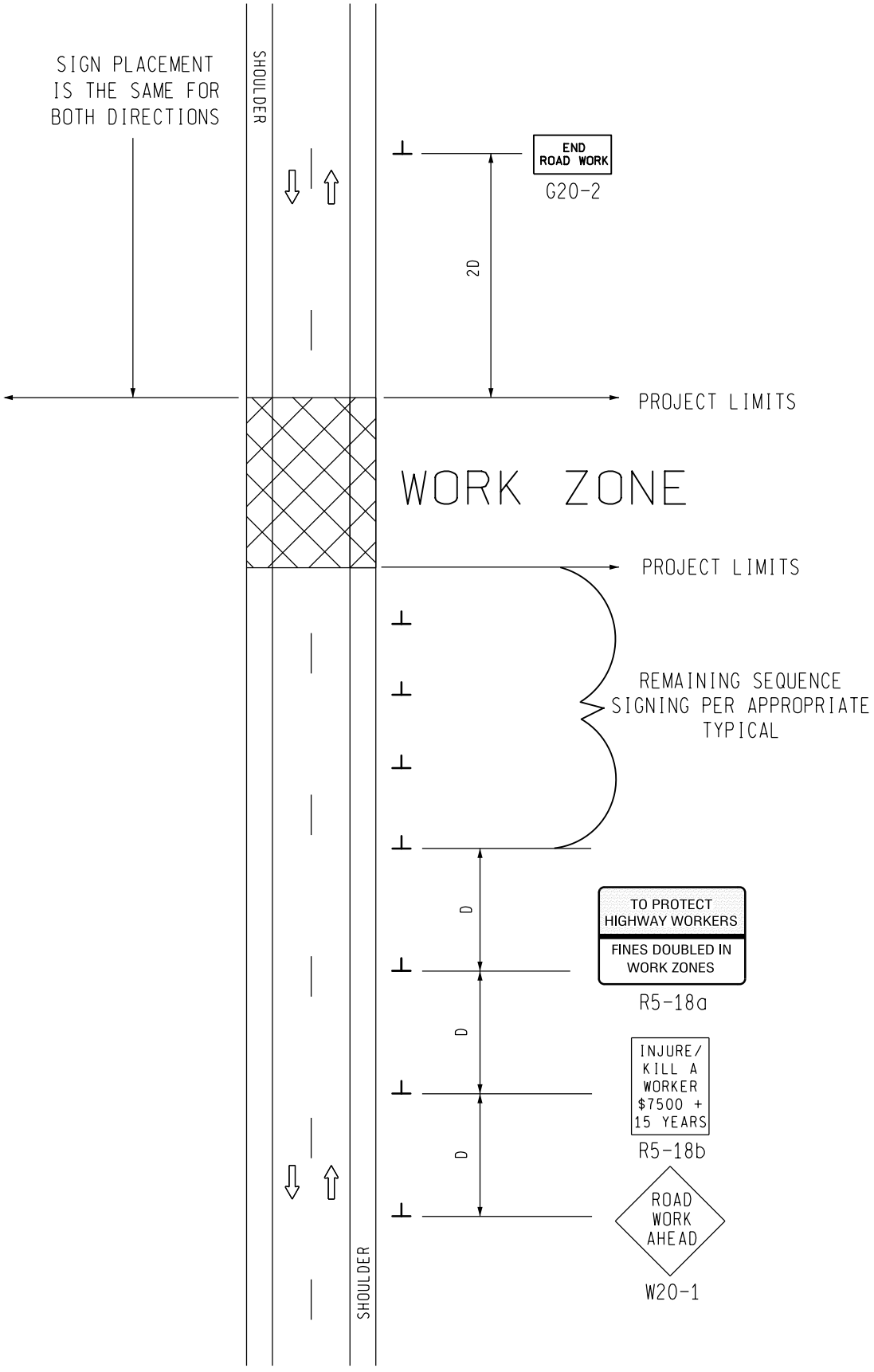
* POSTED SPEED, OFF PEAK 85TH PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

1 BASED UPON AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS (A POLICY ON GEOMETRIC DESIGN OF HIGHWAY AND STREETS), AASHTO. THIS AASHTO DOCUMENT ALSO RECOMMENDS ADJUSTMENTS FOR THE EFFECT OF GRADE ON STOPPING AND VARIATION FOR TRUCKS.

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TABLES FOR "L", "D" AND "B" VALUES

| | | | |
|---|---|---|---|
| DRAWN BY: CON:AE:djf | JUNE 2006 PLAN DATE: | M0020a | SHEET 2 OF 2 |
| CHECKED BY: BMM | | | |
| FILE: K:/DGN/TSR/STDS/ENGLISH/MNTTRF/M0020a.dgn | REV. 08/21/2006 | | |




SIGN = 68 ft2 - TYPE B
FOR ONE DIRECTION OF TRAFFIC
W20-1 QUANTITY INCLUDED
WITH APPROPRIATE TYPICAL
FOR SEQUENCE SIGNING

NOT TO SCALE

MDOT
Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC
TYPICAL

TYPICAL ADVANCE SIGNING TREATMENT FOR LONG, INTERMEDIATE AND SHORT TERM STATIONARY WORK ZONE OPERATIONS OF LESS THAN TWO MILES IN LENGTH WHERE TRAFFIC CONTROL DEVICES MAY REMAIN AT END OF WORK DAY ON AN UNDIVIDED TWO-WAY ROADWAY

| | | | |
|---|---|---|---|
| DRAWN BY: CON:AE:djf | OCTOBER 2011 | M0040a | SHEET 1 OF 2 |
| CHECKED BY: BMM:CRB | PLAN DATE: | | |

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0040a.dgn REV. 10/13/2011

## NOTES

30. THE APPROPRIATE ADVANCE SIGNING SEQUENCE(S), (M0030a THROUGH M0080a) SHALL BE USED ON ALL PROJECTS.

32. THESE SIGNS SHALL BE LEFT IN PLACE AT THEIR PRESCRIBED LOCATIONS FOR THE DURATION OF THE PROJECT AND UNTIL ALL TEMPORARY TRAFFIC CONTROL HAS BEEN REMOVED.

35. THESE SIGNS ARE INTENDED TO BE USED WITHIN THE LIMITS OF THE TEMPORARY SEQUENCE SIGNING AS IS SHOWN ON 1 OF 2. THESE SIGNS ARE NOT TO BE INTERMINGLED WITH ANY OTHER TEMPORARY SEQUENCE SIGNING EXCEPT AS SHOWN.

## SIGN SIZES

| | | |
|---|---|---|
| G20-2 | - | 48" x 24" |
| R5-18a | - | 96" x 60" |
| R5-18b | - | 48" x 60" |
| W20-1 | - | 48" x 48" |

NOT TO SCALE

MDOT Michigan Department of Transportation

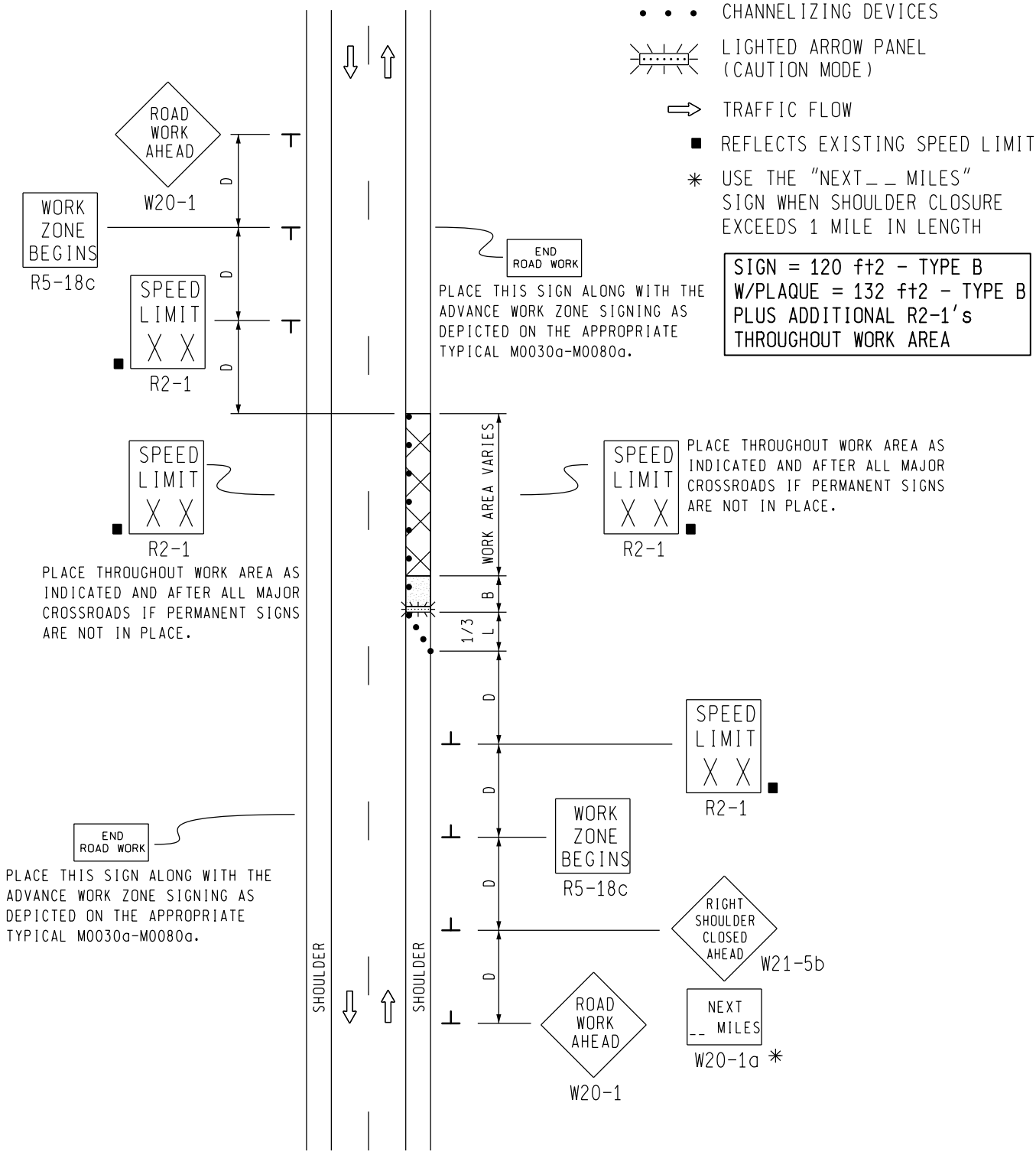
TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

TYPICAL ADVANCE SIGNING TREATMENT FOR LONG, INTERMEDIATE AND SHORT TERM STATIONARY WORK ZONE OPERATIONS OF LESS THAN TWO MILES IN LENGTH WHERE TRAFFIC CONTROL DEVICES MAY REMAIN AT END OF WORK DAY ON AN UNDIVIDED TWO-WAY ROADWAY

| | | | |
|---|---|---|---|
| DRAWN BY: CON:AE:djf | OCTOBER 2011 | M0040a | SHEET 2 OF 2 |
| CHECKED BY: BMM:CRB | PLAN DATE: | | |

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0040a.dgn REV. 10/13/2011




NOT TO SCALE

MDOT Michigan Department of Transportation

TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

# TYPICAL TEMPORARY TRAFFIC CONTROL FOR A SHOULDER CLOSURE ON A TWO LANE TWO-WAY ROADWAY NO SPEED REDUCTION

| | | | |
|---|---|---|---|
| DRAWN BY: CON:AE:djf | OCTOBER 2011 | M0110a | SHEET 1 OF 2 |
| CHECKED BY: BMM:CRB | PLAN DATE: | | |

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0110a.dgn REV. 10/04/2011

## NOTES

1. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
   1/3 L = MINIMUM LENGTH OF TAPER
   B = LENGTH OF LONGITUDINAL BUFFER
   SEE M0020a FOR "D," "L," AND "B" VALUES

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

4E. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES SHOULD BE EQUAL IN FEET TO THE POSTED SPEED IN MILES PER HOUR ON TAPER(S) AND TWICE THE POSTED SPEED IN THE PARALLEL AREA(S).

5. FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

29A. THE TYPE OF REFLECTIVE SHEETING USED FOR THE W20-1a PLAQUE SHALL BE THE SAME AS THE TYPE USED FOR THE PARENT SIGN.

## SIGN SIZES

| | |
|---|---|
| DIAMOND WARNING | - 48" x 48" |
| W20-1a PLAQUE | - 48" x 36" |
| R2-1 REGULATORY | - 48" x 60" |
| R5-18c REGULATORY | - 48" x 48" |

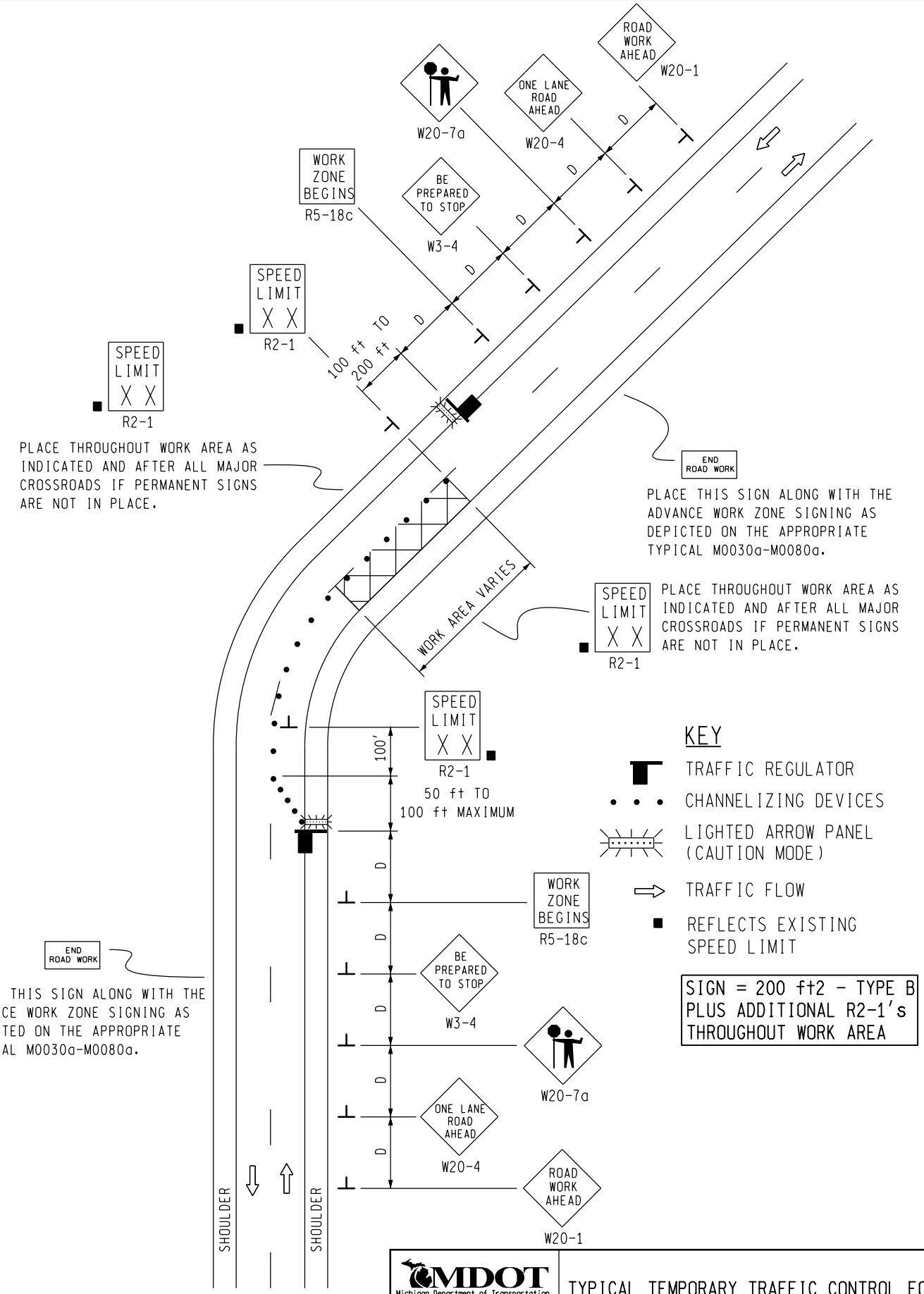
NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A SHOULDER CLOSURE ON A TWO LANE TWO-WAY ROADWAY NO SPEED REDUCTION

| | | | |
|---|---|---|---|
| DRAWN BY: CON:AE:djf | OCTOBER 2011 | M0110a | SHEET 2 OF 2 |
| CHECKED BY: BMM:CRB | PLAN DATE: | | |

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0110a.dgn REV. 10/04/2011




NOT TO SCALE

MDOT Michigan Department of Transportation

TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A TWO-LANE TWO-WAY ROADWAY WHERE ONE LANE IS CLOSED UTILIZING TRAFFIC REGULATORS, NO SPEED REDUCTION

| | | | |
|---|---|---|---|
| DRAWN BY: CON:AE:djf | OCTOBER 2011 | M0140a | SHEET 1 OF 2 |
| CHECKED BY: BMM:CRB | PLAN DATE: | | |

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0140a.dgn REV. 10/04/2011

# NOTES

1H. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
AND LENGTH OF LONGITUDINAL BUFFERS
SEE M0020a FOR "D" VALUES.

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

4A. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES IN THE TAPER AREA(S) SHOULD BE 15 FEET AND SHOULD BE EQUAL IN FEET TO TWICE THE POSTED SPEED IN MILES PER HOUR IN THE PARALLEL AREA(S).

5. FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

9. ALL TRAFFIC REGULATORS SHALL BE PROPERLY TRAINED AND SUPERVISED.

9A. IN ANY OPERATION INVOLVING MORE THAN ONE TRAFFIC REGULATOR, ONE PERSON SHOULD BE DESIGNATED AS HEAD TRAFFIC REGULATOR.

10. ALL TRAFFIC REGULATORS' CONDUCT, THEIR EQUIPMENT, AND TRAFFIC REGULATING PROCEDURES SHALL CONFORM TO THE CURRENT EDITION OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD) AND THE CURRENT EDITION OF THE MDOT HANDBOOK ENTITLED "TRAFFIC REGULATORS INSTRUCTION MANUAL."

11. WHEN TRAFFIC REGULATING IS ALLOWED DURING THE HOURS OF DARKNESS, APPROPRIATE LIGHTING SHALL BE PROVIDED TO SUFFICIENTLY ILLUMINATE THE TRAFFIC REGULATOR'S STATIONS.

12E. THE MAXIMUM DISTANCE BETWEEN THE TRAFFIC REGULATORS SHALL BE NO MORE THAN 2 MILES IN LENGTH UNLESS RESTRICTED FURTHER IN THE SPECIAL PROVISIONS FOR MAINTAINING TRAFFIC. ALL SEQUENCES OF MORE THAN 2 MILES IN LENGTH WILL REQUIRE WRITTEN PERMISSION FROM THE ENGINEER BEFORE PROCEEDING.

13. WHEN INTERSECTING ROADS OR SIGNIFICANT TRAFFIC GENERATORS (SHOPPING CENTERS, MOBILE HOME PARKS, ETC.) OCCUR WITHIN THE ONE-LANE TWO-WAY OPERATION, INTERMEDIATE TRAFFIC REGULATORS AND APPROPRIATE SIGNING SHALL BE PLACED AT THESE LOCATIONS.

14. ADDITIONAL SIGNING AND/OR ELONGATED SIGNING SEQUENCES SHOULD BE USED WHEN TRAFFIC VOLUMES ARE SIGNIFICANT ENOUGH TO CREATE BACKUPS BEYOND THE W3-4 SIGNS.

15. THE HAND HELD (PADDLE) SIGNS REQUIRED BY THE MMUTCD TO CONTROL TRAFFIC WILL BE PAID FOR AS PART OF FLAG CONTROL.

28E. THE TRAFFIC REGULATORS SHOULD BE POSITIONED AT OR NEAR THE SIDE OF THE ROAD SO THAT THEY ARE SEEN CLEARLY AT A MINIMUM DISTANCE OF 500 FEET. THIS MAY REQUIRE EXTENDING THE BEGINNING OF THE LANE CLOSURE TO OVERCOME VIEWING PROBLEMS CAUSED BY HILLS AND CURVES.

## SIGN SIZES

DIAMOND WARNING - 48" x 48"
R2-1 REGULATORY - 48" x 60"
R5-18c REGULATORY - 48" x 48"

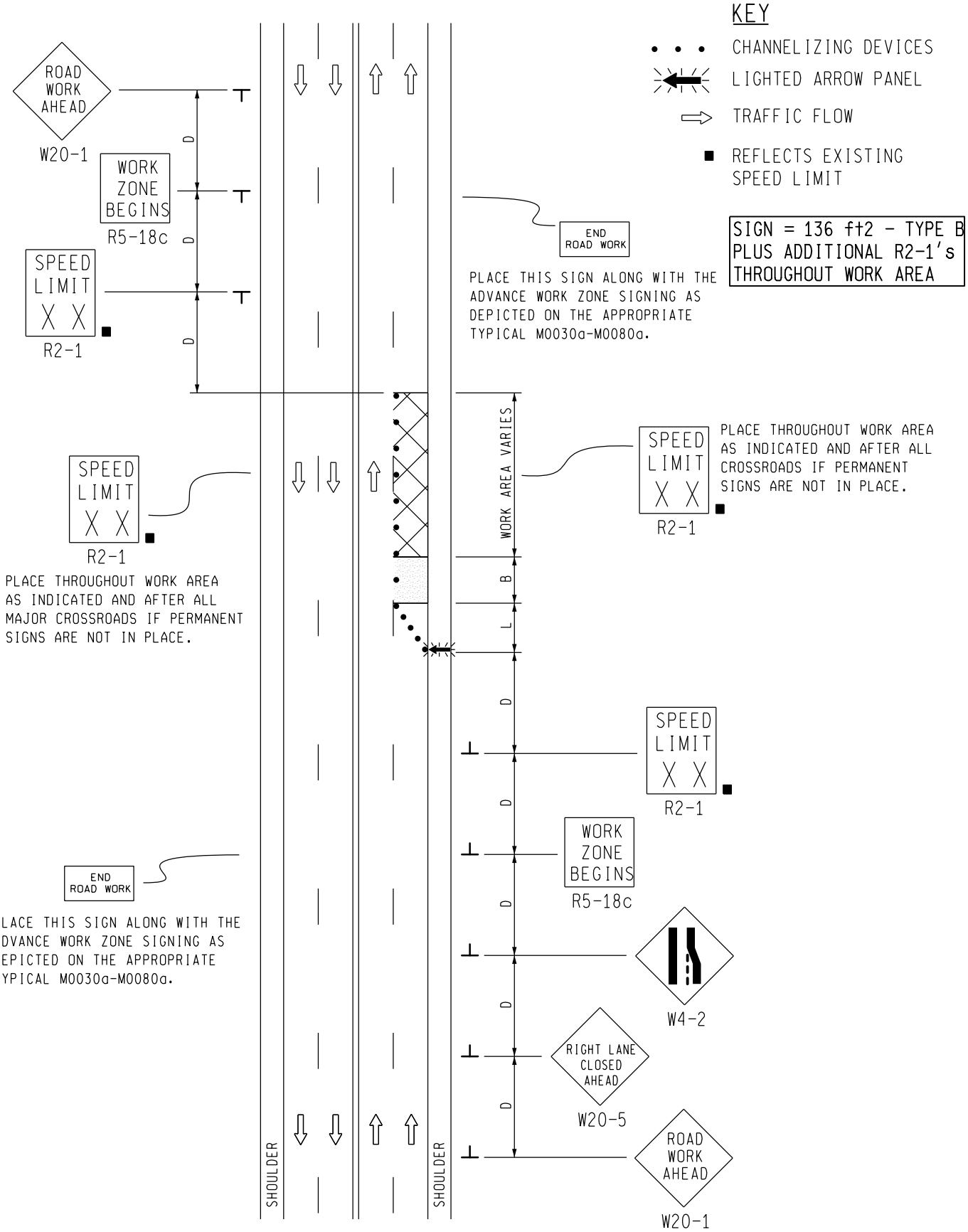
NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A TWO-LANE TWO-WAY ROADWAY WHERE ONE LANE IS CLOSED UTILIZING TRAFFIC REGULATORS, NO SPEED REDUCTION

| | | | |
|---|---|---|---|
| DRAWN BY: CON:AE:djf | OCTOBER 2011 | M0140a | SHEET 2 OF 2 |
| CHECKED BY: BMM:CRB | PLAN DATE: | | |

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0140a.dgn REV. 10/04/2011




NOT TO SCALE

MDOT Michigan Department of Transportation

TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

# TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON AN UNDIVIDED MULTI-LANE ROADWAY, NO SPEED REDUCTION

| | | | |
|---|---|---|---|
| DRAWN BY: CON:AE:djf | OCTOBER 2011 | M0240a | SHEET 1 OF 2 |
| CHECKED BY: BMM:CRB | PLAN DATE: | | |

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0240a.dgn REV. 10/11/2011

# NOTES

1B. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
L = MINIMUM LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER
SEE M0020a FOR "D," "L," AND "B" VALUES

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

4E. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES SHOULD BE EQUAL IN FEET TO THE POSTED SPEED IN MILES PER HOUR ON TAPER(S) AND TWICE THE POSTED SPEED IN THE PARALLEL AREA(S).

5. FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

21. ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

26. THE LIGHTED ARROW PANEL SHALL BE LOCATED AT THE BEGINNING OF THE TAPER AS SHOWN. WHEN PHYSICAL LIMITATIONS RESTRICT ITS PLACEMENT AS INDICATED, THEN IT SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE.

## SIGN SIZES

DIAMOND WARNING - 48" x 48"
R2-1 REGULATORY - 48" x 60"
R5-18c REGULATORY - 48" x 48"

NOT TO SCALE

| | | | |
|---|---|---|---|
| MDOT Michigan Department of Transportation<br>TRAFFIC AND SAFETY<br>MAINTAINING TRAFFIC TYPICAL | TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON AN UNDIVIDED MULTI-LANE ROADWAY, NO SPEED REDUCTION | | |
| DRAWN BY: CON:AE:djf<br>CHECKED BY: BMM:CRB | OCTOBER 2011<br>PLAN DATE: | M0240a | SHEET 2 OF 2 |
| FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0240a.dgn REV. 10/11/2011 | | | |

## SIGN MATERIAL SELECTION TABLE

| | SIGN MATERIAL TYPE | | |
|---|---|---|---|
| SIGN SIZE | TYPE I | TYPE II | TYPE III |
| ≤ 36" X 36" | | X | X |
| >36" X 36"≤ 96" TO WIDE | | X | |
| > 96″ WIDE TO 144″ WIDE | X | X | |
| > 144″ WIDE | X | | |

TYPE I ALUMINUM EXTRUSION
TYPE II PLYWOOD
TYPE III ALUMINUM SHEET

ROUNDING OF CORNERS IS NOT REQUIRED FOR TYPE IOR IISIGNS.
VERTICAL JOINTS ARE NOT PERMITTED.
HORIZONTIAL JOINTS THROUGH SIGN LEGEND OR SYMBOLS ARE NOT PERMITTED.

## POST SIZE REQUIREMENTS TABLE

| | POST TYPE | | |
|---|---|---|---|
| SIGN AREA ($ft^2$) | U-CHANNEL STEEL | SQUARE TUBULAR STEEL | WOOD |
| ≤9 | 1 - 3 lb/ft* | 1 - 2" 12 or 14 GA* | N/A |
| 9 ≤ 20 | 2 - 3 lb/ft | 2 - 2" 12 or 14 GA | 1 - 4" X 6"* |
| > 20 ≤ 30 | N/A | N/A | 2 - 4" X 6" |
| > 30 ≤ 60 | N/A | N/A | 2 - 6" X 8" |
| > 60 ≤ 84 | N/A | N/A | 3 - 6" X 8" |

*SIGNS 4 FEET AND GREATER IN WIDTH REQUIRE 2 POSTS.
SIGNS GREATER THAN 8 FEET IN WIDTH REQUIRE 2 OR 3 WOOD POSTS DEPENDING ON AREA OF SIGN.
A MAXIMUM OF 2 POSTS WITHIN A 7'PATH IS PERMITTED.

NOT TO SCALE

File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY SUPPORT AREA

DRAWN BY: CON/ECH

CHECKED BY: AUG

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

PENDING
FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

# GROUND DRIVEN SIGN SUPPORTS FOR TEMP SIGNS

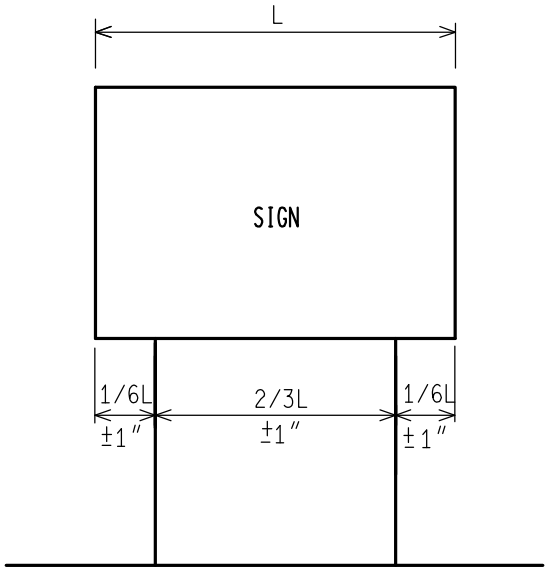
8/2006
PLAN DATE

WZD-100-A

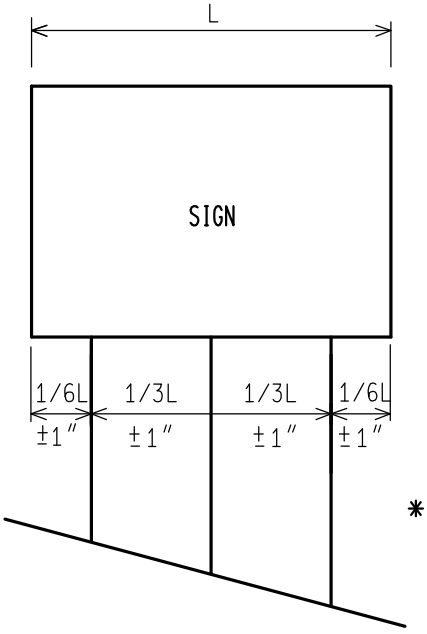
SHEET 1 of11

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.

# 2 POST SIGN SUPPORT SPACING




# 3 POST SIGN SUPPORT SPACING




* FOR ALL 11' AND 12' LONG SIGNS ON 3 WOOD SUPPORTS, SPREAD POSTS SO AS TO HAVE A 8' MIN. TO 9' MAX. DISTANCE BETWEEN OUTSIDE POSTS.

NOT TO SCALE

| MICHIGAN DEPARTMENT OF TRANSPORTATION<br>BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN | PENDING<br>FHWA APPROVAL DATE | 8/2006<br>PLAN DATE | WZD-100-A | SHEET<br>2 of11 |
|---|---|---|---|---|
| File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH | | | | |

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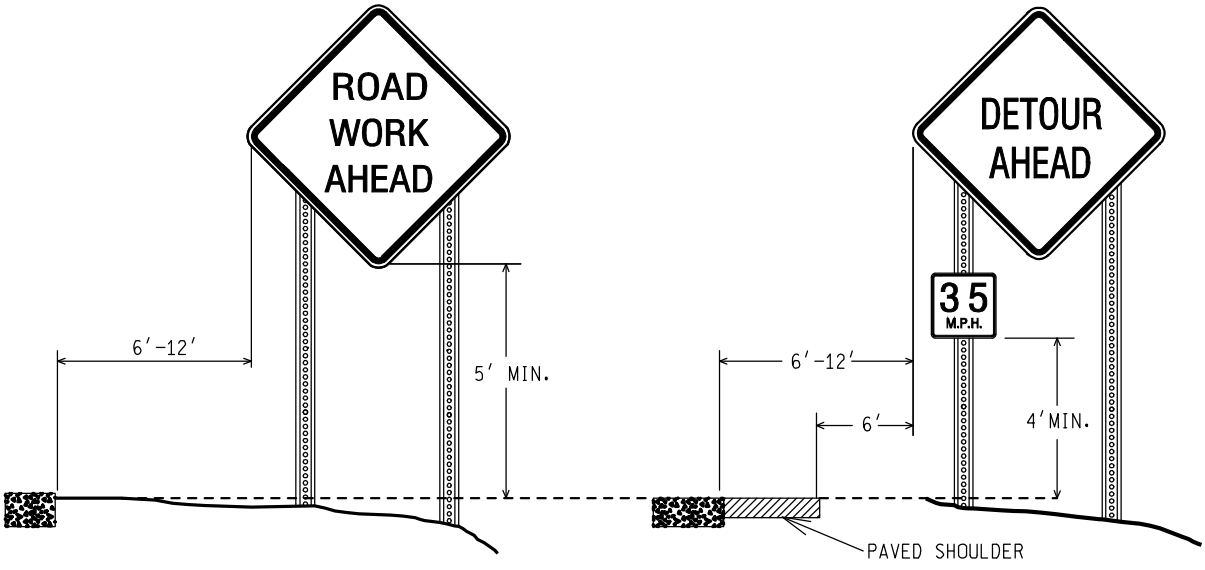
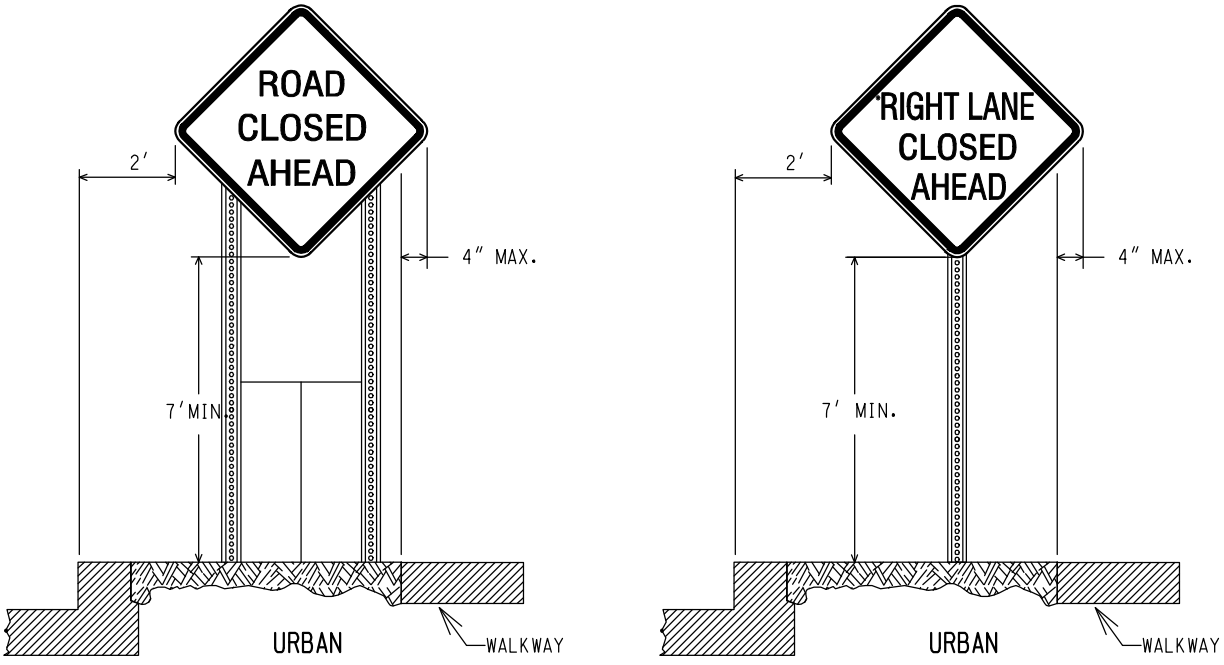



RURAL

RURAL WITH ADVISORY
SPEED PLATE




(CURBED AREAS OR WHERE
WALKWAYS ARE PRESENT)

(CURBED AREAS OR WHERE
WALKWAYS ARE PRESENT)

# BOTTOM HEIGHT AND OFFSET

NOT TO SCALE

| MICHIGAN DEPARTMENT OF TRANSPORTATION<br>BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN | PENDING<br>FHWA APPROVAL DATE | 8/2006<br>PLAN DATE | WZD-100-A | SHEET<br>3 of11 |
|---|---|---|---|---|
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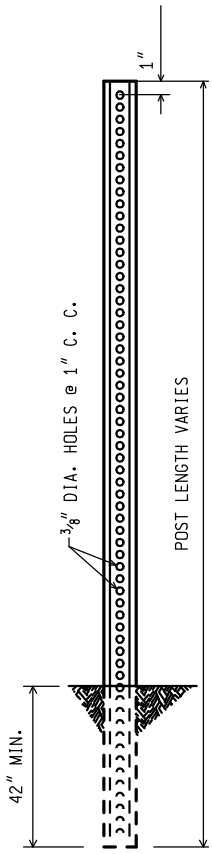


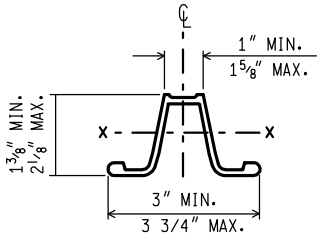


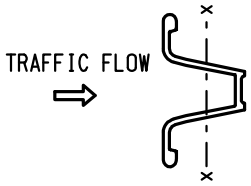


WEIGHT = 3 lbs/ft
SECT. MOD. X.-X. = 0.31 CUBIC INCHES MIN.

# 3 lb. U - CHANNEL STEEL POST
## (NO SPLICE)

MOUNT SIGN ON OPEN FACE OF
U - CHANNEL STEEL POST

NOT TO SCALE

| | | | | |
|---|---|---|---|---|
| MICHIGAN DEPARTMENT OF TRANSPORTATION<br>BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN | PENDING<br>FHWA APPROVAL DATE | 8/2006<br>PLAN DATE | WZD-100-A | SHEET<br>4 of11 |
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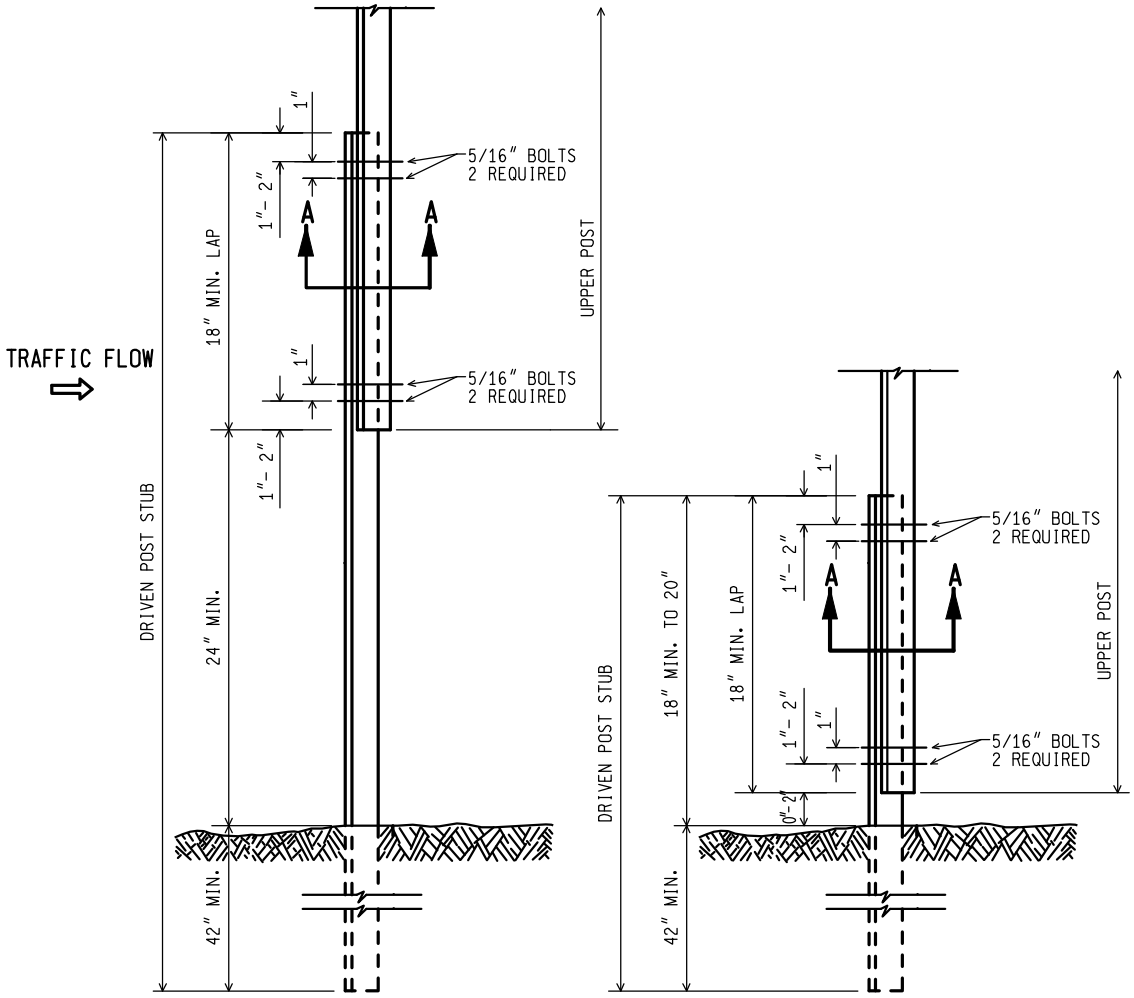


UPPER SPLICE

LOWER SPLICE

# 3 lb. U - CHANNEL STEEL POST
## (WITH SPLICE)

MOUNT SIGN ON OPEN FACE OF
UPPER U - CHANNEL STEEL POST

NOT TO SCALE

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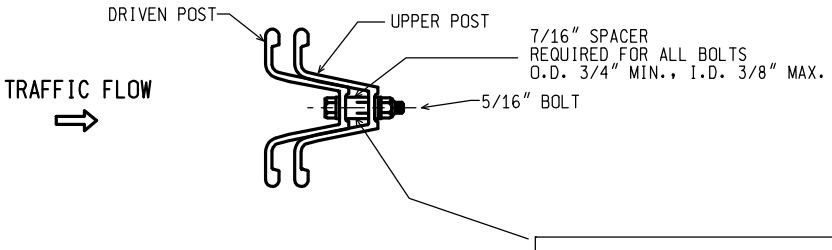
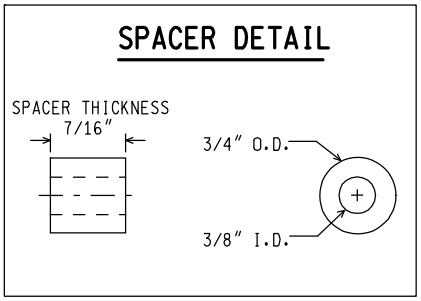



SECTION A-A




NOTES:

1. THE SPACER THICKNESS SHALL BE 1/16" LESS THAN THE GAP BETWEEN THE POST WHEN POSITIONED IN THE UNBOLTED CONFIGURATION.

2. THE EXTERIOR BOLT (CLOSEST TO LAP), SPACER, WASHER, AND NUT SHALL BE INSTALLED IN A PREPUNCHED HOLE 1" to 2" FROM THE END OF THE LAP.

3. THE INTERIOR BOLT (FARTHEST FROM LAP), SPACER, WASHER, AND NUT SHALL BE INSTALLED IN THE NEXT PREPUNCHED HOLE.

4. THE DRIVEN POST SHALL ALWAYS BE MOUNTED IN FRONT OF THE UPPER POST WITH RESPECT TO THE ADJACENT ONCOMING TRAFFIC, REGARDLESS OF THE DIRECTION THE SIGN IS FACING.

5. THE SPLICE LAP SHALL BE FASTENED BY FOUR-5/16" DIA. GALVANIZED A449 BOLTS (SAE J429 GRADE 5) OR GALVANIZED A325 BOLTS.

# 3 lb. U - CHANNEL STEEL POST
## (WITH SPLICE)

NOT TO SCALE

| | | | | |
|---|---|---|---|---|
| MICHIGAN DEPARTMENT OF TRANSPORTATION<br>BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN | PENDING<br>FHWA APPROVAL DATE | 8/2006<br>PLAN DATE | WZD-100-A | SHEET<br>6 of11 |
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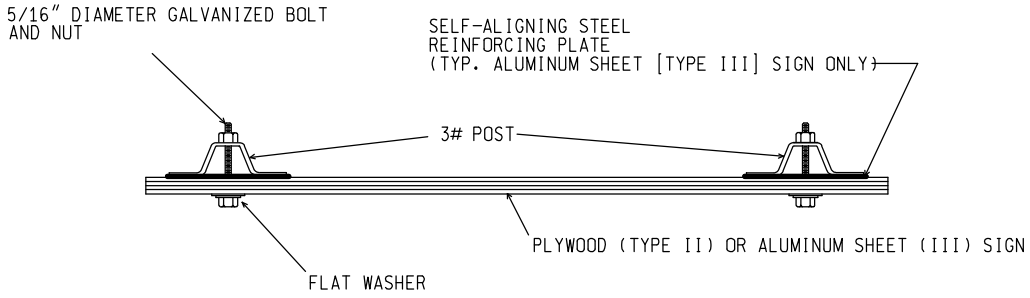
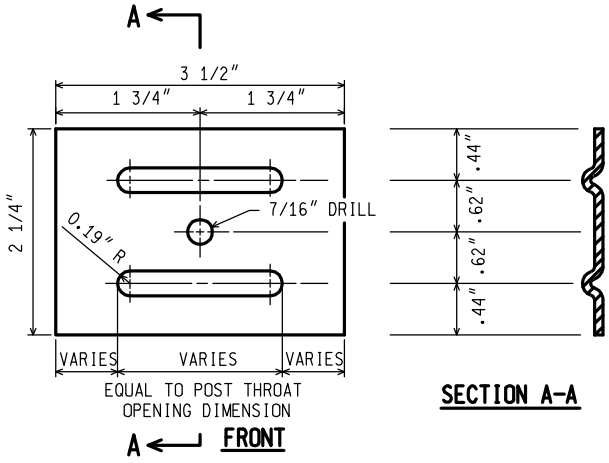



## SIGN TO 3 lb. POST CONNECTION




NOTES: (FOR STEEL SIGN REINF' PLATE)

1. MATERIAL: 12 GAUGE CARBON STEEL.
2. TOLERANCE ON ALL DIMENSIONS ± 0.0625"
3. FINISH-AFTER STAMPING AND PUNCHING, GALVANIZE ACCORDING TO CURRENT SPECIFICATIONS FOR ZINC (HOT GALVANIZE) COATINGS ON PRODUCTS FABRICATED FROM PLATES OR STRIPS

## STEEL SIGN REINFORCING PLATE
## REQUIRED FOR TYPE III SIGNS ONLY

# 3 lb. U - CHANNEL STEEL POST SIGN CONNECTION

NOT TO SCALE

| MICHIGAN DEPARTMENT OF TRANSPORTATION<br>BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN | PENDING<br>FHWA APPROVAL DATE | 8/2006<br>PLAN DATE | WZD-100-A | SHEET<br>7 of11 |
|---|---|---|---|---|
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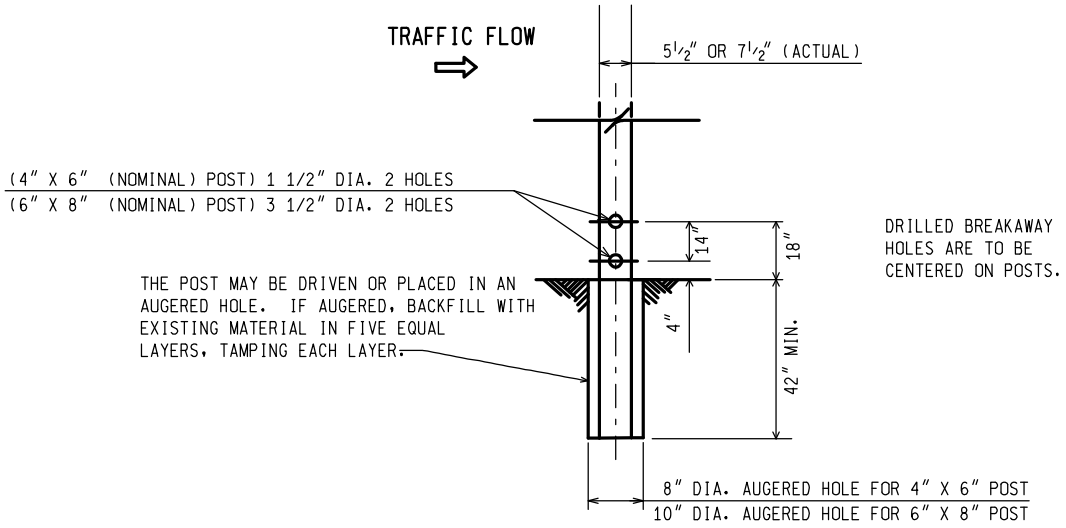
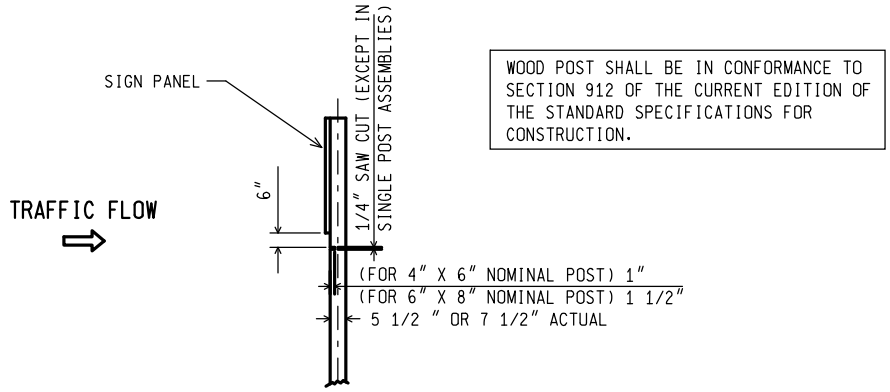



## WOOD POST BREAKAWAY HOLES/ DIRECT EMBEDMENT DETAILS




## SAW CUT DETAIL (MULTIPLE POST INSTALLATIONS)

# WOOD POST DETAILS

NOT TO SCALE

| MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN | PENDING FHWA APPROVAL DATE | 8/2006 PLAN DATE | WZD-100-A | SHEET 8 of11 |
|---|---|---|---|---|
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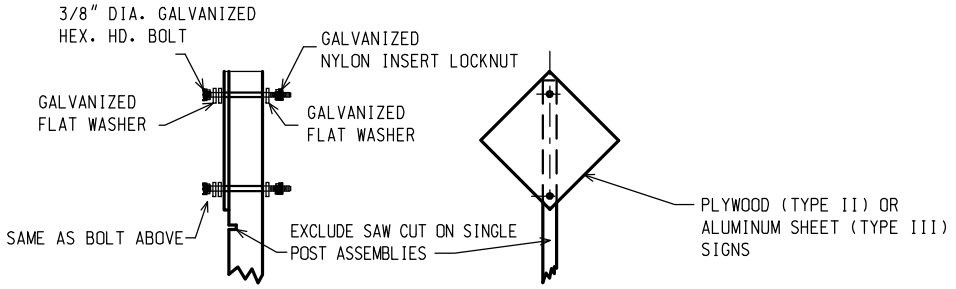
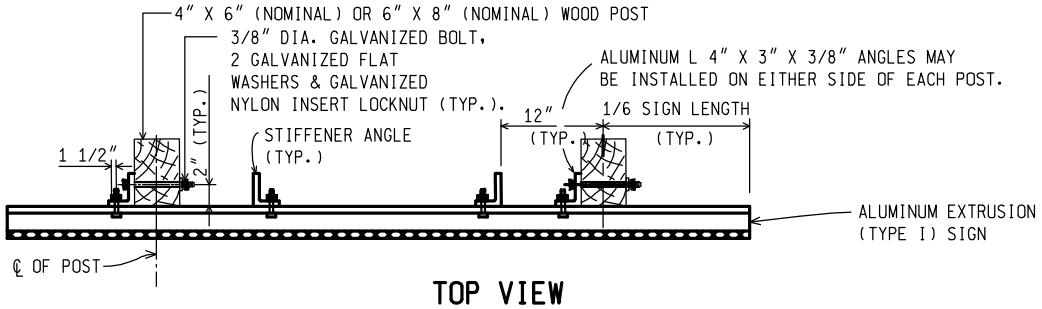
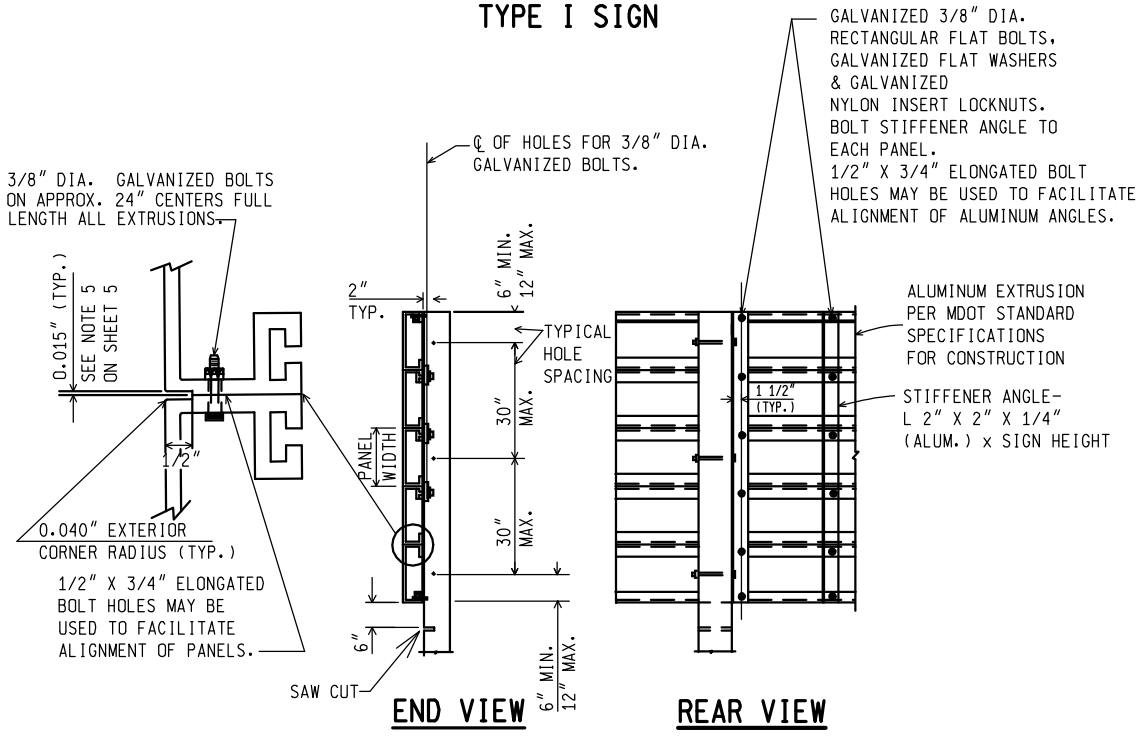



## TYPE II AND TYPE III SIGNS




## TOP VIEW
## TYPE I SIGN




## END VIEW
## REAR VIEW

## TYPE I SIGN - ERECTION DETAILS

# WOOD POST CONNECTIONS

NOT TO SCALE

| MICHIGAN DEPARTMENT OF TRANSPORTATION<br>BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN | PENDING<br>FHWA APPROVAL DATE | 8/2006<br>PLAN DATE | WZD-100-A | SHEET<br>9 of11 |
|---|---|---|---|---|
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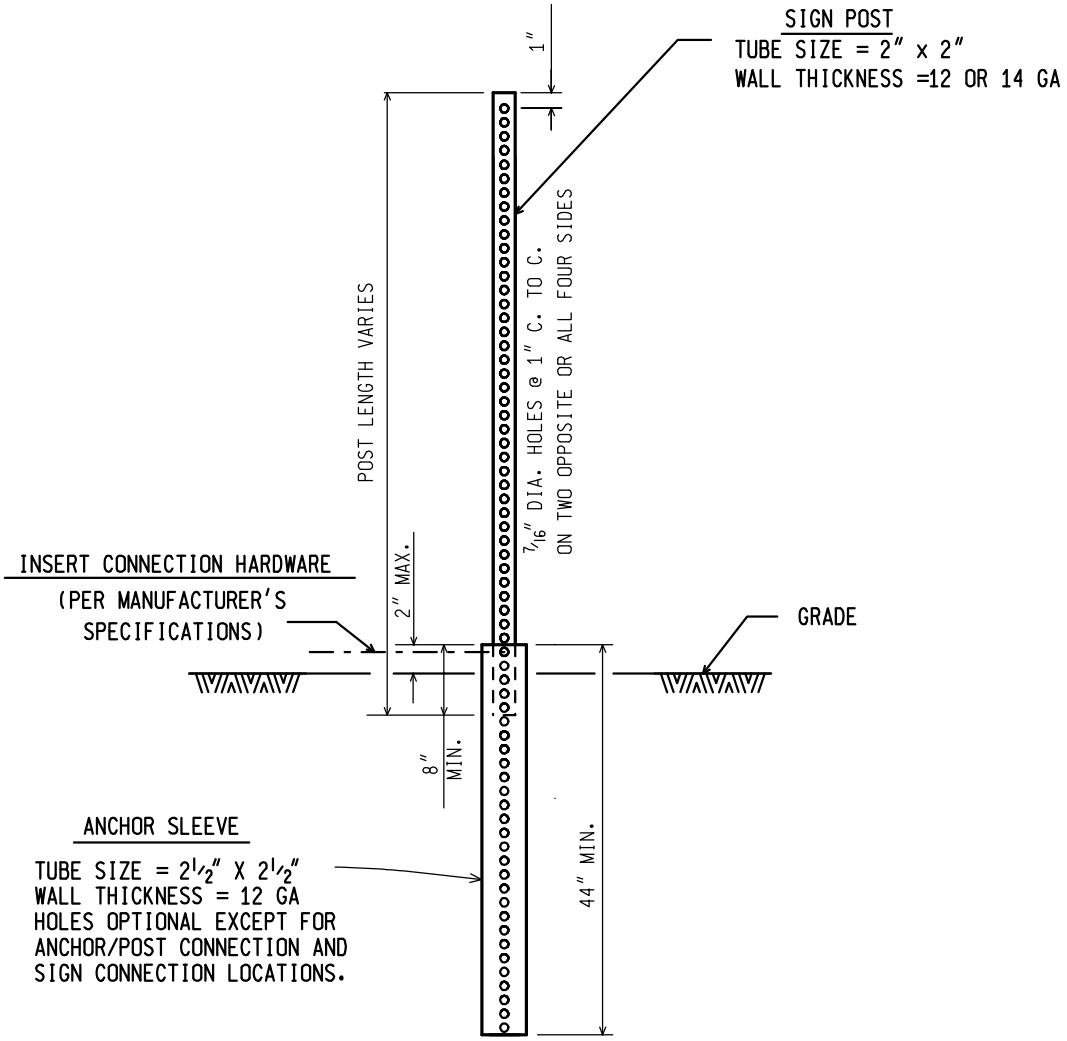


# SQUARE TUBULAR STEEL POST

NOT TO SCALE

| MICHIGAN DEPARTMENT OF TRANSPORTATION<br>BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN | PENDING<br>FHWA APPROVAL DATE | 8/2006<br>PLAN DATE | WZD-100-A | SHEET<br>10 of 11 |
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GENERAL NOTES:

1. A MAXIMUM OF TWO POSTS WITHIN A 7 FOOT PATH IS PERMITTED.
2. ALL SIGN POSTS SHALL COMPLY WITH NCHRP 350.
3. ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 42".
4. BRACING OF POST IS NOT PERMITTED.
5. SIGN SHALL BE LEVEL, AND UPRIGHT FOR THE DURATION OF INSTALLATION.
6. ERECT POSTS SO THE SIGN FACE AND SUPPORTS DO NOT VARY FROM PLUMB BY MORE THAN 3/16" IN 3'. PROVIDE A CENTER-TO-CENTER DISTANCE BETWEEN POSTS WITHIN 2 PERCENT OF PLAN DISTANCE.
7. NO MORE THAN ONE SPLICE PER POST, AS SHOWN, WILL BE PERMITTED.
8. POST TYPES SHALL NOT BE MIXED WITHIN A SIGN SUPPORT INSTALLATION.
9. NO VERTICAL JOINTS ARE PERMITTED IN SIGN. NO HORIZONTIAL JOINTS THROUGH SIGN LEGEND OR SYMBOLS ARE PERMITTED IN SIGN
10. REMOVE SIGN POSTS AND/OR POST STUBS IN THEIR ENTIRETY WHEN NO LONGER REQUIRED.
11. ALL LABOR, MATERIALS, AND EQUIPMENT, INCLUDING TEMPORARY SUPPORTS REQUIRED TO INSTALL, MAINTAIN, RELOCATE, COVER, AND/OR REMOVE THE TEMPORARY SIGN, INCLUDING SUPPORTS, ARE CONSIDERED TO BE INCLUDED IN THE COST OF THE TEMPORARY SIGN.
12. SAW CUTS IN WOOD POSTS ARE TO BE PARALLEL TO THE BOTTOM OF THE SIGN.
13. POSTS SHALL NOT EXTEND MORE THAN 4" ABOVE TOP OF SIGN.

NOT TO SCALE

| MICHIGAN DEPARTMENT OF TRANSPORTATION<br>BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN | PENDING<br>FHWA APPROVAL DATE | 8/2006<br>PLAN DATE | WZD-100-A | SHEET<br>11 of 11 |
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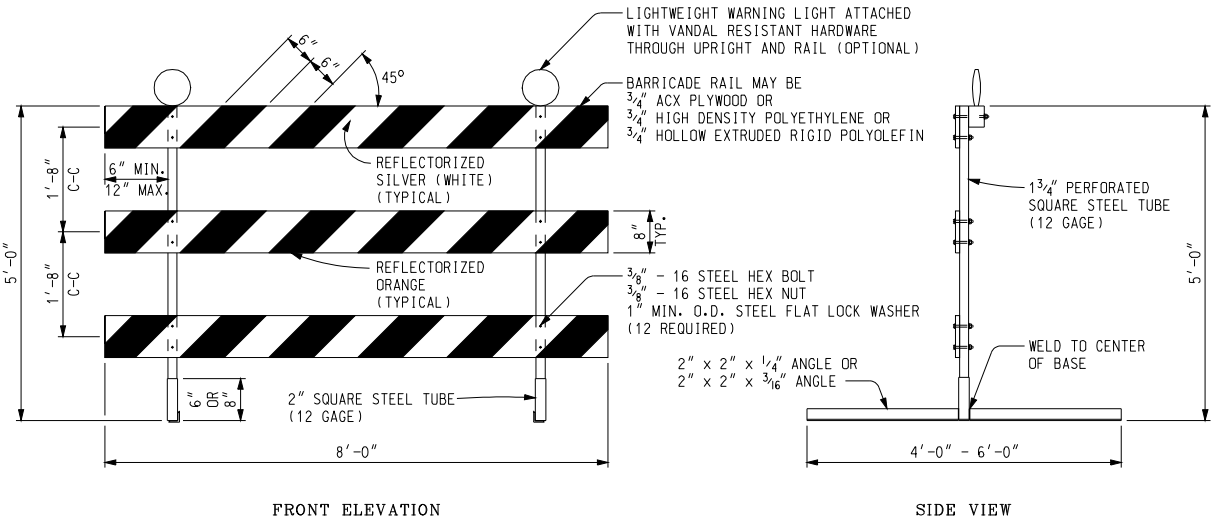
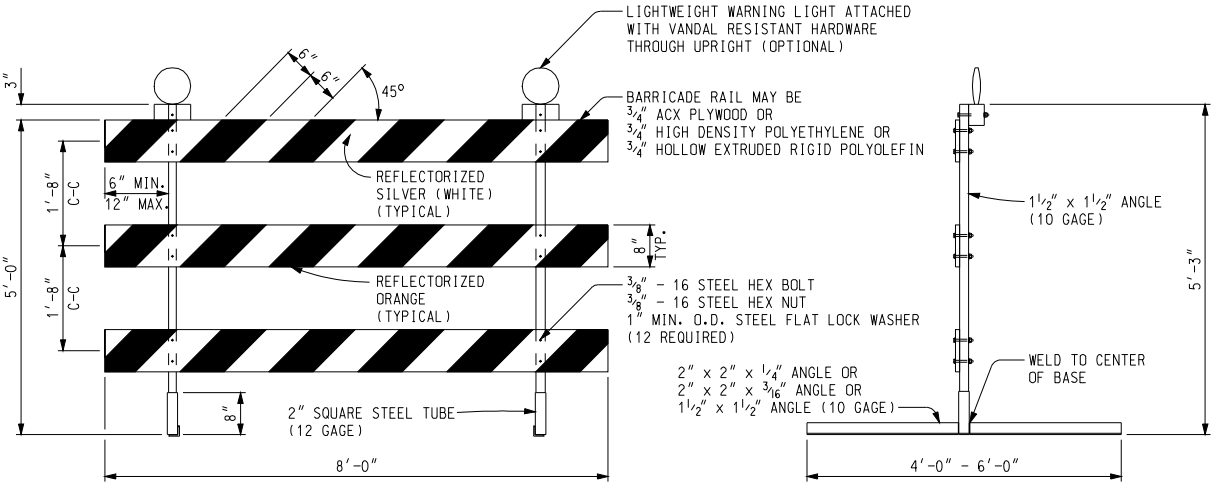
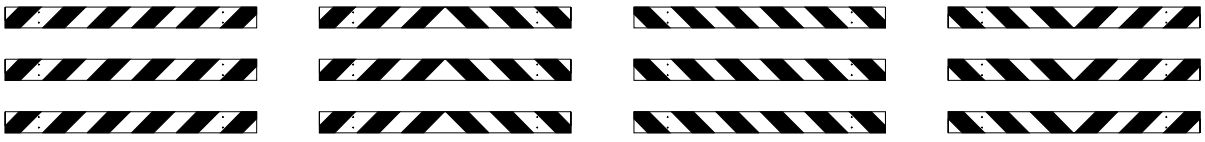



PERFORATED SQUARE STEEL TUBE OPTION




ANGLE IRON OPTION




BARRICADE RAIL SHEETING OPTIONS

TYPE III BARRICADES

Other Type III Barricades meeting current NCHRP crash worthy criteria can be found on the FHWA Safety website at http://safety.fhwa.dot.gov/roadway_dept/road_hardware/wzd.htm

NOT TO SCALE

File: T&S/Typ/Signs/WorkZones/wzd 125 d Rev. 09/22/09 PJ

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: ECH

CHECKED BY: MWB

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

Temporary Traffic Control Devices

9/22/09 PLAN DATE

WZD-125-E

SHEET 1 of 3

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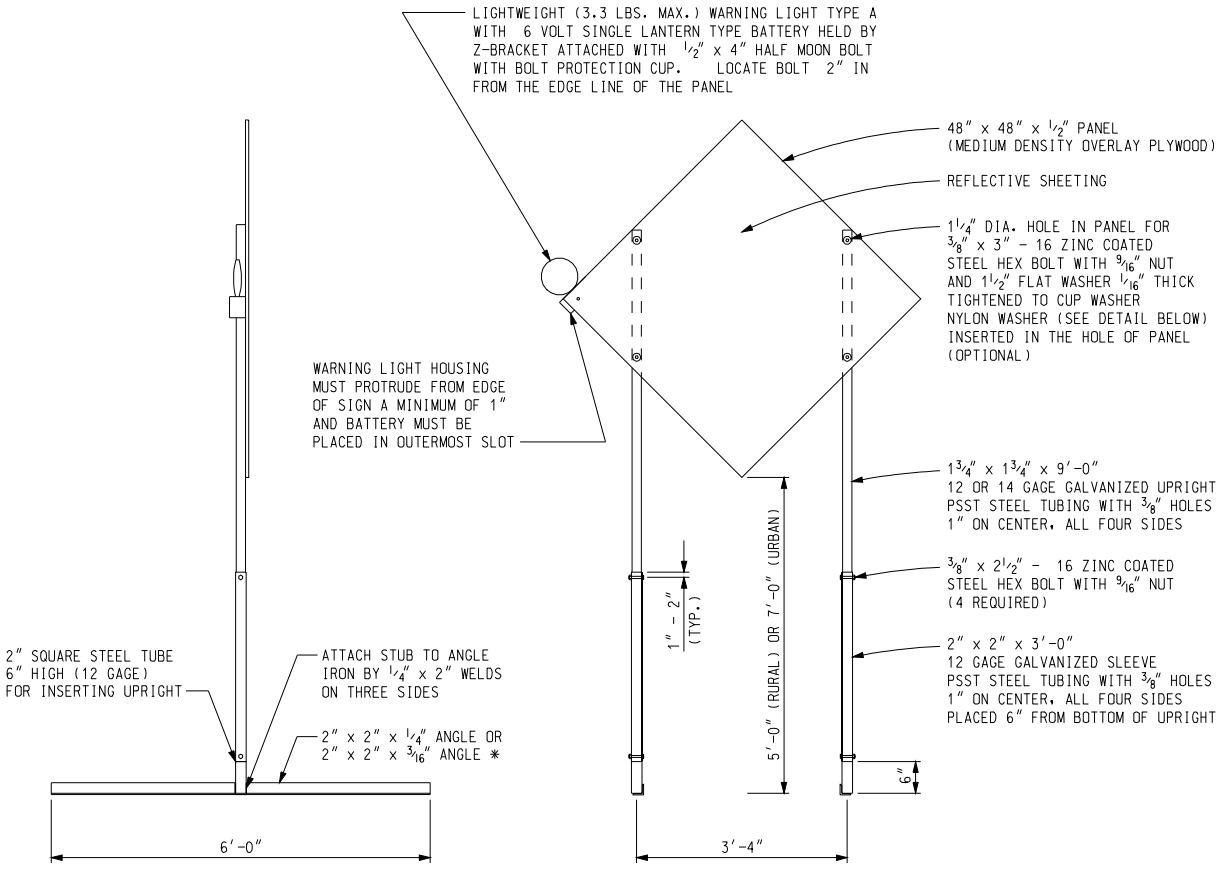
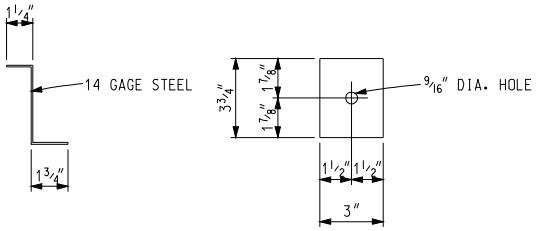



## TEMPORARY SIGN SUPPORT

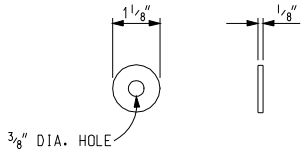
(WARNING LIGHT PLACED ON SIDE CLOSEST TO TRAFFIC)

* SIGN STAND IS BALLASTED WITH FOUR OR MORE 35 LB SANDBAGS. A MINIMUM OF ONE ON EACH END.

UPRIGHTS SHALL NOT EXTEND ABOVE THE SIGN PANEL.




Z-BRACKET DETAIL




OPTIONAL NYLON WASHER

Other temporary sign supports meeting current NCHRP crash worthy criteria can be found on the FHWA Safety website at http://safety.fhwa.dot.gov/roadway_dept/road_hardware/wzd.htm

NOT TO SCALE

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| MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN | (SPECIAL DETAIL) FHWA APPROVAL DATE | 9/22/09 PLAN DATE | WZD-125-E | SHEET 2 of 3 |
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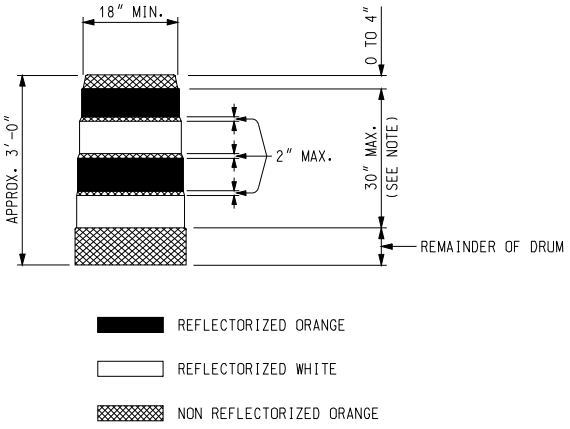
PLASTIC DRUM

PROPOSED TYPE III BARRICADE

EXISTING TYPE III BARRICADE

## SYMBOLS TO BE USED ON PLANS




NOTE:
DRUMS SHALL HAVE AT LEAST 4 HORIZONTAL REFLECTORIZED STRIPES (2 ORANGE AND 2 WHITE) OF 6" UNIFORM WIDTH, ALTERNATING IN COLOR WITH THE TOPMOST REFLECTORIZED STRIPE BEING ORANGE. NON REFLECTORIZED SPACES BETWEEN THE HORIZONTAL REFLECTORIZED ORANGE AND WHITE STRIPES SHALL BE ORANGE IN COLOR AND EQUAL IN WIDTH.

## PLASTIC DRUM

NOTES:

2" PERFORATED SQUARE STEEL TUBES MAY BE USED TO FABRICATE THE HORIZONTAL BASE OF THE TYPE III BARICADE.

WARNING LIGHTS SHALL BE PLACED ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION AND ALL OTHER PROVISIONS IN THE CONTRACT WHEN THEY ARE USED ON TYPE III BARRICADES.

SEE ROAD STANDARD PLANS R-113-SERIES FOR TEMPORARY CROSSOVERS FOR DIVIDED ROADWAY, AND R-126-SERIES FOR TYPICAL LOCATION AND SPACING OF PLASTIC DRUMS FOR PLACEMENT OF TEMORARY CONCRETE BARRIER.

SIGNS, BARRICADES, AND PLASTIC DRUMS SHALL BE FACED WITH PRESSURE-SENSITIVE REFLECTIVE SHEETING ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

SANDBAGS SHALL BE USED WHEN SUPPLEMENTAL WEIGHTS ARE REQUIRED TO ACHIEVE STABILITY OF THE BARRICADE. THE SANDBAGS SHALL BE PLACED SO THEY WILL NOT COVER OR OBSTRUCT ANY REFLECTIVE PORTION OF THE TRAFFIC CONTROL DEVICE.

NOT TO SCALE

| | | | | |
|---|---|---|---|---|
| MICHIGAN DEPARTMENT OF TRANSPORTATION<br>BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN | (SPECIAL DETAIL)<br>FHWA APPROVAL DATE | 9/22/09<br>PLAN DATE | WZD-125-E | SHEET<br>3 of 3 |
| File: T&S/Typ/Signs/WorkZones/wzd 125 d | Rev. 09/22/09 PJ | | | |

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CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
**SLOPE RESTORATION**

AA:DAD 1 of 2 04/05/15

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

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

1. Topsoil Surface: Place ***4 inches*** of topsoil in area disturbed areas to be restored. Topsoil shall be free of all stones one inch in diameter or greater.
2. Turf Seed Mixture: Use seed mixture type THM (Turf Loamy to Heavy). Use Mesic seed mix adjacent to timber boardwalk in wetland buffer areas along Stone School requiring restoration.
3. Chemical Fertilizer Nutrient: Use Class A fertilizer. Do not fertilize in wetland buffer area to be restored.
4. Use Mulch Blankets on all areas to be restored with exception to wetland buffer areas where straw mulch shall be used.

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

Prior to placing topsoil, shape, compact and assure all areas to be seeded ***are weed free***. Place topsoil to the minimum depth indicated above, to meet proposed finished grade. Remove any stones greater than or equal to 1 inch in diameter. If the area being restored requires more than the minimum depth of topsoil to meet finished grade, this additional depth must be filled using topsoil. Furnishing and placing this additional material is included in this item of work.

Topsoil shall be ***weed and weed seed free*** and friable prior to placing seed. Remove all stones from the topsoil greater than 1 inch in diameter. Apply seed mixture and fertilizer to prepared soil surface. Seed shall be incorporated into top ½ inch of topsoil.

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

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

The Engineer will inspect the seeded turf to ensure the end product is well established, weed free, in a vigorous growing condition, and contains the species called for in the seeding

mixture. **If areas do not promote growth, the Contractor shall apply new seed at its expense**.

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

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

| **Pay Item** | **Pay Unit** |
|---|---|
| Slope Restoration | Square Yard |

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

CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
**TIMBER BOARDWALK AND FOUNDATION SYSTEM**



**a. Description.** This work consists of furnishing all labor, equipment, and materials necessary to construct a timber boardwalk over the wetland area as shown on the plans, including timber framing, decking and structural components, a foundation system using helical piers, railings with treated timber and composite wood, and concrete massive wall unit blocks as the HMA terminus.

All structural members of the boardwalk shall be designed for a uniform pedestrian live load of 90 psf. The pedestrian live load shall be applied to those areas of the walkway so as to produce maximum stress in the member being designed. The boardwalk shall be designed for a maintenance vehicle satisfying the AASHTO H-10 Design Truck configuration. A single truck shall be placed to produce the maximum load effects and shall not be placed in combinations with the pedestrian load.

**b. Materials.** Wood framing, decking, structural components and footings must be in accordance with sections 709 and 912 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction except as modified herein.

Submit the following to the Engineer for approval at least 14 calendar days prior to the start of construction. Work must not begin until all submittals have been received and approved by the Engineer.

1. Working drawings and design calculations for the Helical Piles intended for use. The calculations should include the minimum torque required to install the vertical and battered helical piles based on the specified allowable capacities, the estimated pier installation depth of the helical piles, and a critical buckling load analysis due to the low strength soil conditions on site.

2. A detailed description of the construction procedures proposed for review, including a list of major equipment to be used.

3. Shop drawings for all Helical Pile components that include, but are not limited to:

    a. Helical Pile design load,
    b. Type and size of central steel shaft,
    c. Helix configuration (number and diameter of helix plates),
    d. Minimum effective installation torque,
    e. Minimum overall length,
    f. Inclination of Helical Pile,
    g. Helical Pile attachment to structure relative to grade beam, column pad, pile cap, etc.,
    h. Indication of corrosion protection.

4. Soil Analysis Report for detailed bearing capacity.

5. Copies of calibration reports for each torque indicator or torque motor, and all load test equipment to be used on the project. The calibration tests must have been performed within 45 working days of the date submitted. Helical Pile installation and testing must not proceed until the Engineer has received the calibration reports.

Helical piers as specified must conform to the applicable building code.

The helical lead sections and extension sections must be solid steel, round cornered square shaft, or round steel pipe shaft, or composite steel and grout shaft configured with one or more helical bearing plates welded to the shaft. Bolts and couplings shall be per manufacturer's recommendations for each helical pier type.

All helical pile material must be corrosion protected by hot dip galvanization after fabrication in accordance with ASTM A 123 and/or ASTM A 153.

Installation units consist of a rotary type torque motor with forward and reverse capabilities.

Appropriate helical pier selection will consider design load plus safety factor, soil parameters and the installation torque vs. capacity equation as per the manufacturer's recommendations.

Design of helical screw piers and anchors must be performed by an entity as required in accordance with existing local code requirements or established local practices. This design work shall be performed by a licensed professional engineer licensed in the state of Michigan.

Piers must have U-shape bracket sleeves to mount lateral support beams for joist and deck structure. All component materials must be protected by hot dip galvanization in accordance with ASTM A 153.

The minimum block dimensions for the concrete massive wall units shall be 12 inches high x 72 inches wide x 14 inches deep and have a minimum block weight of 850 pounds.

The concrete massive wall units shall meet the aesthetic requirements for the site.

The concrete massive wall units shall have a minimum 28-day compressive strength of 5000 psi as tested in accordance with ASTM C 140. The concrete shall have a maximum moisture absorption rate of 5 percent to ensure adequate freeze-thaw.

The drainage pipe used in the HMA path terminus section shall be perforated corrugated HDPE or PVC pipe, with a minimum diameter of 4 inches, protected by a geotextile filter to prevent the migration of soil particles into the pipe.

All timber and lumber shall be treated and in accordance with section 912 of the MDOT 2012 Standard Specifications for Construction. Lumber shall be S4S (surfaced four sides) according to ASTM D245. All lumber sizes are nominal. All lumber shall be stamped by the rating agency and certifications shall be provided to verify the preservative treatment including net retention, pressure process used, and compliance to current standards.

**c. Construction.** Construction must be in accordance with section 709 and 912 of the MDOT 2012 Standard Specifications for Construction except as modified herein.

Protection in Transit. A coat of end sealer must be applied to ends of all wood members as soon as practicable after end trimming. Wood members must be protected until installed.

Field Storage and Handling. If products are stored temporarily at the job site after arrival, wood members must be placed on blocking, well off the ground and be separated by wood blocking so air can circulate around each member. Place water resistance paper over the top but do not use opaque polyethylene.

Butt Joints, if used, must be placed over supports and must be staggered a minimum of 3 feet apart for adjacent planks.

Centerline of Helical Piles must not be more than 3 inches from indicated plan location. Helical Pile plumbness must be within 2 degrees of design alignment. Top elevation of Helical Pile must be within +1 inch to -2 inches of the design vertical elevation.

Helical Piles must be installed by an authorized installer who has satisfied the certification requirements of the manufacturer. Provide the Engineer proof of current manufacturer's certification.

Adequate soil boring information for estimated bearing capacity and pier depths are available from the geotechnical report within the proposal. Installation of Helical Pile locations on the project site will be necessary to generate a presumptive soil profile using the well-known installed torque vs. capacity attribute of helical piles to determine an appropriate helical pier to meet the required capacity.

A torque indicator must be used during Helical Pile installation. The torque indicator can be an integral part of the installation equipment or externally mounted in-line with the installation tooling and must be properly calibrated. The torque indicator shall be capable of providing continuous measurement of applied torque throughout the installation. Installation units must be capable of developing a torque capacity 15% greater than the torsional strength rating of the central steel shaft to be installed.

Installation units must be capable of positioning the helical pier at the proper installation angle and location as indicated on the plans. The Helical Pile sections shall be engaged and advanced into the soil in a smooth, continuous manner at a rate of rotation of 5 to 20 RPM's. Extension sections shall be provided to obtain the required minimum overall length and installation torque as shown on the shop drawings and calculations. Connect sections together using coupling bolt(s) and nut torqued to 40 ft-lb. Sufficient down pressure shall be applied to uniformly advance the Helical Pile sections approximately 3 inches per revolution. The rate of rotation and magnitude of down pressure shall be adjusted for different soil conditions and depths.

Helical Piles must be installed so that the top helical plate is at minimum 42" below ground level.

Battered Helical Piles must be installed to the minimum torque value required to provide 6 kip allowable load capacities. Vertical Helical Piers must be installed to the minimum torque value required to provide 15 kip allowable load capacities. The average torque for the last three feet of penetration shall be used as the basis of comparison with the minimum installation torque. The average torque shall be defined as the average of the last three readings recorded

at on-foot intervals.

Installation torque must be monitored throughout the installation process. Measured torque shall never exceed the torsional strength rating of the central steel shaft.

If reasonable doubt exists as to the accuracy of the torque measurements, the torque indicator shall be re-calibrated on-site.

Install the piers within the construction area with the least amount of disturbance to the wetlands as possible.

Accurately record location, type, torque and depth of piers and provide the Engineer with a copy of this data.

Helical Pile capacity in soil shall not be relied upon from the soil layers indicating peat, marl, or loose sands as shown in the geotechnical report. End-bearing on the helix plates must be in appropriate soil strata.

The bottom row of wall modules for the HMA path terminus section shall be placed on the prepared leveling base as shown on the plans. Care shall be taken to ensure that the wall modules are aligned properly, leveled from side to side and front to back and in complete contact with the base material.

The wall modules above the bottom course shall be placed such that the tongue and grove arrangement provides the design batter as indicated on the plans.

The wall modules shall be swept clean before placing additional levels to ensure no dirt, concrete, or other foreign materials become lodged between successive lifts of the wall modules.

The contractor shall check the level of wall modules with each lift to ensure that no gaps are formed between successive lifts.

Care shall be taken to ensure that the wall modules are not broken or damaged during handling and placement.

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

| **Pay Item** | **Pay Unit** |
|---|---|
| Timber Boardwalk | Foot |
| Helical Pier | Foot |
| HMA Path Terminus | Each |
| Safety Railing | Foot |

**Timber Boardwalk** as measured shall be paid for based on the length in feet of boardwalk installed, and includes all labor, equipment, and materials for furnishing and installing the boardwalk over the wetland including all wood members, hardware and fasteners, and appurtenances for a complete installation and as shown on the plans.

**Helical Pier** as measured shall be paid for based on the length in feet below grade of helical pier installed to the minimum depth specified, and includes all labor, equipment, and materials for furnishing and installing the boardwalk foundation piers in the wetland including drilling equipment, hardware and fasteners, and appurtenances for a complete installation and as shown on the plans. Any helical pier length installed below the minimum depth or minimum torque requirement, whichever is deeper will not be paid.

**HMA Path Terminus** as measured shall be paid for based on the number each of units installed, and includes all labor, equipment, and materials for furnishing and installing the HMA terminus at the ends of the boardwalk including all concrete massive wall unit blocks, required backfill, limestone base, geotextile fabric, and perforated drain as shown on the plans.

**Safety Railing** as measured shall be paid for based on the length in feet of safety railing installed, and includes all labor, equipment, and materials necessary for furnishing and installing the safety railings on the boardwalk including all wood members, hardware and fasteners, and appurtenances for a complete installation and as shown on the plans.

**APPENDIX**

MDOT Special Provisions

MDOT Supplemental Specifications

MDOT, City of Ann Arbor, and Pittsfield Charter Twp Standard Plans and Special Details

MDEQ, WCWRC, and Pittsfield Charter Twp Permits

Geotechnical Report

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTAL SPECIFICATION
FOR
**ERRATA TO THE 2012 STANDARD SPECIFICATIONS**



| Page | Subsection | Errata |
|---|---|---|
| 3 | 101.02 | Modify the abbreviation reading “AIS” to read “AISI”. |
| 4 | 101.02 | Delete the following abbreviations and the long forms<br>MDELEG<br>MDNRE<br>Add the following abbreviations and the long forms<br>MDNR Michigan Department of Natural Resources<br>MDEQ Michigan Department of Environmental Quality<br>MDLARA Michigan Department of Licensing and Regulatory Affairs<br>NESC National Electrical Safety Code |
| 27 | 103.02.B.2 | Change the last sentence of the first paragraph to read "For decreases below 75 percent, the maximum allowable payment for work performed, including any adjustment, will not exceed an amount equal to 75 percent of the original contract quantity times the contract unit price." |
| 34 | 104.05 | The first sentence of this subsection should read "If the Contractor performs unauthorized work (work performed without the inspections required by the contract, extra work performed without Department approval, work performed contrary to the inspectors direction, or work performed while under suspension by the inspector), the Engineer may reject the unauthorized work." |
| 46 | 104.12 | Add the following to the end of the first paragraph "The use of right-of-way in wetlands and floodplains, or the crossing of water courses by construction equipment is prohibited." |
| 53 | 105.09 | Add the following to the end of the second paragraph "Any specifically produced material not purchased by the Department, will remain the Contractors and must be removed from the project prior to final acceptance." |
| 56 | 107.02.B.2 | This sentence should read "U.S.Army Corps of Engineers' Section 404, Dredge and Fill; and Section 10, Navigable Waterway." |
| 56 | 107.02.B | Add the subsection reading as follows:<br>“3. U.S. Coast Guard Section 9, Navigable Waterway.”<br><br>Change "MDNRE" to "MDEQ" in this subsection. |

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| Page | Subsection | Errata |
|---|---|---|
| 64 | 107.12 | Change the first sentence of the first paragraph to read:<br>“For protection of underground utilities and in accordance with 2013 PA 174, the Contractor must notify Miss Dig at least 3 work days, excluding Saturdays, Sundays and holidays, before beginning each excavation in areas where public utilities have not been previously located.” |
| 65 | 107.15.A | Change "MDNRE" to "MDEQ" in four instances in this subsection. |
| 66 | 107.15.A.3 | Add the following to the end of the paragraph "Note that a burn permit from the MDNR is required for any open burning whenever the ground is not snow covered. Any individuals that allow a fire to escape will be in violation of the Natural Resources and Environmental Protection Act and will be required to reimburse the costs of suppressing the wild fire." |
| 67* | 107.16 | The third sentence should read "In State Forests, the Contractor must contact the local Unit Manager, Forest Management Division, MDNR, regarding the work to be performed within or adjacent to the forest land."<br><br>Delete the last sentence of the first paragraph of this subsection. |
| 83 | 108.10.C | Change the last sentence of the first paragraph to read:<br>“The liquidated damages may contain one or more components of damages added together.” |
| 83 | 108.10.C.1 | In Table 108-1 delete the last row of the table and replace it with the following:<br>≥50,000,000 4,500 |
| 102 | 109.05.E.1 | Change the second sentence of the third paragraph to read:<br>“Provide the content specified in subsection 109.05.D.11 for the applicable items in this statement and as follows:” |
| 107 | 150.04 | Change the following pay item reading “Mobilization, Max __” to read “Mobilization, Max (dollar)” at nine locations throughout the subsection. |
| 112 | 201.03.A.3.b | Change "MDNRE" to "MDNR" in three instances in this subsection. |
| 150 | 208.01 | Change "MDNRE" to "MDEQ" in this subsection. |
| 180 | 308.03.A | Change the first sentence of the second paragraph to read:<br>“Do not operate equipment required to place backfill directly on geotextile products.” |
| 185 | 401.03.A | Change the first sentence of the second paragraph to read:<br>Where unstable soil conditions, or obstructions other than rock, require excavation of the trench below the elevation detailed on the plans; undercut, backfill, and compact the trench as directed by the Engineer. |

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|---|---|---|
| 188 | 401.03.H | Change the second sentence of the paragraph to read “Jack steel pipes in place in accordance with subsection 401.03.G”. |
| 189 | 401.03.N | Add the following sentence to the end of the first paragraph "Where possible, maintain the stream flow thru a temporary channel or temporary culvert."<br><br>The second sentence of the second paragraph should read "Direct water from the dewatering operations through a filter bag before discharging to an existing drainage facility." |
| 190 | 401.04 | Change the fourth pay item from the end of the list to read as follows:<br>“Steel Casing Pipe, __ inch, Tr Det __.” |
| 200 | 402.04 | Change the third pay item from the top of the list to read as follows:<br>“Sewer, Cl __, __ inch, Jacked in Place” |
| 201* | 402.04.H | Change the last sentence of the first paragraph to read "The Department will not make an adjustment in the pay items of **Minor Traf Devices** or **Traf Regulator Control**." |
| 208 | 403.04.D.3 | Change the sentence to read:<br>“Removing and replacing pavement adjacent to the adjusted cover per Standard Plan R-37 Series.” |
| 218 | 406.03.A.2 | Change the first sentence of the first paragraph to read:<br>“Design precast box culverts less than 10 feet in span length measured along the centerline of the roadway in accordance with current AASHTO LRFD Bridge Design Specifications and ASTM C 1577.”<br><br>Add the following sentence to the end of the first paragraph:<br>“Design precast box culverts greater than or equal to 10 feet in span length measured along the centerline of the roadway for HL-93 Modified live load.” |
| 219 | 406.03.B | Change the first sentence of the first paragraph to read:<br>“Submit shop drawings for culverts greater than or equal to 10 feet in span length measured along the centerline of the roadway to the Engineer, for review and approval in accordance with subsection 104.02.” |
| 219 | 406.03.C.1 | Change the second sentence of the first paragraph to read:<br>“Before manufacture, perform load ratings on precast three-sided, arch or box culverts greater than or equal to 10 feet in span length measured along the centerline of the roadway, in accordance with the AASHTO Manual of Bridge Evaluation, Section 6, Part A, the Michigan Bridge Analysis Guide current at the time load rating is performed, and the Michigan Structure Inventory and Appraisal Guide.” |
| 223 | 406.03.G | Add the following after the first sentence of the second paragraph: |

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| Page | Subsection | Errata |
|---|---|---|
| | | "Where possible, maintain the stream flow thru the existing channel, temporary channel, or temporary culvert." |
| 224 | 406.03.G | Replace the fifth paragraph of this subsection with the following:<br>"The Contractor may use cast-in-place wing walls, headwalls, and aprons, as alternatives to precast wing walls, headwalls, and aprons. Attach cast-in-place wing walls or headwalls as shown on the shop drawings." |
| 225 | 406.03.G.2 | Change the third sentence of the first paragraph to read:<br>"Before placing the open-graded aggregate 34R, compact the coarse aggregate 6A using at least three passes of a vibrating plate compactor." |
| 226 | 406.03.G.2 | Change the first sentence of the second paragraph of this subsection to read:<br>"Fill the space between the box culvert joints during placement of box sections with closed-cell rubber extrusion type gaskets in accordance with ASTM C 990." |
| 226 | 406.04.A.9 | Change the sentence to read:<br>"Providing plan modifications including design, additional plan quantities and pay items to accommodate any changes to the precast units as shown on the plans." |
| 226* | 406.04.A | Add the following paragraph after the last paragraph of the subsection:<br>"The substructure design is specific to the three-sided or arch culvert detailed on the plans. The Contractor must use approved MDOT service vendors qualified in Hydraulics, Geotechnical Engineering Services, and Short and Medium Span Bridges to perform the required design and plan modifications, as directed by the Engineer, if the Contractor selects a culvert shape different than shown on the plans." |
| 227 | 406.04.B | Add the following new item in the list of items in this subsection:<br>2. Headwalls, wingwalls, aprons, and curtain walls, precast or cast-in-place;<br><br>Renumber the exist items 2 through 4 in this list to read 3 through 5.<br><br>Delete existing item numbered 5 and replace with the following:<br>6. Inserts for bars and connection hardware; and<br><br>Renumber the existing item 6 in this list to read 7. |
| 227 | 406.04.B | Delete the first and second paragraphs following the list of items in this subsection and replace with the following:<br>"The Department will pay separately for cast-in-place concrete, other than for culvert segments, wing walls, and headwalls; excavation; protective coating; providing and placing backfill material; by plan quantity in accordance with subsection 109.01.A." |

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| 239 | 501.03.C.6 | The first sentence of this subsection should read "Except as specified in subsection 501.03.C.4, removing HMA surface applies to removing HMA overlying a material designated for removal or that is required to remain in place." |
| 247 | 501.03.O | Change footnote e in Table 501-5 to read:<br>"Flushing severe enough to significantly affect surface friction (Friction Number <35)." |
| 249 | 501.04.H | The first sentence of this subsection should read "The Engineer will measure, and the Department will pay for removing HMA surface, no greater than 12 inches thick, overlying a material designated for removal or that is required to remain in place, as **HMA Surface, Rem**."<br><br>The second paragraph of this subsection should read "The Engineer will measure, and the Department will pay for removing HMA surface, greater than 12 inches thick, overlying a material designated for removal or that is required to remain in place, as **Pavt, Rem** in accordance with subsection 204.04." |
| 257 | 503.03.E | Delete this subsection in its entirety. |
| 265 | 504.03.E.3 | Delete this subsection in its entirety. |
| 269 | 504.04.A | This subsection should read "The unit prices for **Micro-Surface**, regardless of the type required, include cleaning existing pavement; applying a bond coat; temporary pavement markings; stationing; corrective action; and traffic control to complete corrective action." |
| 299 | 601.04 | In table 601-2 delete the row for Grade P-NC concrete in its entirety. |
| 300 | 601.04 | In table 601-2, the first sentence of footnote b. should read:<br>“Use coarse aggregate 6A, 6AA or 6AAA for Grades P1, P2 and M.”<br><br>In table 601-2, footnote c. should read:<br>“The mix design basis for bulk volume (dry, loose) of course aggregate per unit volume of concrete is 72% for Grade P1; 74% for Grade P2.” |
| 308 | 602.03.F | Note c. in Table 602-1 should read "Refer to Section D6 of the Materials Quality Assurance Procedures Manual for inspection procedure." |
| 320 | 602.04.C.3 | The last paragraph in this subsection should read "If the Engineer approves a substitution of a higher concrete grade for a lesser grade (e.g., P1 for P2), the Department will pay for the higher grade of concrete using the original bid and pay items of the lesser grade." |
| 327 | 603.02 | Change the second material in the list to read:<br>“Concrete, Grade P-NC……..….603” |

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|---|---|---|
| | | Change the third material in the list to read:<br>“Base Course Aggregate, 4G, 21AA, 22A…….902” |
| 334 | 603.03.B.10 | Change the last sentence of the second paragraph to read "Apply the required curing compound in two coats, at a rate of at least 1 gallon per 25 square yards for each coat." |
| 342 | 603.04.G.3 | Change "D1" to "W" in two instances in this subsection. |
| 351 | 701.04 | Replace Tables 701-1A and 701-1B with the Table 701-1 below. |
| 372 | 705.03.C.1 | Add the following sentence after the first paragraph of this subsection: “Do not drive piles within a radius of 25 feet of newly placed concrete until the concrete attains at least 75 percent of its specified minimum strength.” |
| 374 | 705.03.C.2.c | Change the last sentence of the second paragraph to read “Drive test piles to the minimum pile length or practical refusal, whichever is greater”. |
| 379 | 705.04 | Change the fifth item down the list to read:<br>“Pile, Galv (Structure No.)” |
| 380 | 705.04 | Change the last item in the list to read:<br>“Pile Driving Equipment, Furn (Structure No.)” |
| 383 | 706.02 | The fourth paragraph following the list of materials should read "Provide AASHTO M 270, Grade 36 steel, meeting the requirements of ASTM A 786, galvanized in accordance with section 707, for expansion joint cover plates. Provide plates at least 3/8 inch thick. Use plates with a slip resistance equal to or greater than those meeting the requirements of ASTM A 786 and must be approved by the Engineer. Provide ASTM F 593 (Type 304) stainless steel, 3/4-inch or 1/2-inch diameter, flathead countersunk screws with 3/4-inch or 1/2-inch diameter inserts for use in expansion joint cover plates." |
| 389 | 706.03.D.4.b | Change the first sentence of the fourth paragraph to read "Design forms, form supports, and attachments to carry dead loads, and resultant horizontal loads due to forming of cantilever overhangs." |
| 390 | 706.03.E.4 | Change the forth sentence of the first paragraph to read:<br>“Use wire ties to secure all bar intersections for the top mat. Use wire ties to secure all bar intersections for other mats where the product of the length and width of bar intersection spacing exceeds 120 square inches.” |
| 391 | 706.03.E.8 | Change the first sentence of the second paragraph of this subsection to read:<br>"Patch sawed or sheared ends and visible defects in accordance with ASTM A 775." |

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|---|---|---|
| 392 | 706.03.E.8 | Change the last sentence of the third paragraph of this subsection to read:<br>"Coat mechanical splices after splice installation in accordance with ASTM A 775 for patching damaged epoxy coating." |
| 394 | 706.03.H.1 | Delete the last paragraph on page 394 and replace it with the following:<br>“Do not cast sidewalk, curb, or barrier pours until the deck concrete attains at least the minimum specified 7-day flexural or compressive strength, and after completion of the 7-day continuous wet cure. The forming of succeeding portions may occur, provided the wet cure is maintained.” |
| 406* | 706.03.N.1.b | Add the following to the end of the last paragraph of the subsection:<br>“Do not discontinue wet cure nor cast succeeding portions onto the bridge deck prior to completion of the 7-day two-phase continuous wet cure. Ensure excess or ponding cure water is removed prior to casting of succeeding structure portions.” |
| 416 | 707.03.C.1 | Change the title of the subsection from “Shop Plans to read “Shop Drawings”.<br><br>Change the second sentence of this subsection to read:<br>“Do not use design drawings in lieu of shop drawings.” |
| 426 | 707.03.C.17 | Change the second sentence in the first paragraph of this subsection to read:<br>"Tap oversized galvanized nuts in accordance with ASTM A 563 or AASHTO M 292 and meet Supplementary Requirement S1 of ASTM A 563 or AASHTO M 292." |
| 430 | 707.03.D.7.b | Delete the first sentence of the last paragraph of this subsection. |
| 430* | 707.03.D.7.b | Change the title of the Table 707-4 to read:<br>"Minimum Bolt Tension for ASTM A 325 Bolts" |
| 430 | 707.03.D.7.b | Change "104,000" to "103,000" in the last row under the column titled Minimum Bolt Tension. |
| 431 | 707.03.D.7.c | Add the following sentence to the end of the first paragraph of this subsection:<br>“If using impact wrenches, provide wrenches sufficient to tighten each bolt in approximately 10 seconds.” |
| 431* | 707.03.D.7.c | Change the first sentence of the second paragraph to read:<br>"Do not reuse ASTM A 325 bolts and nuts." |
| 434 | 707.04.A | Change the first sentence of the first paragraph of this subsection to read: |

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|---|---|---|
| | | "The Engineer will measure structural steel by the calculated weight of metal in the finished structure, excluding filler metal in welding, as shown on the shop drawings or working drawings." |
| 438 | 708.03.A.2 | Change the title of the subsection from "Shop Plans to read "Shop Drawings".<br><br>Change the first sentence to read:<br>"Submit shop drawings in accordance with subsection 104.02."<br><br>Change the fourth sentence to read:<br>"Do not start production until the Engineer approves the shop drawings." |
| 441* | 708.03.A.11 | Change the last sentence of the first paragraph to read "Cure concrete at temperatures from 70 ◦F to 150 ◦F until concrete attains the release strength shown on the shop drawings". |
| 441 | 708.03.A.11 | Change the fourth sentence of the fourth paragraph to read "Do not exceed a maximum concrete temperature of 150 ◦F during the curing cycle." |
| 458 | 711.03.A | Change the first sentence in the first paragraph to read:<br>"Shop drawings for structural steel and pipe railings are not required." |
| 460 | 711.04.A | Change the second sentence of the first paragraph to read:<br>"The unit price for **Bridge Barrier Railing** includes the cost of placing steel reinforcement, providing and placing concrete, constructing joints, and forming, finishing, curing and protecting the concrete." |
| 461 | 711.04.F | The title of this subsection should read "**Reflective Marker, Permanent Barrier.**" |
| 467 | 712.03.C | Add the following to the end of the third paragraph of the subsection:<br>"Notify the Engineer of any saw cuts in the top flange. Saw cuts equal to or less than 1/32 inch deep in steel beams must be repaired by grinding, to a surface roughness no greater than 125 micro-inches per inch rms, and tapering to the original surface using a 1:10 slope. Saw cuts in excess of 1/32 inch deep in steel beams require a welded repair to be submitted to the Engineer for approval. Weld in accordance with subsection 707.03.D.8 and provide adequate notice to allow the Engineer to witness the repair work. Inspect and test all saw cut repairs (including grinding repairs) using ultrasonic testing in accordance with 707.03.D.8.c at no additional cost to the Department." |
| 471 | 712.03.J | Add the following to the end of the second paragraph of the subsection:<br>"Select adhesive anchor systems from the Qualified Products List." |
| 471 | 712.03.J.1 | Delete the first paragraph in this subsection and replace it with the following: "Propose complete details of drilling, cleaning, and bonding systems for anchoring reinforcement and submit for the Engineer's |

| Page | Subsection | Errata |
|---|---|---|
| | | approval before use. The minimum embedment depth must be nine times the anchor diameter for threaded rod or bolt and twelve times the anchor diameter for reinforcing bar. Propose a drilling method that does not cut or damage existing reinforcing steel. Prepare at least three proof tests per anchor diameter and type in the same orientation in which they will be installed on the existing structure, on a separate concrete block, in the presence of the Engineer. The Engineer will proof test the proposed systems. The Engineer will base approval of the anchoring system on the following criteria:" |
| 471 | 712.03.J.2 | Change the third sentence of the first paragraph to read:<br>"Use a tension testing device for unconfined testing, in accordance with ASTM E 488." |
| 473 | 712.03.L.2 | Change the first sentence in the second paragraph of this subsection to read:<br>"If using epoxy coated steel reinforcement, epoxy coat mechanical reinforcement splices in accordance with ASTM A 775." |
| 473 | 712.03.L.3 | Delete the existing first sentence in the first paragraph. |
| 473 | 712.03.L.3 | Change the third sentence of the first paragraph to read "Provide two test splices on the largest bar size." |
| 473* | 712.03.L.3 | Change the sentence beginning "Demonstrate to the…. to read:<br>"Demonstrate to the Engineer that splices have a tensile strength of 125 percent of the bar yield strength and high strength splices have a tensile strength of 150 percent of the bar yield strength." |
| 488 | 713.02 | Add the following as subsection 713.02.C:<br>"C. **Structural Steel for Retrofitting and Welded Repairs.** Structural steel material used for retrofitting and welded repairs of primary members as defined in subsection 707.01.B must meet longitudinal Charpy V-Notch impact test requirements." |
| 501 | 715.02 | Add the following material reference above the two existing items:<br>"Sealant for Perimeter of Beam Plates.....713" |
| 508 | 715.03.D.1 | Add the following sentence after the second paragraph of the subsection:<br>"Apply sealant for perimeter of beam plates in accordance with subsection 713.03.F." |
| 515 | 716.03.A | Delete the second paragraph of this subsection in its entirety.<br><br>Change the last sentence of the last paragraph of this subsection to read:<br>"Provide a primer dry film thickness for the top flange between 4 mils and 10 mils." |

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| Page | Subsection | Errata |
|---|---|---|
| 519 | 716.04 | Change the second sentence of the first paragraph of this subsection to read:<br>"The unit price for **Field Repair of Damaged Coating (Structure No.)** includes the costs of making field repairs to the shop applied coating system; prime coat surfaces and exposed surfaces of bolts, nuts, and washers; and repairing stenciling." |
| 521 | 717.04.B | This subsection should read "The unit price for **Drain Casting Assembly** includes the cost of providing and installing the downspout and, if necessary, the lower bracket to the drain casting." |
| 522 | 718.02 | Change the section number "906" in the third material in the list to read "919." |
| 533 | 718.04 | Delete the following pay item from the list:<br>Temp Casing…….Foot |
| 533 | 718.04.B.2 | Delete this subsection in its entirety. |
| 533 | 718.04.B.3 | Renumber this subsection as follows:<br>“2. **Permanent Casing.”** |
| 540 | 802.04 | Change "Non reinf" in the last pay item of the list with "Nonreinf". |
| 545* | 803.04.E | Change the second sentence of the second paragraph to read:<br>“The unit price for **Railing for Steps** includes the cost of providing, fabricating, installing, and grouting the railing.” |
| 560 | 807.04 | Delete the following pay item from the list:<br>Guardrail Buffered End .....Each |
| 560 | 807.04.B | Change the fifth paragraph of this subsection to read:<br>“The Engineer will measure **Guardrail Salv** and **Guardrail, Mult, Salv** along the face of the rail (one face for multiple beams), including terminals and end shoes.” |
| 567 | 808.04.C | Change the first paragraph of this subsection to read:<br>"The Department will not pay separately for protective fence required in accordance with subsection 104.07." |
| 569 | 809.04.A | Change the first sentence to read:<br>“The unit price for **Field Office, Cl** __ includes the cost of setup, providing access, grading, maintaining, plowing snow, and utility hook-up charges.” |
| 570 | 809.04.B | Delete the existing second and third sentences in the first paragraph and replace them with the following:<br>“The unit price for **Field Office, Utility Fees** includes the cost of monthly usage fees for electricity, gas, telephone service and charges, fuel for the stove, monthly water and sanitary service.” |

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| 570 | 809.04.B | Change the existing fourth sentence in the first paragraph to read:<br>“The Department will reimburse the Contractor for monthly usage fees for electricity, gas, telephone, water and sanitary charges incurred by the Department.” |
| 575 | 810.03.K | Change the subsection to read<br>"K. **Drilled Piles for Cantilever and Truss Foundations.** Construct drilled piles for cantilever and truss foundations in accordance with section 718." |
| 578 | 810.03.N.2 | Add the following sentence after the first sentence of the second paragraph on this page:<br>"Mark each nut and bolt to reference the required rotation." |
| 584 | 810.04 | Delete the last pay item in the list:<br>Truss Fdn Anchor Bolts, Replace…….Each |
| 596 | 811.03.G | Delete this subsection in its entirety. |
| 597* | 811.03.H | Rename this subsection as follows:<br>“G. **Raised Pavement Marker (RPM) Removal.”** |
| 597* | 811.04 | Change "Crosshatching" in the last pay item of the list on this page to "Cross Hatching". |
| 598* | 811.04 | Delete the following pay items from the list:<br>Pavt Mrkg, (material), 4 inch, SRSM, (color)……Foot<br>Pavt Mrkg, (material), 4 inch, SRSM, 2nd Application, (color)……Foot<br><br>Add the following pay items to the list:<br>“Pavt Mrkg, Polyurea, (legend)…….Each<br>Pavt Mrkg, Polyurea, (symbol)……..Each”<br><br>Change the sixth item down the list to read:<br>“Pavt Mrkg, Polyurea, __ inch, Cross Hatching, (color)”<br><br>Change the eleventh item down the list to read:<br>“Rem Curing Compound, for Longit Mrkg, __ inch……Foot”<br><br>Change the last item in the list to read:<br>“Witness, Log, Layout, $1000.00” |
| 599 | 811.04.B | Delete this subsection in its entirety. |
| 599 | 811.04 | Rename the following subsections as follows:<br>“B. **Call Back.**<br>C. **Pavement Marking Removal.**<br>D. **Material Deficiency.”** |

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| 602 | 812.03.D | Change the first sentence to read "Provide and maintain traffic control devices meeting the requirements in the ATSSA Quality Guidelines for Work Zone Traffic Control Devices and Features." |
| 603 | 812.03.D.1 | The last sentence on this page should read "Lay the sign behind the guardrail, with the uprights pointing downstream from the traffic, and place the support stands and ballasts close to the guardrail." |
| 604 | 812.03.D.2 | The first sentence of the fourth paragraph should read "Do not use burlap or similar material to cover Department or Local Government owned signs." |
| 604 | 812.03.D.5 | The fifth sentence of the first paragraph should read "Do not mix drums and cones within a traffic channeling sequence." |
| 605 | 812.03.D.6.b | Change the first sentence of the first paragraph to read: "The Department will allow the nighttime use of 42-inch channelizing devices, in the tangent area only, on CPM and pavement marking of any duration where the use of plastic drums restricts proposed lane widths to less than 11 feet, including shy distance." |
| 605 | 812.03.D.7 | Add the following sentence after the first sentence of the first paragraph: "Place a shoulder closure taper in advance of the lighted arrows placed on the shoulders." |
| 607 | 812.03.D.9 | Delete the second paragraph of this subsection and replace with the following: "Link sections together to fully engage the connection between sections. Maintain the barrier with end-attachments engaged and within 2 inches of the alignment shown on the plans." |
| 608 | 812.03.D.10.b | Add the following sentence after the first paragraph of this subsection: "Use an NCHRP 350, Test Level 3, or MASH accepted attenuation system." |
| 608 | 812.03.D.10.b | Delete the second sentence of the second paragraph of this subsection beginning with "Install sand module attenuators…" |
| 608 | 812.03.D.10.b | Add the following sentence after the second paragraph of this subsection: "Install impact attenuation devices as shown on the plans, as directed by the Engineer, or both." |
| 609 | 812.03.D.10.d | Add the following sentence after the first paragraph of this subsection: "Use an NCHRP 350, Test Level 3, or MASH accepted attenuation system." |
| 613 | 812.03.D.14.a.iii | Change the sentence in this subsection to read "Place an ET Type or SKT Type extruder guardrail ending on both blunt guardrail ends." |

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| 615 | 812.03.F | The second sentence of the second paragraph of this subsection should read: "The Contractor may use a Type R temporary pavement marking cover, per subsection 812.03.D.12 when authorized by the Engineer." |
| 616 | 812.03.F.2 | The last sentence of the first paragraph should read: "If the removal equipment cannot collect all removal debris, operate a self-propelled sweeper capable of continuously vacuuming up the removal debris immediately behind the removal equipment." |
| 617 | 812.03.G.3 | The first sentence of the second paragraph should read: "Sweep the shoulder and remove debris prior to placing traffic on the shoulder and throughout the time the shoulder is used to maintain traffic." |
| 617 | 812.03.G.4.a | Delete "48 inch by 48 inch" from the first sentence of this subsection. |
| 618* | 812.03.G.7 | The first sentence of the first paragraph should read: "Clean barrier reflectors, plastic drums, 42 inch channelizing devices, tubular markers, signs, barricades, and attached lights in operation on the project to ensure they meet required luminosity." |
| 619 | 812.03.G.8 | The second sentence of the third paragraph from the end of the subsection should read: "Illuminate traffic regulator stations at night per subsection 812.03.H." |
| 621 | 812.03.I.6 | Delete "48 inch by 48 inch" from the second sentence of this subsection. |
| 622* | 812.03.J | The second paragraph should read "Apply one 2-inch wide horizontal stripe of red and white conspicuity tape along at least 50 percent of each side of, and across the full width of the rear of the vehicle or equipment." |
| 622 | 812.04 | Change the second item down the list to read:<br>“Traf Regulator Control”<br><br>Change the sixth item down the list to read:<br>“Sign Cover, Type I” |
| 626 | 812.04.I | Change the reference "812.04.E" in the first sentence to "812.04.D". |
| 628 | 812.04.M.4 | Add the following as the first sentence of this subsection:<br>“The Engineer will not measure a temporary barrier ending move as **Conc Barrier Ending, Temp, Relocated** if it involves work defined in subsection 812.04.M.3.” |
| 629 | 812.04.N.1 | Change the reference "811.04.D" in the second paragraph of this subsection to read "811.04.C". |
| 630 | 812.04.S | Change the first sentence to read: "The Department will not make additional payments for traffic regulating, signing, arrow boards, and lighting systems for traffic regulator stations operated at night due to a temporary PTS system failure." |

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| 634 | 813.03.C.3 | Change the reference "903.07.A" in the paragraph of this subsection to read "907.07.B". |
| 646 | 815.04 | Change the first, third and fourth pay items in the list to read:<br>“Site Preparation, Max (dollar) ..... Lump Sum<br>Watering and Cultivating, First Season, Min (dollar)..... Lump Sum<br>Watering and Cultivating, Second Season, Min (dollar) ..... Lump Sum” |
| 646 | 815.04.C.1 | Change the following pay item reading: “Watering and Cultivating, First Season, Min. (dollar)” to read “Watering and Cultivating, First Season, Min (dollar)” at two locations throughout the subsection. |
| 646 | 815.04.C.1.b | Delete this subsection in its entirety. |
| 646 | 815.04.C.1.c | Rename this subsection to read:<br>“b. Removal and disposal of unacceptable plants.” |
| 646 | 815.04.C.2 | Change the following pay item reading: “Watering and Cultivating, Second Season, Min. (dollar)” to read “Watering and Cultivating, Second Season, Min (dollar)” at three locations throughout the subsection. |
| 647 | 815.04.C.2 | Change the last paragraph of this subsection to read:<br>“For each unacceptable plant identified, the Engineer will calculate a 50 percent reduction in the unit price for the relevant **(Botanical Name)** pay item, and will process a negative assessment for each unacceptable plant for that amount.” |
| 650 | 816.03.B | Delete the first paragraph of this subsection and replace with the following:<br>"Conduct soil tests when called for in the contract or when directed by the Engineer. Provide soils tests results to the Engineer when testing is required. Provide and place fertilizer as indicated below and as indicated in the soils tests, if required." |
| 650 | 816.03.B.1 | Change the sentence to read: "For Class A fertilizer, evenly apply 176 pounds of chemical fertilizer nutrient per acre on a prepared seed bed." |
| 650 | 816.03.B.2 | Change the sentence to read: "For Class B fertilizer, evenly apply 120 pounds of chemical fertilizer nutrient per acre on a prepared seed bed." |
| 650* | 816.03.B.3 | Change the sentence to read: "For Class C fertilizer, evenly apply 80 pounds of chemical fertilizer nutrient per acre on established turf." |
| 663* | 819.01 | Delete the first paragraph in the subsection and replace it with the following:<br>“This work consists of providing operating electrical and lighting units; removing, salvaging, or disposing of existing electrical and lighting components; excavating, backfilling, restoring the site in accordance |

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| | | with section 816; and disposing of waste excavated materials. Complete this work in accordance with this section, section 820, and the contract and to the requirements of the NEC, the National Electrical Safety Code, and the MDLARA for those items not identified in the contract."<br><br>Change the third sentence of the second paragraph in this subsection to read:<br>"Contact the MDLARA for electrical service inspection and pay the applicable fees." |
| 671 | 819.03.F.1 | Change the paragraph to read:<br>"Install light standard foundations as shown on the plans and the standard plans, as applicable." |
| 673 | 819.03.G.4.b | Change the last sentence of the first paragraph to read:<br>"Tighten the anchor bolts to a snug tight condition as described in the third paragraph of subsection 810.03.N.2 ensuring the lock washer is completely compressed." |
| 673 | 819.03.G.4.b | Delete the first two sentences of the second paragraph and replace with the following:<br>"Tighten bolts connecting the pole to the frangible base to a snug tight condition. Snug tight is the tightness attained by a few impacts of an impact wrench, or the full effort of a person using an ordinary spud wrench. The lock washers must be fully compressed." |
| 678* | 819.04 | Delete the last item in the list on this page reading:<br>"DB Cable, in Conduit, 600 Volt, (number) 1/C# (size) ..... Foot" |
| 680 | 819.04 | Change the first paragraph to read:<br>"Unless otherwise required, the unit prices for the pay items listed in this subsection include the cost of excavation, granular material, backfill, and disposal of waste excavated material. If the contract does not include pay items for restoring the site in kind in accordance with section 816, the Department will consider the cost of restoration included in the pay items listed in this subsection." |
| 680 | 819.04.A | Add the following paragraph after the first paragraph of the subsection.<br>"The unit prices for **Conduit, Rem** include the cost of removing the type, number, and size of conduit shown on the plans."<br><br>Change the third paragraph of the subsection to read:<br>"The unit prices for **Conduit, (type), __ inch** and **Conduit, DB, (number), __ inch** include the cost of installing the type, number, and size of conduit shown on the plans, and installing marking tape." |
| 681 | 819.04.B | Change the last paragraph of the subsection to read: |

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| | | "The unit price for **DB Cable, in Conduit, Rem** includes the cost of removing all cables from the existing conduit measured per lineal foot of conduit." |
| 681 | 819.04.C | Change the first paragraph of the subsection to read:<br>"The unit prices for **Cable, Rem** and **Cable, (type), Rem** include the cost of dead ending, circuit cutting, installing guying, work required to leave circuits operable, and disposing of the removed cables, wire, hardware, and other appurtenances." |
| 681 | 819.04.D | Change the first paragraph of the subsection to read:<br>"The unit price for **Cable, Pole, (type), Disman** includes the cost of dismantling and off-site disposal of the following:" |
| 685 | 820.01.D | Change the sentence to read:<br>"Excavate, backfill, restore the site in kind in accordance with section 816, and dispose of excess or unsuitable material;" |
| 688 | 820.03.C | Change the seventh paragraph of this subsection to read:<br>"Tighten top anchor bolt nuts, snug, in accordance with the first four paragraphs of subsection 810.03.N.2, except beeswax will not be required." |
| 696 | 820.04 | Add the following pay items to the list:<br>"Pedestal, Pushbutton, Alum……Each<br>Pedestal, Pushbutton, Rem……Each" |
| 697 | 820.04.A.2 | Change the sentence to read:<br>"If the contract does not include pay items for restoring the site in kind in accordance with section 816, the Department will consider the cost of restoration included in the pay items listed in this subsection." |
| 698 | 820.04.B | Delete the second paragraph of this subsection found on this page. |
| 698 | 820.04.C | Change "**Fdns**" to read "**Fdn**" in four instances in this subsection. |
| 701 | 820.04.J.3 | Change the sentence to read: "Installing wires in the saw slots and to the handholes;" |
| 701. | 820.04.J | Add the following as a new subsection:<br>"7. A 3/4 inch minimum flexible conduit (non-metallic and rated for underground use) from the pavement to the handhole." |
| 706 | 821.01.B | Change the website address listed after the second paragraph on this page to read:<br>"http://www.ngs.noaa.gov/heightmod/GuidelinesPublications.shtml" |
| 711 | 822.03.B | Change the second paragraph to read: |

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| | | "If corrugations are required on concrete shoulders and the method of installation is not shown on the plans or directed by the Engineer, construct corrugations by grinding, or cutting." |
| 720 | 823.04 | Change the pay item seventh from the bottom of the list to read:<br>"Water Shutoff, Adj, Temp, Case __" |
| 730 | 824.03.Q | Change the third sentence of the fourth paragraph to read:<br>"Ensure placement of monumentation in accordance with section 821." |
| 730 | 824.03.Q | Change the first sentence of the last paragraph to read:<br>"The Department will not pay for work dependent on lost or destroyed stakes until the Contractor replaces the stakes." |
| 732 | 824.04 | Change the first sentence of the first paragraph following the list of pay items to read:<br>"If the Engineer determines the Contractor will perform staking as extra work, the Department will pay for staking in accordance with section 103." |
| 733 | 824.04 | Change the left column header in Table 824-2 to read:<br>"**Percent of Original Contract Amount Earned"** |
| 739 | 902.02 | Change the last aggregate testing description to read:<br>"Determining Specific Gravity and Absorption of<br>Fine Aggregates……..MTM 321" |
| 742 | 902.03.C.1.a | Change the sentence to read:<br>"Coarse aggregate includes all aggregate particles greater than or retained on the 3/4-inch sieve." |
| 742 | 902.03.C.2.a | Change the sentence to read:<br>"Intermediate aggregate includes all aggregate particles passing the 3/4-inch sieve through those retained on the No. 4 sieve." |
| 744 | 902.07 | Delete the fourth paragraph of the subsection and replace it with the following:<br>"The Engineer will only allow the use of granular material produced from crushed portland cement concrete for embankment and as trench backfill for non-metallic culvert and sewer pipes without associated underdrains. However, granular material produced from crushed portland cement concrete is not permitted as swamp backfill, nor within the top 3 feet below subgrade regardless of the application. |
| 746* | 902.11 | Change the Item of Work by Section Number column in Table 902-1 for the 6AA row to read: "406, 601, 602, 706, 708, 806".<br><br>Change the Item of Work by Section Number column in Table 902-1 for the 6A row to read: "206, 401, 402, 406, 601, 602, 603, 706, 806". |

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| | | Change the Item of Work by Section Number column in Table 902-1 for the 34R row to read: "401, 404, 406". |
| 751* | 902.11 | Replace Table 902-6 with the Table 902-6 below. |
| 751 | Table 902-7 | Under the Material column in the fourth row change the "FA2" to read "2FA". |
| 751 | Table 902-7 | Under the Material column in the fifth row change the "FA3" to read "3FA". |
| 752 | Table 902-8 | Under the Material column in the fourth row change the "FA2" to read "2FA". |
| 752 | Table 902-8 | Under the Material column in the fifth row change the "FA3" to read "3FA". |
| 761 | Table 904-2 | Delete the footnote f and any other reference to footnote f from the table. |
| 767 | 905.03 | Change the first sentence of the first paragraph to read: “Deformed bars, must meet the requirements of ASTM A 706, ASTM A 615, or ASTM A 996 (Type R or Type A only) for Grade 60 steel bars, unless otherwise required”. |
| 767* | 905.03 | Change the first sentence of the second paragraph to read: “Unless otherwise specified, spiral reinforcement must meet the requirements of plain or deformed Grade 40 steel bars of ASTM A 615, ASTM A 996 (Type A), or the requirements of cold-drawn wire of ASTM A 1064”. |
| 767 | 905.03 | Change the first sentence of the third paragraph to read: “Bar reinforcement for prestressed concrete beams must meet the requirements of ASTM A 996 (Type R) for Grade 60 steel bars, except the Engineer will allow bar reinforcement that meets the requirements of ASTM A 615 or ASTM A 996 (Type A) for Grade 40 steel bars for stirrups in prestressed concrete beams”. |
| 768 | 905.03.C | Change the first sentence in the subsection to read:<br>"Epoxy coated steel reinforcement, if required, must be coated in accordance with ASTM A 775, with the following exceptions and additions." |
| 768 | 905.03.C.3 | Change the first sentence of this subsection to read:<br>"Include written certification that the coated reinforcing bars were cleaned, coated, and tested in accordance with ASTM A 775 with the coating applicator." |
| 768 | 905.05 | Change the first sentence of the first paragraph to read: “Deformed steel bars must meet the requirements of ASTM A 706 or the requirements for Grade 40, Grade 50, or Grade 60 of ASTM A 615 or ASTM A 996 (Type R or Type A only)”. |

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| 768 | 905.06 | Delete this subsection in its entirety and replace it with the following:<br>"Deformed wire fabric for prestressed concrete and fabric for concrete pavement reinforcement must meet the requirements of ASTM A 1064 and fabricated as required." |
| 772 | 906.07 | Change the first paragraph to read:<br>"High-strength bolt fasteners for structural joints must meet the requirements of ASTM A 325 Type 1 bolts. High-strength nuts for structural joints must meet the requirements of ASTM A 563 Grade DH or AASHTO M 292 Grade 2H. High-strength washers for structural joints must meet the requirements of ASTM F 436 Type 1 for circular, beveled, clipped circular, and clipped beveled washers."<br><br>Change the second sentence of the second paragraph of this subsection to read:<br>"Galvanized nuts must be tapped oversize in accordance with ASTM A 563 and meet Supplementary Requirements S1, Lubricant and Rotational Capacity Test for Coated Nuts and S2, Lubricant Dye." |
| 777* | 907.03.D.2.a | Change the first sentence of the second paragraph to read:<br>“Angle sections must be nominal 2½ inch by 2½ inch by ¼ inch.” |
| 777* | 907.03.D.2.b | Change the first sentence of the first paragraph to read:<br>“Angle section braces must be nominal 1¾ inch by 1¾ inch by ¼ inch or nominal 2 inch by 2 inch $^{3}/_{16}$ inch.” |
| 782 | 908.04 | Change the first sentence of the first paragraph of this subsection to read:<br>"Steel castings for steel construction must meet the requirements of ASTM A 148 for Grade 60/90 carbon steel castings, as shown on the plans, unless the Engineer approves an alternate in writing." |
| 783* | 908.09.A | Change the title of this subsection and the first sentence to read<br>"A. **Base Plates, Angle, and Non-Tubular Post Elements.** Galvanized base plates, angle, rail splice elements, and non-tubular post elements must meet the requirements of ASTM A 36 and ASTM A 123". |
| 783* | 908.09.B | Change the title of this subsection and the first sentence to read<br>“B. **Rail Elements and Tubular Post Elements.** Rail elements and tubular post elements must meet the requirements of ASTM A 500, for Grade B and subsection 908.09.B and be galvanized in accordance with ASTM A 123”. |
| 784* | 908.09.C | Change this subsection to read:<br>“C. **Hardware.** Railing anchor studs must meet the requirements of ASTM A 449. Heavy hex nuts must meet the requirements of ASTM A 563. Bolts, used as rail fasteners, must meet the requirements of ASTM A 325, Type 1. Where called for, round head bolts must meet the |

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| | | requirements of ASTM A 449. The material for the railing hand hole screws must meet the requirements of ASTM A 276, Type 304. All nuts must meet the requirements of ASTM A 563 Grade DH or AASHTO M 292 Grade 2H. All flat washers must meet the requirements of ASTM F 436. Lock washers must be steel, regular, helical spring washers meeting the requirements of ANSI B18.21.1 - 1972. Bolts, nuts, washers and other hardware must be hot-dip galvanized in accordance with AASHTO M 232. Galvanized nuts must be tapped oversize in accordance with ASTM A 563, and meet Supplementary Requirements S1, Lubricant and Rotational Capacity Test for Coated Nuts, and S2, Lubricant Dye." |
| 785 | 908.11.B | Change the second paragraph to read:<br>"Bolts, nuts, and round washers for guardrail, other than at bridge barrier railings, must meet the requirements of ASTM A 307, ASTM A 563 (Grade A with Supplementary Requirements S1 of ASTM A 563), and ASTM F 436, respectively."<br><br>Change the third paragraph to read:<br>"Washers, other than round washers, for guardrail must meet the requirements for circular washers in ASTM F 436 except that the dimensions must be as shown on the plans."<br><br>Change the fifth paragraph to read:<br>"Bolts, nuts, and washers for connections at bridge barrier railings must conform to ASTM A 325 Type 1 galvanized high-strength structural bolts with suitable nuts and hardened washers." |
| 787 | 908.14.B | Add the following sentence to the end of the third paragraph of this subsection:<br>"Exposed threaded ends of anchor bolts must be galvanized a minimum of 20 inches."<br><br>Change the sixth paragraph in this subsection to read:<br>"Provide washers meeting the requirements of ASTM F 436 for circular washers." |
| 787 | 908.14.B | Change the second sentence of the fourth paragraph to read "After coating, the maximum limit of pitch and major diameter for bolts with a diameter no greater than 1 inch may exceed the Class 2A limit by no greater than 0.021 inch, and by no greater than 0.031 inch for bolts greater than 1 inch in diameter". |
| 787* | 908.14.C | Change the first paragraph to read "Provide either four or six high strength anchor bolts per the contract plans, meeting the mechanical requirements of ASTM F 1554, for Grade 105, with each standard. Anchor bolts for traffic signal strain poles must meet the requirements of subsection 908.14.B with the following exceptions and additions:" |
| 789 | 909.03 | Change the second sentence of the second paragraph to read: |

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| | | "As an alternative to the AASHTO M 36 requirements for metal pipe, the Contractor may use gasket material meeting the low temperature flexibility and elevated temperature flow test requirements of ASTM C 990, excluding the requirements for softening point, flashpoint and fire point." |
| 793 | 909.06 | Change the first sentence of the second paragraph of this subsection to read:<br>"Provide Corrugated Polyvinyl Chloride Pipe (CPV) and required fittings meeting the requirements of AASHTO M 304." |
| 793* | 909.05.D | Change the second sentence of the paragraph to read “Provide a continuous welded joint to create a watertight casing that is capable of withstanding handling and installation stresses. Perform field welding by the SMAW process using E7018 electrodes.” |
| 794* | 909.08.A | Change the first sentence to read:<br>“Provide bridge deck downspouts of PE pipe meeting the requirements of ASTM F 714, PE 4710, DR 26.” |
| 804 | Table 909-9 | In the note area at the bottom of the table change the designation of the second note from “c.” to “b.”. |
| 811 | 910.04 | Add the following sentence to the end of this subsection:<br>“Fabricate silt fence according to subsection 916.02.” |
| 829* | 912.08.K | Replace Table 912-10 with the Table 912-10 below. |
| 833* | 913.03.B | Change the first sentence of the first paragraph to read:<br>"Clay brick, to construct manholes, catch basins, and similar structures, must meet the requirements of ASTM C 32, for Grade MS." |
| 837* | 914.04 | Add the following as subsection 914.04.C:<br>“C. **Lubricant-Adhesive for Neoprene Joint Seals**. The lubricant-adhesive must be a single-component moisture-curing polyurethane and aromatic hydrocarbon solvent mixture meeting ASTM D 2835, Type I. Ship in containers plainly marked with the lot or batch number of the material and date of manufacture. Store at temperatures between 58 and 80°F. Do not exceed 12 months shelf-life prior to use.” |
| 840 | 914.08 | Change the first sentence of the second paragraph to read: “Straight tie bars for end-of-pour joints must consist of bars of the diameter and length shown on the plans meeting the requirements of ASTM A 615, ASTM A 706, or ASTM A 996 (Type R or Type A only)”. |
| 840* | 914.09.A | Change the first sentence of the first paragraph to read: “Straight tie bars for longitudinal pavement joints must consist of bars of the diameter and length shown on the plans meeting the requirements of ASTM A 615, ASTM A 706, or ASTM A 996 (Type R or Type A only)”. |

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| 840 | 914.09.B | Change the first sentence of the first paragraph to read: “Bent tie bars for bulkhead joints must consist of bars of the diameter and length shown on the plans.” |
| 841 | 914.12 | In the first sentence of this subsection change "AASHTO Division II" to read "AASHTO LRFD Bridge Construction Specifications". |
| 841* | 914.13 | In the first sentence of this subsection change "ASTM D 1248, for Type III, Class B" to read "ASTM D 4976, Group 2, Class 4, Grade 4". |
| 844 | 916.01.A | Change the first sentence to read: "Cobblestone must consist of rounded or semi-rounded rock fragments with an average dimension from 3 inches to 10 inches." |
| 845 | 916.01.D.1 | Change the second sentence to read: "Checkdams for ditch grades 2 percent or greater must be constructed using cobblestone or broken concrete ranging from 3 inches to 10 inches in size." |
| 851* | 917.10.B.1 | Delete the paragraph and replace it with the following:<br>“1. **Class A.** Provide and apply Class A chemical nutrient fertilizer either according to MSU Soil Testing Lab Recommendations for Phosphorus Applications to Turfgrass, except the maximum single application rate of nutrient will be 48 pounds per acre, when soil tests are required or as indicated in subsections 917.10.B.1.a and 917.10.B.1.b.” |
| 851 | 917.10.B.1 | Add the MSU Soil Testing Lab Recommendations for Phosphorus Applications to Turfgrass, found below, after the first paragraph of this subsection. |
| 853 | 917.15.B.1 | Change the second sentence of the subsection to read:<br>“The net must meet the requirements of subsection 917.15.D and be capable of reinforcing the blanket to prevent damage during shipping, handling, and installation.” |
| 857 | 918.01 | Add the following two paragraphs following the first paragraph of this subsection:<br>“Wall thickness and outside diameter dimensions must conform to ASTM D 1785 for smooth-wall schedule 40 and 80 PVC conduit material. The Department will allow no more than 3 percent deviation from the minimum wall thickness specified.<br><br>Wall thickness range must be within 12 percent in accordance with ASTM D 3035 for smooth-wall coilable schedule 40 and 80 PE conduit.” |
| 858 | 918.01.E | Delete the first three sentences of the second paragraph shown on page 858. |
| 863 | 918.06.F.1 | Delete the third paragraph in this subsection in its entirety and replace it with the following: |

An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.

| Page | Subsection | Errata |
|---|---|---|
| | | "Provide smooth or deformed welded wire fabric in accordance with ASTM A 1064." |
| 864 | 918.07.C | Change the first sentence of the first paragraph to read:<br>“Provide anchor bolts, nuts, and washers meeting the requirements of subsection 908.14.A and subsection 908.14.B.” |
| 864 | 918.07.C | Delete the second sentence of the second paragraph. |
| 864 | 918.07.C | Change the third sentence to read:<br>“Provide anchor bolts threaded 4 inches beyond the anchor bolt projection shown on the plans.” |
| 867 | 918.08.C | Change the last sentence of the first paragraph on this page to read:<br>“Galvanize bolts, nuts, washers, and lock washers as specified in subsection 908.14.B.” |
| 867 | 918.08.C | Change the last sentence of the subsection to read:<br>“Provide each frangible base with manufacturer access covers as shown on the plans.” |
| 867* | 918.08.D | Delete this subsection in its entirety and replace with the following:<br>"Provide galvanized anchor bolts, studs, nuts, couplings, and washers in accordance with subsection 908.14." |
| 879 | 918.10.J | Change the third sentence of the second paragraph of this subsection to read:<br>"Provide anchor bolts and associated nuts, washers, and hardware meeting the requirements of subsection 908.14." |
| 887 | 919.06 | Change the second paragraph to read:<br>“Shims must be fabricated from brass shim stock or brass strip meeting the requirements of ASTM B 36, for copper alloy UNS No. C26000, half-hard rolled temper, or fabricated from galvanized sheeting meeting the requirements of ASTM A 653, for Coating Designation G 90.” |
| 887 | 919.07.C | Change the sentence to read:<br>“Galvanized high-strength steel bolts, nuts, and washers for connecting arm connection flanges must meet the requirements of subsection 906.07.” |
| 903 | 921.03.D | Delete the last three sentences of the first paragraph of this subsection. |
| 914 | 921.05.D | Change the first sentence of this subsection to read:<br>"Provide anchor bolts meeting the requirements of subsection 908.14.C, including elongation and reduction of area requirements." |
| 916 | 921.07 | Change the first sentence of the first paragraph to read: "Provide LED case signs internally illuminated by LEDs and changeable message case signs internally illuminated with LED light sources." |

An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.

| Page | Subsection | Errata |
|---|---|---|
| 936 | 922.04.B | In the first sentence of the first paragraph change the "R-52" to "R-126". |
| 936 | 922.04.B | Add the following to the end of the first paragraph:<br>“Hardware used to connect the end section to the barrier must meet the requirements of NCHRP 350 or MASH (Test Level 3 or higher).” |
| 936 | 922.04.B | In the first sentence of the second paragraph delete "R-52". |
| 953* | Pay Item Index | Delete the following pay item reading:<br>“DB Cable, in Conduit, 600 Volt, (number) 1/C# (size) .....678 819” |
| 957 | Pay Item Index | Delete the following pay item from the list:<br>Guardrail Buffered End .....560 807 |
| 960 | Pay Item Index | Change the following pay item to read:<br>“Mobilization, Max (dollar) .....107 150” |
| 961 | Pay item Index | Delete the following pay items from the list:<br>Pavt Mrkg, (material), 4 inch, SRSM, (color)……598……811<br>Pavt Mrkg, (material), 4 inch, SRSM, 2nd Application, (color)……598…..…811 |
| 961 | Pay Item Index | Change the following pay items in the list to read:<br>Pavt Mrkg, Ovly Cold Plastic, 12 inch, Cross Hatching, (color)<br>Pavt Mrkg, Polyurea, __ inch, Cross Hatching, (color)<br><br>Add the following pay items to the list:<br>“Pavt Mrkg, Polyurea, (legend)……..….598…….811<br>Pavt Mrkg, Polyurea, (symbol)……..….598…….811<br>Pedestal, Pushbutton, Alum……....696…….820<br>Pedestal, Pushbutton, Rem……...…….696…….820” |
| 962 | Pay Item Index | Change the following pay items in the list to read:<br>“Pile Driving Equipment, Furn (Structure No.)<br>Pile, Galv (Structure No.)” |
| 963 | Pay Item Index | Change the following pay item to read:<br>“Rem Curing Compound, for Longit Mrkg, __ inch .....598 811” |
| 964 | Pay Item Index | Change the following pay item to read:<br>“Sewer, Cl __, __ inch, Jacked in Place .....200 402”<br>“Sign Cover, Type I .....622 812” |
| 965* | Pay Item Index | Change the following pay item in the list to read:<br>“Steel Casing Pipe, __ inch, Tr Det __<br>Site Preparation, Max (dollar) .....646 815” |
| 966 | Pay Item Index | Delete the following pay item form the list;<br>Temp Casing……...533…….718 |

An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.

| Page | Subsection | Errata |
|---|---|---|
| 967* | Pay Item Index | Delete the following pay item from the list;<br>Truss Fdn Anchor Bolts, Replace……...584…..…810 |
| 967 | Pay Item Index | Change the following pay item in the list to read:<br>“Traf Regulator Control” |
| 968* | Pay item Index | Change the following pay item in the list to read:<br>“Water Shutoff, Adj, Temp, Case __<br>Watering and Cultivating, First Season, Min (dollar).....646 815<br>Watering and Cultivating, Second Season, Min (dollar) .....646 815” |
| 969 | Pay item Index | Change the following pay item in the list to read:<br>“Witness, Log, Layout, $1000.00” |
| 993 | General Index | Change “Shop Plans (see Plans and Working Drawings)” to read “Shop Drawings (see Plans and Working Drawings)”. |

An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.

**Table 701-1**
**Concrete Structure Mixtures**

| Concrete Grade (e,h) | Section Number Reference (i) | Cement Content per cyd (b,c) lb | Cement Content per cyd (b,c) sack | Slump (inches) Type A, D or no Admixture | Slump (inches) Type MR, F, or G Admixtures (g) Before Admixture | Slump (inches) Type MR, F, or G Admixtures (g) After Admixture (Type MR) | Slump (inches) Type MR, F, or G Admixtures (g) After Admixture (Type F or G) | Minimum Strength of Concrete (f) Flexural (psi) 7 Day | Flexural (psi) 14 Day | Flexural (psi) 28 Day (Class Design Strength) | Compressive (psi) 7 Day | Compressive (psi) 14 Day | Compressive (psi) 28 Day (Class Design Strength) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D (a) | 706, 711, 712 | 658 (d) | 7.0 | 0 - 3 | 0 - 3 | 0 - 6 | 0 - 7 | 625 | 700 | 725 | 3,200 | 4,000 | 4,500 |
| S1 | 705 | 611 | 6.5 | 3 - 5 | 0 - 3 | 3 - 6 | 3 - 7 | 600 | 650 | 700 | 3,000 | 3,500 | 4,000 |
| T | 705, 706 | 611 | 6.5 | 3 - 7 | 0 - 4 | 3 - 7 | 3 - 8 | 550 | 600 | 650 | 2,600 | 3,000 | 3,500 |
| S2 (a) | 401, 705, 706, 712, 713, 801, 802, 803, 810 | 564 | 6.0 | 0 - 3 | 0 - 3 | 0 - 6 | 0 - 7 | 550 | 600 | 650 | 2,600 | 3,000 | 3,500 |
| | | 526 (d) | 5.6 | | | | | | | | | | |
| S3 | 402, 403, 803, 804, 806 | 517 | 5.5 | 0 - 3 | 0 - 3 | 0 - 6 | 0 - 7 | 500 | 550 | 600 | 2,200 | 2,600 | 3,000 |
| | | 489 (d) | 5.2 | | | | | | | | | | |

a. Unless otherwise required, use Coarse Aggregate 6AA or 17A for exposed structural concrete in bridges, retaining walls, and pump stations.
b. Do not place concrete mixtures containing supplemental cementitious materials unless the local average minimum temperature for the next 10 consecutive days is forecast to be above 40 °F. Adjustments to the time required for opening to construction or vehicular traffic may be necessary. Cold weather protection may be required, as described in the quality control plan. The restriction does not apply to Grade S1 concrete in foundation piling below ground level or Grade T concrete in tremie construction.
c. Type III cement is not permitted
d. Use admixture quantities specified by the Qualified Products Lists to reduce mixing water. Admixture use is required for Grade D, Grade S2, and Grade S3, concrete with a reduced cement content. Use a water-reducing retarding admixture at the required dosage for Grade D concrete to provide the setting retardation required. When the maximum air temperature is not forecast to exceed 60 °F for the day, the Contractor may use a water-reducing admixture or a water-reducing retarding admixture. Ensure Grade D concrete in concrete diaphragms contains a water-reducing admixture, or a water-reducing retarding admixture. For night casting, the Contractor may use a water-reducing admixture in lieu of water-reducing retarding admixture, provided that the concrete can be placed and finished prior to initial set.
e. The mix design basis for bulk volume (dry, loose) of coarse aggregate per unit volume of concrete is 68% for Grade S1, and 70% for Grade D, Grade S2, Grade T, and Grade S3.
f. The Contractor may use flexural strength to determine form removal. Use compressive strength for acceptance in other situations.
g. MR = Mid-range.
h. The Engineer will allow the use of an optimized aggregate gradation as specified in section 604.
i. Section Number Reference:

| | | | | | |
|---|---|---|---|---|---|
| 401 | Culverts | 711 | Bridge Railings | 803 | Concrete Sidewalk, Sidewalk Ramps, and Steps |
| 402 | Storm Sewers | 712 | Bridge Rehabilitation-Concrete | 804 | Concrete Barriers and Glare Screens |
| 403 | Drainage Structures | 713 | Bridge Rehabilitation-Steel | 806 | Bicycle Paths |
| 705 | Foundation Piling | 801 | Concrete Driveways | 810 | Permanent Traffic Signs and Supports |
| 706 | Structural Concrete Construction | 802 | Concrete Curb, Gutter and Dividers | | |

An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.

**Table 902-6**
**Superpave Final Aggregate Blend Physical Requirements**

| Est. Traffic (million ESAL) | Mix Type | Percent Crushed Minimum Criteria | | Fine Aggregate Angularity Minimum Criteria | | % Sand Equivalent Minimum Criteria | | Los Angeles Abrasion % Loss Maximum Criteria | | % Soft Particles Maximum Criteria (b) | | % Flat and Elongated Particles Maximum Criteria (c) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Top & Leveling Courses | Base Course | Top & Leveling Courses | Base Course | Top & Leveling Courses | Base Course | Top & Leveling Courses | Base Course | Top & Leveling Courses | Base Course | Top & Leveling Courses | Base Course |
| < 0.3 | LVSP | 55/— | — | — | — | 40 | 40 | 45 | 45 | 10 | 10 | — | — |
| < 0.3 | E03 | 55/— | — | — | — | 40 | 40 | 45 | 45 | 10 | 10 | — | — |
| ≥0.3 -<1.0 | E1 | 65/— | — | 40 | — | 40 | 40 | 40 | 45 | 10 | 10 | — | — |
| ≥1.0 - < 3 | E3 | 75/— | 50/— | 40(a) | 40(a) | 40 | 40 | 35 | 40 | 5 | 5 | 10 | 10 |
| ≥3 - <10 | E10 | 85/80 | 60/— | 45 | 40 | 45 | 45 | 35 | 40 | 5 | 5 | 10 | 10 |
| ≥10 - <30 | E30 | 95/90 | 80/75 | 45 | 40 | 45 | 45 | 35 | 35 | 3 | 4.5 | 10 | 10 |
| ≥30 - <100 | E50 | 100/100 | 95/90 | 45 | 45 | 50 | 50 | 35 | 35 | 3 | 4.5 | 10 | 10 |

(a) For an E3 mixture type that enters the restricted zone as defined in Table 902-5, the minimum is 43. If these criteria are satisfied, acceptance criteria and associated incentive/disincentive or pay adjustment tied to this gradation restricted zone requirement included in contract, do not apply. Otherwise, final gradation blend must be outside of the restricted zone.

(b) Soft particles maximum is the sum of the shale, siltstone, ochre, coal, clay-ironstone and particles that are structurally weak or are non-durable in service.

(c) Maximum by weight with a 1 to 5 aspect ratio.

Note: “85/80” denotes that 85 percent of the coarse aggregate has one fractured face and 80 percent has at least two fractured faces.

An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.

| Table 912-10<br>Minimum Retention Requirements | | | | |
|---|---|---|---|---|
| **Preservative** | **Minimum Retention, (pcf)** | | | **AWPA Standard** |
| | **Guardrail Posts** | **Sign Posts** | **Blocks** | |
| Pentachlorophenol | 0.60 | 0.50 | 0.40 | A6 |
| CCA, ACZA | 0.60 | 0.50 | 0.40 | A11 |
| ACQ (a) | 0.60 | Not Allowed | 0.40 | A11 |
| CA-B (a) | 0.31 | Not Allowed | 0.21 | A11 |
| CA-A (a) | 0.31 | Not Allowed | 0.15 | A11 |
| Other Waterborne preservatives | AWPA Commodity Specification A, Table 3.0, Use Category 4B | Not Allowed | AWPA Commodity Specification A, Table 3.0, Use Category 4A | A11 |
| a. Non-Metallic washers or spacers are required for timber and lumber treated with ACQ or CA placed in direct contact with aluminum. Do not use with sign posts. | | | | |

An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.

MSU Soil Testing Lab Recommendationsfor Phosphorus Applications to Turfgrass
3/8/2012

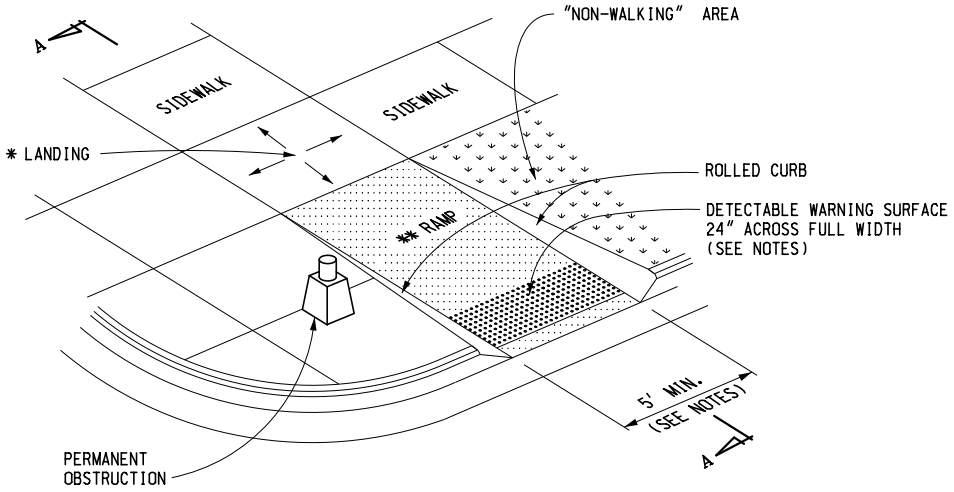
| | | Sand based rootzone establishment | Golf greens and tees est. or mature; Kentucky bluegrass or perennial ryegrass athletic fields est. or mature; sand based rootzone mature | Lawns, golf course fairways; establishment or mature | Establishment without soil test |
|---|---|---|---|---|---|
| Bray P1, Mehlich 3 Soil Test Value (ppm): pH<7.4 | Olsen Soil Test Value (ppm) pH>7.4 | Recommendation (lbs. $P_2O_5$/1000 ft.2) | Recommendation (lbs. $P_2O_5$/1000 ft.2) | Recommendation (lbs. $P_2O_5$/1000 ft.2) | Recommendation (lbs. $P_2O_5$/1000 ft.2) |
| | | | | | |
| 0 | 0 | 4.4 | 3.4 | 2.5 | |
| 2 | 1.3 | 4.1 | 3.1 | 2.2 | |
| 4 | 2.7 | 3.9 | 2.7 | 1.9 | |
| 6 | 4 | 3.6 | 2.4 | 1.6 | |
| 8 | 5.3 | 3.4 | 2.0 | 1.3 | |
| 10 | 6.7 | 3.1 | 1.7 | 1.0 | 2.5 lbs. year (Maximum single application of 1.5 lbs.) |
| 12 | 8 | 2.8 | 1.4 | 0.7 | |
| 14 | 9.3 | 2.6 | 1.0 | 0.4 | |
| 16 | 10.7 | 2.3 | 0.7 | 0.1 | |
| 18 | 12 | 2.1 | 0.3 | 0.0 | 109 lbs/acre year (maximum single application of 65 lbs/acre) |
| 20 | 13.3 | 1.8 | 0.0 | | |
| 22 | 14.7 | 1.5 | | | |
| 24 | 16 | 1.3 | | | |
| 26 | 17.3 | 1.0 | | | |
| 28 | 18.7 | 0.8 | | | |
| 30 | 20 | 0.5 | | | |
| 32 | 21.3 | 0.2 | | | |
| 34 | 22.7 | 0.0 | | | |

Web resources: www.turf.msu.edu or www.bephosphorussmart.msu.edu

An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.

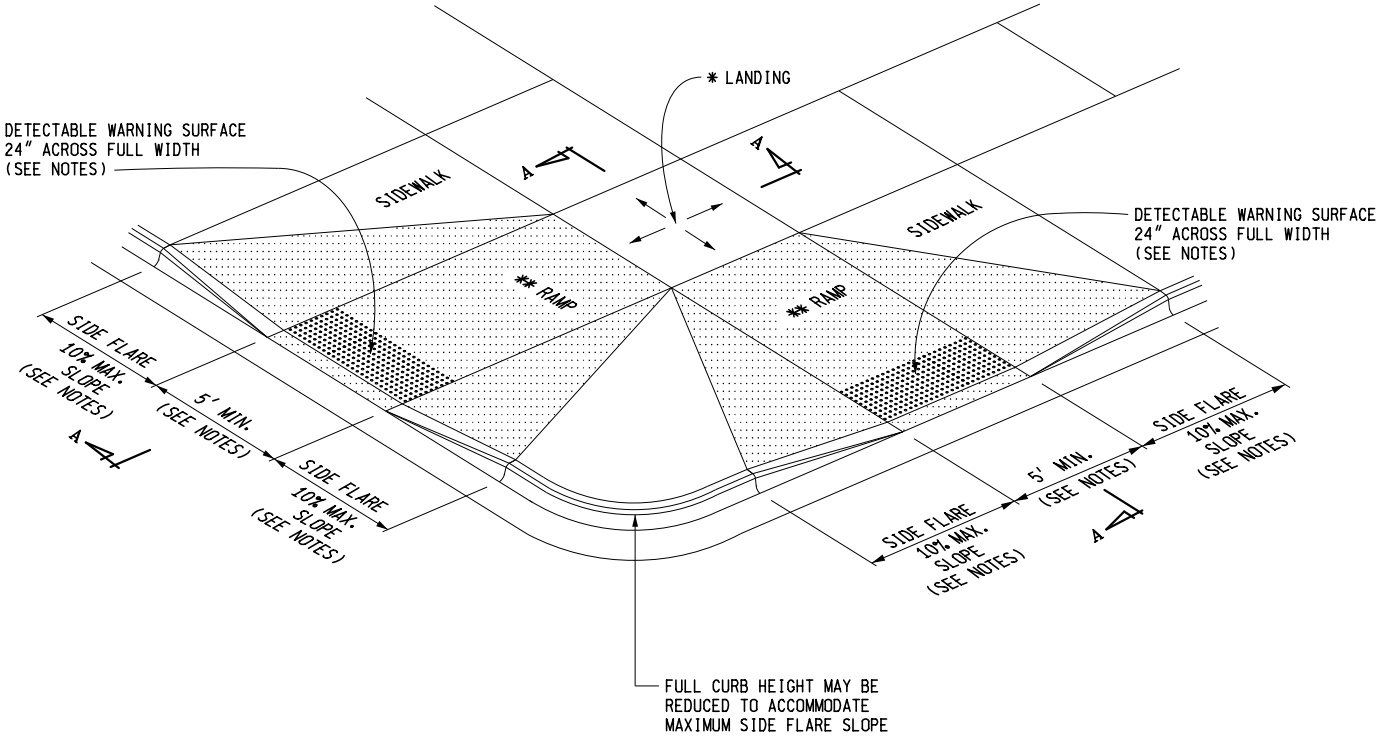
* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5′ x 5′. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%, RUNNING SLOPE 5% – 7% (8.3% MAXIMUM). SEE NOTES.




## SIDEWALK RAMP TYPE R

(ROLLED SIDES)




## SIDEWALK RAMP TYPE F

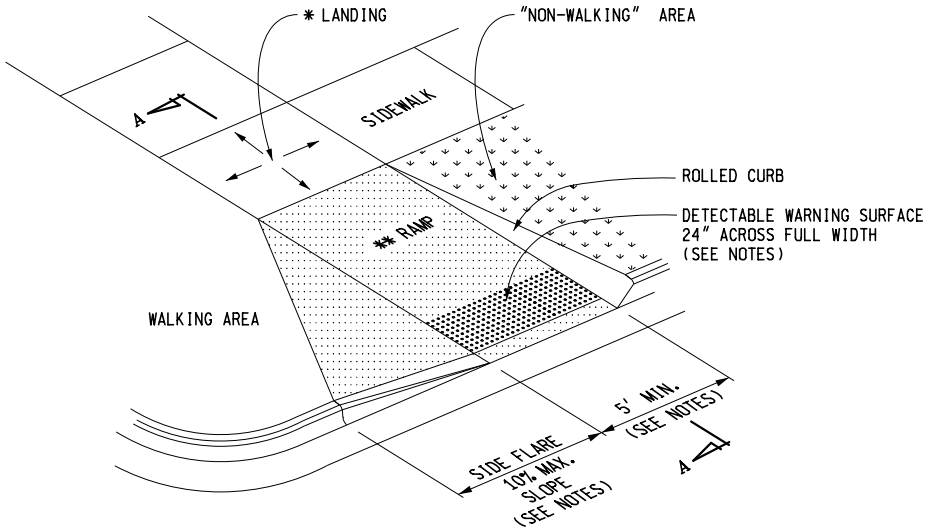
(FLARED SIDES, TWO RAMPS SHOWN)

| | | |
|---|---|---|
| MDOT Michigan Department of Transportation<br>PREPARED BY DESIGN DIVISION<br>DRAWN BY: B.L.T.<br>CHECKED BY: W.K.P. | DEPARTMENT DIRECTOR<br>Kirk T. Steudle<br>APPROVED BY: _____<br>DIRECTOR, BUREAU OF FIELD SERVICES<br>APPROVED BY: _____<br>DIRECTOR, BUREAU OF DEVELOPMENT | MICHIGAN DEPARTMENT OF TRANSPORTATION<br>BUREAU OF DEVELOPMENT STANDARD PLAN FOR<br>SIDEWALK RAMP AND DETECTABLE WARNING DETAILS |

| F.H.W.A. APPROVAL | 3-15-2016 PLAN DATE | R-28-J | SHEET 1 OF 7 |
|---|---|---|---|

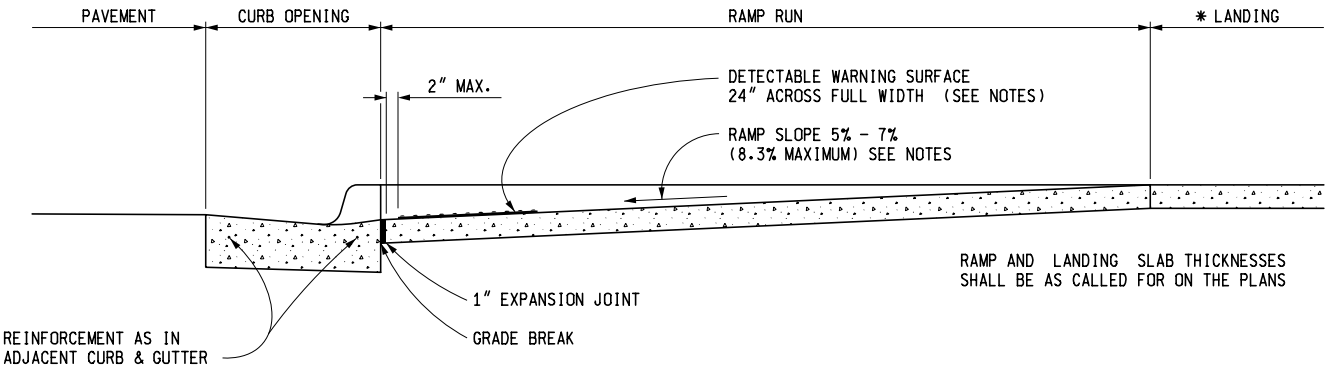
* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5′ x 5′. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% – 7% (8.3% MAXIMUM). SEE NOTES.



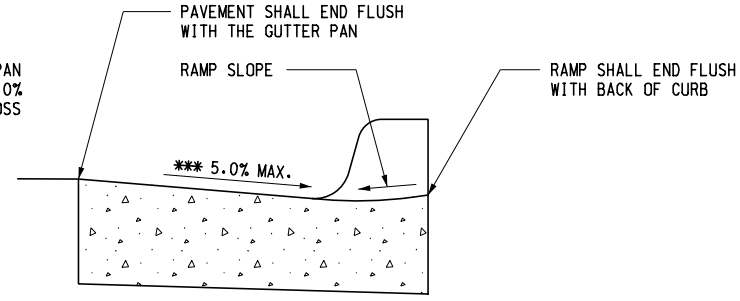

## SIDEWALK RAMP TYPE RF

(ROLLED / FLARED SIDES)




## SECTION A-A

*** TRANSITION ADJACENT GUTTER PAN CROSS SECTION TO PROVIDE 5.0% MAXIMUM COUNTER SLOPE ACROSS THE RAMP OPENING.




## SECTION THROUGH CURB OPENING

(TYPICAL ALL RAMP TYPES)

MICHIGAN DEPARTMENT OF TRANSPORTATION

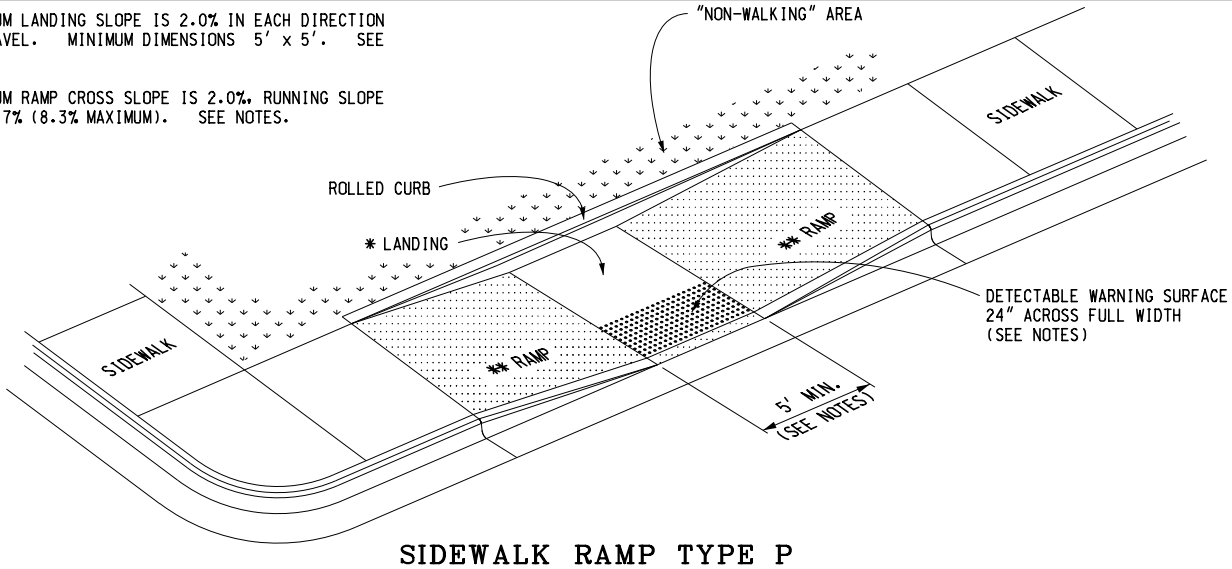
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

# SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

| F.H.W.A. APPROVAL | 3-15-2016 PLAN DATE | R-28-J | SHEET 2 OF 7 |
|---|---|---|---|

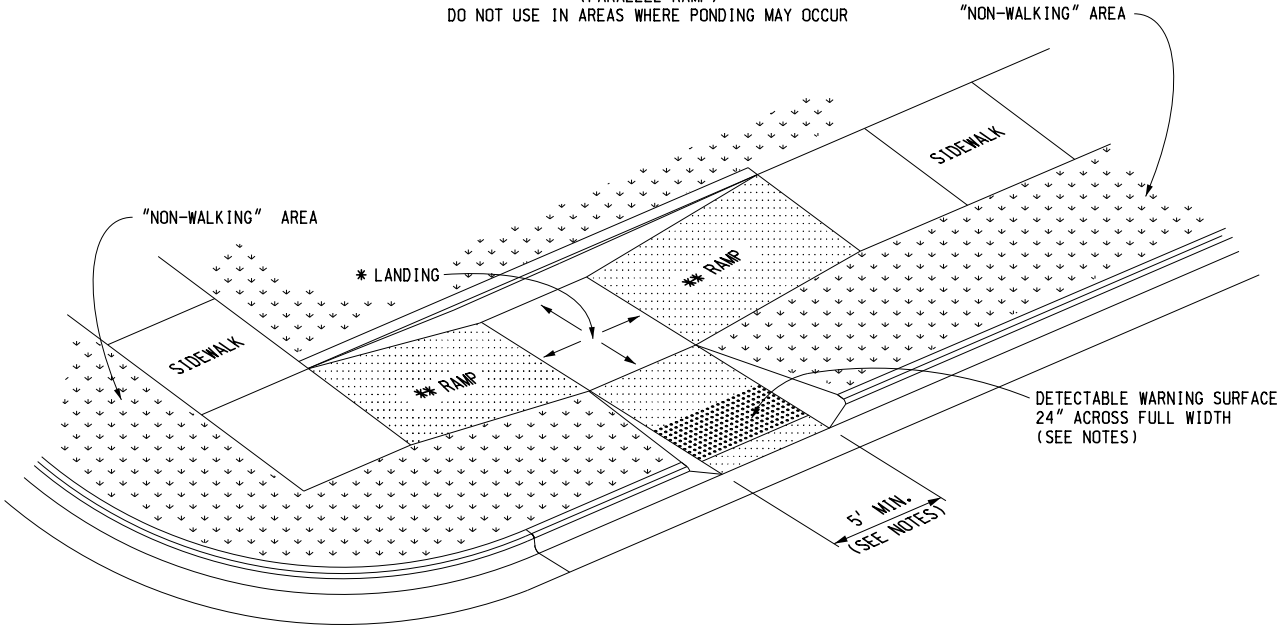
* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5′ x 5′. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% – 7% (8.3% MAXIMUM). SEE NOTES.



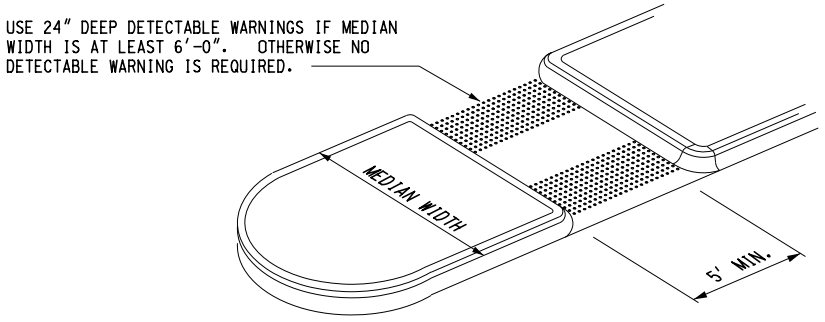

## SIDEWALK RAMP TYPE P

(PARALLEL RAMP)
DO NOT USE IN AREAS WHERE PONDING MAY OCCUR




## SIDEWALK RAMP TYPE C

(COMBINATION RAMP)




## SIDEWALK RAMP TYPE M

(MEDIAN ISLAND)

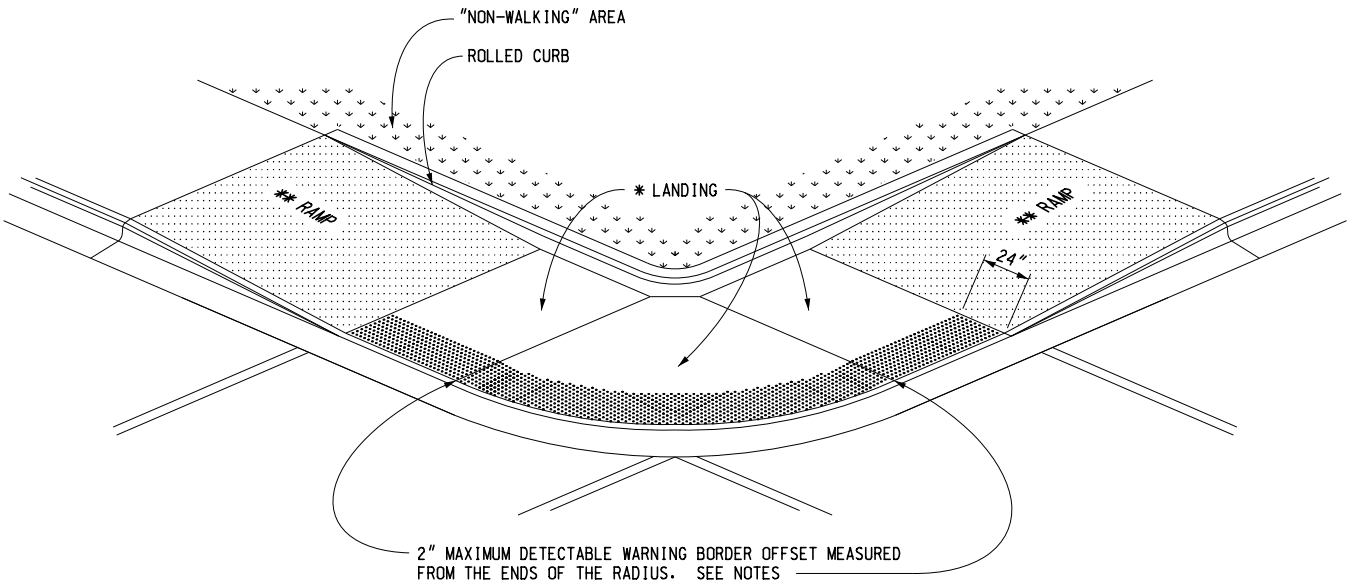
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

# SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

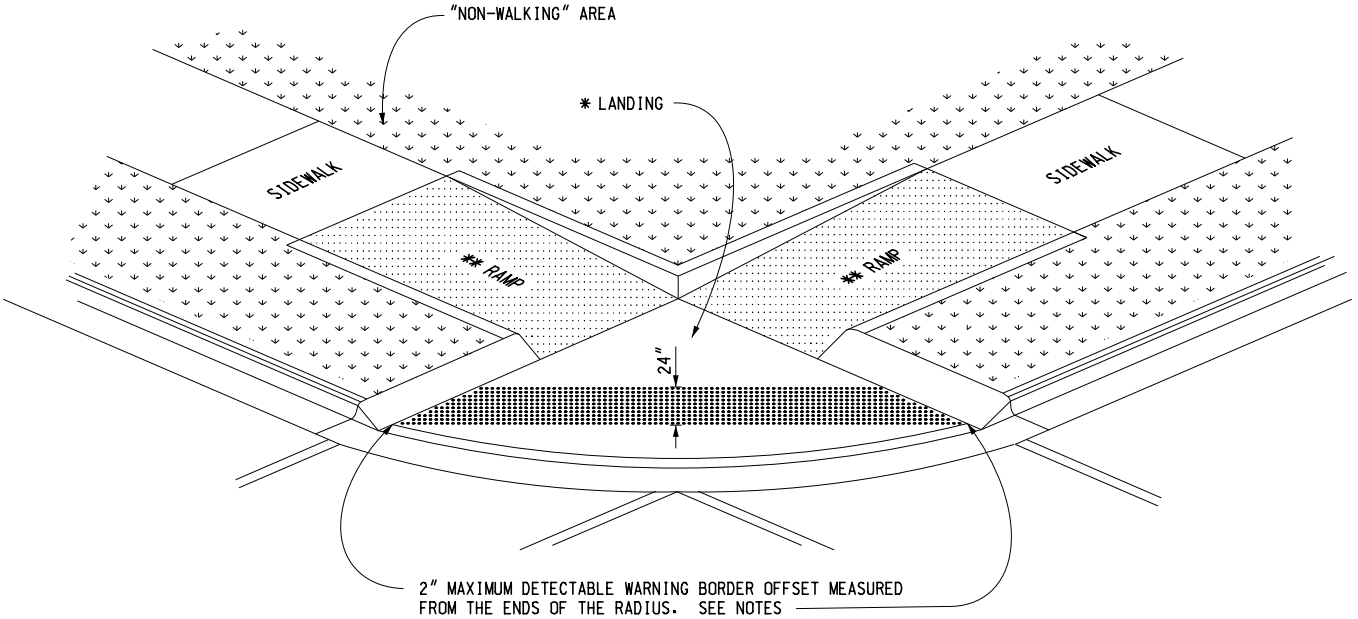
| F.H.W.A. APPROVAL | 3-15-2016 PLAN DATE | R-28-J | SHEET 3 OF 7 |
|---|---|---|---|

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5′ x 5′. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%, RUNNING SLOPE 5% – 7% (8.3% MAXIMUM). SEE NOTES.




( RADIAL DETECTABLE WARNING SHOWN )




( TANGENT DETECTABLE WARNING SHOWN )

## SIDEWALK RAMP TYPE D

(DEPRESSED CORNER)

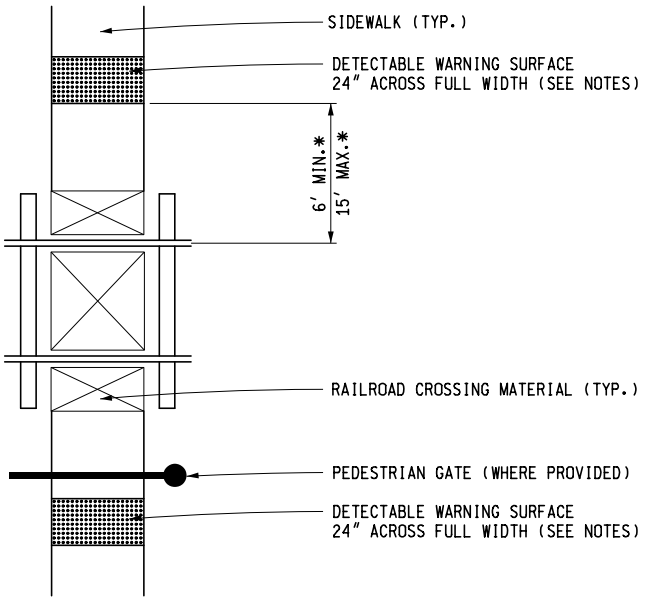
USE ONLY WHEN INDEPENDENT DIRECTIONAL RAMPS CAN NOT BE CONSTRUCTED FOR EACH CROSSING DIRECTION

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

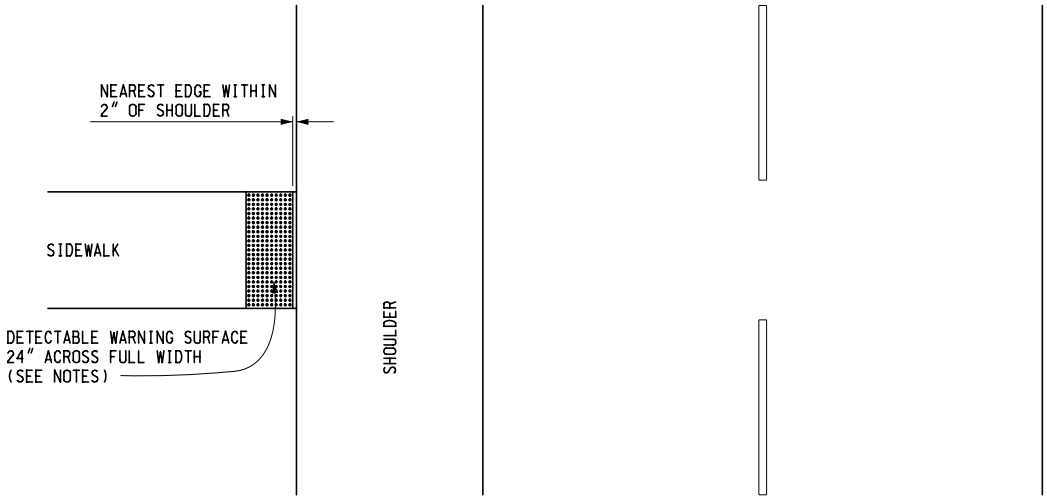
# SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

| F.H.W.A. APPROVAL | 3-15-2016 PLAN DATE | R-28-J | SHEET 4 OF 7 |
|---|---|---|---|

* THE DETECTABLE WARNING SURFACE SHALL BE LOCATED SO THAT THE EDGE NEAREST THE RAIL CROSSING IS 6′ MINIMUM AND 15′ MAXIMUM FROM THE CENTERLINE OF THE NEAREST RAIL. DO NOT PLACE DETECTABLE WARNING ON RAILROAD CROSSING MATERIAL.




DETECTABLE WARNING AT RAILROAD CROSSING

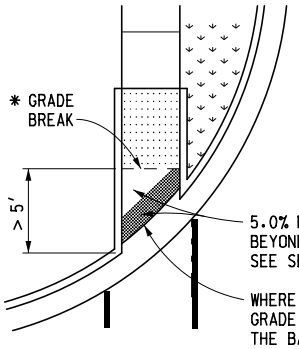



DETECTABLE WARNING AT FLUSH SHOULDER OR ROADWAY

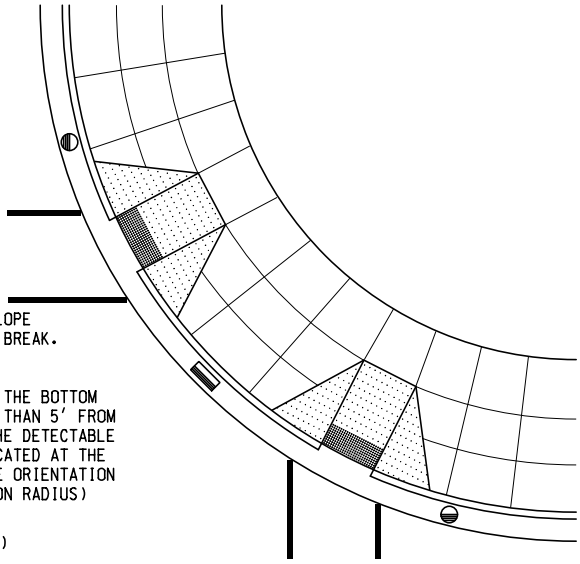
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

# SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

| F.H.W.A. APPROVAL | 3-15-2016 PLAN DATE | R-28-J | SHEET 5 OF 7 |
|---|---|---|---|




SIDEWALK RAMP LOCATED IN RADIUS (TYPE R SHOWN)
(GRADE BREAK GREATER THAN 5')

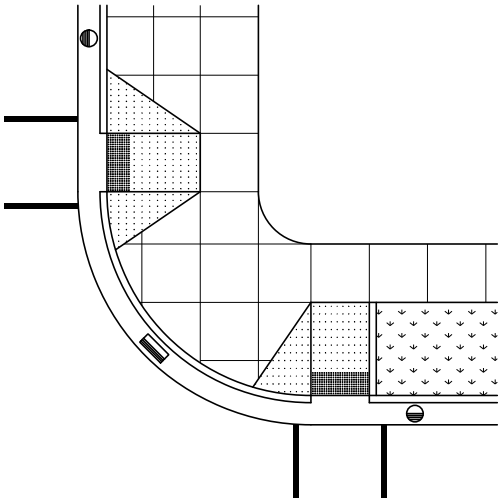


SIDEWALK RAMP PERPENDICULAR TO RADIAL CURB (TYPE F SHOWN)

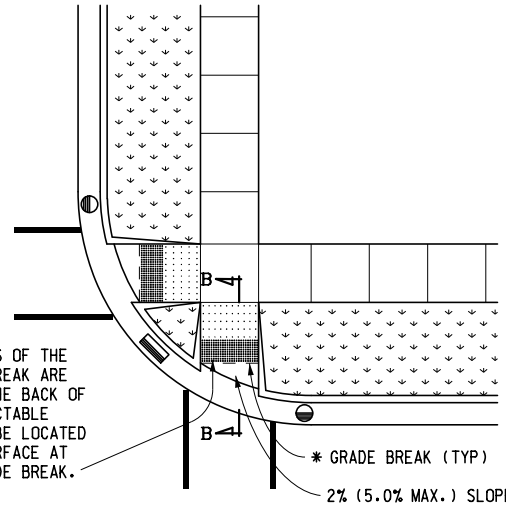
(USE WITH RADIAL CURB WHEN THE CROSSWALK AND SIDEWALK RAMP ARE NOT ALIGNED)

LEGEND

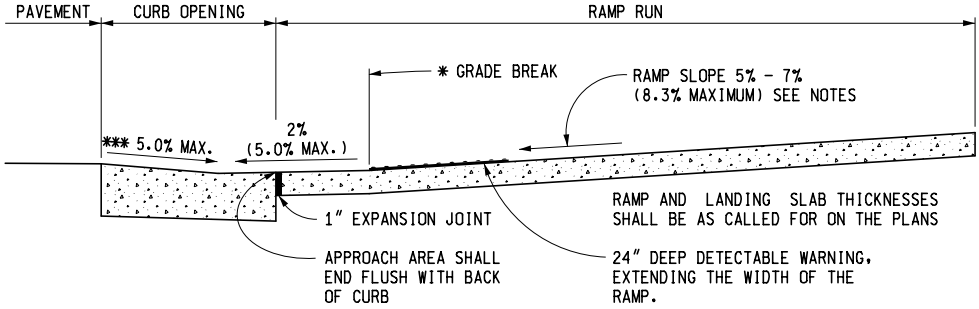
- SLOPED SURFACE
- DETECTABLE WARNING
- "NON-WALKING" AREA
- CROSSWALK MARKING
- PREFERRED LOCATION OF DRAINAGE INLET (TYP.)
- ALTERNATE LOCATION OF DRAINAGE INLET (TYP.)



SIDEWALK RAMP PERPENDICULAR TO TANGENT CURB
(TYPE F AND TYPE RF SHOWN)




SIDEWALK RAMP LOCATED IN RADIUS (TYPE R SHOWN)
(GRADE BREAK LESS THAN 5')




* GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMPS SHALL BE PERPENDICULAR TO THE DIRECTION OF TRAVEL.

*** TRANSITION ADJACENT GUTTER PAN CROSS SECTION TO PROVIDE 5.0% MAXIMUM COUNTER SLOPE ACROSS THE RAMP OPENING.

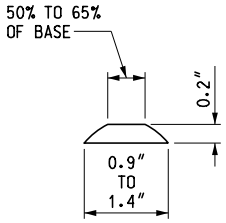
SECTION B-B

SIDEWALK RAMP ORIENTATION

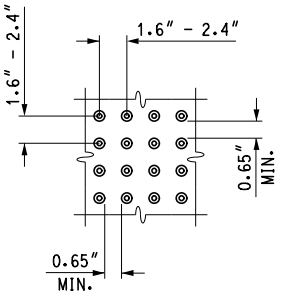
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

# SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

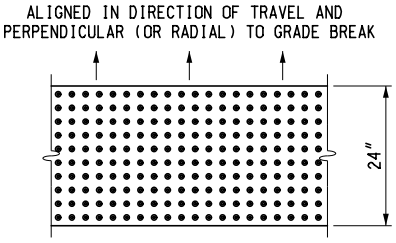
| F.H.W.A. APPROVAL | 3-15-2016 PLAN DATE | R-28-J | SHEET 6 OF 7 |
|---|---|---|---|




DOME SECTION




DOME SPACING




DOME ALIGNMENT

# DETECTABLE WARNING DETAILS

NOTES:

DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS IN THE PUBLIC RIGHT OF WAY.

SIDEWALK RAMPS ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

RAMPS SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMPS SHALL ALSO BE PROVIDED AT MARKED AND/OR SIGNALIZED MID-BLOCK CROSSINGS.

SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING, TRANSVERSE TO THE RUNNING SLOPE.

SIDEWALK SHALL BE RAMPED WHERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.

CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP. WHERE CONDITIONS PERMIT, IT IS DESIRABLE THAT THE SLOPE OF THE RAMP BE IN ONLY ONE DIRECTION, PARALLEL TO THE DIRECTION OF TRAVEL.

RAMP WIDTH SHALL BE INCREASED, IF NECESSARY, TO ACCOMMODATE SIDEWALK SNOW REMOVAL EQUIPMENT NORMALLY USED BY THE MUNICIPALITY.

WHEN 5′ MINIMUM WIDTHS ARE NOT FEASIBLE, RAMP WIDTH MAY BE REDUCED TO NOT LESS THAN 4′ AND LANDINGS TO NOT LESS THAN 4′ x 4′.

DETECTABLE WARNING SURFACE COVERAGE IS 24″ MINIMUM IN THE DIRECTION OF RAMP/PATH TRAVEL AND THE FULL WIDTH OF THE RAMP/PATH OPENING EXCLUDING CURBED OR FLARED CURB TRANSITION AREAS. A BORDER OFFSET NOT GREATER THAN 2″ MEASURED ALONG THE EDGES OF THE DETECTABLE WARNING IS ALLOWABLE. FOR RADIAL CURB THE OFFSET IS MEASURED FROM THE ENDS OF THE RADIUS.

FOR NEW ROADWAY CONSTRUCTION, THE RAMP CROSS SLOPE MAY NOT EXCEED 2.0%. FOR ALTERATIONS TO EXISTING ROADWAYS, THE CROSS SLOPE MAY BE TRANSITIONED TO MEET AN EXISTING ROADWAY GRADE. THE CROSS SLOPE TRANSITION SHALL BE APPLIED UNIFORMLY OVER THE FULL LENGTH OF THE RAMP.

THE MAXIMUM RUNNING SLOPE OF 8.3% IS RELATIVE TO A FLAT (0%) REFERENCE. HOWEVER, IT SHALL NOT REQUIRE ANY RAMP OR SERIES OF RAMPS TO EXCEED 15 FEET IN LENGTH.

DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMPS. THE LOCATION OF THE RAMP SHOULD TAKE PRECEDENCE OVER THE LOCATION OF THE DRAINAGE STRUCTURE. WHERE EXISTING DRAINAGE STRUCTURES ARE LOCATED IN THE RAMP PATH OF TRAVEL, USE A MANUFACTURER′S ADA COMPLIANT GRATE. OPENINGS SHALL NOT BE GREATER THAN $\frac{1}{2}$″. ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.

TRANSITION THE GUTTER PAN CROSS SECTION SUCH THAT THE COUNTER SLOPE IN THE DIRECTION OF RAMP TRAVEL IS NOT GREATER THAN 5.0%. MAINTAIN THE NORMAL GUTTER PAN CROSS SECTION ACROSS DRAINAGE STRUCTURES.

THE TOP OF THE JOINT FILLER FOR ALL RAMP TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.

CROSSWALK AND STOP LINE MARKINGS, IF USED, SHALL BE SO LOCATED AS TO STOP TRAFFIC SHORT OF RAMP CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE GIVEN IN THE "MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES".

FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNOBSTRUCTED CIRCULATION PATH LATERALLY CROSSES THE SIDEWALK RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THE RAMP IS BORDERED BY LANDSCAPING, UNPAVED SURFACE OR PERMANENT FIXED OBJECTS. WHERE THEY ARE NOT REQUIRED, FLARED SIDES CAN BE CONSIDERED IN ORDER TO AVOID SHARP CURB RETURNS AT RAMP OPENINGS.

DETECTABLE WARNING PLATES MUST BE INSTALLED USING FABRICATED OR FIELD CUT UNITS CAST AND/OR ANCHORED IN THE PAVEMENT TO RESIST SHIFTING OR HEAVING.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

## SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

| F.H.W.A. APPROVAL | 3-15-2016 PLAN DATE | R-28-J | SHEET 7 OF 7 |
|---|---|---|---|

DEQ

# MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
# WATER RESOURCES DIVISION
# GENERAL PERMIT AUTHORIZATION

**ISSUED TO:**

City of Ann Arbor
Attn: David Dykman
301 East Huron Street
P.O. Box 8647
Ann Arbor, MI 48107-8647

| | |
|---|---|
| **No.** | WRP001040 |
| **Issued** | December 3, 2015 |
| **Expires** | December 3, 2020 |

**This General Permit Authorization is being issued by the Michigan Department of Environmental Quality (MDEQ) under the provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), and specifically:**

☐ **Part 301, Inland Lakes and Streams** ☐ **Part 325, Great Lakes Submerged Lands** ☒ **Part 303, Wetlands Protection**

**PROPERTY LOCATION:** **4251 Stone School Road**
**Ann Arbor, Michigan 48108**
**Washtenaw County, Pittsfield Township**
**Town/Range T03S/06E, Section 15**
**Watercourse Affected: Swift Drain**

**Permission is hereby granted, based on permittee's assurance of adherence to State of Michigan requirements, the applicable general permit category(s), and authorization conditions, to:**

**Authorized Activity:**

Construct a permanent 12 foot wide by 340 foot long, elevated, open pile boardwalk. All work shall be completed in accordance with the attached plans and the specifications of this permit.

**This General Permit Authorization is subject to the following limitations:**

A. Initiation of any work on the permitted project confirms the permittee's acceptance and agreement to comply with all terms and conditions of an authorization under this permit.
B. The permittee, in exercising the authority granted by an authorization under this permit, shall not cause unlawful pollution as defined by Part 31, Water Resources Protection, of the NREPA.
C. An authorization under this permit shall be kept at the site of the work and available for inspection at all times during the duration of the project or until its date of expiration.
D. All work shall be completed in accordance with the plans and specifications submitted with the application and/or plans and specifications attached to the authorization.
E. No attempt shall be made by the permittee to forbid the full and free use by the public of public waters at or adjacent to the structure or work approved.
F. It is made a requirement of an authorization under this permit that the permittee give notice to public utilities in accordance with Act 53 of the Public Acts of 1974 and comply with each of the requirements of that Act.
G. An authorization under this permit does not convey property rights, in either real estate or material; nor does it authorize any injury to private property or invasion of public or private rights; nor does it waive the necessity of seeking federal assent, all local permits, or complying with other state statutes.
H. An authorization under this permit does not prejudice or limit the right of a riparian owner or other person to institute proceedings in any circuit court of this state, when necessary, to protect his or her rights.
I. Permittee shall notify the MDEQ within one week after the completion of the authorized activity.
J. An authorization under this permit shall not be assigned or transferred without the written approval of the MDEQ.

K. Failure to comply with conditions of an authorization under this permit may subject the permittee to revocation of the authorization and criminal and/or civil action as cited by the specific state act, federal act and/or rule under which this permit is granted.
L. All dredged or excavated materials shall be disposed of in an upland site (outside of floodplains, unless exempt under Part 31, and wetland).
M. In issuing an authorization under this permit, the MDEQ has relied on the information and data that the permittee has provided in connection with the submitted application for permit. If, subsequent to the issuance of a General Permit Authorization, such information and data prove to be false, incomplete, or inaccurate, the MDEQ may modify, revoke, or suspend the General Permit Authorization, in whole or in part, in accordance with the new information.
N. The permittee shall indemnify and hold harmless the State of Michigan and its departments, agencies, officials, employees, agents and representatives for any and all claims or causes of action arising from acts or omissions of the permittee or employees, agents, or representatives of the permittee undertaken in connection with this permit. This permit shall not be construed as an indemnity by the State of Michigan for the benefit of the permittee or any other person.
O. Noncompliance with these terms and conditions and/or the initiation of other regulated activities not specifically authorized shall be cause for the modification, suspension, or revocation of this permit, in whole or in part. Further, the MDEQ may initiate criminal and/or civil proceedings as may be deemed necessary to correct project deficiencies, protect natural resource values, and secure compliance with statutes.
P. If any change or deviation from the permitted activity becomes necessary, the permittee shall request, in writing, a revision of the permitted activity from the MDEQ. Such revision request shall include complete documentation supporting the modification and revised plans detailing the proposed modification. Proposed modifications must be approved, in writing, by the MDEQ prior to being implemented.
Q. An authorization under this permit may be transferred to another person upon written approval of the MDEQ. The permittee must submit a written request to the MDEQ to transfer the permit to the new owner. The new owner must also submit a written request to the MDEQ to accept transfer. The new owner must agree, in writing, to accept all conditions of the authorization. A single letter signed by both parties which includes all the above information may be provided to the MDEQ. The MDEQ will review the request and if approved, will provide written notification to the new owner.
R. Prior to initiating authorized construction, the permittee is required to provide a copy of the General Permit Authorization to the contractor(s) for review. The property owner, contractor(s), and any agent involved in exercising the authorization are held responsible to ensure that the project is constructed in accordance with all drawings and specifications. The contractor is required to provide a copy of the General Permit Authorization to all subcontractors doing work authorized by the authorization.
S. Construction must be undertaken and completed during the dry period of the wetland. If the area does not dry out, construction shall be done on equipment mats to prevent compaction of the soil.
T. Authority granted by an authorization does not waive permit requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA, or the need to acquire applicable permits from the County Enforcing Agent.
U. Authority granted by this permit does not waive permit requirements under the authority of Part 305, Natural Rivers, of the NREPA. A Natural Rivers Zoning Permit may be required for construction, land alteration, streambank stabilization, or vegetation removal along or near a natural river.
V. The permittee is cautioned that grade changes resulting in increased runoff onto adjacent property is subject to civil damage litigation.
W. Unless specifically stated in an authorization under this permit, construction pads, haul roads, temporary structures, or other structural appurtenances to be placed in a wetland or on bottomland of the waterbody are not authorized and shall not be constructed unless authorized by a separate permit or permit revision granted in accordance with the applicable law.
X. For projects with potential impacts to fish spawning or migration, no work shall occur within fish spawning or migration timelines (i.e., windows) unless otherwise approved in writing by the MDNR, Fisheries Division.

1. Authority granted by this permit does not waive permit or program requirements under Part 91 of the NREPA or the need to acquire applicable permits from the CEA. To locate the Soil Erosion Program Administrator for your county, visit www.mi.gov/deqstormwater and select "Soil Erosion and Sedimentation Control Program" under "Related Links."

2. The authority to conduct the activity as authorized by this permit is granted solely under the provisions of the governing act as identified above. This permit does not convey, provide, or otherwise imply approval of any other governing act, ordinance, or regulation, nor does it waive the permittee's obligation to acquire any local, county, state, or federal approval or authorization necessary to conduct the activity.

3. No fill, excess soil, or other material shall be placed in any wetland or surface water area not specifically authorized by this permit, its plans, and specifications.

4. This permit does not authorize or sanction work that has been completed in violation of applicable federal, state, or local statutes.

5. The permit placard shall be kept posted at the work site, in a prominent location at all times for the duration of the project, or until permit expiration.

6. This permit is being issued for the maximum time allowed and no extensions of this permit will be granted. Initiation of the construction work authorized by this permit indicates the permittee's acceptance of this condition. The permit, when signed by the MDEQ, will be for a five-year period beginning on the date of issuance. If the project is not completed by the expiration date, a new permit must be sought.

7. Prior to the start of construction, all adjacent non-work wetland areas shall be protected by properly trenched sedimentation barrier to prevent sediment from entering the wetland. Orange construction fencing shall be installed as needed to prohibit construction personnel and equipment from entering or performing work in these areas. Fence shall be maintained daily throughout the construction process. Upon project completion, the accumulated materials shall be removed and disposed of at an upland site, the sedimentation barrier shall then be removed in its entirety and the area restored to its original configuration and cover.
8. Additional attachments to permitted structures, including but not limited to roofs, sidewalls, benches, decks, docks, piers, or extensions thereof, are **not** authorized by this permit.
9. Dredging is not authorized by this permit.
10. Filling is not authorized by this permit.

Issued By Luke Golden

Luke Golden
Water Resources Division
517-416-7001

**THIS GENERAL PERMIT AUTHORIZATION MUST BE SIGNED BY PERMITTEE TO BE VALID**

I hereby assure that I have read, am familiar with, and agree to adhere to the terms and conditions of this authorization.

Permittee Signature

01/25/2016
Date

cc: Pittsfield Township Clerk (via e-mail)

# CITY OF ANN ARBOR
## PROJECT MANAGEMENT

# WHEELER CENTER PUD

## W.R. WHEELER (SWIFT RUN) SERVICE CENTER PUD NON-MOTORIZED IMPROVEMENTS

USACE/MDEQ JOINT PERMIT APPLICATION
MDEQ FILE No. 15-81-0001-P

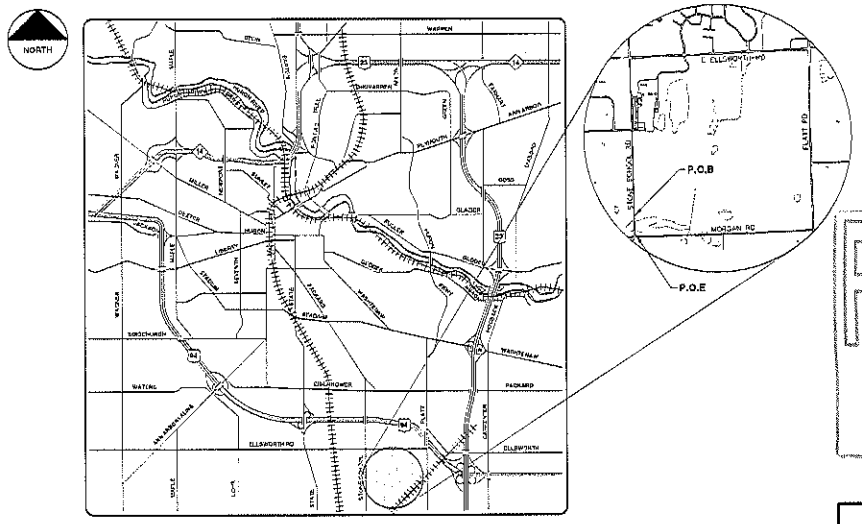
**NOTES**

FOR PROTECTION OF UNDERGROUND UTILITIES AND IN CONFORMANCE WITH PUBLIC ACT 53, THE CONTRACTOR SHALL CALL 811 OR 1-800-482-7171 A MINIMUM OF THREE FULL WORKING DAYS, EXCLUDING SATURDAYS, SUNDAYS, AND HOLIDAYS, PRIOR TO BEGINNING EACH EXCAVATION IN AREAS WHERE PUBLIC UTILITIES HAVE NOT BEEN PREVIOUSLY LOCATED. MEMBERS WILL THUS BE ROUTINELY NOTIFIED. THIS DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF NOTIFYING UTILITY OWNERS WHO MAY NOT BE A PART OF THE "MISS DIG" ALERT SYSTEM.

THE UNDERGROUND LOCATIONS SHOWN FOR NATURAL GAS, TELEPHONE, ELECTRICAL POWER, CABLE TV AND FIBER OPTIC LINES ARE APPROXIMATE. THE CITY OF ANN ARBOR ASSUMES NO RESPONSIBILITY FOR THEIR ACCURATE REPRESENTATION IN THIS DRAWING. MISS DIG MUST BE CONTACTED PRIOR TO CONSTRUCTION TO LOCATE THESE UTILITIES.

THE CONSTRUCTION COVERED BY THESE PLANS SHALL CONFORM TO THE 1994 EDITION OF THE CITY OF ANN ARBOR PUBLIC SERVICES DEPARTMENT STANDARD SPECIFICATIONS, ITS DETAILS, WHICH ARE INCLUDED BY REFERENCE, AND THIS PROJECT'S CONTRACT DOCUMENTS. THE OMISSION OF ANY CURRENT STANDARD DETAIL DOES NOT RELIEVE THE CONTRACTOR FROM THIS REQUIREMENT.

| SHEET LIST TABLE | |
|---|---|
| SHEET NUMBER | SHEET TITLE |
| 1 | COVER SHEET |
| 2 | OVERALL SITE |
| 3 | STONE SCHOOL ROAD |
| 4 | STONE SCHOOL ROAD BOARDWALK |
| 5 | MDEQ DETAIL 1 |
| 6 | STA. 13+50 TO STA. 18+00 |
| 7 | STA. 18+00 TO POE |
| 8 | SECTION STA. 16+00 TO STA. 17+25 |
| 9 | SECTION STA. 17+50 TO STA. 18+75 |
| 10 | SECTION STA. 19+00 TO STA. 20+25 |



VICINITY MAP



**PROJECT MANAGEMENT SERVICE UNIT**

PREPARED UNDER THE SUPERVISION OF

DAVID ARTHUR DYKMAN, P.E. - MI LICENSE No. 52919
PROJECT MANAGER

10/12/2015
DATE

DAVID ARTHUR DYKMAN ENGINEER No. 52919 PROFESSIONAL ENGINEER

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

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| | | | | |

CITY OF ANN ARBOR PUBLIC SERVICES 301 EAST HURON STREET ANN ARBOR, MI 48107-8647 734.794.6410 www.a2gov.org

PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

USACE/MDEQ JOINT PERMIT APPLICATION
MDEQ FILE No. 15-81-0001-P

SCALE:

DRAWING No. 2014031-1

SHEET No. 1 OF 10

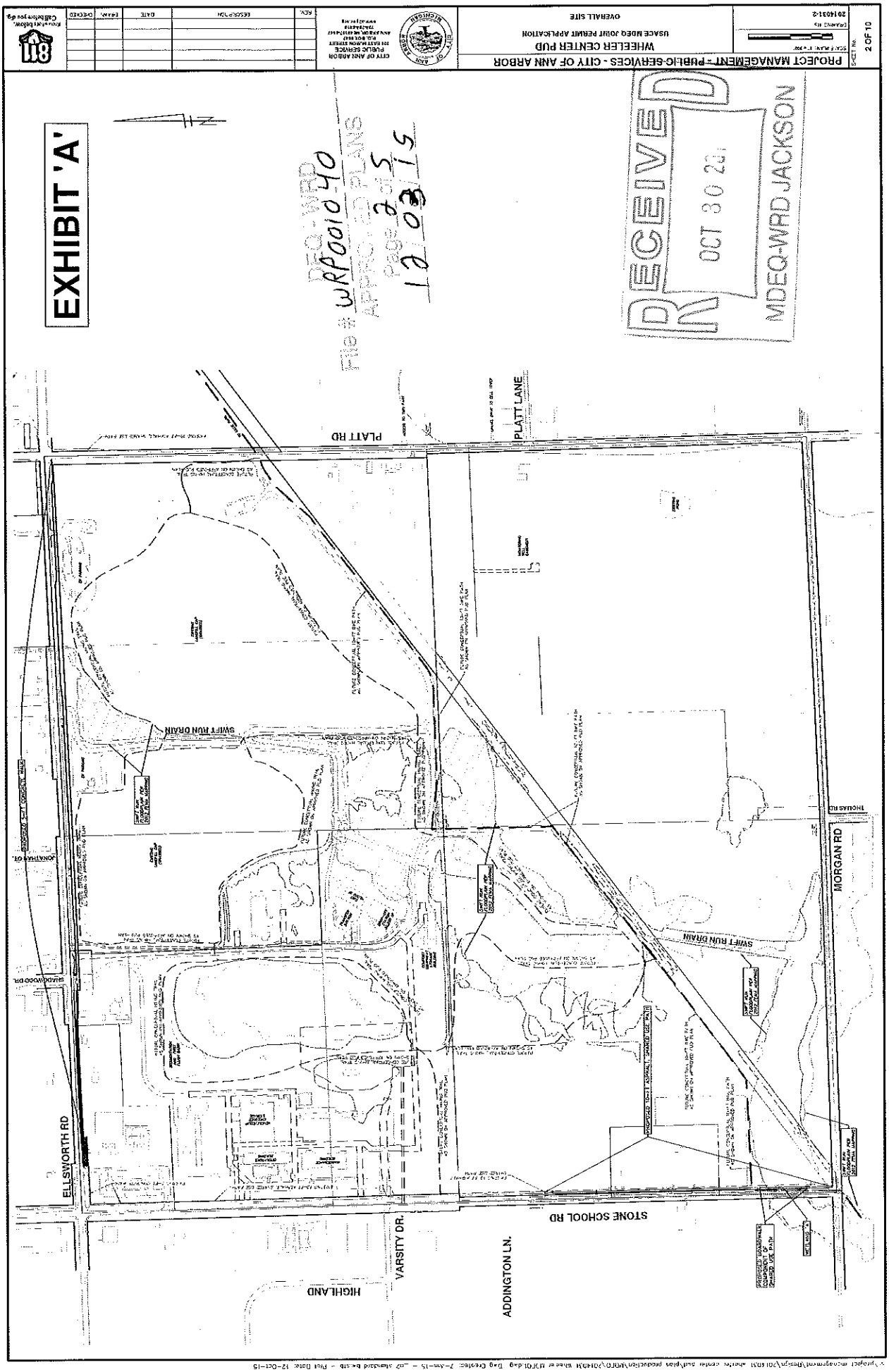
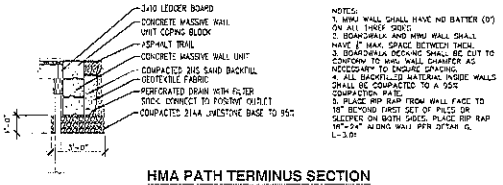


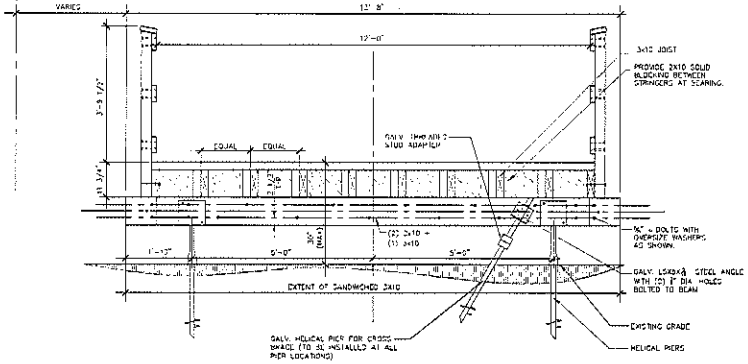
EXHIBIT 'A'
PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR
WHEELER CENTER PUD
USACE MDEQ JOINT PERMIT APPLICATION
OVERALL SITE
SHEET No. 2 OF 10
RECEIVED
OCT 30 20
MDEQ-WRD JACKSON
File # WRP010740
APPROVED PLANS
DATE 12/03/15
PLATT RD
PLATT LANE
SWIFT RUN DRAIN
THOMAS RD
MORGAN RD
ELLSWORTH RD
STONE SCHOOL RD
VARSITY DR.
ADDINGTON LN.
HIGHLAND
SHADOWOOD DR.
JONATHAN CT.




NOTES:
1. MMU WALL SHALL HAVE NO BATTER (0°) ON ALL THREE SIDES.
2. BOARDWALK AND MMU WALL SHALL HAVE 1" MAX. SPACE BETWEEN THEM.
3. BOARDWALK DECKING SHALL BE CUT TO CONFORM TO MMU WALL CHAMFER AS NECCESARY TO ENSURE SPACING.
4. ALL BACKFILLED MATERIAL INSIDE WALLS SHALL BE COMPACTED TO A 95% COMPACTION RATE.
5. PLACE RIP RAP FROM WALL FACE TO 18" BEYOND FIRST SET OF PILES OR SLEEPER ON BOTH SIDES. PLACE RIP RAP 18"-24" ALONG WALL PER DETAIL G.
L-3.01

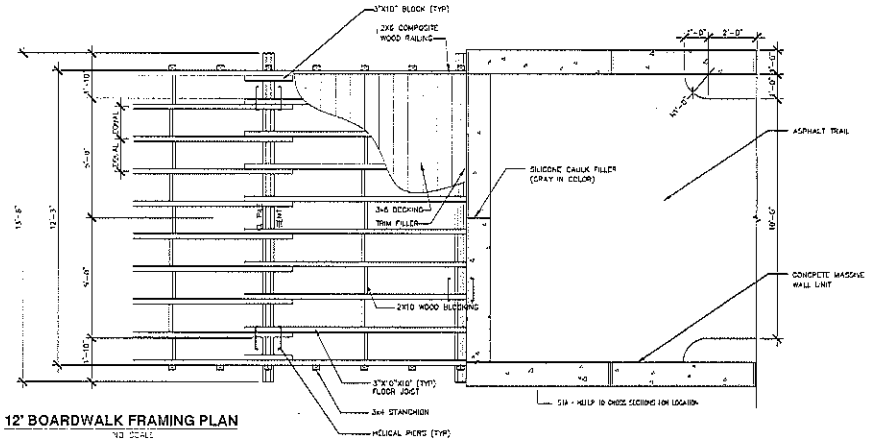
## HMA PATH TERMINUS SECTION

NTS SCALE




## 12' BOARDWALK SECTION

NO SCALE




## 12' BOARDWALK FRAMING PLAN

NO SCALE

## BOARDWALK FRAMING PLAN AND WALL APPROACH PLAN

NO SCALE





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

| REV | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|

CITY OF ANN ARBOR
PUBLIC SERVICE
STATE STREET
ANN ARBOR, MICHIGAN 48107-8647
734.794.6410
www.a2gov.org

PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

WHEELER CENTER PUD

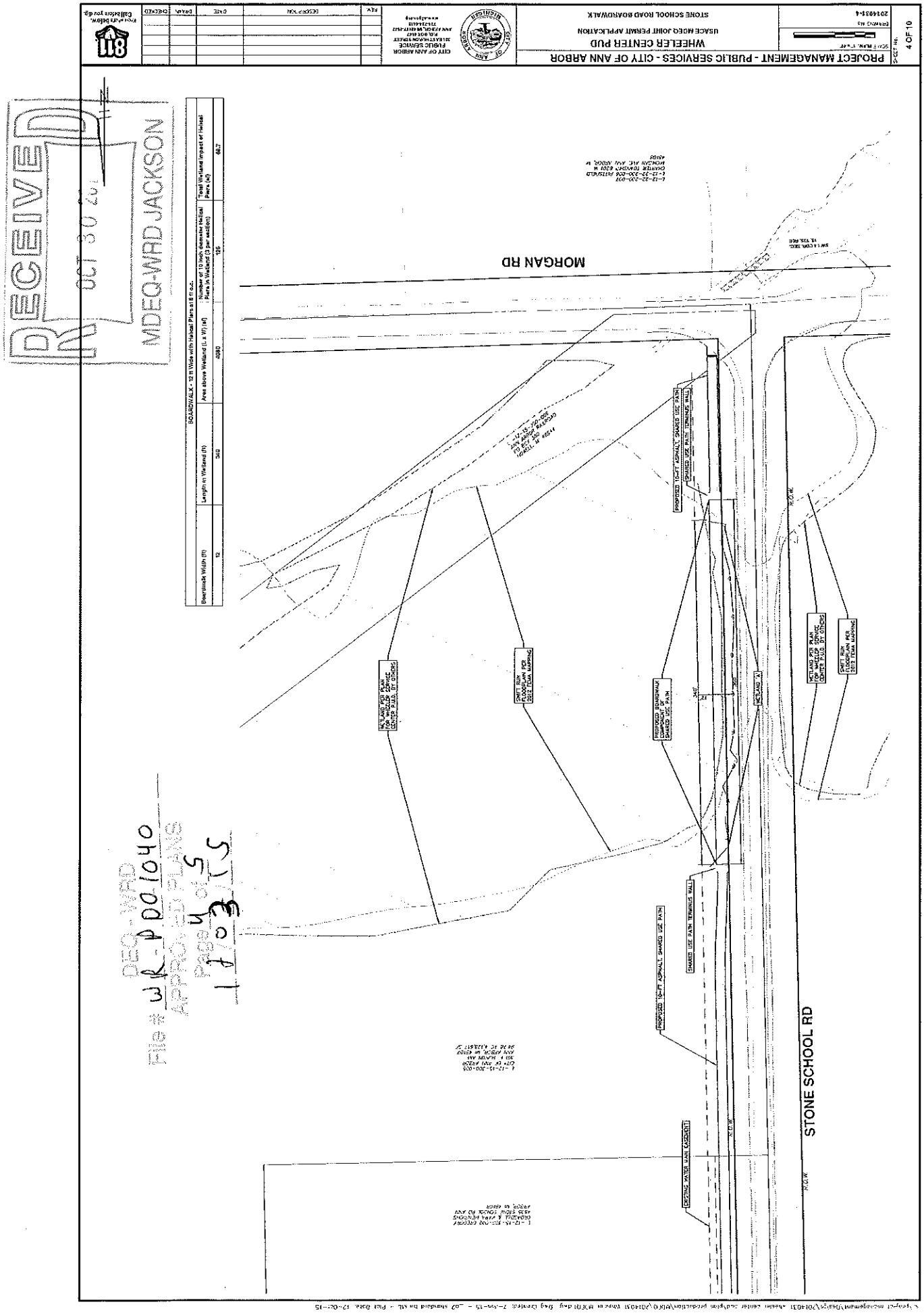
USACE NDEQ JOINT PERMIT APPLICATION

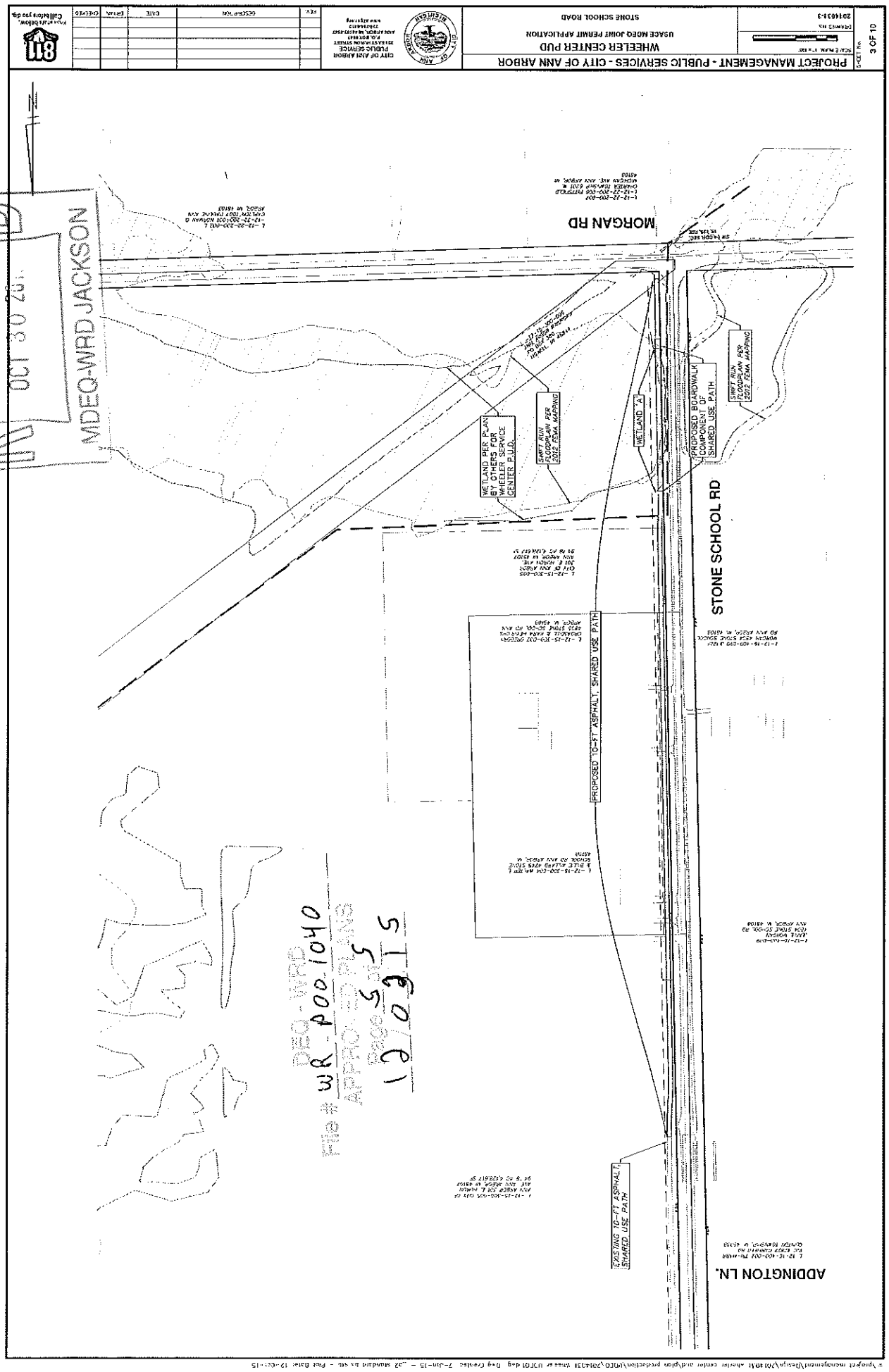
MDEQ DETAIL 1

SHEET No. 5 OF 10

SHEET PLAN 1" = 40'

DRAWING No. 2014031-5


PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR
WHEELER CENTER PUD
USACE NOD JOINT PERMIT APPLICATION
STONE SCHOOL ROAD BOARDWALK
CITY OF ANN ARBOR
PUBLIC SERVICE
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734.794.6410
www.a2gov.org
REV
DESCRIPTION
DATE
DRAWN
CHECKED
Know what's below.
Call before you dig.
811
SCALE: NONE
DRAWING NO.
2014031-4
4 OF 10
BOARDWALK - 12 ft Wide with Helical Piers at 8 ft o.c.
Boardwalk Width (ft)
Length in Wetland (ft)
Area above Wetland (L x W) (sf)
Number of 10 inch diameter Helical Piers in Wetland (3 per section)
Total Wetland Impact of Helical Piers (sf)
12
340
4080
126
66.7
RECEIVED
OCT 30 2014
MDEQ-WRD JACKSON
File # WRP 001040
APPROVED PLANS
Page 4 of 5
MORGAN RD
STONE SCHOOL RD
PROPOSED 10-FT ASPHALT SHARED USE PATH
SHARED USE PATH TERMINUS WALL
WETLAND PER PLAN FOR WHEELER CENTER PUD, BY OTHERS
SWIFT RUN FLOODPLAIN PER 2012 FEMA MAPPING
PROPOSED BOARDWALK SHARED USE PATH
WETLAND "A"
EXISTING WATER MAIN EASEMENT
ROW


PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR
WHEELER CENTER PUD
USACE NOEG JOINT PERMIT APPLICATION
STONE SCHOOL ROAD
SHEET No. 3 OF 10
MORGAN RD
STONE SCHOOL RD
ADDINGTON LN.
WETLAND PER PLAN BY OTHERS FOR WHEELER SERVICE CENTER P.U.D.
SWIFT RUN FLOODPLAIN PER 2012 FEMA MAPPING
WETLAND 'A'
PROPOSED BOARDWALK COMPONENT OF SHARED USE PATH
SWIFT RUN FLOODPLAIN PER 2012 FEMA MAPPING
PROPOSED 10-FT ASPHALT SHARED USE PATH
EXISTING 10-FT ASPHALT SHARED USE PATH
RECEIVED
OCT 30 20..
MDEQ-WRD JACKSON
DEQ-WRD
File # WR-P00-1040
APPROVED PLANS
Page 5 of 5
12/09/15

**Evan N. Pratt, P.E.**

**Water Resources Commissioner**
**County of Washtenaw**
**State of Michigan**

No. DRA2016-00021

Fees Paid: ✓ Date: WASHTENAW CO

FEB 0 8 2016

WATER RESOURCES

# Drain Use Permit Application

Site Name: W.R. Wheeler Service Center PUD Non-motorized Improvements (reference name for project) Property Owner: City of Ann Arbor (if different from site name)

Address of Owner: 301 East Huron Street, P.O. Box 8647, Ann Arbor, MI 48107-8647 (address) See below (phone)

Contact Person: David Dykman, P.E. (name) 734-794-6410 x 43685 (phone)

Design Performed by: Chris Carson, P.E. (name of designer) Same as above (address) 734-794-6410 x 43631 (phone)

Work to be Performed by: Presently not known; to be determined at a future date (contractor's name) (address) (phone)

I, David Dykman, P.E. (please print) certify that I am the owner/designated agent of property located as follows:

and do hereby make application to the Washtenaw County Water Resource Commissioner pursuant to Act 40, Public Act of 1956 as amended, for permission to: tap-in (cross, clean out, tap-in, etc) the Ellsworth Road Drain (name of drain)

~~at a point~~ / between Stone School Road and Platt Road (exact location)

and to make such excavation as may be necessary for the purpose.

I agree to do the above work or have same done under supervision of the County Water Resource Commissioner and to pay all costs of inspection, labor, and material that may be required to perform said work, protect and guard the opening during construction, and restore the surface to its original condition, saving the Water Resource Commissioner and County of Washtenaw harmless in the event of accident or injury to others. If I do not pay such costs as invoiced, these costs will be assessed against the property. *(Separate permit is required to* enter, *use, or alter conditions of county right of way)*

(owner / agent signature; copies/faxes not accepted) Project Manager (title)

## PERMIT RESTRICTIONS

Permission to perform the work applied for above is hereby granted under (rejected for) the following conditions (reasons):

1. 48 hour notification to the Water Resource Commissioner's Office is required prior to tapping the drain/encroaching easement.
2. This permit is not valid unless all other required permits (WCRC, MDEQ, municipality, etc.) are obtained.
3. Permits to discharge to a county drain are not valid unless attached affidavit is signed.
4. Notify the Water Resource Commissioner's Office in writing within 10 days of project completion.
5. Construction to be in accordance with plans prepared by: _____
6. Special Conditions: _____

The above application approved on basis of plans (structures already built and) reviewed on MAR 22, 2016, and restrictions listed above. This permit shall expire on MAR 22, 2017

Scott Miller, P.E. (name) (signature) ENGINEERING SUPERVISOR (title)

## CONSTRUCTION APPROVAL

Work inspected by _____ Date: _____

Modification and compliance with all permit requirements for work performed on _____ is hereby certified on _____ Approved by: _____

Plan Location: _____

**Evan N. Pratt, P.E.**

**Water Resources Commissioner**
**County of Washtenaw**
**State of Michigan**

No. DRA2016 - 00022

Fees Paid: ✓ Date: WASHTENAW CO

FEB 0 8 2016

WATER RESO

# Drain Use Permit Application

Site Name: W.R. Wheeler Service Center PUD Non-motorized Improvements (reference name for project) Property Owner: City of Ann Arbor (if different from site name)

Address of Owner: 301 East Huron St, PO Box 8647, Ann Arbor, MI 48107 (address) See below (phone)

Contact Person: David Dykman, P.E. (name) 734-794-6410 x 43685 (phone)

Design Performed by: Chris Carson, P.E. (name of designer) Same as above (address) 734-794-6410 x 43631 (phone)

Work to be Performed by: Presently not known; to be determined at a future date (contractor's name) (address) (phone)

I, David Dykman, P.E. (please print) certify that I am the owner/designated agent of property located as follows:

and do hereby make application to the Washtenaw County Water Resource Commissioner pursuant to Act 40, Public Act of 1956 as amended, for permission to: discharge to and cross (cross, clean out, tap-in, etc) the Swift Run Drain (name of drain)

at a point / ~~between~~ on Ellsworth Road approximately 1900 feet west of Platt Road, and Stone School Road near Morgan Road (exact location)

and to make such excavation as may be necessary for the purpose.

I agree to do the above work or have same done under supervision of the County Water Resource Commissioner and to pay all costs of inspection, labor, and material that may be required to perform said work, protect and guard the opening during construction, and restore the surface to its original condition, saving the Water Resource Commissioner and County of Washtenaw harmless in the event of accident or injury to others. If I do not pay such costs as invoiced, these costs will be assessed against the property. *(Separate permit is required to* enter, *use, or alter conditions of county right of way)*

(owner / agent signature; copies/faxes not accepted) Project Manager (title)

## PERMIT RESTRICTIONS

Permission to perform the work applied for above is hereby granted under (rejected for) the following conditions (reasons):

1. 48 hour notification to the Water Resource Commissioner's Office is required prior to tapping the drain/encroaching easement.
2. This permit is not valid unless all other required permits (WCRC, MDEQ, municipality, etc.) are obtained.
3. Permits to discharge to a county drain are not valid unless attached affidavit is signed.
4. Notify the Water Resource Commissioner's Office in writing within 10 days of project completion.
5. Construction to be in accordance with plans prepared by: _____
6. Special Conditions: _____

The above application approved on basis of plans (structures already built and) reviewed on MAR 22, 2016, and restrictions listed above. This permit shall expire on MAR 22, 2017

SCOTT MILLER, P.E. (name) (signature) ENGINEERING SUPERVISOR (title)

## CONSTRUCTION APPROVAL

Work inspected by _____ Date: _____

Modification and compliance with all permit requirements for work performed on _____ is hereby certified on _____ Approved by: _____

Plan Location: _____

# WETLANDS PERMIT PITTSFIELD CHARTER TOWNSHIP

PERMIT NO. 15-02 Date Issued November 10, 2015
Expiration Date November 10, 2016

Pittsfield Charter Township, 6201 W. Michigan Ave., Ann Arbor, MI 48108, 734-822-3130, has issued a permit for the activity described below, under provisions of the Township's Wetland Protection Ordinance, Chapter V, Article V of Township Code, as amended.

**AUTHORIZED ACTIVITY: To construct a permanent 10-foot wide, 340 lineal foot boardwalk pathway through wetland on southwest portion of site.**

To be conducted on property located on the west side of Stone School Road, known as tax parcel #L-12-15-300-005, Section15, Pittsfield Charter Township, Washtenaw County, Michigan, T3S, Range 6E.

Permittee: David Dykman, P.E.
City of Ann Arbor
301 East Huron St., P.O. Box 8647
Ann Arbor, MI 48107
734-794-6410 x 43685

Issued by: _____ Date: November 10, 2015
Matthew Bourke, Planning and Zoning Administrator

***This notice must be displayed at the site of work in such a way that it can be seen from an adjacent road***

This permit is subject to the following conditions, per Section 8-207(j) of the Township Code of Ordinances:

1. The Township's final approval of a Wetlands Use Permit application shall be contingent upon receipt of evidence by the Township that all required state and federal permits have been obtained by the applicant.
2. No Wetlands Use Permit shall be issued by the Township that would allow a more extensive alteration of a wetland than allowed by state and federal laws and regulations.
3. A Wetlands Use Permit shall remain effective for a time period coincidental with other land use permits reviewed and approved concurrent with the Wetlands Use Permit. If applied for prior to the expiration date and concurrent with the expiring land use permit, the applicant may be granted an extension that corresponds to additional time granted for the underlying land use permit. The maximum number of extensions shall coincide with the maximum number allowed for the underlying land use permit. If there is no other activity or permit involved, the Wetlands Use Permit shall remain effective for one (1) year. A maximum of a one (1) year extension may be approved.
4. Wetlands Use Permits for seasonal operations must be renewed annually unless otherwise stated in the permit.
5. Any temporary, seasonal, or permanent operation that is discontinued for two (2) consecutive years or two (2) consecutive seasons shall be deemed abandoned and, upon such a determination of abandonment by the Township, the Wetlands Use Permit for the operation shall automatically become void and of no further effect.
6. Any change that increases the size or scope of the operation and that affects the criteria considered in approving the permit as determined by the Township may require the filing of a new Wetlands Use Permit application.
7. A permittee shall comply with all the following in connection with any construction or other activity on the property for which the Wetlands Use Permit has been issued:
   (a) Maintain soil erosion control measures in accordance with the Article IV of Chapter 8 of the Township Code, Soil Erosion and Sediment Control as well as any best management practices required by the Wetlands Use Permit.
   (b) Maintain clear delineation of the wetland (as marked by the Ordinance Enforcement Officer or Township wetlands consultant) so that its location and boundaries are visible to all construction workers.
   (c) Post on the site, prior to commencement of work on the site and continuing throughout the duration of the project, a copy of the approved Wetlands Use Permit containing the conditions of issuance, in a conspicuous manner such that the wording of the permit is available for public inspection.
8. This permit be revoked or suspended by the Township, after notice and an opportunity for a hearing, for any of the following causes:
   (a) A violation of any condition of the permit.
   (b) Misrepresentation or failure to fully disclose all relevant facts in the permit application.
   (c) A change in a condition that requires a temporary or permanent change in the activity. This includes, but is not limited to, withdrawal of the site plan or cancellation of the project by the permittee.
9. All work to be done per plans recived by the Township on October 22, 2015.
10. Adhere to the requirements of the five (5) year monitoring plan per Section 8-207 k 6 VIII, Chapter 8, Article 5, Wetlands.

This permit is also subject to the following conditions as part of Planning Commission approval granted on November 5, 2015:

1. The applicant should provide to the Township a copy of the application for wetland permit that was submitted to the MDEQ. In addition, the applicant should provide a copy of any correspondence from MDEQ, including the issued permit, once available.

2. The applicant shall provide a restoration plan that addresses materials and proposed construction sequence for the proposed boardwalk installation. Any areas of temporary wetland or wetland buffer disturbance shall be restored using a specified, native wetland or wetland buffer seed mix, as appropriate. The applicant shall provide a proposed restoration seed mix on the Plan. Sod/common grass seed will not be acceptable in these areas.
3. The Site Plan submitted with the application does not appear to include an existing tree survey or tree removal plan. The Township regulates trees that are 6-inches diameter-at-breast-height (dbh) or greater. The Plan should specify all proposed tree removals as well as any proposed woodland replacement/mitigation information. Per Section 14.08.F.1 of the Township Zoning Ordinance, replacement trees shall be provided to equal a minimum of 100 percent of the original dbh removed. Please review and revise the Plan as necessary.

CONSULTING GROUP

Report of Geotechnical Investigation

# Ann Arbor Soil Borings
# Fuller Street, Stone School Road, Devonshire/Londonderry/Belmont Roads, Wheeler Park, and Lawrence Street
# Ann Arbor, Michigan

Prepared for:

City of Ann Arbor
310 E. Huron Street
Ann Arbor, Michigan 48108

G2 Project No. 130744 - Authorization 2
February 24, 2015

g2consultinggroup.com

| | | | | |
|---|---|---|---|---|
| **Headquarters** | 1866 Woodslee St | Troy, MI 48083 | P 248.680.0400 | F 248.680.9745 |
| **Ann Arbor** | 1595 Eisenhower Pl | Ann Arbor, MI 48108 | P 734.390.9330 | F 734.390.9331 |
| **Chicagoland** | 1186 Heather Dr | Lake Zurich, IL 60047 | P 847.353.8740 | F 847.353.8742 |

CONSULTING GROUP

February 24, 2015

Ms. Elizabeth Rolla, P.E.
City of Ann Arbor
Project Management Services Unit
310 E. Huron Street
Ann Arbor, Michigan 48107

Re: Report of Geotechnical Investigation
Ann Arbor Soil Borings
Fuller Street, Stone School Road, Devonshire/Londonderry/Belmont Road, Wheeler Park, and Lawrence Street
Ann Arbor, Washtenaw County, Michigan
G2 Project No. 130744 - Authorization 2

Dear Ms. Rolla,

We have completed the geotechnical investigation for the proposed roadway and utility improvements at various locations within the City of Ann Arbor, Michigan. This report presents the results of our observations and analyses, and our recommendations for site preparation and construction considerations as they related to the geotechnical conditions at the sites.

We appreciate the opportunity to be of service to the City of Ann Arbor and look forward to discussing the recommendations presented herein. In the meantime, if you have any questions regarding the report or any other matter pertaining to the project, please call us.

Sincerely,

**G2 Consulting Group, LLC**

Michael G. Dagher, E.I.T.
Staff Engineer

David L. Wanlass, P.E.
Project Manager

MGD/DLW/cjh

g2consultinggroup.com

Headquarters 1866 Woodslee St Troy, MI 48083 P 248.680.0400 F 248.680.9745
Ann Arbor 1595 Eisenhower Pl Ann Arbor, MI 48108 P 734.390.9330 F 734.390.9331
Chicagoland 1186 Heather Dr Lake Zurich, IL 60047 P 847.353.8740 F 847.353.8742

## PROJECT DESCRIPTION

We understand the sites of the proposed roadway and utility improvements are located at various locations throughout Ann Arbor, Michigan. The following table provides our understanding of the types of work proposed at each site.

| Project Location | Project Scope |
|---|---|
| Fuller Street (FS) | Sanitary Sewer Diversion |
| Stone School Road (SS) | Water Main Improvements |
| Devonshire/Londonderry/Belmont Roads (DLB) | Water Main Improvements |
| Wheeler Park (WP) | Water Main Improvements |
| Lawrence Street (LS) | Water Main Improvements & Road Resurfacing |

The purpose of this report is to determine and evaluate the general subsurface conditions at the sites and develop related geotechnical recommendations for design and construction of the proposed improvements.

## SCOPE OF SERVICES

The field operations, laboratory testing, and engineering report preparation were performed under direction and supervision of a licensed professional engineer. Our services were performed according to generally accepted standards and procedures in the practice of geotechnical engineering in this area. Our scope of services for this project is as follows:

1. **Fuller Street**: We drilled a total of four (4) soil borings in the area of the proposed sanitary sewer diversion. Soil borings FS-1, FS-3 and FS-4 were hand-auger excavations extending to a depth of 10 feet, or to refusal. Soil boring FS-2 was drilled to a depth of 30 feet. The total drilling depth for this site was 60 feet.

2. **Stone School Road**: We drilled a total of twelve (12) soil borings along the proposed water main alignment to depths ranging from 15 to 40 feet with a total drilling depth of 215 vertical feet.

3. **Devonshire/Londonderry/Belmont Roads:** We drilled a total of six (6) soil borings along proposed water main alignments to depths of 10 feet with a total drilling depth of 60 vertical feet.

4. **Wheeler Park:** We drilled a total of two (2) soil borings along the proposed water main alignment to a depth of 10 feet each with a total drilling depth of 20 vertical feet.

5. **Lawrence Street** – We drilled a total of four (4) soil borings within the proposed water main alignment and road resurfacing area to a depth of 10 feet with a total drilling depth of 40 vertical feet.

6. We performed laboratory testing on representative samples obtained from the soil boring. Laboratory testing included visual engineering classification, natural moisture content, and unconfined compressive strength determinations.

7. We prepared this engineering report.

## FIELD OPERATIONS

The City of Ann Arbor (AA), in conjunction with G2, selected the number, depth, and location of the soil borings. The soil boring locations were staked in the field by a G2 representative using GPS assisted mobile technology; however, soil boring locations were staked in the field by an AA representative for soil borings associated with the Lawrence Street (LS) project. The approximate soil boring locations are shown on the respective Soil Boring Location Plans found in the Appendices. For the Wheeler Park (WP)

project, ground surface elevations at the soil boring locations were interpolated from the topographic contour lines presented the topographical map "Summit Street Water Main" by Midwestern Consulting, LLC Sheet No. 9 dated 04-30-14.

The soil borings were drilled using a truck-mounted rotary drilling rig. Continuous flight 3-1/4-inch inside-diameter hollow-stem augers were used to advance the boreholes to the explored depths. Soil samples were obtained at intervals of 2-1/2 feet within the upper 10 feet and at intervals of 5 feet thereafter. The samples were obtained by the Standard Penetration Test method (ASTM D 1586), which involves driving a 2-inch diameter split-spoon sampler into the soil with a 140-pound weight falling 30 inches. The sampler is generally driven three successive 6-inch increments with the number of blows for each increment recorded. The number of blows required to advance the sampler the last 12 inches is termed the Standard Penetration Resistance (N or N-value). The blow counts for each 6-inch increment and the resulting N-value are presented on the soil boring logs.

The soil samples were placed in sealed containers and brought to our laboratory for testing and classification. During field operations, the driller maintained logs of the subsurface conditions, including changes in stratigraphy and observed groundwater levels. The final boring logs are based on the field boring logs supplemented by laboratory soil classification and test results. Where necessary, the boreholes were backfilled with auger cuttings upon completion of drilling operations and capped with cold patch where necessary.

## LABORATORY TESTING

Representative soil samples were subjected to laboratory testing to determine soil parameters pertinent to foundation design and site preparation. An experienced geotechnical engineer classified the samples in general conformance with the Unified Soil Classification System.

Laboratory testing included natural moisture content, organic matter content and unconfined compressive strength determinations. The unconfined compressive strengths were determined using a spring-loaded hand penetrometer. The hand penetrometer estimates the unconfined compressive strength to a maximum of 4-1/2 tons per square foot (tsf) by measuring the resistance of the soil sample to the penetration of a calibrated spring-loaded cylinder.

The results of the moisture content, organic matter content and unconfined compressive strength tests are indicated on the soil boring logs at the depths the samples were obtained. We will hold the soil samples for 60 days from the date of this report, after which time they will be discarded. If you would like the samples, please let us know.

## SITE DESCRIPTION

### Fuller Street

The proposed sanitary sewer diversion is to be constructed at the intersection of Fuller Street and Glen Avenue in Ann Arbor, Michigan. At the time of the investigation, proposed site grades and sanitary sewer invert depths were unavailable. The intersection of Fuller Street and Glen Avenue is supported on an embankment that was constructed with the development of Fuller Street. The site grades peak at the intersection of Fuller Street and Glen Avenue slope downward to the north to the Amtrak rail line, to the west along the alignment of Fuller Street, and to the south along Glen Court. The University of Michigan – Medical Center sits on a hill to the east of the proposed development site.

### Stone School Road

The proposed water main alignment is along the east side of Stone School Road between Morgan Road and Addington Lane. At the time of the investigation, proposed water main invert depths where unavailable, however; we anticipate that the proposed water main excavation will extend to depths

ranging from 5 to 8 feet below existing grades. Based on data available from Google Earth, site grades generally slope upward along the proposed water main alignment from Morgan Road at an elevation of approximately 830 feet to an elevation of approximately 850 feet at Addington Lane. Along the east side of the proposed water main alignment a low-lying area is present near the intersection of Morgan and Stone School Road. Elsewhere, farmland and residential properties are present along Stone School Road.

### Devonshire/Londonderry/Belmont Roads

The proposed water main alignment traverses along Devonshire Road, Belmont Road, and Londonderry Road. At the time of the investigation, water main invert depths were unavailable, however; we anticipate that the proposed water main excavation will extend to depths ranging from 5-8 feet below existing grades. Based on data available from Google Earth, site grades slope downward from the intersection of Londonderry and Devonshire Road, upward along Devonshire Road to the intersection of Belmont and Devonshire, upward along Belmont Road to the intersection of Londonderry and Belmont, and downward along Londonderry to the intersection of Londonderry and Devonshire. Residential properties are present along the entire alignment.

### Wheeler Park

The proposed water main alignment traverses along the inside edge of the southern track at Wheeler Park. Wheeler Park is located at the northwestern corner of N 5th Avenue and Summit Street between Summit Street and Depot Street. At the time of the investigation, proposed water main invert depths were unavailable, however; we anticipate that the proposed water main excavation will extend to depths ranging from 5-8 feet below existing grades. Based on data available from Google Earth, site grades are slope upward from the west at an elevation of approximately 770 feet to the east at an elevation of approximately 780 feet. Prior to the development of Wheeler Park, the area was used as a commercial packing company to the east and as a storage yard to the west. Depot Road bounds Wheeler Park to the north and the site is generally surrounded by residential properties to the west and south and by commercial properties to the east.

### Lawrence Street

We anticipate that the proposed water main alignment will generally follow the existing water main alignment along Lawrence Street between N Division and N State Street. At the time of the investigation, proposed water main invert depths were unavailable, however; we anticipate that the proposed water main excavation will extend to depths ranging from 5 to 8 feet below existing grades. Based on data available from Google Earth, site grades gradually slope upward from the west at an elevation of approximately 840 feet to the east at an approximate elevation of 860 feet. Residential properties are present along Lawrence Street to the north and south of the roadway alignment.

## SOIL CONDITIONS

### Fuller Street (Appendix A)

Bituminous concrete is present at the ground surface of soil boring FS-2 having a thickness of 7-1/2 inches. Silty sand topsoil is present at the ground surface of soil borings FS-1, FS-3, and FS-4 and ranges in thickness from 6 to 10 inches.

Fill soils comprised of silty sand, sandy clay and silty clay underlie the topsoil and bituminous concrete in all soil borings extending to the explored depths ranging from 2-1/2 to 21 feet. The granular fill is generally medium compact to very compact with N-values ranging from 25 to 67 blows per foot (bpf). The cohesive fill soils are generally stiff to very stiff in consistency with natural moisture contents ranging from 11 to 13 percent and unconfined compressive strengths ranging from 3,000 to 4,500 pounds per square foot (psf). Cobbles and/or construction debris obstructions were encountered at depths of 9-1/2 feet, 16-1/2 feet, 18-1/2 feet and at 21 feet during drilling operations.

Stone School Road (Appendix B)

Road gravel fill, consisting of sandy gravel, is present at the ground surface of soil borings B-02 through B-05 and B-07. The road gravel fill is medium compact with Standard Penetration Test (SPT) N-values of 15 and 30 blows per foot (bpf). Approximately 4 to 16 inches of topsoil is present at the ground surface of soil borings B-01, B-06 and B-08 through B-12.

Native sand and gravelly sand underlie the fill in soil borings B-03, B-04 and B-05, and extend to depths ranging from 3 to 11-1/2 feet. The upper native granular soils are generally loose to medium compact with SPT N-values ranging from 6 to 13 bpf.

Native silty clay underlies the native granular soils in these soil borings and to depths ranging from 9 feet to the explored depths of 15 feet in soil borings B-01 through B-04 and B-06 through B-12. The silty clay is medium to hard in consistency with natural moisture contents ranging from 13 to 20 percent and unconfined compressive strengths ranging between 2,000 and 9,000 psf.

Peat is present from 8 to 18 feet in soil boring B-03, from 17 to 27 feet in soil boring B-04, and from 3 to 6 feet in soil boring B-05. Silty clay marl underlies the peat, and extends to a depths ranging from to 8 to 37-1/2 feet. The peat and marl are generally very soft to soft in consistency, with natural moisture contents ranging from 46 to 495 percent and unconfined compressive strengths of up to 500 psf.

Silty sand and sand underlie the marl in soil borings B-05 and silty clay in soil borings B-10 and B-11, and extend to the explored depths of 15 feet. The silty sand and sand are very loose to medium compact, with SPT N-values ranging between 4 and 17 bpf.

Devonshire/Londonderry/Belmont Road (Appendix C)

The pavement section at the soil boring locations is generally comprised of 4 to 6-1/2 inches if bituminous concrete over 8-1/2 to 31 inches of aggregate base, however; no aggregate base was encountered within soil boring B-4.

Silty sand fill underlies the pavement section in soil boring B-03, and extends to a depth of 2-1/2 feet. The silty sand fill soil is medium compact with an SPT N-value of 12 bpf. Silty clay and sandy clay fill are present beneath the pavement section in soil borings B-1 and B-2, and extend to depths of 3 and 8 feet, respectively. The cohesive fill soils are medium to stiff in consistency with natural moisture contents ranging from 14 to 15 percent and unconfined compressive strengths ranging from 2,000 to 2,500 psf.

Native silty sand and sand are present beneath the fill soils within borings B-5 and B-6, and extend to a depth of 6 feet in boring B-5 and to the explored depth of 10 feet in boring B-6. The native granular soils are loose in compactness with SPT N-values ranging from 6 to 7 bpf.

Native sandy clay and silt underlie the fill soils within borings B-1 through B-4 and the native silty sand in boring B-5. The native cohesive soils are generally medium to very stiff in consistency with natural moisture contents ranging from 8 to 22 percent and unconfined compressive strengths ranging from 1,500 to 7,000 psf, however; the silty clay below a depth of 9 feet in boring B-3 is hard in consistency with a natural moisture content of 9 percent and an unconfined compressive strength in excess of 9,000 psf.

Wheeler Park (Appendix D)

Approximately 11 to 15 inches of topsoil is present at the ground surface. Alternating layers of granular and cohesive fill soils are present beneath the topsoil and extend to a depth of 8 feet in boring B-1 and to a depth of 6-1/2 feet within boring B-2. The cohesive fill soil consists of very soft to medium consistency silty clay, with moisture contents ranging between 12 and 55 percent and an organic matter content of 17.4 percent. The granular fill soils consist of loose to medium compact silty sand and sand,

with SPT N-values ranging between 5 and 27 bpf.

Peat is present beneath the fill within boring B-2 between the depths of 6-1/2 and 7 feet. The peat is very soft in consistency, with a moisture content of 117 percent and an organic matter content of 30.5 percent.

Native sandy clay is present beneath the fill soils, and extends to the explored depth of 10 feet in boring B-1 and to a depth of 9-1/2 feet in boring B-2. The native sandy clay is soft to stiff in consistency, with natural moisture contents of 11 and 24 percent and an unconfined compressive strength of 1,000 psf.

Native sand is present beneath the native sandy clay in boring B-2, and extends to the explored depth of 10 feet. The native sand is medium compact, with an SPT N-value of 27 bpf.

### Lawrence Street (Appendix E)

The pavement section at the soil boring locations consists of 3 to 5 inches of bituminous concrete overlying 4 to 5 inches of Portland cement concrete. No aggregate base was observed beneath the pavement.

Sandy clay and silty clay fill soils are present beneath the pavement section and extend to depths ranging between 2-1/2 and 3-3/4 feet. The cohesive fill is soft to stiff in consistency, with unconfined compressive strengths ranging between 1,000 and 2,500 psf.

Silty sand and sand fill soils are present beneath the cohesive fill soils and extend to the explored depth of 10 feet. The granular fill soils are very loose to compact, with SPT N-values ranging between 3 and 44 bpf.

## GROUNDWATER CONDITIONS

The following table summarizes groundwater measurements that were taken during and upon completion of drilling operations at the various sites.

| Site | Groundwater Depth Range, ft | |
|---|---|---|
| | During Drilling Operations | Upon Completion of Drilling Operations |
| Fuller Street | NE | NE |
| Stone School Road | 3 to 14 | 4 to 14-3/4 |
| Devonshire/Londonderry/Belmont Roads | 5 to 8-1/2 | NE |
| Wheeler Park | 5 to 8 | 4-2/3 to 5-1/3 |
| Lawrence Street | NE | NE |

NE – Not Encountered

Fluctuations in perched and long term groundwater levels should be anticipated due to seasonal variations and following periods of prolonged precipitation. It should also be noted that groundwater observations made during drilling operations in predominantly cohesive soils are not necessarily indicative of the static groundwater level. This is due to the low permeability of such soils and the tendency of drilling operations to seal off the natural paths of groundwater flow.

## PAVEMENT RECOMMENDATIONS

### General

No specific details were provided regarding the anticipated nature of the proposed rehabilitation of the existing roadways. In addition, no data were provided indicating the type and frequency of anticipated traffic. We assume that rehabilitation will generally include overlays; however, there may be areas where

full depth patching or primary pavement surface replacement is justified.

We recommend that all pavement materials meet the property, quality and placement specifications described within the 2012 Standard Specifications for Construction from the Michigan Department of Transportation (MDOT).

## Existing Pavement and Subgrade Conditions

The following table presents a summary of the existing pavement and subgrade soil conditions encountered within each of our soil borings performed within existing roadways. The subgrade soil information focuses on the upper few feet of fill or native soils directly beneath the existing pavement and aggregate base sections. The table also presents the estimated subgrade soil resilient modulus ($M_R$) values recommended for use in pavement design. The $M_R$ values may be used to perform pavement calculations for overlay and replacement options based on AASHTO design criteria.

| | | Pavement Section Thicknesses (in) | | | Subgrade Conditions | | | |
|---|---|---|---|---|---|---|---|---|
| Site | Boring(s) | HMA | PCC | AB | Soil Type | N (bpf) | UC (psf) | $M_R$ (ksi) |
| Fuller | FS-2 | 7-1/2 | NE | NE | Silty Sand | 31 | | 8.0 |
| Stone School | B-2 & B-7 | NE | NE | 22 & 6 | Silty Clay | | 5,000 & 8,500 | 4.0 |
| Stone School | B-3 to B-5 | NE | NE | 12 to 42 | Sand | 6 to 12 | | 3.5 |
| Londonberry | B-1 & B-2 | 6-1/2 | NE | 8-1/2 & 10-1/2 | Sandy Clay & Silty Clay | | 2,000 & 2,500 | 2.5 |
| Belmont | B-3 | 3 | NE | 13 | Silty Sand | 12 | | 3.5 |
| Devonshire | B-4 | 6 | NE | NE | Silty Clay | | 5,500 | 4.0 |
| Devonshire | B-5 & B-6 | 5 | NE | 31 & 25 | Silty Sand | 7 | | 4.0 |
| Lawrence | B-1 to B-4 | 3 to 5 | 4 to 5 | NE | Sandy Clay & Silty Clay | | 1,000 to 2,000 | 2.0 |

Table Key
HMA – Hot-Mix Asphalt
PCC – Portland Cement Concrete
AB – Aggregate Base
N – SPT N-value
UC – Unconfined compressive Strength
$M_R$ – Subgrade Resilient Modulus (recommended value)

## Bituminous Pavement Overlay

Where a bituminous pavement overlay is proposed, a minimum of 1-1/2 inches of the existing bituminous concrete should be milled. Following milling operations, the milled pavement should be thoroughly inspected for any visible cracks or joints in the pavement surface that are wider than 1/8 inch. All cracks wider than 1/8 inch should be cleaned and filled with hot-applied bituminous crack filler.

Any areas of the pavement that exhibit excessive fatigue cracking or deterioration should be removed and replaced with new full-depth bituminous pavement section in accordance with the recommendations presented in the next section of this report entitled Pavement Reconstruction. The excessively cracked or deteriorated bituminous pavement areas should be saw-cut at least 2 feet laterally beyond the limits of the affected area. The pavement and underlying aggregate base should then be excavated to expose the subgrade soils.

After saw cutting and removing the existing pavement and aggregate base, the exposed subgrade soils should be evaluated for stability. Unsuitable areas, exhibiting low strength, saturation, or excessive instability, such as rutting or pumping, should be removed by undercutting to expose stable subgrade

soils. Any resulting undercut areas should be backfilled with MDOT Class II granular engineered fill and the appropriate thickness of new aggregate base. All engineered fill and aggregate base should be compacted to a density of at least 95 percent of the maximum density obtainable by the Michigan Cone method of testing.

Prior to placing the leveling course of bituminous mixture, a tack coat should be applied to the sides of the saw-cut pavement. The bituminous MDOT leveling course layer may be placed and compacted to level with the milled surface. A minimum 1-1/2-inch bituminous overlay should be constructed per MDOT requirements and using MDOT approved bituminous wearing course materials.

### Pavement Reconstruction

Where full-depth patching or pavement reconstruction are proposed or required, the existing bituminous concrete or Portland cement concrete pavement should be removed and disposed of off-site. If the underlying aggregate base (where present) is to be reused, the exposed base course layer should be evaluated in-place for stability before reconstructing the new hot-mix asphalt pavement surface. If the aggregate base is to be replaced as well, the underlying subgrade soils should be evaluated for stability after removal of the existing aggregate base. The aggregate base and/or subgrade soils should be thoroughly proof rolled using a loaded rubber-tired tandem-axle dump truck. Unsuitable areas exhibiting excessive instability, such as rutting and/or pumping, should be removed by undercutting to expose stable soils. We recommend that undercut excavations be backfilled with MDOT Class II granular engineered fill.

Depending on the time of year or changes in weather, the upper cohesive soils present below many of the existing roadways may become saturated and unstable under the load of construction vehicles. We recommend, therefore, that pavement improvements be performed during dry periods of the summer months to minimize groundwater penetration into the sensitive cohesive subgrade soils. If pavement construction occurs in the spring or fall, additional quantities of undercutting should be budgeted.

All proof rolling and any required undercutting operations should be observed by a qualified Geotechnical Engineer or Technician. All engineered fill and aggregate base should be placed within 3 percent of the optimum moisture content and compacted to a density of at least 95 percent of the maximum density determined by the Michigan Cone method of testing. Engineered fill lift thicknesses should not exceed 9 inches. Frozen material should not be used as fill, nor should fill be placed on a frozen subgrade.

Any required aggregate base should consist of MDOT 21AA dense-graded material. All hot-mix asphalt materials should consist of currently approved MDOT bituminous base, leveling and wearing course mixtures. Bituminous pavement placement rates, temperatures and compaction limits shall follow current MDOT specifications.

### Pavement Drainage

In consideration of the existing cohesive subgrade soils along some of the roadways, proper drainage is considered to be an important consideration for pavement performance, regardless of the chosen rehabilitation option. We recommend any existing drains be evaluated for functionality and upgraded or replaced as needed. If edge drains are not present, we recommend they be provided along the down-slope perimeter of curbs to remove any collected water from the aggregate base. Such drains could be connected to nearby catch basins or discharged to properly constructed slope drain outlets. We recommend finger drains be provided at all catch basin locations. A minimum of four (4) finger drains should extend a minimum of 20 feet outward from each catch basin.

The pavement surface and pavement subgrade should be properly sloped to promote effective surface and subsurface drainage and prevent water from ponding. In addition, we recommend the surrounding greenbelt areas be properly sloped to prevent water from ponding at the pavement edge.

### Pavement Maintenance

Regular timely maintenance should be performed on the bituminous pavements to reduce the potential deterioration associated with moisture infiltration through surface cracks. We anticipate the existing pavements would have lasted longer and been in better condition if crack seal maintenance had occurred as required. The observed distress is typical of pavements in which water has entered through cracks and saturated the aggregate base and subgrade soils. To keep the new and overlaid pavements in good condition and extend their life span, the owner should be prepared to seal the cracks with a hot-applied elastic crack filler as soon as possible after cracking develops and as often as necessary to block the passage of water to the subgrade soils.

## PIPELINE RECOMMEDATIONS

### General

Based on the observed subsurface conditions, open-cut pipeline construction methods would generally be possible along most of the proposed pipeline alignments where the existing groundwater is at least two (2) feet deeper than the proposed trench bottom, and where existing adjacent or overlying utilities and structures would not require complex relocation or supplementary support. Where such adverse conflicts exist, we recommend consideration be given to the use of alternative trenchless pipeline installation methods such as directional drilling.

Proposed pipelines may be supported on soils that consist of loose granular soils or better or medium consistency cohesive soils or better. Where the pipeline invert would bear on very loose granular soils or soft to medium consistency cohesive soils, we recommend these soils be undercut a minimum of 2 additional feet to allow the placement of 2 feet of granular engineered fill to support the pipeline. Where the pipeline invert would bear on or within 2 feet above peat, marl or very soft consistency cohesive soils, we recommend these deposits be completely undercut to expose stable soils and backfilled with granular engineered fill to support the pipeline.

We recommend all earthwork operations be performed in accordance with comprehensive specifications and that the earthwork be properly monitored in the field by qualified personnel under the direction of a licensed engineer. Any dewatering or shoring designs provided by the contractor should be prepared and stamped by a licensed engineer with extensive experience in the design of such systems.

### Temporary Construction Dewatering

It should be anticipated that groundwater seepage will occur within any temporary excavations that extend below the encountered water table. Unless trenchless pipeline installation methods are used, it will be necessary to temporarily lower the groundwater table or cut off water flow in order to construct the pipeline and any associated manhole structures under dry conditions at the Stone School, Devonshire/Londonberry/Belmont and Wheeler Park sites. Where the existing groundwater is present above the proposed excavation depth or within two feet below the bottom of excavation elevation, the groundwater table needs to be lowered prior to excavation.

A perimeter well-point dewatering system may be suitable for dewatering where permeable granular soils are present beneath the proposed pipeline inverts, but will likely not be effective where fine-grained soils are present. Well-point dewatering is the preferred method of dewatering, where feasible, since, it will allow adequate stabilization and preparation of the trench invert soils prior to pipeline installation and backfilling.

We recommend that well points be installed to lower the groundwater level prior to beginning excavation operations. The groundwater level should be lowered to at least 2 feet below the expected depth of excavation. The well points should be installed by a qualified dewatering contractor. The spacing of the well points will depend on the depth of the wells points, the size of the pump that will be used, and the

effective hydraulic conductivity of the soils being dewatered. The dewatering contractor should perform pump tests to determine the hydraulic conductivity of the soils.

Where well points prove to be ineffective, or if predominantly cohesive soils are encountered beneath the pipeline, we anticipate minor groundwater accumulated within trench excavations can be reasonably controlled by pumping collected seepage water from properly constructed sumps. Sump pits should be constructed near the perimeter of the trench excavation beyond the supporting subgrade for the pipeline. It is preferable that sump pits be constructed at low elevation points along the alignment and that trenching progress upslope to allow seepage water to freely collect at sump locations. Water should not be allowed to pond in uncontrolled, non-sump pit areas.

### Temporary Excavations, Shoring, and Slopes

It should generally be expected that vertical or near-vertical excavations would be unstable where granular soils, peat, marl, very soft to soft cohesive soils and/or where seepage are encountered. Where sufficient space is available, temporary unsurcharged trench sides could be sloped back. Temporary unsurcharged slopes may be cut at ¾:1 (horizontal:vertical) in the very stiff to hard cohesive soils, 1:1 in medium to stiff cohesive soils, 1:1 in compact granular soils, 1-1/4:1 in medium compact granular soils and 1-1/2:1 in loose granular soils above groundwater. Where seepage from excavation cuts is observed, the slopes will need to be flattened sufficiently to achieve stability, but in no case left steeper than 2:1 at and below the seepage level. The tops of the slopes should be barricaded to prevent vehicles and storage loads. If the temporary construction embankments are to be maintained during the rainy season, berms are suggested along the tops of the embankments to prevent runoff water from entering the excavation and eroding the slope faces. The soils exposed in slope faces should be inspected by our personnel so that modifications of the slopes may be made if variations in the soil or water conditions occur. Sloped excavations are not recommended where excavations will extend through or within 3 feet above peat, marl or very soft cohesive soil deposits.

When sloped excavations are not possible, shoring will be required to support vertical cuts. For design of braced or tied-back shoring, we recommend the use of a rectangular distribution of lateral earth pressure. It may be assumed that retained medium compact to compact granular soils or stiff to hard consistency cohesive soils with a level surface behind the braced shoring will exert a lateral pressure equal to 26H in pounds per square foot (psf), where H is the height of the shoring in feet. It may be assumed that retained very loose to loose granular soils or soft to medium consistency cohesive soils with a level surface behind the braced shoring will exert a lateral pressure equal to 30H psf. It may be assumed that retained peat, marl and very soft consistency cohesive soils with a level surface behind the braced shoring will exert a lateral pressure equal to 35H psf. Where shoring extends below the water table, an additional triangular distribution of hydrostatic pressure should be added to the design lateral load.

For design of cantilevered shoring, a triangular distribution of lateral earth pressure (active earth pressure) may be used. It may be assumed that the retained medium compact to compact granular soils and stiff to hard consistency cohesive soils with a level surface behind the cantilevered shoring will exert a lateral pressure equal to that developed by a fluid with a density of 35 pounds per cubic foot (pcf) for soils above water level and 85 pcf below water level. It may be assumed that the retained very loose to loose granular soils and soft to medium consistency cohesive soils with a level surface behind the cantilevered shoring will exert a lateral pressure equal to that developed by a fluid with a density of 40 pcf for soils above water level and 95 pcf below water level. It may be assumed that the retained peat, marl and very soft consistency cohesive soils with a level surface behind the cantilevered shoring will exert a lateral pressure equal to that developed by a fluid with a density of 45 pcf for soils above water level and 105 pcf below water level.

The passive resistance of medium compact to compact granular soils and stiff to hard consistency cohesive soils below the excavation level may be assumed to be equivalent to a fluid with a density of 250 pcf up to a maximum of 2,500 psf. The passive resistance of very loose to loose granular soils and

soft to medium consistency cohesive soils below the excavation level may be assumed to be equivalent to a fluid with a density of 175 pcf up to a maximum of 1,750 psf. The passive resistance of peat, marl and very soft consistency cohesive soils below the excavation level may be assumed to be equivalent to a fluid with a density of 50 pcf up to a maximum of 500 psf. If construction traffic or material storage is allowed within 7 feet of the excavation, a uniform lateral pressure of 100 pounds per square foot should be added to the design lateral load.

If some lateral deflection of adjacent soils can be tolerated, such as in open areas, trench-box shoring may be used. If a trench box is used, excavation should be performed from within the trench box, such that no unsupported vertical cut is allowed to exist. A trench box is not recommended where adjacent utilities, roadways or structures are located less than a lateral distance delineated by a plane extending upward from the bottom edges of the excavation at a 1:1 slope.

All excavations should be safely sheeted, shored, sloped or braced in accordance with MI-OSHA requirements. If material is stored or equipment is operated near an exaction, stronger shoring must be used to resist the extra pressure due to the superimposed loads. Care should always be exercised when excavating near existing roadways or utilities to avoid undermining. In no case should excavations extend below the level of adjacent existing structures or utilities unless underpinning is planned.

### Backfill

We recommend the proposed pipelines be bedded on aggregate base or granular engineered fill placed to a minimum of 6 inches below the pipe invert. After the pipe is placed on the bedding material, the remainder of the trench may be backfilled.

Clean granular fill should be used to backfill the pipe (pipe shading sand) and to a minimum of 12 inches above the pipe. The on-site granular soils identified as “Sand” or “Sand with trace gravel” on the soil boring logs are considered suitable for use as shading sand. The first lift of shading sand should be placed up to the spring-line of the pipe. The initial lift should be compacted using light-duty compaction equipment, such as a walk-behind vibratory plate compactor, and in a manner that will not disturb the pipe alignment. The next lift of shading fill may then be placed to 12 inches above the top of the pipe. Again, light-duty compaction equipment should be used to complete the compaction of the shading fill. No specific degree of compaction is required; however, the shading sand should be compacted to a relatively firm and unyielding condition.

After the shading sand has been placed and compacted, the remainder of the trench may be backfilled using on-site, non-organic, excavated soils provided they are placed in an engineered manner. The trench backfill above the shading fill should be placed in loose layers not to exceed 12 inches in thickness and mechanically compacted to at least 95 percent of the material’s maximum density, as determined by the Michigan Cone method of testing.

## GENERAL COMMENTS

We have formulated the evaluations and recommendations presented in this report on the basis of data provided to us relating to the project location, type of structure, and surface grade for the proposed site. Any significant change in this data should be brought to our attention for review and evaluation with respect to prevailing subsurface conditions. Furthermore, if changes occur in the design, location, or concept of the project, conclusions and recommendations contained in this report are not valid unless G2 Consulting Group, LLC reviews the changes. G2 Consulting Group, LLC will then confirm the recommendations presented herein or make changes in writing.

The scope of the present investigation was limited to evaluation of subsurface conditions for the support of the proposed improvements and other related aspects of the project. No chemical, environmental, or hydrogeological testing or analyses were included in the scope of this investigation.

We base the analyses and recommendations submitted in this report upon the data from the soil boring performed at the approximate location shown on the respective soil boring location plans. This report does not reflect variations that may occur between the actual boring location and the actual structure locations. The nature and extent of any such variations may not become clear until the time of construction. If significant variations then become evident, it may be necessary for us to re-evaluate our report recommendations.

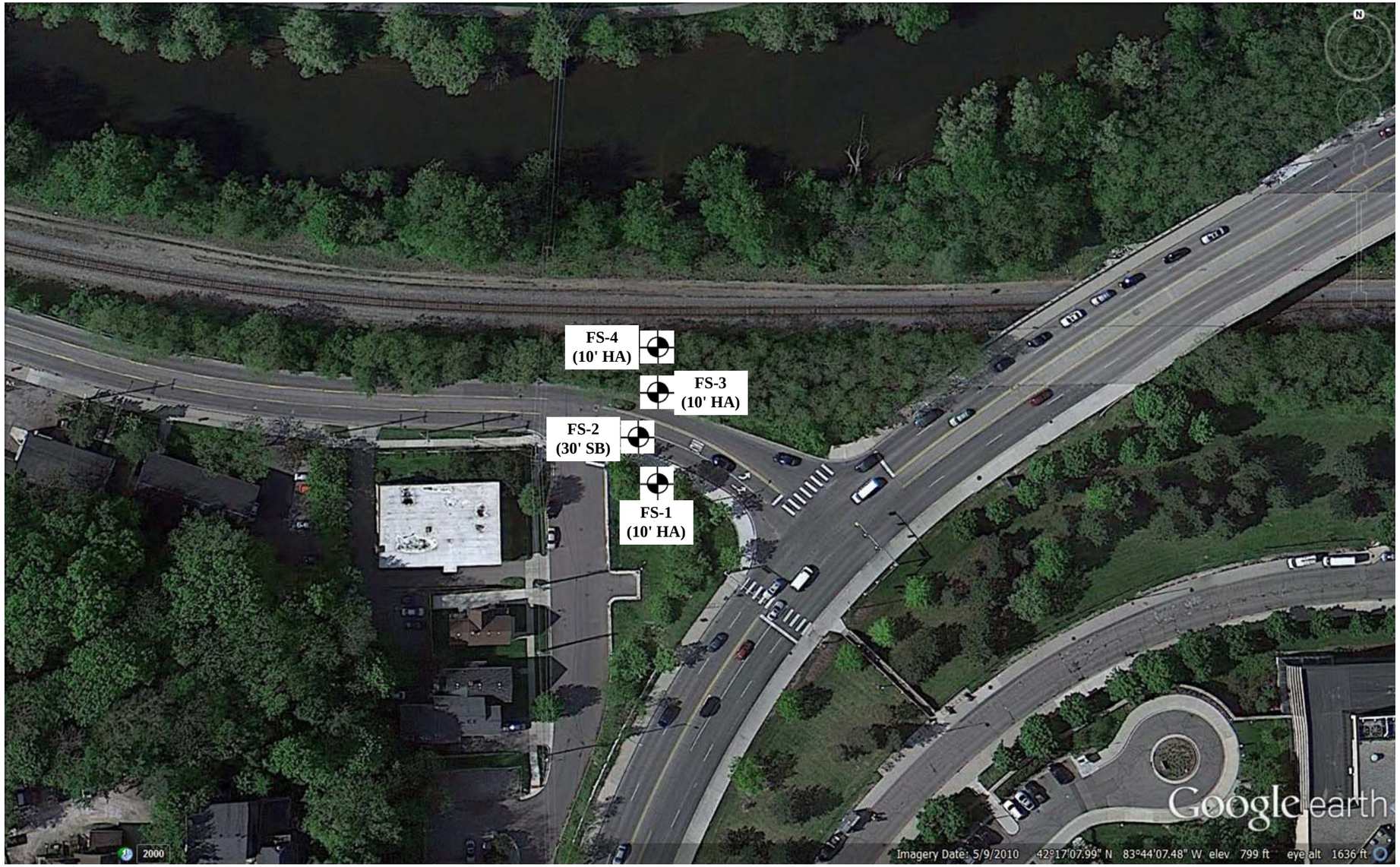
We recommend G2 Consulting Group, LLC observe all geotechnical related work, including utility trench excavation, subgrade preparation, and engineered fill placement. G2 Consulting Group, LLC will perform the appropriate testing to confirm the geotechnical conditions given in the report are found during construction.

## APPENDICES

APPENDIX A – FULLER STREET
APPENDIX B – STONE SCHOOL ROAD
APPENDIX C – DEVONSHIRE/LONDONBERRY/BELOMONT ROADS
APPENDIX D – WHEELER PARK
APPENDIX E – LAWRENCE STREET
APPENDIX F – GENERAL NOTES

## APPENDIX A – FULLER STREET

| | |
|---|---|
| Soil Boring Location Plan | Plate No. 1 |
| Soil Boring Logs | Figure No. 1 through 4 |




## Legend

Soil Borings Drilled by West Michigan Drilling, Inc. between May 23rd, 2014 and May 27th, 2014.

**Soil Boring Location Plan**

Ann Arbor Soil Borings
Fuller Street
Ann Arbor, Michigan

G2 CONSULTING GROUP
1866 Woodslee Street
Troy, Michigan 48083

| | |
|---|---|
| Project No. 130744 | |
| Drawn by: MGD | |
| Date: 5/8/2014 | Plate No. 1 |
| Scale: NTS | |

Project Name: Ann Arbor Soil Borings

Project Location: Fuller Street
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. FS-1

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Topsoil: Dark Brown Silty Sand with trace gravel and roots (7 inches) 0.6 | | AS-1 | | | | | |
| | | Fill: Brown Silty Sand with trace clay and gravel | | AS-2 | | | | | |
| | | 3.0 | | AS-3 | | | | | |
| | | End of Boring @ 3 ft, Auger Refusal | | | | | | | |
| 5 | | | 5 | | | | | | |
| 10 | | | 10 | | | | | | |
| 15 | | | 15 | | | | | | |
| 20 | | | 20 | | | | | | |
| 25 | | | 25 | | | | | | |

Total Depth: 3 ft
Drilling Date: May 24, 2014
Inspector: M. Dagher, EIT
Contractor: G2 Consulting Group, LLC
Driller: M. Dagher, EIT

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Drilling Method:
3-inch diameter hand auger

Figure No. 1

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - FULLER STREET.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/9/15

Project Name: Ann Arbor Soil Borings

Project Location: Fuller Street
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. FS-2

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Bituminous Concrete (7-1/2 inches) 0.6 | | | | | | | |
| | | Fill: Compact Brown Silty Sand with trace gravel | | S-1 | 10<br>17<br>14 | 31 | | | |
| | | 3.7 | | | | | | | |
| 5 | | Fill: Very Stiff Dark Gray Sandy Clay with trace gravel 5.0 | 5 | S-2 | 4<br>4<br>7 | 11 | 13.0 | | 4500* |
| | | Fill: Stiff Brown and Gray Silty Clay with trace sand and gravel | | S-3 | 3<br>5<br>6 | 11 | 10.6 | | 4000* |
| | | 8.5 | | | | | | | |
| | | Fill: Stiff Yellowish Brown Sandy Clay with trace gravel | | S-4A | 4<br>3<br>--- | --- | 11.2 | | 3000* |
| 10 | | (Borehole offset 25 feet SE due to obstruction @ 9-1/2 feet) 10.0 | 10 | S-4B | 4<br>4<br>4 | 8 | 12.1 | | 4000* |
| | | Fill: Medium Compact Brown Silty Sand with trace clay and gravel | | S-5A | 3<br>5<br>20 | 25 | | | |
| 15 | | 15.0 | 15 | | | | | | |
| | | (Cobbles @ 16-1/2 feet) | | S-5B | 50/0" | --- | | | |
| | | Fill: Very Compact Brown Sand (Cobbles @ 18-1/2 feet) | | S-6 | 47<br>30<br>37 | 67 | | | |
| 20 | | | 20 | | | | | | |
| | | 21.0 (Auger Refusal @ 21 feet) | | | | | | | |
| | | End of Boring @ 21 ft, Auger Refusal | | | | | | | |
| 25 | | | 25 | | | | | | |

Total Depth: 21 ft
Drilling Date: May 23, 2014
Inspector: M. Dagher, EIT
Contractor: West Michigan Drilling
Driller: D. Amos

Drilling Method:
2-1/4 inside diameter hollow stem augers

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
Borehole offset 25 feet southeast due to traffic safety
Borehole collapsed at 18-1/2 ft after auger removal
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings and capped with cold patch

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - FULLER STREET.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/9/15

Figure No. 2

Project Name: Ann Arbor Soil Borings

Project Location: Fuller Street
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. FS-3

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Topsoil: Dark Brown Silty Sand with trace gravel and roots (10 inches) 0.8 | | AS-1 | | | | | |
| | | Fill: Dark Yellowish Brown Silty Sand with trace gravel and fine roots (Cobbles @ 2-1/2 feet) 2.5 | | AS-2 | | | | | |
| | | End of Boring @ 2.5 ft, Auger Refusal | | AS-3 | | | | | |
| 5 | | | 5 | | | | | | |
| 10 | | | 10 | | | | | | |
| 15 | | | 15 | | | | | | |
| 20 | | | 20 | | | | | | |
| 25 | | | 25 | | | | | | |

Total Depth: 2.5 ft
Drilling Date: May 24, 2014
Inspector: M. Dagher, EIT
Contractor: G2 Consulting Group, LLC
Driller: M. Dagher, EIT

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Drilling Method:
3-inch diameter hand auger

Figure No. 3

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - FULLER STREET.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/9/15

Project Name: Ann Arbor Soil Borings

Project Location: Fuller Street
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. FS-4

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Topsoil: Dark Brown Silty Sand with trace gravel and roots (0.5) | | | | | | | |
| | | Fill: Brown Sandy Clay with some gravel (1.0) | | AS-1 | | | | | |
| | | Fill: Yellowish Brown Sandy Clay with trace gravel and organic matter (Organic Matter Content = 30.5%) (2.0) | | AS-2 | | | 30.1 | | |
| | | Fill: Brown Sandy Clay with trace gravel (Cobbles @ 3 feet 3 inches) (3.3) | | AS-3 | | | 13.1 | | |
| 5 | | End of Boring @ 3 ft, Auger Refusal | 5 | | | | | | |
| 10 | | | 10 | | | | | | |
| 15 | | | 15 | | | | | | |
| 20 | | | 20 | | | | | | |
| 25 | | | 25 | | | | | | |

Total Depth: 3 ft
Drilling Date: May 27, 2014
Inspector: J. Brix
Contractor: G2 Consulting Group, LLC
Driller: J. Britz

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

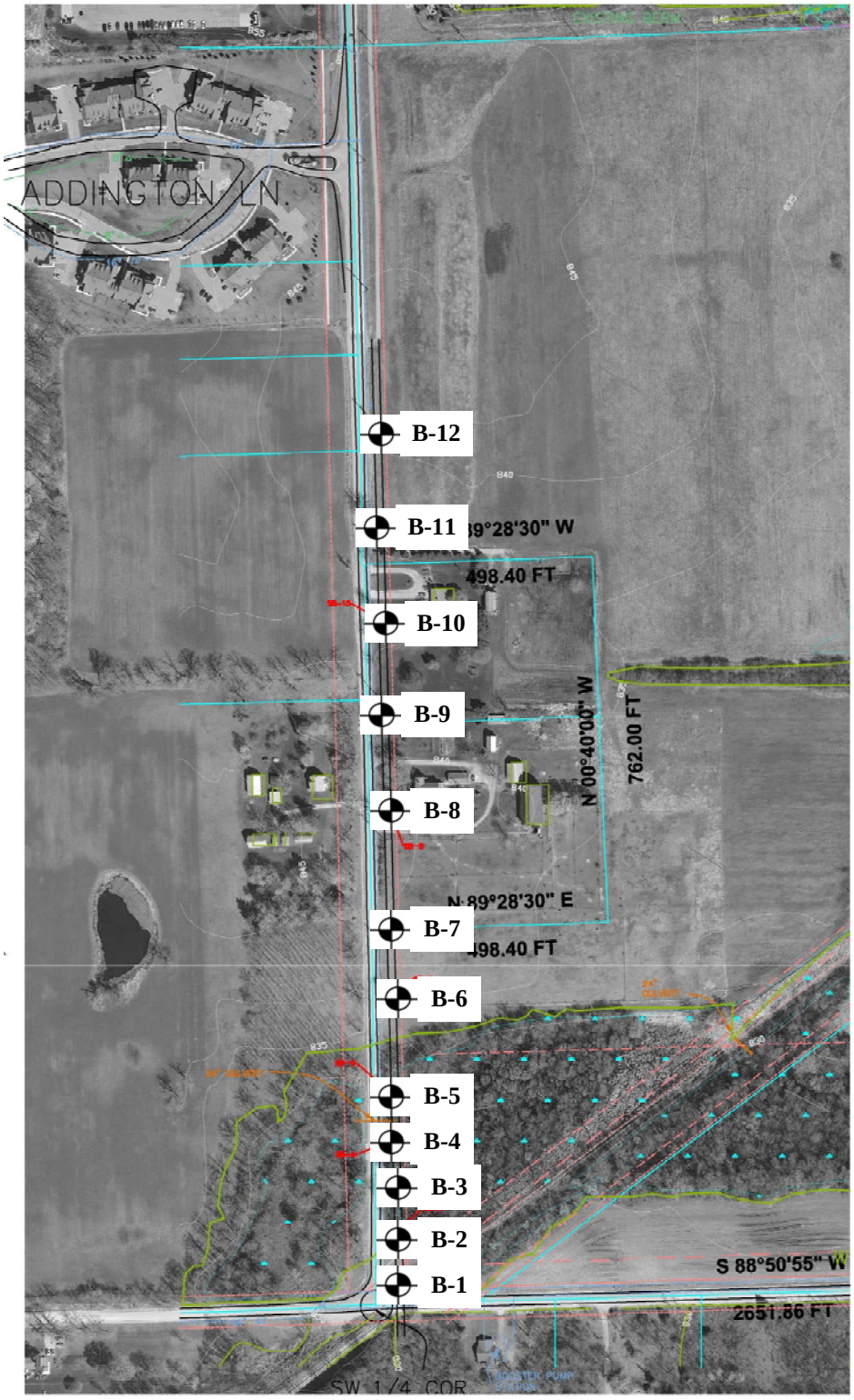
Drilling Method:
3-inch diameter hand auger

Figure No. 4

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - FULLER STREET.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/9/15

## APPENDIX B – STONE SCHOOL ROAD

| | |
|---|---|
| Soil Boring Location Plan | Plate No. 1 |
| Soil Boring Logs | Figure No. 1 through 12 |




N

## Legend

Soil Borings Drilled by West Michigan Drilling, Inc. between May 27th, 2014 and May 28th, 2014.

## Soil Boring Location Plan

Ann Arbor Soil Borings
Stone School Road
Ann Arbor, Michigan

G2 CONSULTING GROUP
1866 Woodslee Street
Troy, Michigan 48083

| | |
|---|---|
| Project No. 130744 | |
| Drawn By: MGD | |
| Date: 5/20/14 | Plate No. 1 |
| Scale: NTS | |

Project Name: Ann Arbor Soil Borings

Project Location: Stone School Road
Pittsfield Township, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-01

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Topsoil: Dark Brown Silty Clay (7 inches) 0.6 | | S-01 | 3<br>5<br>7 | 12 | 16.3 | | 9000* |
| 5 | | | 5 | S-02 | 5<br>10<br>11 | 21 | 16.3 | | 9000* |
| | | Very Stiff to Hard Brown Silty Clay with trace sand and gravel | | S-03 | 6<br>11<br>17 | 28 | 16.5 | | 9000* |
| 10 | | | 10 | S-04 | 5<br>9<br>15 | 24 | 17.7 | | 9000* |
| | | (Occasional Sand Seams) | | S-05 | 8<br>8<br>4 | 12 | 6.6 | | |
| 15 | | 15.0 | 15 | | | | | | |
| | | End of Boring @ 15 ft | | | | | | | |
| 20 | | | 20 | | | | | | |
| 25 | | | 25 | | | | | | |
| 30 | | | 30 | | | | | | |

Total Depth: 15 ft
Drilling Date: May 27, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
Groundwater observed at 14 feet during drilling operations; 13-1/2 feet upon completion

Notes:
Borehole offset 36 feet north due to presence of utilities
Borehole collapsed at 12-1/2 ft after auger removal
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Figure No. 1

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - STONE SCHOOL.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Stone School Road
Pittsfield Township, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-02

G2 CONSULTING GROUP

## SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

Fill: Light Gray Sandy Gravel (Crushed Limestone - 22 inches) — 1.8

Very Stiff to Hard Brown Silty Clay with trace sand and gravel — 4.0

Hard Dark Brown Silty Clay with trace sand and gravel — 12.0

Very Stiff to Hard Gray Silty Clay with trace sand and gravel — 15.0

End of Boring @ 15 ft

## SOIL SAMPLE DATA

| DEPTH (ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
|---|---|---|---|---|---|---|
| | S-01 | 11<br>5<br>6 | 11 | 15.4 | | 5000* |
| 5 | S-02 | 5<br>7<br>9 | 16 | 15.7 | | 9000* |
| | S-03 | 5<br>8<br>10 | 18 | 16.4 | | 9000* |
| 10 | S-04 | 4<br>6<br>8 | 14 | 19.2 | | 9000* |
| 15 | S-05 | 3<br>4<br>6 | 10 | 14.3 | | 4000* |
| 20 | | | | | | |
| 25 | | | | | | |
| 30 | | | | | | |

Total Depth: 15 ft
Drilling Date: May 28, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
No groundwater observed during drilling operations; 14-3/4 feet upon completion

Notes:
Borehole offset 42 feet west due to presence of standing water
Borehole collapsed at 13 ft after auger removal
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Figure No. 2

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - STONE SCHOOL.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Stone School Road
Pittsfield Township, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-03

CONSULTING GROUP

## SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

| DEPTH (ft) | Description | DEPTH (ft) |
|---|---|---|
| | Fill: Light Gray Sandy Gravel (Crushed Limestone - 20 inches) | |
| | 1.7 | |
| | Fill: Medium Compact Dark Brown Sandy Gravel | |
| | 3.0 | |
| 5 | Loose Brown Sand with trace gravel | 5 |
| | 5.5 | |
| | Soft Gray Silty Clay with trace sand, gravel and organic matter | |
| | 8.0 | |
| 10 | Very Soft Dark Brown Peat | 10 |
| 15 | | 15 |
| | 18.0 | |
| 20 | Soft to Medium Gray Silty Clay with trace sand, gravel and organic matter (Marl) | 20 |
| | 22.0 | |
| 25 | Medium Gray Silty Clay with trace sand and gravel | 25 |
| | 25.0 | |
| | End of Boring @ 25 ft | |
| 30 | | 30 |

## SOIL SAMPLE DATA

| SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
|---|---|---|---|---|---|
| S-01 | 16<br>8<br>7 | 15 | 5.0 | | |
| S-02 | 4<br>3<br>3 | 6 | 9.7 | | |
| S-03 | 2<br>2<br>2 | 4 | 24.8 | | 1000* |
| S-04 | 1<br>1<br>1 | 2 | 114.1 | | |
| S-05 | 2<br>0<br>18 | 18 | 495.6 | | |
| S-06 | 1<br>1<br>1 | 2 | 46.8 | | |
| S-07 | 3<br>5<br>6 | 11 | 19.9 | | 2000* |

Total Depth: 25 ft
Drilling Date: May 28, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
Groundwater observed at 3 feet during drilling operations; 8 feet upon completion

Notes:
Borehole offset 30 feet west due to presence of utilities
Borehole collapsed at 23 ft after auger removal
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Figure No. 3

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - STONE SCHOOL.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Stone School Road
Pittsfield Township, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-04

G2 CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH (ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH (ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Fill: Medium Compact Light Gray Sandy Gravel (Crushed Limestone - 42 inches) | | S-01 | 26<br>19<br>11 | 30 | 4.5 | | |
| | | 3.5 | | | | | | | |
| 5 | | Medium Compact Brown Sand with trace gravel | 5 | S-02 | 6<br>7<br>5 | 12 | 8.1 | | |
| | | 5.5 | | | | | | | |
| | | Medium Compact Brown Sand with trace clay and gravel | | S-03 | 5<br>5<br>8 | 13 | 19.2 | | |
| | | 8.0 | | | | | | | |
| 10 | | Medium Compact Brown Gravelly Sand with trace clay | 10 | S-04 | 8<br>8<br>4 | 12 | 11.0 | | |
| | | 11.5 | | | | | | | |
| 15 | | Stiff Brown Silty Clay with trace sand and gravel | 15 | S-05 | 2<br>2<br>2 | 4 | 14.6 | | 2500* |
| | | 17.0 | | | | | | | |
| 20 | | Very Soft Dark Brown Peat (Occasional Clay Layers) | 20 | S-06 | 1<br>1<br>3 | 4 | 57.9 | | 500* |
| 25 | | | 25 | S-07 | 1<br>2<br>2 | 4 | 363.8 | | |
| | | 27.0 | | | | | | | |
| 30 | | Very Soft Dark Gray Silty Clay with trace shells (Marl) | 30 | S-08 | 0<br>0<br>1 | 1 | 57.1 | | |

Total Depth: 40 ft
Drilling Date: May 28, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
Groundwater observed at 4 feet during drilling operations; 4 feet upon completion

Notes:
Borehole offset 20 feet west due to presence of utilities
Borehole collapsed at 5 ft after auger removal
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Figure No. 4a

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - STONE SCHOOL.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Stone School Road
Pittsfield Township, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-04

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| 35 | | Very Soft Dark Gray Silty Clay with trace shells (Marl) *(continued)* | 35 | S-09 | 0<br>0<br>0 | 0 | 55.3 | | |
| | | 37.5 | | | | | | | |
| 40 | | Very Stiff Brown Silty Clay with trace sand and gravel<br>40.0 | 40 | S-10 | 2<br>4<br>5 | 9 | 20.1 | | 4000* |
| | | End of Boring @ 40 ft | | | | | | | |
| 45 | | | 45 | | | | | | |
| 50 | | | 50 | | | | | | |
| 55 | | | 55 | | | | | | |
| 60 | | | 60 | | | | | | |

Total Depth: 40 ft
Drilling Date: May 28, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
Groundwater observed at 4 feet during drilling operations; 4 feet upon completion

Notes:
Borehole offset 20 feet west due to presence of utilities
Borehole collapsed at 5 ft after auger removal
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Figure No. 4b

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - STONE SCHOOL.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Stone School Road
Pittsfield Township, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-05

G2 CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH (ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH (ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Fill: Light Gray Sandy Gravel (Crushed Limestone - 12 inches) 1.0 | | | | | | | |
| | | Loose Brown Sand with trace clay and gravel 3.0 | | S-01 | 7 5 4 | 9 | 11.0 | | |
| 5 | | Soft Dark Brown Peat | 5 | S-02 | 2 1 2 | 3 | 57.2 | | |
| | | 6.0 | | | | | | | |
| | | Soft Brown and Gray Silty Clay with trace shells (Marl) | | S-03 | 2 1 2 | 3 | 127.2 | | |
| | | 8.0 | | | | | | | |
| | | Very Loose Gray Silty Sand with trace gravel 9.5 | | | | | | | |
| 10 | | | 10 | S-04 | 4 1 3 | 4 | 14.6 | | |
| | | Loose Gray Silty Sand with trace clay and gravel | | | | | | | |
| 15 | | 15.0 | 15 | S-05 | 3 3 3 | 6 | 10.2 | | |
| | | End of Boring @ 15 ft | | | | | | | |
| 20 | | | 20 | | | | | | |
| 25 | | | 25 | | | | | | |
| 30 | | | 30 | | | | | | |

Total Depth: 15 ft
Drilling Date: May 28, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
Groundwater observed at 8 feet during drilling operations; 10 feet upon completion

Notes:
Borehole offset 20 feet west due to presence of utilities
Borehole collapsed at 10-1/2 ft after auger removal

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Figure No. 5

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - STONE SCHOOL.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Stone School Road
Pittsfield Township, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-06

G2 CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH (ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH (ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Topsoil: Dark Brown Silty Clay with trace gravel (5 inches) 0.4 | | | | | | | |
| | | Very Stiff to Hard Brown Silty Clay with trace sand and gravel | | S-01 | 3 5 5 | 10 | 23.1 | | 4000* |
| | | 4.0 | | | | | | | |
| 5 | | | 5 | S-02 | 6 11 12 | 23 | 14.8 | | 9000* |
| | | | | S-03 | 5 9 11 | 20 | 14.3 | | 9000* |
| 10 | | Very Stiff to Hard Brown Silty Clay with trace sand | 10 | S-04 | 6 9 13 | 22 | 13.8 | | 9000* |
| | | 14.0 | | | | | | | |
| 15 | | Very Stiff Gray Silty Clay with trace sand and gravel 15.0 | 15 | S-05 | 4 6 8 | 14 | 18.0 | | 4500* |
| | | End of Boring @ 15 ft | | | | | | | |
| 20 | | | 20 | | | | | | |
| 25 | | | 25 | | | | | | |
| 30 | | | 30 | | | | | | |

Total Depth: 15 ft
Drilling Date: May 27, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
Borehole offset 10 feet south and 6 feet east due to utilities
Borehole collapsed at 13 ft after auger removal
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Figure No. 6

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - STONE SCHOOL.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Stone School Road
Pittsfield Township, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-07

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH (ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH (ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Fill: Light Gray Sandy Gravel (Crushed Limestone - 6 inches) 0.5 | | S-01 | 4<br>5<br>7 | 12 | 17.2 | | 8500* |
| 5 | | | 5 | S-02 | 5<br>11<br>13 | 24 | 15.1 | | 9000* |
| | | Hard Brown Silty Clay with trace sand and gravel | | S-03 | 6<br>9<br>13 | 22 | 13.3 | | 9000* |
| 10 | | | 10 | S-04 | 5<br>9<br>14 | 23 | 16.0 | | 9000* |
| | | 12.5<br>Very Stiff Gray Silty Clay with trace sand and gravel | | S-05 | 4<br>6<br>8 | 14 | 15.0 | | 7500* |
| 15 | | 15.0 | 15 | | | | | | |
| | | End of Boring @ 15 ft | | | | | | | |
| 20 | | | 20 | | | | | | |
| 25 | | | 25 | | | | | | |
| 30 | | | 30 | | | | | | |

Total Depth: 15 ft
Drilling Date: May 28, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
Borehole offset 25 feet west due to presence of steep grade
Borehole collapsed at 12 ft after auger removal
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Figure No. 7

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - STONE SCHOOL.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Stone School Road
Pittsfield Township, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-08

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Topsoil: Dark Brown Silty Sand with trace gravel (16 inches) 1.3 | | | | | | | |
| | | | | S-01 | 3 4 5 | 9 | 18.6 | | 5000* |
| 5 | | | 5 | S-02 | 5 8 11 | 19 | 14.8 | | 8500* |
| | | | | S-03 | 6 8 13 | 21 | 16.3 | | 8500* |
| | | Very Stiff to Hard Brown Silty Clay with trace sand and gravel | | | | | | | |
| 10 | | | 10 | S-04 | 5 7 10 | 17 | 18.5 | | 8500* |
| | | | | S-05 | 4 7 9 | 16 | 18.2 | | 8000* |
| 15 | | 15.0 | 15 | | | | | | |
| | | End of Boring @ 15 ft | | | | | | | |
| 20 | | | 20 | | | | | | |
| 25 | | | 25 | | | | | | |
| 30 | | | 30 | | | | | | |

Total Depth: 15 ft
Drilling Date: May 28, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
Borehole offset 20 feet north due to presence of overhead tree
Borehole collapsed at 15 ft after auger removal
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Figure No. 8

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - STONE SCHOOL.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Stone School Road
Pittsfield Township, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-09

G2 CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Topsoil: Dark Brown Silty Clay (6 inches) 0.5 | | S-01 | 4 3 4 | 7 | 17.7 | | 5500* |
| 5 | | | 5 | S-02 | 4 5 7 | 12 | 16.2 | | 8000* |
| | | | | S-03 | 4 5 7 | 12 | 16.0 | | 8000* |
| | | Very Stiff Brown Silty Clay with trace sand and gravel | | | | | | | |
| 10 | | | 10 | S-04 | 4 6 6 | 12 | 8.6 | | |
| | | | | S-05 | 5 4 3 | 7 | 7.1 | | |
| 15 | | 15.0 | 15 | S-06 | 3 4 3 | 7 | 8.4 | | |
| | | End of Boring @ 15 ft | | | | | | | |
| 20 | | | 20 | | | | | | |
| 25 | | | 25 | | | | | | |
| 30 | | | 30 | | | | | | |

Total Depth: 15 ft
Drilling Date: May 27, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
Borehole offset 18 feet north and 5 feet east due to utilities
Borehole collapsed at 13 ft after auger removal
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Figure No. 9

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - STONE SCHOOL.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Stone School Road
Pittsfield Township, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-10

CONSULTING GROUP

## SUBSURFACE PROFILE

## SOIL SAMPLE DATA

| DEPTH (ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH (ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
|---|---|---|---|---|---|---|---|---|---|
| | | Topsoil: Dark Brown SIlty Clay with trace sand and gravel (6 inches) 0.5 | | S-01 | 3 4 5 | 9 | 24.0 | | 4000* |
| 5 | | | 5 | S-02 | 6 7 9 | 16 | 15.9 | | 4000* |
| | | Very Stiff to Hard Brown Silty Clay with trace sand and gravel | | S-03 | 5 10 12 | 22 | 18.0 | | 8500* |
| 10 | | | 10 | S-04 | 5 10 12 | 22 | 18.2 | | 8500* |
| | | 12.5 Medium Compact Brown Sand with trace gravel | | | | | | | |
| 15 | | 15.0 | 15 | S-05 | 8 8 9 | 17 | 3.4 | | |
| | | End of Boring @ 15 ft | | | | | | | |
| 20 | | | 20 | | | | | | |
| 25 | | | 25 | | | | | | |
| 30 | | | 30 | | | | | | |

Total Depth: 15 ft
Drilling Date: May 27, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
Borehole collapsed at 13 ft after auger removal
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Figure No. 10

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - STONE SCHOOL.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Stone School Road
Pittsfield Township, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-11

CONSULTING GROUP

## SUBSURFACE PROFILE

## SOIL SAMPLE DATA

| DEPTH (ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH (ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
|---|---|---|---|---|---|---|---|---|---|
| | | Topsoil: Dark Brown Silty Clay with trace sand and gravel (6 inches) 0.5 | | S-01 | 3 4 4 | 8 | 18.1 | | 4000* |
| 5 | | | 5 | S-02 | 5 7 9 | 16 | 17.4 | | 5500* |
| | | Very Stiff to Hard Brown Silty Clay with trace sand and gravel | | S-03 | 5 6 9 | 15 | 21.8 | | 8500* |
| 10 | | | 10 | S-04 | 4 6 8 | 14 | 16.9 | | 7000* |
| | | 12.0 Very Loose Brown Sand with trace gravel and clay | | S-05 | 2 1 2 | 3 | 11.3 | | |
| 15 | | 15.0 End of Boring @ 15 ft | 15 | | | | | | |
| 20 | | | 20 | | | | | | |
| 25 | | | 25 | | | | | | |
| 30 | | | 30 | | | | | | |

Total Depth: 15 ft
Drilling Date: May 27, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
Borehole offset 10 feet east due to presence of underground utilities
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Figure No. 11

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - STONE SCHOOL.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Stone School Road
Pittsfield Township, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-12

CONSULTING GROUP

## SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

Topsoil: Dark Brown Silty Sand with trace gravel (4 inches) — 0.3

Very Stiff to Hard Brown Silty Clay with trace sand and gravel

13.0

Hard Gray Silty Clay with trace sand and gravel — 15.0

End of Boring @ 15 ft

## SOIL SAMPLE DATA

| DEPTH (ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
|---|---|---|---|---|---|---|
| | S-01 | 3<br>4<br>5 | 9 | 17.0 | | 6000* |
| 5 | S-02 | 6<br>9<br>11 | 20 | 17.5 | | 8000* |
| | S-03 | 6<br>10<br>13 | 23 | 14.0 | | 8500* |
| 10 | S-04 | 5<br>8<br>11 | 19 | 21.2 | | 8500* |
| | S-05 | 5<br>6<br>8 | 14 | 14.9 | | 8000* |
| 15 | | | | | | |
| 20 | | | | | | |
| 25 | | | | | | |
| 30 | | | | | | |

Total Depth: 15 ft
Drilling Date: May 28, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
Borehole offset 10 feet east due to presence of underground utilities
* Calibrated Hand Penetrometer

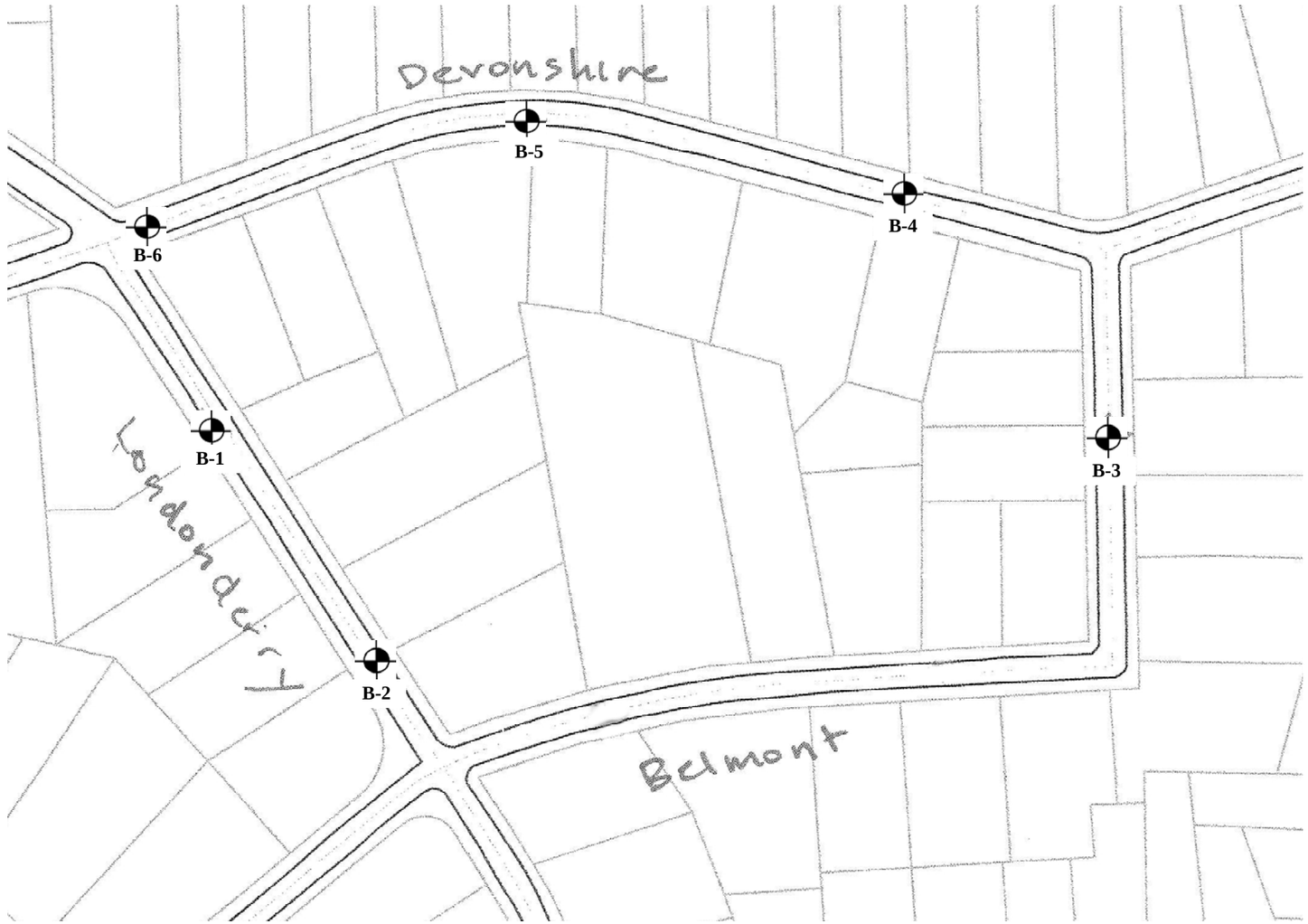
Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Figure No. 12

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - STONE SCHOOL.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

## APPENDIX C – DEVONSHIRE/LONDONDERRY/BELMONT ROAD

| | |
|---|---|
| Soil Boring Location Plan | Plate No. 1 |
| Soil Boring Logs | Figure No. 1 through 6 |




## Legend

Soil Borings Drilled by West Michigan Drilling between May 29th, 2014 and June 3rd, 2014.

**Soil Boring Location Plan**

Ann Arbor Soil Borings
Devonshire Rd, Londonderry Rd, and Belmont Rd
Ann Arbor, Michigan

G2 CONSULTING GROUP
1866 Woodslee Street
Troy, Michigan 48083

| | |
|---|---|
| Project No. 130460 | |
| Drawn by: MGD | |
| Date: 5/8/2014 | Plate No. 1 |
| Scale: NTS | |

Project Name: Ann Arbor Soil Borings

Project Location: Devonshire, Londonderry, Belmont Roads
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-1

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Bituminous Concrete (6-1/2 inches) 0.5 | | | | | | | |
| | | Aggregate Base: Yellowish Brown Sand with trace gravel (8-1/2 inches) 1.3 | | | | | | | |
| | | Fill: Medium Greenish Gray Sandy Clay with trace gravel and organic matter | | S-1 | 3<br>2<br>2 | 4 | 15.1 | | 2000* |
| | | 4.0 | | | | | | | |
| 5 | | ▽ | 5 | S-2 | 2<br>2<br>2 | 4 | 21.3 | | 1500* |
| | | Medium Greenish Gray Silt with trace sand | | S-3 | 4<br>4<br>5 | 9 | 22.2 | | 2000* |
| | | 8.0 | | | | | | | |
| 10 | | Very Stiff Gray Silt with trace clay 10.0 | 10 | S-4 | 3<br>6<br>7 | 13 | 16.2 | | 7000* |
| | | End of Boring @ 10 ft | | | | | | | |
| 15 | | | 15 | | | | | | |

Total Depth: 10 ft
Drilling Date: May 29, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
Groundwater observed at 5 feet during drilling operations; none upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 1

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - DEVONSHIRE.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/9/15

Project Name: Ann Arbor Soil Borings

Project Location: Devonshire, Londonderry, Belmont Roads
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-2

G2 CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Bituminous Concrete (6-1/2 inches) 0.5 | | | | | | | |
| | | Aggregate Base: Light Gray Sandy Gravel (Crushed Limestone) (10-1/2 inches) 1.4 | | | | | | | |
| | | Fill: Stiff Gray Silty Clay with trace sand and gravel 2.5 | | S-1 | 6<br>3<br>2 | 5 | 14.1 | | 2500* |
| 5 | | Fill: Very Soft to Soft Greenish Gray Silty Clay with trace sand and gravel | 5 | S-2 | 4<br>2<br>2 | 4 | 17.2 | | 1000* |
| | | | | S-3 | 2<br>1<br>1 | 2 | 22.1 | | 0* |
| | | 8.0 | | | | | | | |
| 10 | | Gray Silty Clay with trace sand and gravel 10.0 | 10 | S-4 | 2<br>1<br>1 | 2 | 26.9 | | 500* |
| | | End of Boring @ 10 ft | | | | | | | |
| 15 | | | 15 | | | | | | |

Total Depth: 10 ft
Drilling Date: May 29, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
Groundwater observed at 8 feet 7 inches during drilling operations; none upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 2

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - DEVONSHIRE.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/9/15

Project Name: Ann Arbor Soil Borings

Project Location: Devonshire, Londonderry, Belmont Roads
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-3

G2 CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Bituminous Concrete (3 inches) 0.3 | | | | | | | |
| | | Aggregate Base: Yellowish Brown Sandy Gravel (13 inches) 1.3 | | | | | | | |
| | | Fill: Medium Compact Dark Yellowish Brown Silty Sand with trace gravel 2.5 | | S-1 | 7 7 5 | 12 | | | |
| 5 | | Medium Yellowish Brown and Gray Silty Clay with trace sand and gravel 5.5 | 5 | S-2 | 5 2 3 | 5 | 20.2 | | 2000* |
| | | Stiff Yellowish Brown Silty Clay with trace sand and gravel 9.0 | | S-3 | 5 6 8 | 14 | 17.6 | | 4000* |
| 10 | | Hard Gray Silty Clay with trace sand and gravel 10.0 | 10 | S-4 | 6 13 17 | 30 | 8.5 | | 9000* |
| | | End of Boring @ 10 ft | | | | | | | |
| 15 | | | 15 | | | | | | |

Total Depth: 10 ft
Drilling Date: May 29, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 3

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - DEVONSHIRE.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/9/15

Project Name: Ann Arbor Soil Borings

Project Location: Devonshire, Londonderry, Belmont Roads
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-4

G2 CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Bituminous Concrete (6 inches) 0.5 | | | | | | | |
| | | Very Stiff Dark Yellowish Brown Sandy Clay with trace gravel | | S-1 | 4 4 4 | 8 | 10.7 | | 5500* |
| | | 2.5 | | | | | | | |
| 5 | | Medium Dark Yellowish Brown Sandy Clay witht trace gravel | 5 | S-2 | 3 6 3 | 9 | 12.2 | | 1000* |
| | | | | S-3 | 2 1 1 | 2 | 17.0 | | 1000* |
| | | (Occaisonal Sand Seams @ 8 feet) 8.0 | | | | | | | |
| | | Very Stiff Yellowish Brown Sandy Clay with trace silt and gravel | | | | | | | |
| 10 | | 10.0 | 10 | S-4 | 4 8 17 | 25 | 7.5 | | 6000* |
| | | End of Boring @ 10 ft | | | | | | | |
| 15 | | | 15 | | | | | | |

Total Depth: 10 ft
Drilling Date: June 3, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: G. Strauch

Drilling Method:
2-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 4

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - DEVONSHIRE.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/9/15

Project Name: Ann Arbor Soil Borings

Project Location: Devonshire, Londonderry, Belmont Roads
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-5

G2 CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Bituminous Concrete (5 inches) 0.4 | | | | | | | |
| | | Aggregate Base: Yellowish Brown Silty Sand with trace gravel (31 inches) | | S-1 | 6<br>7<br>5 | 12 | | | |
| | | 3.0 | | | | | | | |
| 5 | | Loose Yellowish Brown Silty Sand with trace gravel | 5 | S-2 | 3<br>3<br>4 | 7 | | | |
| | | 6.0 | | | | | | | |
| | | Medium to Stiff Yellowish Brown Sandy Clay with trace gravel | | S-3 | 10<br>12<br>11 | 23 | 8.9 | | 2000* |
| 10 | | 10.0 | 10 | S-4 | 9<br>11<br>13 | 24 | 8.2 | | 1500* |
| | | End of Boring @ 10 ft | | | | | | | |
| 15 | | | 15 | | | | | | |

Total Depth: 10 ft
Drilling Date: June 3, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: G. Strauch

Drilling Method:
2-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 5

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - DEVONSHIRE.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/9/15

Project Name: Ann Arbor Soil Borings

Project Location: Devonshire, Londonderry, Belmont Roads
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-6

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Bituminous Concrete (5 inches) 0.4 | | | | | | | |
| | | Aggregate Base: Loose Yellowish Brown Silty Sand with trace gravel (25 inches) 2.5 | | S-1 | 5<br>6<br>4 | 10 | | | |
| 5 | | Loose Dark Yellowish Brown Silty Sand with trace gravel 6.5 | 5 | S-2 | 4<br>3<br>4 | 7 | | | |
| | | | | S-3 | 3<br>3<br>3 | 6 | | | |
| 10 | | Loose Yellowish Brown Sand 10.0 | 10 | S-4 | 3<br>3<br>4 | 7 | | | |
| 15 | | End of Boring @ 10 ft | 15 | | | | | | |

Total Depth: 10 ft
Drilling Date: June 3, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: G. Strauch

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

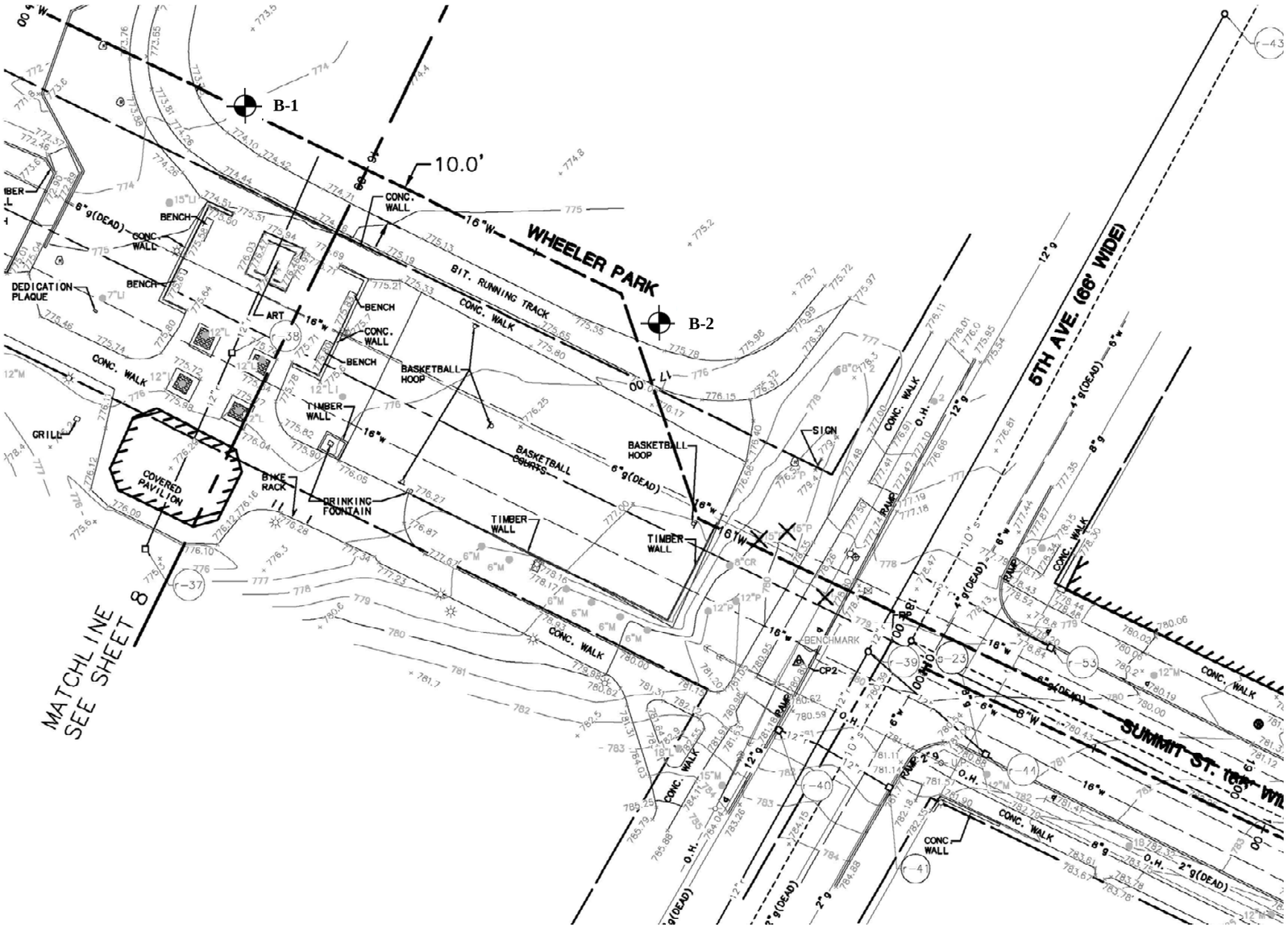
Drilling Method:
2-1/4 inch inside diameter hollow-stem augers

Figure No. 6

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - DEVONSHIRE.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/9/15

## APPENDIX D – WHEELER PARK

| | |
|---|---|
| Soil Boring Location Plan | Plate No. 1 |
| Soil Boring Logs | Figure No. 1 through 2 |




## Legend

Soil Borings Drilled by West Michigan Drilling, Inc. on May 23rd, 2014.

## Soil Boring Location Plan

Ann Arbor Soil Borings
Wheeler Park
Ann Arbor, Michigan

G2 CONSULTING GROUP
1866 Woodslee Street
Troy, Michigan 48083

| | |
|---|---|
| Project No. 130744 | |
| Drawn by: MGD | |
| Date: 5/19/2014 | Plate No. 1 |
| Scale: NTS | |

Project Name: Ann Arbor Soil Borings

Project Location: Wheeler Park
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-1

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ELEV. ( ft) | PROFILE | GROUND SURFACE ELEVATION: 774.1 ft ± | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Topsoil: Dark Brown Clayey Sand with trace organic matter (11 inches) | | | | | | | |
| | | 0.9 | | | | | | | |
| | | Fill: Medium Brown Silty Clay with trace sand and gravel | | S-1 | 4<br>4<br>2 | 6 | 11.5 | | |
| | | 2.3 | | | | | | | |
| 769.1 | | Fill: Loose Brown Silty Sand with trace gravel | 5 | S-2 | 2<br>2<br>3 | 5 | | | |
| | | 7.0 | | | | | | | |
| | | Fill: Loose Greenish Gray and Brown Sand with trace gravel | | S-3 | 2<br>3<br>6 | 9 | | | |
| | | 8.0 | | | | | | | |
| 764.1 | | Stiff Gray Sandy Clay with trace gravel<br>10.0 | 10 | S-4 | 4<br>6<br>5 | 11 | 10.6 | | |
| | | End of Boring @ 10 ft | | | | | | | |
| 759.1 | | | 15 | | | | | | |

Total Depth: 10 ft
Drilling Date: May 23, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Amos

Water Level Observation:
8 feet during drilling operations; 4-2/3 feet upon completion

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Drilling Method:
3-1/4 inside diameter hollow-stem augers

Figure No. 1

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - WHEELER PARK.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Wheeler Park
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-2

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ELEV. ( ft) | PROFILE | GROUND SURFACE ELEVATION: 775.8 ft ± | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Topsoil: Dark Brown Clayey Sand with trace organic matter (15 inches) | | | | | | | |
| | | 1.3 | | | | | | | |
| | | Fill: Medium Compact Brown Sand with trace gravel | | S-1 | 10<br>13<br>14 | 27 | | | |
| | | 3.5 | | S-2a | | | 32.0 | | |
| 770.8 | | Fill: Very Soft Gray Silty Clay with trace sand, 1-inch seam of asphalt millings @ 4-1/2 feet (Organic Matter Content = 17.4%) | 5 | S-2b | 2<br>1<br>1 | 2 | 54.7 | | |
| | | 6.5 | | S-3a | | | 116.6 | | |
| | | Fill: Very Soft Dark Brown Peat (Organic Matter Content = 30.5%) | | S-3b | 2<br>1<br>2 | 3 | 23.5 | | 1000* |
| | | 7.0 | | | | | | | |
| | | Soft Brown and Gray Sandy Clay with trace gravel | | | | | | | |
| | | 9.5 | | | | | | | |
| 765.8 | | Medium Compact Brown Sand with trace gravel | 10 | S-4 | 12<br>15<br>12 | 27 | 17.1 | | |
| | | 10.0 | | | | | | | |
| | | End of Boring @ 10 ft | | | | | | | |
| 760.8 | | | 15 | | | | | | |

Total Depth: 10 ft
Drilling Date: May 23, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Amos

Drilling Method:
3-1/4 inside diameter hollow-stem augers

Water Level Observation:
5 feet during drilling operations; 5-1/3 feet upon completion

Notes:
* Calibrated Hand Penetrometer

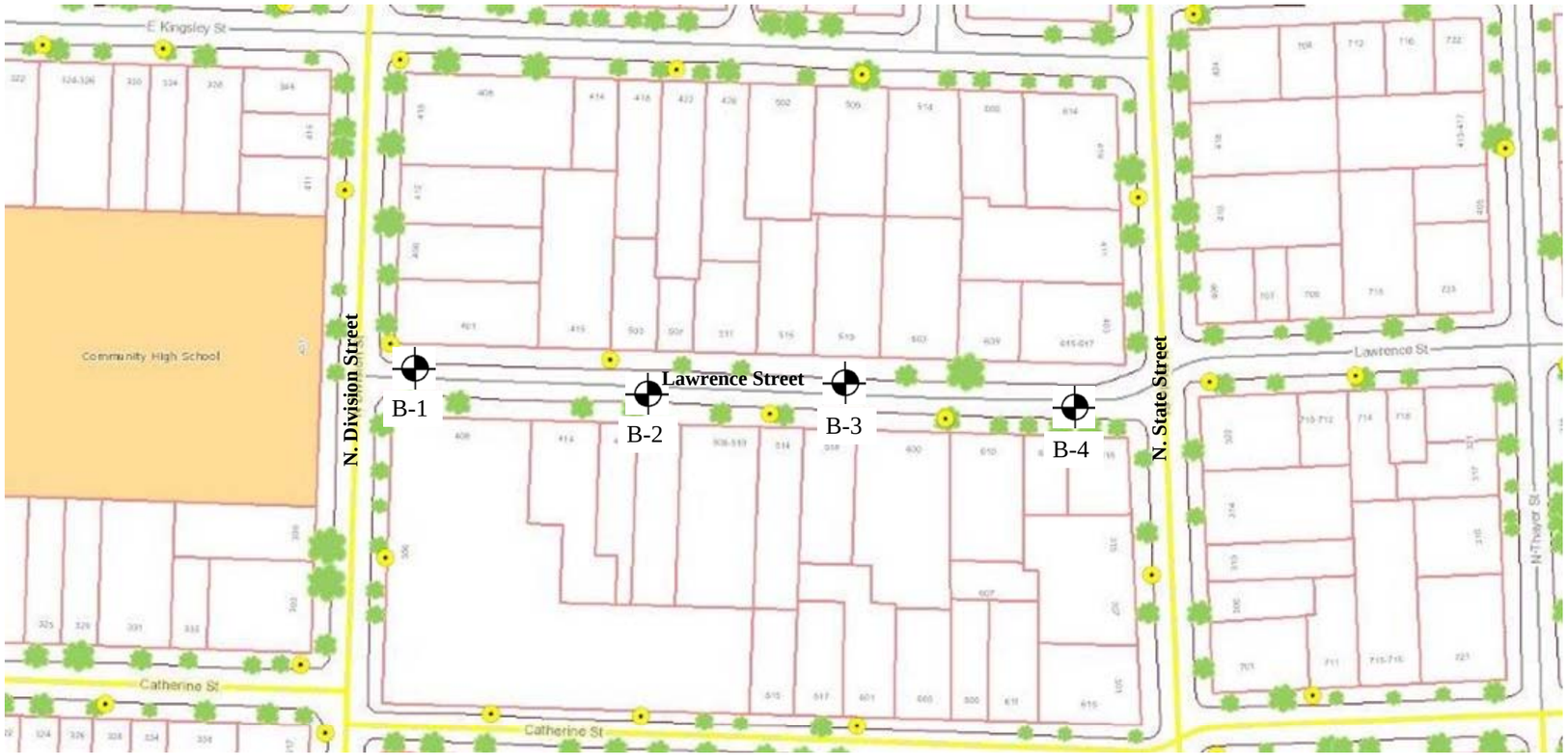
Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings

Figure No. 2

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - WHEELER PARK.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

## APPENDIX E – LAWRENCE STREET

| | |
|---|---|
| Soil Boring Location Plan | Plate No. 1 |
| Soil Boring Logs | Figure No. 1 through 4 |




## Legend

Soil Borings Drilled by West Michigan Drilling, Inc. on June 4th, 2014.

## Soil Boring Location Plan

Ann Arbor Soil Borings
Lawerence Street
Ann Arbor, Michigan

G2 CONSULTING GROUP
1866 Woodslee Street
Troy, Michigan 48083

| | |
|---|---|
| Project No. 130744 | |
| Drawn by: MGD | |
| Date: 5/21/14 | Plate No. 1 |
| Scale: NTS | |

Project Name: Ann Arbor Soil Borings

Project Location: Lawrence Street
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-1

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Bituminous Concrete (3 inches) 0.3 | | | | | | | |
| | | Portland Cement Concrete (5 inches) 0.7 | | | | | | | |
| | | Fill: Stiff Yellowish Brown Sandy Clay with trace gravel 2.5 | | S-1 | 2<br>2<br>2 | 4 | | | 2500* |
| 5 | | Fill: Very Loose Yellowish Brown and Gray Sand with trace gravel 7.5 | 5 | S-2 | 2<br>2<br>1 | 3 | | | |
| | | | | S-3 | 3<br>2<br>2 | 4 | | | |
| 10 | | Fill: Compact Yellowish Brown and Gray Silty Sand 10.0 | 10 | S-4 | 14<br>18<br>14 | 32 | | | |
| 15 | | End of Boring @ 10 ft | 15 | | | | | | |

Total Depth: 10 ft
Drilling Date: June 4, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: G. Strauch

Drilling Method:
2-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 1

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - LAWRENCE.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Lawrence Street
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-2

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Bituminous Concrete (5 inches) 0.4 | | | | | | | |
| | | Portland Cement Concrete (4-1/2 inches) 0.8 | | | | | | | |
| | | Fill: Soft Dark Yellowish Brown and Gray Sandy Clay with trace gravel | | S-1 | 3<br>2<br>2 | 4 | | | 1000* |
| | | 2.5 | | | | | | | |
| 5 | | | 5 | S-2 | 6<br>7<br>5 | 12 | | | |
| | | Fill: Medium Compact Yellowish Brown and Gray Silty Sand with trace gravel | | S-3 | 7<br>10<br>13 | 23 | | | |
| | | | | S-4 | 6<br>7<br>6 | 13 | | | |
| 10 | | 10.0 | 10 | | | | | | |
| | | End of Boring @ 10 ft | | | | | | | |
| 15 | | | 15 | | | | | | |

Total Depth: 10 ft
Drilling Date: June 4, 2014
Inspector: M. Dagher, EIT
Contractor: West Michigan Drilling
Driller: G. Strauch

Drilling Method:
2-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 2

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - LAWRENCE.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Lawrence Street
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-3

G2 CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Bituminous Concrete (5 inches) 0.4 | | | | | | | |
| | | Portland Cement Concrete (5 inches) 0.8 | | | | | | | |
| | | Fill: Medium Dark Yellowish Brown and Gray Silty Clay with trace sand and gravel | | S-1 | 4<br>4<br>3 | 7 | | | |
| | | 3.8 | | | | | | | |
| 5 | | | 5 | S-2 | 3<br>5<br>6 | 11 | | | |
| | | Fill: Medium Compact Yellowish Brown and Gray Sand with trace gravel | | S-3 | 9<br>10<br>10 | 20 | | | |
| | | 7.5 | | | | | | | |
| | | Fill: Medium Compact Yellowish Brown and Gray Silty Sand with trace gravel | | S-4 | 10<br>12<br>13 | 25 | | | |
| 10 | | 10.0 | 10 | | | | | | |
| | | End of Boring @ 10 ft | | | | | | | |
| 15 | | | 15 | | | | | | |

Total Depth: 10 ft
Drilling Date: June 4, 2014
Inspector: M. Dagher, EIT
Contractor: West Michigan Drilling
Driller: G. Strauch

Drilling Method:
2-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 3

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - LAWRENCE.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

Project Name: Ann Arbor Soil Borings

Project Location: Lawrence Street
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

# Soil Boring No. B-4

CONSULTING GROUP

| SUBSURFACE PROFILE | | | | SOIL SAMPLE DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DEPTH ( ft) | PROFILE | GROUND SURFACE ELEVATION: N/A | DEPTH ( ft) | SAMPLE TYPE-NO. | BLOWS/ 6-INCHES | STD. PEN. RESISTANCE (N) | MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONF. COMP. STR. (PSF) |
| | | Bituminous Concrete (4 inches) 0.3 | | | | | | | |
| | | Portland Cement Concrete (4 inches) 0.7 | | | | | | | |
| | | Fill: Soft Dark Yellowish Brown and Gray Silty Clay with trace sand and gravel | | S-1 | 2<br>2<br>2 | 4 | | | 1000* |
| | | 3.0 | | | | | | | |
| 5 | | Fill: Medium Compact Yellowish Brown and Gray Sand with trace clay and gravel | 5 | S-2 | 4<br>6<br>8 | 14 | | | |
| | | | | S-3 | 10<br>13<br>15 | 28 | | | |
| | | 8.0 | | | | | | | |
| 10 | | Fill: Compact Yellowish Brown and Gray Silty Sand with trace gravel 10.0 | 10 | S-4 | 21<br>23<br>21 | 44 | | | |
| | | End of Boring @ 10 ft | | | | | | | |
| 15 | | | 15 | | | | | | |

Total Depth: 10 ft
Drilling Date: June 4, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: G. Strauch

Drilling Method:
2-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 4

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - LAWRENCE.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/24/15

## APPENDIX F – GENERAL NOTES

General Notes Terminology Figure No. 1

# GENERAL NOTES TERMINOLOGY

Unless otherwise noted, all terms herein refer to the Standard Definitions presented in ASTM 653.

**PARTICLE SIZE**

| | | |
|---|---|---|
| Boulders | | - greater than 12 inches |
| Cobbles | | - 3 inches to 12 inches |
| Gravel | - Coarse | - 3/4 inches to 3 inches |
| | - Fine | - No. 4 to 3/4 inches |
| Sand | - Coarse | - No. 10 to No. 4 |
| | - Medium | - No. 40 to No. 10 |
| | - Fine | - No. 200 to No. 40 |
| Silt | | - 0.005mm to 0.074mm |
| Clay | | - Less than 0.005mm |

**CLASSIFICATION**

The major soil constituent is the principal noun, i.e. clay, silt, sand, gravel. The second major soil constituent and other minor constituents are reported as follows:

| Second Major Constituent (percent by weight) | Minor Constituent (percent by weight) |
|---|---|
| Trace - 1 to 12% | Trace - 1 to 12% |
| Adjective - 12 to 35% | Little - 12 to 23% |
| And - over 35% | Some - 23 to 33% |

**COHESIVE SOILS**

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier, i.e. sandy clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohesionless soils, i.e. silty clay, trace sand, little gravel.

| Consistency | Unconfined Compressive Strength (psf) | Approximate Range of (N) |
|---|---|---|
| Very Soft | Below 500 | 0 - 2 |
| Soft | 500 - 1,000 | 3 - 4 |
| Medium | 1,000 - 2,000 | 5 - 8 |
| Stiff | 2,000 - 4,000 | 9 - 15 |
| Very Stiff | 4,000 - 8,000 | 16 - 30 |
| Hard | 8,000 - 16,000 | 31 - 50 |
| Very Hard | Over 16,000 | Over 50 |

Consistency of cohesive soils is based upon an evaluation of the observed resistance to deformation under load and not upon the Standard Penetration Resistance (N).

**COHESIONLESS SOILS**

| Density Classification | Relative Density % | Approximate Range of (N) |
|---|---|---|
| Very Loose | 0 - 15 | 0 - 4 |
| Loose | 16 - 35 | 5 - 10 |
| Medium Compact | 36 - 65 | 11 - 30 |
| Compact | 66 - 85 | 31 - 50 |
| Very Compact | 86 - 100 | Over 50 |

Relative Density of cohesionless soils is based upon the evaluation of the Standard Penetration Resistance (N), modified as required for depth effects, sampling effects, etc.

**SAMPLE DESIGNATIONS**

AS - Auger Sample – Cuttings directly from auger flight
BS - Bottle or Bag Samples
S - Split Spoon Sample - ASTM D 1586
LS - Liner Sample with liner insert 3 inches in length
ST - Shelby Tube sample - 3 inch diameter unless otherwise noted
PS - Piston Sample - 3 inch diameter unless otherwise noted
RC - Rock Core - NX core unless otherwise noted

STANDARD PENETRATION TEST (ASTM D 1586) - A 2.0 inch outside-diameter, 1-3/8 inch inside-diameter split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).

Figure No. 1

# CITY OF ANN ARBOR
## PROJECT MANAGEMENT

**NOTES:**

FOR PROTECTION OF UNDERGROUND UTILITIES AND IN CONFORMANCE WITH PUBLIC ACT 174 of 2013, THE CONTRACTOR SHALL CALL 811 OR 1-800-482-7171 A MINIMUM OF THREE FULL WORKING DAYS, EXCLUDING SATURDAYS, SUNDAYS, AND HOLIDAYS, PRIOR TO BEGINNING EACH EXCAVATION IN AREAS WHERE PUBLIC UTILITIES HAVE NOT BEEN PREVIOUSLY LOCATED. MEMBERS WILL THUS BE ROUTINELY NOTIFIED. THIS DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF NOTIFYING UTILITY OWNERS WHO MAY NOT BE A PART OF THE "MISS DIG" ALERT SYSTEM.

THE UNDERGROUND LOCATIONS SHOWN FOR NATURAL GAS, TELEPHONE, ELECTRICAL POWER, CABLE TV AND FIBER OPTIC LINES ARE APPROXIMATE. THE CITY OF ANN ARBOR ASSUMES NO RESPONSIBILITY FOR THEIR ACCURATE REPRESENTATION IN THIS DRAWING. MISS DIG MUST BE CONTACTED PRIOR TO CONSTRUCTION TO LOCATE THESE UTILITIES.

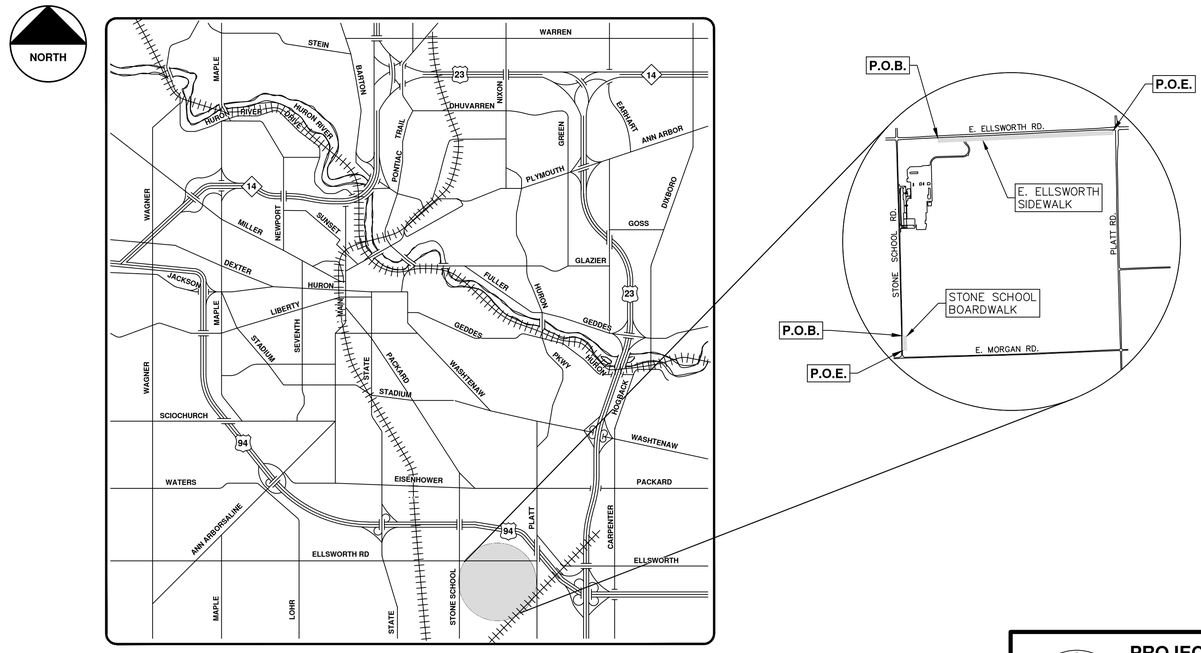
THE CONSTRUCTION COVERED BY THESE PLANS SHALL CONFORM TO THE 1994 EDITION OF THE CITY OF ANN ARBOR PUBLIC SERVICES DEPARTMENT STANDARD SPECIFICATIONS, IT'S DETAILS, WHICH ARE INCLUDED BY REFERENCE, AND THIS PROJECT'S CONTRACT DOCUMENTS. THE OMISSION OF ANY CURRENT STANDARD DETAIL DOES NOT RELIEVE THE CONTRACTOR FROM THIS REQUIREMENT.

# PHASE 1 - SIDEWALK & BOARDWALK

## W.R. WHEELER (SWIFT RUN) SERVICE CENTER PUD NON-MOTORIZED IMPROVEMENTS

BID No. ITB 4424, FILE No. 2014031

| SHEET LIST TABLE | |
|---|---|
| **SHEET NUMBER** | **SHEET TITLE** |
| 1 | COVER SHEET |
| 2 | NOTES |
| 3 | LEGEND |
| 4 | DETAILS |
| 5 | STONE SCHOOL ROAD BOARDWALK DETAILS |
| 6 | SESC NOTES AND DETAILS |
| 7 - 13 | SOIL EROSION CONTROLS AND WATER QUALITY IMPROVEMENTS |
| 14 - 19 | ELLSWORTH ROAD REMOVALS |
| 20 | STONE SCHOOL ROAD REMOVALS |
| 21 - 32 | ELLSWORTH ROAD SIDEWALK PLAN AND PROFILE |
| 33 | STONE SCHOOL ROAD BOARDWALK PLAN AND PROFILE |
| 34 - 35 | ELLSWORTH ROAD TREE REPLACEMENT |
| 36 | STONE SCHOOL ROAD TREE REPLACEMENT |
| 37 | ELLSWORTH ROAD TRAFFIC CONTROL |




VICINITY MAP




SITE PLAN FILE NO.: **CSPA 15-09**

**PROJECT MANAGEMENT SERVICE UNIT**

**PREPARED UNDER THE SUPERVISION OF**

DAVID ARTHUR DYKMAN, P.E. - MI LICENSE No. 52912
PROJECT MANAGER

*4 / 20 /2016*
DATE

DAVID ARTHUR DYKMAN ENGINEER No. 52912 — STATE OF MICHIGAN — REGISTERED PROFESSIONAL ENGINEER

Know what's below. Call before you dig. 811

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH - PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |


CITY OF ANN ARBOR
PUBLIC SERVICE
301 E. HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734.794.6410
www.a2gov.org


**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

APPLICATION FOR AMENDMENT TO APPROVED PUD FINAL SITE PLAN FOR THE CITY OF ANN ARBOR SWIFT RUN SERVICE CENTER AREA PLAN (RZ 04-01 & ANN ARBOR MAINTENANCE FACILITY FINAL SITE PLAN CSPA 04-21). RZ 04-01 AND CSPA 04-21 WERE APPROVED BY THE PITTSFIELD TOWNSHIP BOARD IN 2004, UPDATED IN 2008 (RZ08-01)

SCALE

DRAWING No. **2014031-1**

SHEET No. **1 OF 37**

## CONSTRUCTION NOTES:

1. Driveways and entrances to buildings, real property, and the like shall not be blocked except for short durations and only when approved by the Engineer. Vehicular and pedestrian access shall be maintained at all times. It shall be the Contractor's responsibility to coordinate all necessary driveway closures with the property owner(s) and resident(s) in the areas of construction.
2. The location and depth of all existing utilities and service leads are to be field verified by the Contractor prior to construction.
3. Location and depth of utilities as depicted on the plans is approximate and shown according to the best information available. It is the Contractor's responsibility to excavate ahead and adjust depth of conflict utilities accordingly. Any damage to utilities is the Contractor's responsibility to avoid and/or repair as necessary.
4. During non-working hours no trench shall remain open; any open trench shall be properly secured with protective fencing. This work shall be included in the item of work "General Conditions".
5. Postal delivery and refuse pickup service shall be maintained at all times by the Contractor.
6. All City of Ann Arbor fittings, hydrants, valves and castings removed during construction are the property of the City of Ann Arbor. The Contractor within 48 hours shall deliver to City of Ann Arbor Field Operations and Maintenance Facility at the W.R. Wheeler Service Center located at 4251 Stone School Road.
7. Where street curbs are undermined due to construction activities, they shall be removed and replaced as directed by the Engineer.
8. The Contractor shall be responsible for the continuous maintenance of the soil erosion control measures within the construction area until the full completion of the project. This work shall be included in the item of work "General Conditions".
9. All curb, sidewalk, driveway approach removals shall be approved by Engineer before the work is done.
10. Sawed sewer pipe connections shall be coupled with a Fernco flexible coupling and a stainless steel shear ring.
11. The location of material stock piles and on-site staging areas to be approved by the Engineer.
12. All City of Ann Arbor structures shall receive new castings as directed by the Engineer, as specified on the standard casting schedule. The existing castings are the property of the City of Ann Arbor. The Contractor shall deliver to City of Ann Arbor Field Operations and Maintenance Facility at the W.R. Wheeler Service Center located at 4251 Stone School Road.
13. Drainage structure sumps, where specified, shall be included in the payment for the various drainage structure sizes and or types.
14. Where sewer pipes of different sizes or materials are joined, Fernco flexible couplings with stainless steel shear rings shall be used. The Contractor's purchase price for these devices, including shipping, shall be paid as an extra. Prior to payment for this item, the Contractor shall submit receipts for the Engineer's review and approval. All other costs associated with the installation of these devices shall be included in the payment for the sewer.
15. Where sewer and water main are to be removed & replaced or added, all pipe shall be installed using Trench Detail detailed in the specifications or shown on Plans. Backfill for sewer and water construction shall be MDOT Granular Material, Class II, Modified.
16. Existing street name, guide, and regulatory signs, and mailboxes which conflict with the proposed construction shall be removed prior to construction, stored in a manner which will prevent damage, and re-set in locations as directed by the Engineer. This work will not be paid for separately, but shall be included in "Machine Grading, Modified"
17. In areas where edge drain cannot be installed in accordance with City of Ann Arbor Detail SD-TD-11, the edge drain shall be installed at the depth as indicated on the plans, or as directed by Engineer. In no case shall the edge drain be installed at a grade less than 0.50% or at a depth of less than 2' below top of proposed pavement.

**TREE TABLE**

| | Tag No. | Size | Species | Condition | Northing | Easting |
|---|---|---|---|---|---|---|
| | 5729 | 19" 5729 | Black Walnut | fair | 262308.2882 | 13298753.6496 |
| | 5728 | 27" 5728 | Black Walnut | good | 262319.5274 | 13298755.7677 |
| | 5727 | 24" 5727 | Black Walnut | good | 262489.5926 | 13298754.7871 |
| | 5726 | 24" 5726 | Shagbark Hickory | fair | 262518.0257 | 13298748.4271 |
| | 5725 | 17" 5725 | | | 262544.3284 | 13298769.3066 |
| | 5724 | 16" 5724 | Black Walnut | good | 262638.7132 | 13298746.5767 |
| | 5723 | 24" 5723 | Black Walnut | good | 262701.7575 | 13298737.1774 |
| | 5722 | 36" 5722 | Siblrian Elm | poor | 262767.0576 | 13298738.3929 |
| * | 5721 | 7" 5721 | Blue Spruce | | 262870.2640 | 13298746.9253 |
| | 5720 | 18" 5720 | Siberian Elm | poor | 262860.1349 | 13298736.2099 |
| | 5719 | 34" 5719 | Burr Oak | good | 262960.8761 | 13298728.3183 |
| | 5718 | 24" 5718 | | | 262843.3840 | 13298687.3929 |
| | 5717 | 17" 5717 | Black Walnut | good | 262624.1304 | 13298676.3197 |
| | 5716 | 11" 5716 | | | 262606.6718 | 13298678.6273 |
| | 5715 | 5" 5715 | | | 262584.5978 | 13298691.3167 |
| | 5714 | 24" 5714 | Black Walnut | good | 262527.8964 | 13298690.2146 |
| | 5713 | 34" 5713 | Black Walnut | good | 262480.7122 | 13298694.6840 |
| | 5712 | 26" 5712 | Sugar Maple | | 262421.2342 | 13298697.2767 |
| | 5711 | 26" 5711 | Sugar Maple | | 262408.9103 | 13298698.5537 |
| | 5710 | 26" 5710 | Sugar Maple | fair | 262375.8584 | 13298698.0342 |
| | 5709 | 24" 5709 | Sugar Maple | fair | 262357.2147 | 13298699.8614 |
| | 5708 | 24" 5708 | Balck Walnut | poor | 262328.3628 | 13298697.8410 |
| | 5707 | 12" 5707 | Red Maple | good | 262258.9766 | 13298684.5221 |
| | 5706 | 17" 5706 | Black Walnut | good | 262259.2018 | 13298695.1641 |
| | 5705 | 16" 5705 | Kentucky Coffee Tree | good | 262218.9466 | 13298696.9168 |
| | 5704 | 18" 5704 | Elm | dead | 262217.0411 | 13298696.6715 |
| | 5703 | 12" 5703 | Elm | dead | 262209.8707 | 13298693.0478 |
| | 5702 | 9" 5702 | Austiran Pine | dead | 262209.9885 | 13298685.9528 |
| | 5701 | 20" 5701 | Red Maple | good | 262189.1373 | 13298695.2367 |
| | 5700 | 12" 5700 | Black Walnut | good | 262117.0701 | 13298695.8813 |
| | 5699 | 15" 5699 | Black Walnut | good | 262112.1851 | 13298680.8089 |
| | 5699 | 14" 5699 | Black Walnut | good | 262083.5548 | 13298695.8667 |
| | 5698 | 13" 5698 | Shagbark Hickory | good | 262064.2860 | 13298700.3402 |
| | 5696 | 10" 5696 | Shagbark Hickory | good | 262047.8969 | 13298707.2338 |
| | 5695 | 24" 5695 | Shagbark Hickory | good | 262013.2097 | 13298707.7488 |
| * | 5694 | 8" 5694 | Crab Apple | poor | 261404.2369 | 13298785.5286 |
| * | 5693 | 8" 5693 | Crab Apple | poor | 261404.9612 | 13298786.1898 |
| | 5692 | 13" 5692 | Ash | dead | 261408.8661 | 13298807.8468 |
| | 5691 | 12" 5691 | Black Cherry | poor | 261412.3792 | 13298807.2118 |
| | 5690 | 8" 5690 | Elm | poor | 261420.6046 | 13298797.3056 |
| | 5689 | 7" 5689 | Red Maple | good | 261420.3770 | 13298811.0176 |
| | 5688 | 6" 5688 | Box Elder | good | 261429.4943 | 13298812.2519 |
| | 5687 | 8" 5687 | | | 261434.8010 | 13298789.5676 |
| * | 5686 | 5" 5686 | | | 261442.8061 | 13298786.0742 |
| | 5685 | 9" 5685 | | | 261445.9308 | 13298804.8245 |
| | 5684 | 5" 5684 | | | 261445.1280 | 13298810.2152 |
| | 5683 | 18" 5683 | Ash | good | 261443.7808 | 13298813.8354 |
| | 5682 | 15" 5682 | Elm | fair | 261453.7234 | 13298817.8477 |
| | 5681 | 7" 5681 | | | 261460.2444 | 13298810.7301 |
| | 5680 | 7" 5680 | | | 261460.1590 | 13298806.0161 |
| | 5679 | 6" 5679 | | | 261456.5346 | 13298803.0604 |
| | 5678 | 6" 5678 | Black Cherry | | 261459.0010 | 13298793.4712 |
| | 5677 | 14" 5677 | | | 261470.1537 | 13298806.0494 |
| | 5676 | 10" 5676 | | | 261479.1322 | 13298810.2358 |
| | 5675 | 5" 5675 | | | 261483.1339 | 13298808.0241 |
| | 5674 | 6" 5674 | | | 261472.1632 | 13298791.7854 |
| | 5673 | 5" 5673 | | | 261476.3645 | 13298793.2085 |
| | 5672 | 8" 5672 | | | 261505.1628 | 13298814.6230 |
| | 5671 | 13" 5671 | | | 261500.6721 | 13298807.0513 |
| | 5670 | 6" 5670 | | | 261496.9946 | 13298797.3664 |

* - REMOVE

**TREE TABLE**

| | Tag No. | Size | Species | Condition | Northing | Easting |
|---|---|---|---|---|---|---|
| * | 5669 | 10" 5669 | Silver Maple | fair | 261514.5965 | 13298785.5705 |
| | 5668 | 8" 5668 | | | 261514.7353 | 13298798.3772 |
| | 5667 | 7" 5667 | | | 261514.5282 | 13298801.6336 |
| | 5666 | 10" 5666 | | | 261515.6498 | 13298801.2360 |
| | 5665 | 6" 5665 | | | 261527.6652 | 13298801.8591 |
| | 5664 | 8" 5664 | | | 261523.1895 | 13298790.5794 |
| | 5663 | 5" 5663 | | | 261531.1808 | 13298795.5550 |
| | 5662 | 5" 5662 | | | 261532.4736 | 13298795.1262 |
| | 5661 | 20" 5661 | Elm | good | 261550.2184 | 13298799.5537 |
| | 5660 | 14" 5660 | Elm | good | 261552.1546 | 13298799.2809 |
| | 5659 | 7" 5659 | | | 261546.7652 | 13298802.2109 |
| | 5658 | 9" 5658 | | | 261561.4504 | 13298801.0689 |
| | 5657 | 10" 5657 | Silver Maple | fair | 261563.0198 | 13298789.4894 |
| | 5656 | 6" 5656 | Silver Maple | good | 261562.4980 | 13298790.5633 |
| | 5655 | 10" 5655 | | | 261574.9259 | 13298802.8467 |
| | 5654 | 32" 5654 | Silver Maple | good | 261641.7856 | 13298811.4397 |
| | 5653 | 12" 5653 | | | 261637.2997 | 13298790.8509 |
| | 5652 | 15" 5652 | | | 261639.0523 | 13298789.7481 |
| | 5651 | 16" 5651 | | | 261643.5133 | 13298786.2718 |
| | 5650 | 6" 5650 | | | 261655.6196 | 13298783.5786 |
| * | 5649 | 16" 5649 | Silver Maple | poor | 261692.9051 | 13298780.6473 |
| | 5648 | 12" 5648 | Silver Maple | good | 261680.9271 | 13298804.0863 |
| | 5647 | 9" 5647 | Silver Maple | good | 261677.1995 | 13298802.6377 |
| | 5646 | 12" 5646 | Silver Maple | good | 261750.5645 | 13298808.6880 |
| | 5645 | 15" 5645 | | | 261743.7818 | 13298797.4692 |
| | 5644 | 6" 5644 | | | 261748.7478 | 13298795.4777 |
| * | 5643 | 16" 5643 | Elm | poor | 261754.1241 | 13298780.1520 |
| | 5642 | 6" 5642 | Box Elder | poor | 261759.1259 | 13298782.6337 |
| | 5641 | 5" 5641 | Box Elder | dead | 261764.7608 | 13298795.9883 |
| | 5640 | 5" 5640 | | | 261766.6973 | 13298806.0298 |
| | 5639 | 13" 5639 | Elm | dead | 261780.8034 | 13298796.8883 |
| | 5638 | 9" 5638 | | | 261785.7470 | 13298812.3109 |
| | 5637 | 6" 5637 | Box Elder | dead | 261810.2382 | 13298806.6889 |
| | 5636 | 7" 5636 | Box Elder | dead | 261809.7688 | 13298801.9946 |
| | 5635 | 5" 5635 | Box Elder | dead | 261798.9774 | 13298802.8796 |
| | 5634 | 18" 5634 | Black Walnut | good | 261809.4019 | 13298792.6997 |
| | 5633 | 8" 5633 | Box Elder | good | 261811.3813 | 13298792.7197 |
| | 5632 | 5" 5632 | Black Cherry | good | 261810.5061 | 13298784.2884 |
| | 5631 | 7" 5631 | | | 261800.9367 | 13298788.7096 |
| | 5630 | 8" 5630 | | | 261799.9072 | 13298786.6262 |
| | 5629 | 8" 5629 | Box Elder | dead | 261791.4154 | 13298783.5487 |
| | 5628 | 6" 5628 | Box Elder | dead | 261795.3110 | 13298782.5198 |
| | 5627 | 18" 5627 | Black Cherry | poor | 261950.9069 | 13298757.3862 |
| | 5626 | 31" 5626 | Black Walnut | good | 261928.3321 | 13298713.0338 |
| | 5625 | 8" 5625 | Black Walnut | good | 261875.9264 | 13298714.9818 |
| | 5624 | 21" 5624 | Black Walnut | fair | 261855.9879 | 13298712.3105 |
| | 5623 | 28" 5623 | Black Walnut | good | 261782.8654 | 13298710.8787 |
| | 5622 | 24" 5622 | | | 261771.2412 | 13298709.9978 |
| | 5621 | 20" 5621 | | | 261755.7912 | 13298703.9008 |
| | 5620 | 6" 5620 | | | 261753.1881 | 13298674.9316 |
| | 5619 | 5" 5619 | | | 261746.8720 | 13298674.6472 |
| | 5618 | 27" 5618 | | | 261739.0546 | 13298681.7526 |
| | 5617 | 22" 5617 | | | 261738.3274 | 13298689.1328 |
| | 5616 | 8" 5616 | | | 261744.4145 | 13298698.0399 |
| | 5615 | 20" 5615 | | | 261730.8233 | 13298702.9882 |
| | 5614 | 14" 5614 | | | 261694.5466 | 13298701.6961 |
| | 5613 | 12" 5613 | | | 261692.2250 | 13298705.3715 |
| | 5612 | 12" 5612 | | | 261694.4596 | 13298705.4791 |
| | 5611 | 10" 5611 | | | 261695.3615 | 13298706.9414 |
| | 5610 | 8" 5610 | | | 261673.7703 | 13298697.7406 |

* - REMOVE

**TREE TABLE**

| | Tag No. | Size | Species | Condition | Northing | Easting |
|---|---|---|---|---|---|---|
| | 5609 | 14" 5609 | | | 261650.0985 | 13298690.5310 |
| | 5608 | 20" 5608 | | | 261646.0075 | 13298690.7121 |
| | 5607 | 8" 5607 | | | 261642.9819 | 13298691.2313 |
| | 5606 | 6" 5606 | | | 261642.8686 | 13298690.4164 |
| | 5605 | 6" 5605 | | | 261643.5525 | 13298687.9562 |
| | 5604 | 12" 5604 | | | 261630.5263 | 13298675.8694 |
| | 5603 | 12" 5603 | | | 261625.8920 | 13298680.0000 |
| | 5602 | 12" 5602 | | | 261625.5299 | 13298682.8159 |
| | 5601 | 10" 5601 | | | 261622.8386 | 13298685.5349 |
| | 5600 | 8" 5600 | | | 261590.9418 | 13298680.9784 |
| | 5599 | 7" 5599 | | | 261590.9604 | 13298682.2070 |
| | 5598 | 7" 5598 | | | 261563.5372 | 13298688.3681 |
| | 5597 | 24" 5597 | | | 261576.3602 | 13298667.9301 |
| | 5596 | 10" 5596 | | | 261551.4484 | 13298669.5243 |
| | 5595 | 5" 5595 | | | 261539.1404 | 13298685.0466 |
| | 5593 | 6" 5593 | Elm | poor | 261544.7135 | 13298714.9872 |
| | 5592 | 24" 5592 | Silver Maple | fair | 261530.7587 | 13298720.5237 |
| | 5591 | 30" 5591 | Silver Maple | fair | 261528.1816 | 13298722.3253 |
| | 5590 | 20" 5590 | Silver Maple | fair | 261525.4824 | 13298675.0571 |
| | 5590 | 21" 5590 | Silver Maple | good | 261525.1328 | 13298719.6533 |
| | 5589 | 9" 5589 | Iron Wood | good | 261513.4253 | 13298720.9849 |
| | 5588 | 8" 5588 | Elm | fair | 261501.0413 | 13298702.2271 |
| | 5587 | 20" 5587 | Silver Maple | poor | 261498.9363 | 13298711.4023 |
| | 5586 | 6" 5586 | Black Cherry | poor | 261497.2355 | 13298708.5172 |
| | 5585 | 6" 5585 | Silver Maple | poor | 261495.8938 | 13298709.7896 |
| | 5584 | 7" 5584 | Silver Maple | good | 261484.4838 | 13298699.6715 |
| | 5583 | 10" 5583 | Silver Maple | good | 261486.9627 | 13298701.9498 |
| | 5582 | 24" 5582 | Silver Maple | dead | 261475.9714 | 13298693.3583 |
| | 5581 | 17" 5581 | Silver Maple | good | 261473.6129 | 13298683.4839 |
| | 5580 | 5" 5580 | Elm | fair | 261471.1685 | 13298683.3060 |
| | 5579 | 15" 5579 | Red Maple | dead | 261460.9328 | 13298693.0046 |
| | 5578 | 20" 5578 | Silver Maple | dead | 261455.0428 | 13298680.7923 |
| | 5577 | 5" 5577 | Box Elder | fair | 261444.3922 | 13298675.5167 |
| | 5576 | 7" 5576 | Box Elder | fair | 261451.3282 | 13298682.2857 |
| | 5575 | 12" 5575 | Ash | dead | 261451.9988 | 13298689.1288 |
| | 5574 | 5" 5574 | | | 261447.4190 | 13298699.0375 |
| | 5573 | 8" 5573 | Black Cherry | dead | 261442.9540 | 13298696.3147 |
| | 5571 | 24" 5571 | Elm | | 261406.2618 | 13298710.8910 |
| | 5570 | 24" 5570 | Black Walnut | good | 261406.8854 | 13298683.0765 |
| | 5569 | 12" 5569 | | | 261387.2570 | 13298668.9642 |
| | 5568 | 24" 5568 | Black Walnut | fair | 261371.6583 | 13298711.8119 |
| * | | 12" | Blue Spruce | | 262867.6283 | 13298762.3465 |
| | | 13" | | | 262623.9714 | 13298652.9335 |
| | | 4" | | | 262606.9974 | 13298660.7910 |
| | | 26" STUMP | | | 262610.1236 | 13298661.7237 |
| | | 16" | | | 262687.6479 | 13298786.3966 |
| | | 5" | | | 262686.4837 | 13298777.0236 |
| | | 5" | | | 262686.5683 | 13298769.3650 |
| | | 9" | | | 262543.6898 | 13298780.6060 |
| | | 1" | | | 262493.1821 | 13298792.5887 |
| | | 5" | | | 262475.3750 | 13298792.5840 |
| | | 8" | | | 262461.8260 | 13298792.5172 |
| | | 21" | | | 262438.2724 | 13298665.3524 |
| | | 18" STUMP | | | 262453.3841 | 13298652.3727 |
| | | 72" | | | 262356.7120 | 13298794.0418 |
| | | 16" | | | 262140.8823 | 13298667.4063 |
| | | 16" | | | 262166.9479 | 13298679.3400 |
| | | 12" | | | 262190.8084 | 13298678.0952 |
| | | 1" 5700 | | | 262177.9554 | 13298712.9248 |
| | | 24" STUMP | | | 262113.5160 | 13298711.3001 |

* - REMOVE

**TREE TABLE**

| | Tag No. | Size | Species | Condition | Northing | Easting |
|---|---|---|---|---|---|---|
| | | 3" 5699 | | | 262111.1875 | 13298695.0867 |
| | | 13" 5698 | | | 262096.6727 | 13298668.0659 |
| | | 12" | | | 262082.4483 | 13298667.9066 |
| | | 11" 5695 | | | 262050.2227 | 13298665.4141 |
| | | 5" 5626 | | | 262036.2345 | 13298675.9203 |
| | | 2" 5626 | | | 262019.7389 | 13298682.0536 |
| | | 8" 5626 | | | 262019.7107 | 13298670.3656 |
| | | 7" 5626 | | | 262005.1203 | 13298669.0563 |
| | | 5" 5626 | | | 261990.8099 | 13298687.0232 |
| | | 8" 5626 | | | 261974.3835 | 13298661.8305 |
| | | 5" 5626 | | | 261959.8834 | 13298665.6694 |
| | | 3" 5626 | | | 261960.0018 | 13298679.0258 |
| | | 1" | | | 261931.6026 | 13298688.9590 |
| | | 1" | | | 261946.3358 | 13298687.7751 |
| | | 1" | | | 261945.4663 | 13298676.7787 |
| | | 10" | | | 261944.8455 | 13298664.5997 |
| | | 5" | | | 261930.5413 | 13298667.8165 |
| | | 2" | | | 261915.5870 | 13298679.2889 |
| | | 4" | | | 261916.2594 | 13298679.4932 |
| | | 4" | | | 261916.8847 | 13298679.2460 |
| | | 3" | | | 261899.8909 | 13298678.9576 |
| | | 5" | | | 261884.7849 | 13298667.4122 |
| | | 5" | | | 261855.0705 | 13298680.2005 |
| | | 4" | | | 261854.6527 | 13298670.2103 |
| | | 8" | | | 261841.0361 | 13298671.0142 |
| | | 8" | | | 261841.5770 | 13298680.2635 |
| | | 10" | | | 261828.2933 | 13298690.4193 |
| | | 9" | | | 261827.7232 | 13298680.8423 |
| | | 6" | | | 261827.2988 | 13298670.8381 |
| | | 6" | | | 261799.0835 | 13298670.7286 |
| | | 9" | | | 261800.3029 | 13298691.2483 |
| | | 8" | | | 261814.2771 | 13298681.7505 |
| | | 11" | | | 261813.9950 | 13298670.5476 |
| | | 18" | | | 262203.0274 | 13298665.5392 |
| | | 2" | | | 262519.6164 | 13298775.1515 |
| | | 26" STUMP | | | 262480.2712 | 13298666.9385 |
| | | 4" | | | 262467.3539 | 13298667.8445 |
| | | 4" 5626 | | | 262035.4936 | 13298665.8322 |
| | | 7" 5626 | | | 261990.4076 | 13298677.5352 |
| | | 3" 5626 | | | 261989.2213 | 13298666.1073 |
| | | 5" 5626 | | | 261975.4216 | 13298687.0696 |
| | | 5" 5626 | | | 261974.7652 | 13298674.9390 |
| | | 16" | | | 262870.4693 | 13298787.2859 |
| | | 3" | | | 262870.2157 | 13298773.6353 |
| | | 42" | | | 262415.9076 | 13298795.8639 |
| | | 3" | | | 261884.7663 | 13298677.9208 |
| | | 4" | | | 261885.7067 | 13298688.6944 |
| | | 4" | | | 261871.8675 | 13298689.7712 |
| | | 5" | | | 261871.4850 | 13298679.3345 |
| | | 10" | | | 261870.7093 | 13298668.8390 |
| | | 3" | | | 261855.7397 | 13298690.3056 |
| | | 7" | | | 261841.5961 | 13298690.3253 |
| | | 12" 5694 | | | 261423.0456 | 13298707.4204 |
| | | 12" STUMP | | | 262232.3174 | 13298704.4577 |
| | | 7" | | | 262685.4592 | 13298776.8120 |

* - REMOVE

## PERMITS REQUIRED TO BE OBTAINED BY THE CONTRACTOR PRIOR TO THE BEGINNING OF CONSTRUCTION.

| PERMIT | ISSUING AUTHORITY |
|---|---|
| LANE CLOSURE PERMIT* | CITY OF ANN ARBOR PROJECT MANAGEMENT UNIT |
| "NO PARKING" SIGNS PERMIT* | CITY OF ANN ARBOR PROJECT MANAGEMENT UNIT |
| GRADING/SOIL EROSION & SEDIMENTATION CONTROL PERMIT* | CITY OF ANN ARBOR CUSTOMER SERVICE |
| RIGHT-OF-WAY PERMIT* | CITY OF ANN ARBOR CUSTOMER SERVICE |

* NO COST TO CONTRACTOR

## PITTSFIELD CHARTER TOWNSHIP PERMITS

| PERMIT | ISSUING AUTHORITY |
|---|---|
| DRAIN PERMIT | WASHTENAW COUNTY DRAIN COMMISSIONER |
| RIGHT-OF-WAY PERMIT | WASHTENAW COUNTY ROAD COMMISSION |
| WETLAND PERMIT | MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY |
| WETLAND PERMIT | PITTSFIELD TOWNSHIP |

## CONTACT INFORMATION

| PUBLIC UTILITIES | OWNER | CONTACT |
|---|---|---|
| WATER | | DAN WOODEN (734) 794-6350 |
| SANITARY | | MARK COZART (734) 794-6350 |
| STORM | CITY OF ANN ARBOR FIELD OPERATIONS SERVICE UNIT W.R. WHEELER SERVICE CENTER 4251 STONE SCHOOL ROAD ANN ARBOR, MI 48108 | MATT WALDSMITH (734) 794-6350 |
| FORESTRY | | STEVEN GOEBEL (734) 794-6350 |
| SIGNS SIGNALS STREET LIGHTS | | CHUCK FOJTIK (734) 794-6361 |
| PITTSFIELD TOWNSHIP UTILITIES | PITTSFIELD CHARTER TOWNSHIP 6201 W. MICHIGAN AVE. ANN ARBOR, MICHIGAN 48108 | 734 822-3105 |

| PRIVATE UTILITIES | OWNER | CONTACT |
|---|---|---|
| GAS | DTE ENERGY 3150 E. MICHIGAN AVE, YPSILANTI TOWNSHIP, MI 48198 | ROBERT CZAPIEWSKI (734) 544-7818 |
| ELECTRIC | DTE ENERGY WESTERN WAYNE SERVICE CENTER 8001 HAGGERTY ROAD BELLEVILLE, MI 48111 | CLAY COMBEE (734) 397-4112 |
| CABLE | COMCAST 27800 FRANKLIN ROAD SOUTHFIELD, MI 48034 | RON SUTHERLAND (313) 999-8300 |
| PHONE | AT&T 550 S. MAPLE ROAD ANN ARBOR, MI 48103 | (734) 996-2135 |
| FIBER OPTIC | MCI 2800 N. GLENFILLE ROAD RICHARDSON, TX 75082 | DEAN BOYERS (972) 729-6016 |

Know what's below. Call before you dig. 811

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH - PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

CITY OF ANN ARBOR
PUBLIC SERVICE
301 E. HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734.794.6410
www.a2gov.org

PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

PHASE 1 - SIDEWALK & BOARDWALK

NOTES

SCALE : NTS

DRAWING No. 2014031-2

SHEET No. 2 OF 37

## EXISTING LEGEND

- FIRE HYDRANT
- GATE VALVE IN BOX
- GATE VALVE IN WELL
- STOP BOX
- WATER VAULT
- WELL
- CATCH BASIN (SQ)
- CATCH BASIN (RD)
- STORM MANHOLE
- NON-CURB CATCH BASIN (SQ)
- END SECTION
- SANITARY MANHOLE
- CLEAN-OUT
- POST
- PEDESTRIAN SIGNAL
- SIGN
- HAND HOLE
- ORNAMENTAL LIGHT
- FLOOD LIGHT
- UNKNOWN MANHOLE
- TELEPHONE MANHOLE
- TELEPHONE RISER
- GAS VALVE
- GAS VENT
- GAS BOX
- ELECTRICAL RISER
- TRANSFORMER
- UTILITY POLE
- LAMP POLE
- GUY ANCHOR
- GUY POLE
- MONITORING WELL
- MAILBOX
- SOIL BORING
- TRAVERSE POINT
- BENCH MARK
- IRON PIPE
- MON BOX

- WATER MAIN
- WATER MAIN ABANDONED
- STORM SEWER
- STORM SEWER ABANDONED
- SANITARY SEWER
- SANITARY SEWER ABANDONED
- GAS MAIN
- GAS MAIN (DEAD)
- ELECTRICAL OVER HEAD
- ELECTRICAL UNDER GROUND
- ELECTRICAL DUCT BANK
- TELEPHONE OVER HEAD
- TELEPHONE UNDER GROUND
- TELEPHONE DUCT BANK
- CABLE TV OVER HEAD
- CABLE TV UNDER GROUND
- FIBER OPTIC
- FIBER OPTIC DUCT BANK
- BOUNDARY
- BUILDING
- CENTERLINE OF DITCH
- CENTERLINE/CROWN OF ROAD
- CONTOUR MAJOR
- CONTOUR MINOR
- EDGE OF WATER
- FLOODPLAIN
- FENCE
- GRAVEL
- GUARDRAIL
- STONE WALL
- R.O.W.
- TREELINE
- WETLAND
- EDGE OF BRUSH
- HEDGE
- TREE (DECIDUOUS)
- TREE (CONIFEROUS)
- SHRUB (DECIDUOUS)
- STUMP
- TREE TO REMAIN & PROTECT (DECIDUOUS)
  CRITICAL ROOT ZONE (C.R.Z.) = DIAMETER BREAST HEIGHT (INCHES) X 10
- TREE TO REMAIN & PROTECT (CONIFEROUS)
  CRITICAL ROOT ZONE (C.R.Z.) = DIAMETER BREAST HEIGHT (INCHES) X 10

## PROPOSED LEGEND

- HYDRANT (PLAN)
- WATER GATE WELL
- REDUCER
- WATER GATE VALVE
- WATER STOP BOX
- WATER VAULT
- INLET
- DOUBLE INLET
- INLET JUNCTION CHAMBER
- ROUND CATCH BASIN
- STORM MANHOLE
- DRAIN ARROW
- FLARED END SECTION
- SANITARY MANHOLE
- CLEAN-OUT
- BARREL
- SIGN
- PUSH BUTTON
- HAND HOLE

- WATER MAIN
- STORM SEWER
- SANITARY SEWER
- FIBER OPTIC
- ELECTRICAL
- CENTERLINE OF DITCH
- CENTERLINE OF ROAD
- FENCE
- GRAVEL
- SILT FENCE
- PROTECTIVE FENCE
- GUARDRAIL
- LOT/UNIT
- CURB
- TEMPORARY GRADING PERMIT
- CONTOUR MAJOR
- CONTOUR MINOR
- WATER EASMENT
- STORM EASEMENT
- SANITARY EASEMENT
- R.O.W.
- LIMITS OF CONSTRUCTION
- LIMIT OF GRADING
- STONE WALL
- DETECTABLE WARNING
- ASPHALT
- CONCRETE
- SIDEWALK
- TREE (DECIDUOUS)
- TREE (CONIFEROUS)
- TREE TO BE REMOVED (DECIDUOUS)
- TREE TO BE REMOVED (CONIFEROUS)
- STUMP TO BE REMOVED

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

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 00 | PATH - PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |

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**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

**PHASE 1 - SIDEWALK & BOARDWALK**

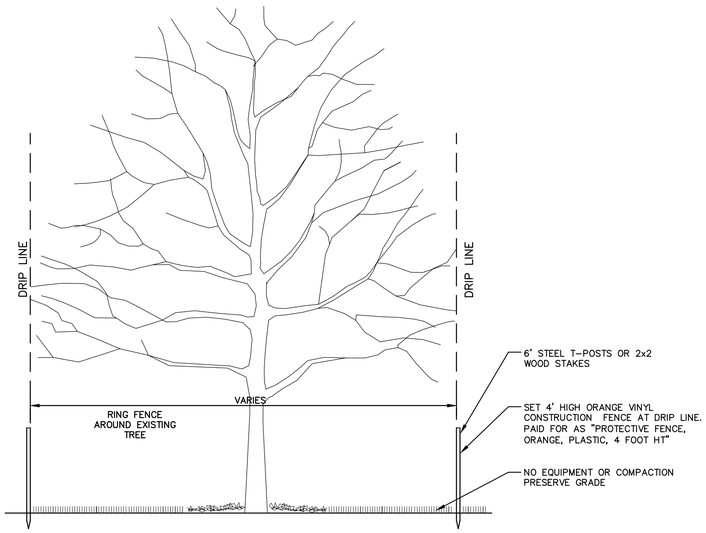
**LEGEND**

SCALE : NTS

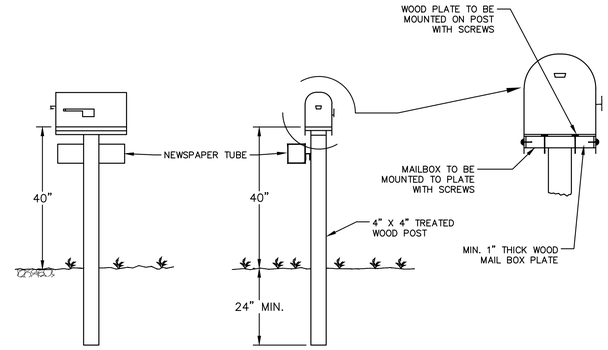
DRAWING No. 2014031-3

SHEET No. 3 OF 37

S:\Project Management\Design\2014031 Wheeler Center PUD\Plan Production\Construction Set\20140310ov.dwg - _a2 standard bw.stb - Plot Date: 5/25/2016 1:34:03 PM

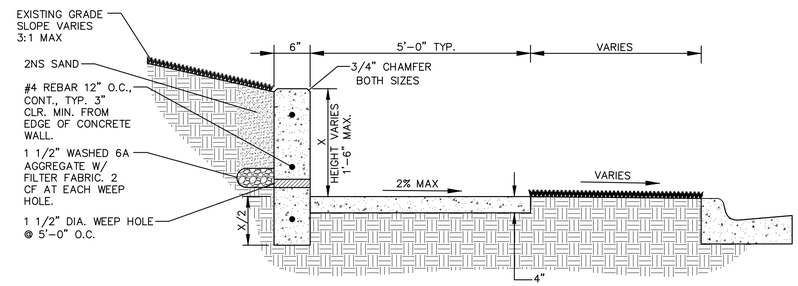



## TREE PROTECTION DETAIL



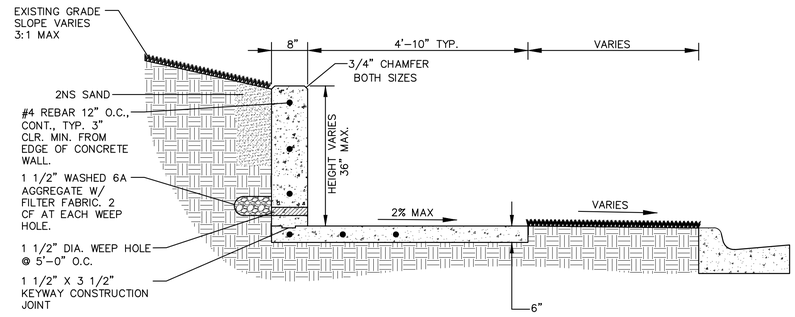

NOTES:
1. ALL WORK TO BE DONE UNDER CURRENT FEDERAL POSTAL SERVICE SPECIFICATIONS.
2. FOR PERMANENT MAILBOX RELOCATION, POST TO BE NEW 4" X 4" POST, OR RESTORE ORIGINAL POST TO AS GOOD OR BETTER THAN ORIGINAL CONDITION.
3. FOR TEMPORARY MAILBOX RELOCATION, THE USE OF EXISTING POST WILL BE PERMITTED.
4. FOR NEWS PAPER TUBE RELOCATION THE USE OF EXISTING POST WILL BE PERMITTED.

## MAILBOX/NEWSPAPER TUBE INSTALLATION AND RELOCATION SD-M-2



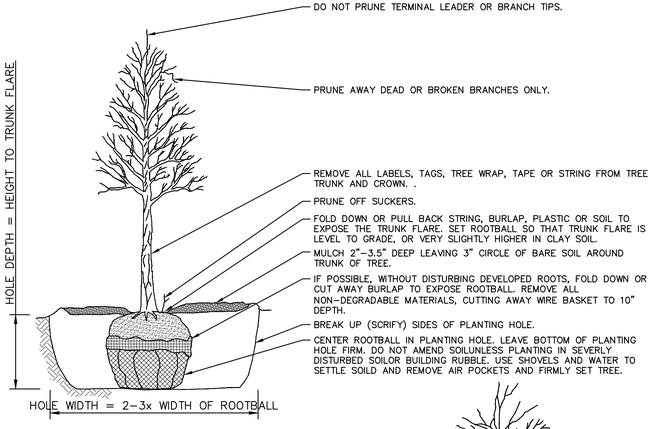

## INTEGRAL SIDEWALK AND RETAINING WALL 6" to 18" WALL

NOT TO SCALE



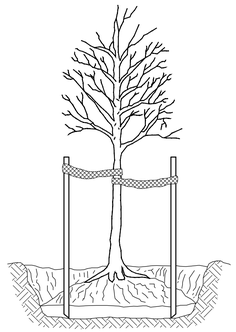

## INTEGRAL SIDEWALK AND RETAINING WALL > 18" WALL

NOT TO SCALE

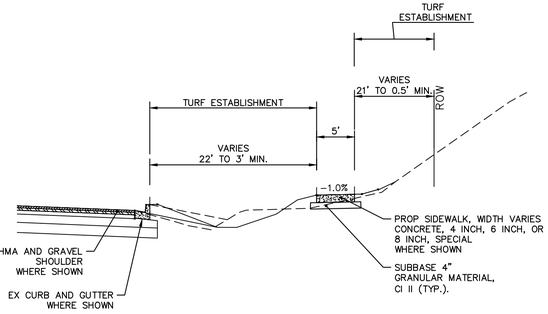



DO NOT STAKE UNLESS IN HEAVY CLAY SOIL, WINDY CONDITIONS, 3" OR GREATER DIAMETER TREE TRUNK OR LARGE CROWN. IF STAKING IS NEEDED DUE TO THESE CONDITIONS:

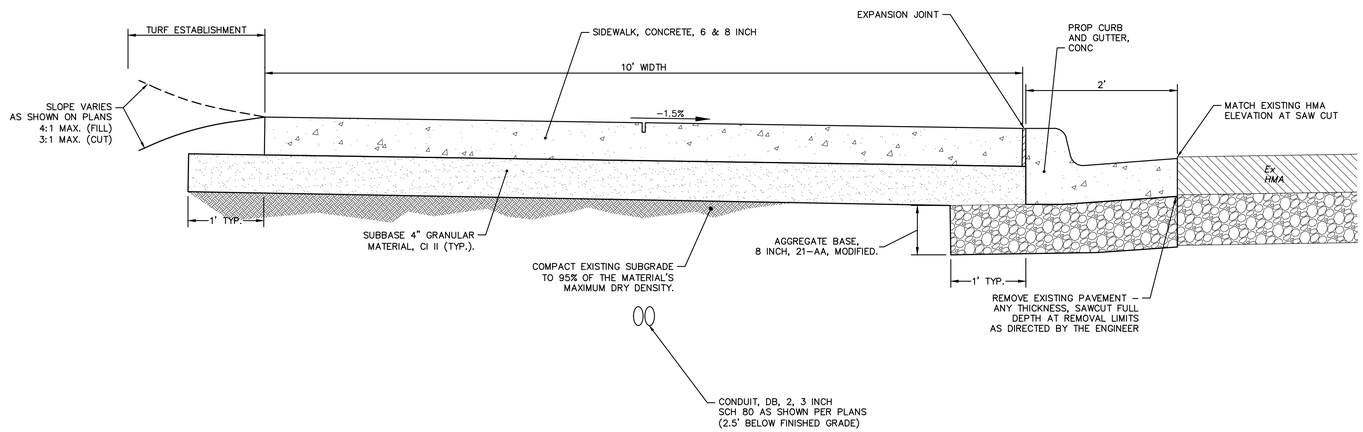
- STAKE WITH 2 x 2 HARDWOOD STAKES, OR APPROVED EQUAL, DRIVEN 6"-8" OUTSIDE OF ROOTBALL.
- LOOSELY STAKE TREE TRUNK TO ALLOW FOR TRUNK FLEXING.
- STAKE TREES JUST BELOW FIRST BRANCH WITH 2"-3" WIDE BELT-LIKE, NYLON OR PLASTIC STRAPS (2 PER TREE ON OPPOSITE SIDES OF TREE, CONNECT FROM TREE TO STAKE HORIZONTALLY. DO NOT USE ROPE OR WIRE THROUGH A HOSE.)
- REMOVE ALL STAKING MATERIALS AFTER 1 YEAR.



## TREE PLANTING SD-L-3




## SIDEWALK TYPICAL SECTION P.O.B. TO P.O.E.




Know what's below. Call before you dig.

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH - PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

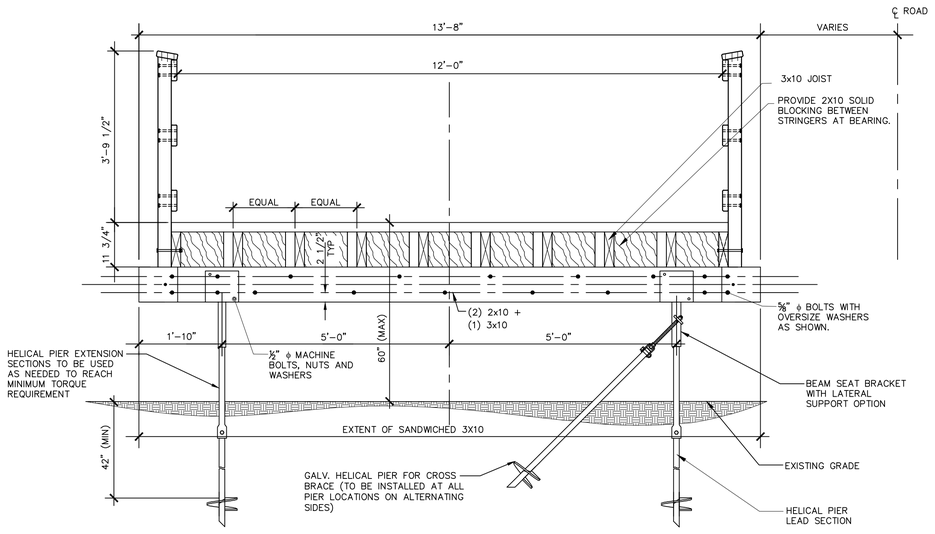
PHASE 1 - SIDEWALK & BOARDWALK

DETAILS

SCALE : N.T.S.

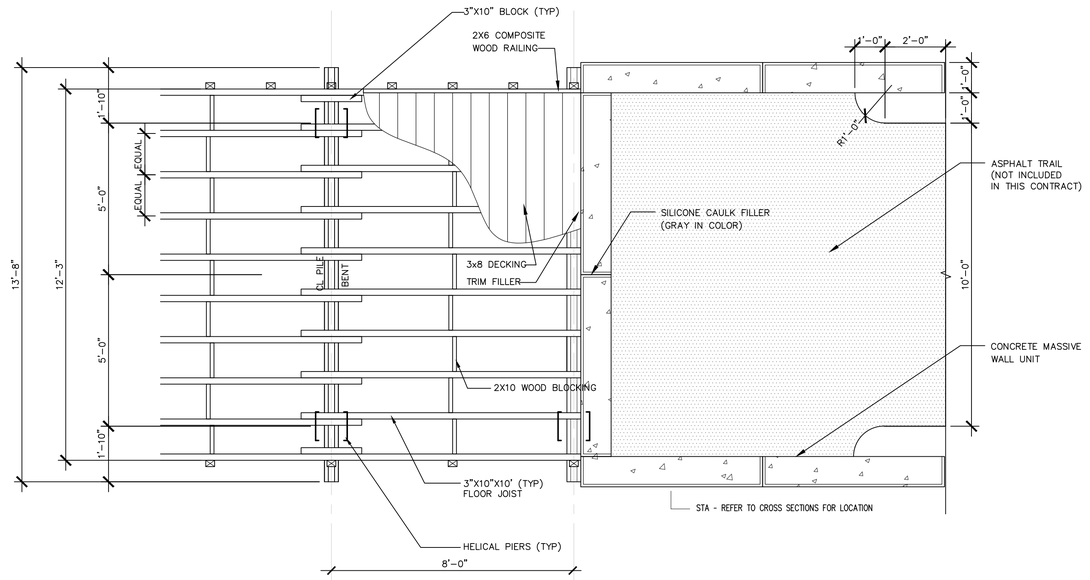
DRAWING No. 2014031-4

SHEET No. 4 OF 37



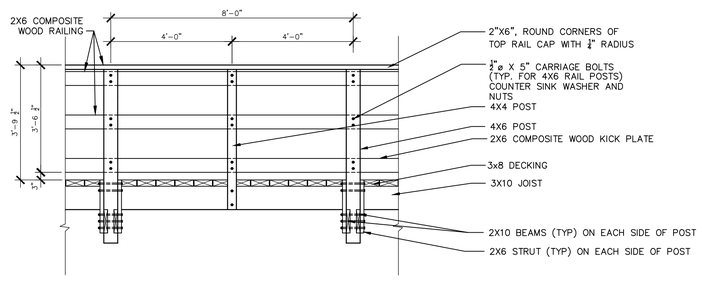

## 12' BOARDWALK SECTION

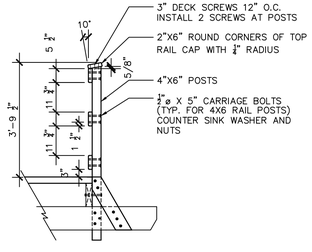
NO SCALE




## 12' BOARDWALK FRAMING PLAN AND WALL APPROACH PLAN

NO SCALE

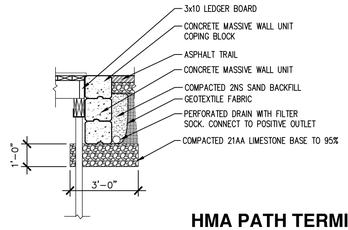



NOTES:
1. ALL TIMBER (EXCEPT THAT NOTED AS COMPOSITE) SHALL BE PRESSURE TREATED TO 0.23 PCF (GROUND CONTACT RATED) WITH MCA.
2. ALL COMPOSITE MATERIAL SHALL BE TREX OR APPROVED EQUIVALENT COORDINATE COLOR W. ENGINEER
3. ALL STEEL FASTENERS SHALL BE HOT DIPPED GALVANIZED.
4. COUNTER SINK ALL SCREW CONNECTIONS 1/4".

## BOARDWALK RAILING DETAIL

NO SCALE




## HMA PATH TERMINUS SECTION

NO SCALE

NOTES:
1. MWU WALL SHALL HAVE NO BATTER (0') ON ALL THREE SIDES.
2. BOARDWALK AND MWU WALL SHALL HAVE ⅜" MAX. SPACE BETWEEN THEM.
3. BOARDWALK DECKING SHALL BE CUT TO CONFORM TO MWU WALL CHAMFER AS NECESSARY TO ENSURE SPACING.
4. ALL BACKFILLED MATERIAL INSIDE WALLS SHALL BE COMPACTED TO A 95% COMPACTION RATE.
5. PLACE RIP RAP FROM WALL FACE TO 18" BEYOND FIRST SET OF PILES OR SLEEPER ON BOTH SIDES. PLACE RIP RAP 18"–24" ALONG WALL PER DETAIL G, L–3.01

Know what's below. Call before you dig.

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10–22–15 | CEC | DAD |
| 01 | OUT FOR BID | 4–15–16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4–20–16 | CEC/DPF | DAD |

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PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

PHASE 1 - SIDEWALK & BOARDWALK

BOARDWALK DETAILS

SCALE : N.T.S.

DRAWING No. 2014031-5

SHEET No.

5 OF 37

GENERAL
NOTIFY THE CITY OF ANN ARBOR SOIL EROSION CONTROL OFFICE 48 HOURS PRIOR TO BEGINNING WORK ON THE PROJECT. PHONE: 734-794-6265.

1. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN THE SOIL EROSION CONTROL MEASURES AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER AT ALL TIMES DURING CONSTRUCTION. ANY MODIFICATIONS OR ADDITIONS TO THE SOIL EROSION CONTROL MEASURES DUE TO CONSTRUCTION OR CHANGED CONDITIONS SHALL BE AS DIRECTED AND APPROVED BY THE ENGINEER.
2. ALL SOIL EROSION AND SEDIMENTATION CONTROL WORK SHALL CONFORM TO THE PERMIT REQUIREMENTS OF THE CITY OF ANN ARBOR, CITY ORDINANCE CHAPTER 63, CITY OF ANN ARBOR STANDARDS DIVISION VII, THE LAWS OF THE STATE OF MICHIGAN, AND THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.
3. DAILY, OR AFTER ANY STORM EVENT, INSPECTIONS OF EROSION CONTROL MEASURES SHALL BE MADE BY THE CONTRACTOR. PERIODIC INSPECTIONS MAY BE MADE BY THE ENGINEER TO DETERMINE THE EFFECTIVENESS OF EROSION AND SEDIMENTATION CONTROL MEASURES. ANY NECESSARY CORRECTIONS SHALL BE MADE WITHOUT DELAY, AND WITHOUT ADDITIONAL COST TO THE CITY OF ANN ARBOR.
4. EROSION AND SEDIMENTATION FROM WORK ON THE SITE SHALL BE CONTAINED ON THE SITE AND NOT BE ALLOWED TO COLLECT ON ANY OFF-SITE AREAS, ROADWAYS OR WATERWAYS.
5. ALL MUD/SOIL TRACKED ONTO ROADWAYS FROM THE SITE DUE TO CONSTRUCTION, SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR. IF SO ORDERED, THE CONTRACTOR SHALL PROVIDE AND OPERATE A VACUUM-TYPE STREET SWEEPER, AT NO ADDITIONAL COST TO THE CITY OF ANN ARBOR, WITHIN FOUR (4) HOURS OF BEING SO ORDERED.
6. RESTORATION OF ALL DISTURBED AREAS, INCLUDING PLACEMENT OF TOPSOIL, SEED, FERTILIZER AND MULCH AND/OR SOD SHALL BE PERFORMED WITHIN FIVE (5) DAYS OF THE COMPLETION OF FINAL GRADE.
7. CONSTRUCTION OPERATIONS SHALL BE SCHEDULED AND PERFORMED SO THAT PREVENTATIVE SOIL EROSION CONTROL MEASURES ARE IN PLACE PRIOR TO EXCAVATION IN CRITICAL AREAS AND TEMPORARY STABILIZATION MEASURES ARE IN PLACE IMMEDIATELY FOLLOWING BACKFILLING OPERATIONS.
8. SPECIAL PRECAUTIONS WILL BE TAKEN IN THE USE OF CONSTRUCTION EQUIPMENT TO PREVENT SITUATIONS THAT PROMOTE EROSION.
9. PROPER DUST CONTROL SHALL BE MAINTAINED DURING CONSTRUCTION BY USE OF WATER TRUCKS AND/OR DUST PALLATIVE AS REQUIRED.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY SOIL EROSION CONTROL MEASURES AND REMOVAL OF SOME MEASURES UPON AUTHORIZED COMPLETION OF THE PROJECT. FINAL COMPLETION OF PROJECT WILL NOT BE AUTHORIZED UNTIL ALL SITE WORK AND UTILITY CONSTRUCTION IS COMPLETE AND ALL SOILS ARE STABILIZED.
11. THE CONTRACTOR SHALL NOT GRADE INTO ADJACENT PROPERTIES. SILT AND PROTECTIVE FENCE SHALL BE INSTALLED AND MAINTAINED TO PREVENT GRADING, EROSION AND SEDIMENTATION INTO THE ADJACENT PROPERTIES.
12. TREE PROTECTION FENCING MUST REMAIN INTACT UNTIL RESTORATION OF THE SITE IS COMPLETE.

SEQUENCE OF EROSION CONTROL MEASURES:

1. THE CONTRACTOR IS TO SUBMIT TO THE ENGINEER, A SEQUENCE OF CONSTRUCTION WITH RESPECT TO THE SOIL EROSION CONTROL MEASURES FOR REVIEW, COMMENT AND APPROVAL. THIS SCHEDULE IS TO INCLUDE INSPECTION AND REPAIR OF ALL TEMPORARY EROSION CONTROL MEASURES DAILY AND WITHIN 24 HOURS OF A STORM EVENT.

SAMPLE SOIL EROSION AND SEDIMENTATION CONTROL INSTALLATION MINIMUM REQUIREMENTS:

1.1. INSTALL SILT FENCE, TREE PROTECTION FENCING, MUD MATS, INLET FILTERS ON EXISTING DRAINAGE FEATURES, AND ALL OTHER TEMPORARY SOIL EROSION CONTROLS, PRIOR TO ANY CLEARING OR EARTH MOVING OPERATION.

1.2. STRIP AND STOCKPILE TOPSOIL. STABILIZE STOCKPILE AS REQUIRED.

1.3. COMPLETE REQUIRED DITCHING FROM MALLET'S CREEK TO STONE SCHOOL ROAD.

1.4. INSTALL WATER MAINS, STORM AND SANITARY SEWERS, AND OTHER ENCLOSED DRAINAGE FEATURES. NEW INLET FILTERS SHALL BE INSTALLED IMMEDIATELY FOLLOWING INSTALLATION OF NEW DRAINAGE INLETS.

1.5. PERFORM MACHINE GRADING OPERATIONS AND CONSTRUCT PAVEMENTS (MAINLINE, SIDEWALKS, DRIVES, ETC.).

1.6. COMPLETE MALLET'S CREEK WORK OPERATIONS IN ACCORDANCE WITH CONSTRUCTION SEQUENCE CONTAINED WITHIN THE SPECIAL PROVISION ENTITLED "MAINTAINING TRAFFIC AND CONSTRUCTION METHOD AND SEQUENCING" CONTAINED IN THE CONTRACT PROPOSAL.

1.7. CONTINUALLY MAINTAIN EROSION AND SEDIMENTATION CONTROL MEASURES, AS REQUIRED TO ALLOW DRAINAGE AND SEDIMENT REMOVAL. REMOVE ANY ACCUMULATED SEDIMENT IMMEDIATELY.

1.8. COMPLETE ALL BIORETENTION GRADING AND FINE GRADING.

1.9. TEMPORARY SEED AND INSTALL EROSION CONTROL BLANKET IN ALL DISTURBED AREAS.

1.10. REFER TO LANDSCAPE PLANTING PLANS FOR PERMANENT SITE STABILIZATION.

1.11. CLEAN OUT STORM SEWER SYSTEMS.

1.12. REMEDY ANY NOTED DEFECTS TO THE SATISFACTION OF THE CITY OF ANN ARBOR'S SOIL EROSION AND SEDIMENTATION CONTROL OFFICIAL.

1.13. ALL TEMP. SOIL EROSION CONTROL MEASURES MUST BE REMOVED, WITH ENGINEERS APPROVAL, PRIOR TO FINAL INSPECTION

NOTE: THIS SEQUENCE IS FOR INFORMATION ONLY. IT IS INTENDED TO SHOW THE SEQUENCE OF CONSTRUCTION WITH RESPECT TO THE SOIL EROSION AND SEDIMENTATION CONTROL MEASURES. THE CONTRACTOR IS RESPONSIBLE FOR SUBMITTING THEIR OWN DETAILED CONSTRUCTION SEQUENCE AND SCHEDULE TO THE ENGINEER FOR REVIEW, COMMENT, AND APPROVAL.

TEMPORARY SEEDING:

1. SEED IN ACCORDANCE WITH PROJECT DRAWINGS AND SPECIFICATIONS.
2. ANY DISTURBED AREA NOT PAVED, SEEDED, MULCHED, SODDED OR BUILT UPON BY NOVEMBER 15TH OR JUNE 30TH IS TO BE TEMPORARILY STABILIZED PER SPECIFICATIONS.

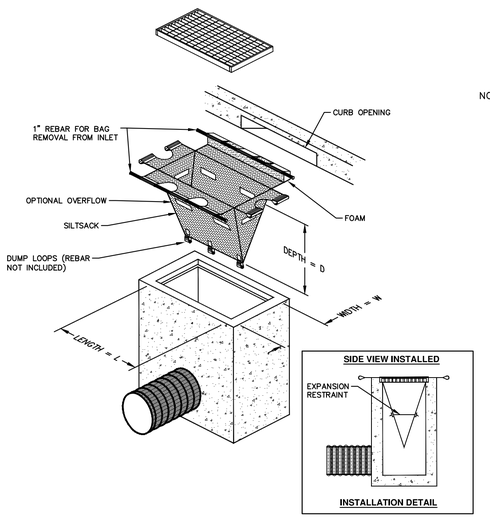
THE ESTIMATED COST OF SOIL EROSION AND SEDIMENTATION CONTROL MEASURES, TOPSOIL, SEEDING, AND MULCH = $xxx,xxx

ESTIMATE OF EXCAVATION AND FILL FROM EXISTING TO FINAL GRADE:
- EXCAVATION = 6240 CY, FILL = 6799 CY

ON SITE SOILS PER THE USDA SOIL SURVEY OF WASHTENAW COUNTY, MICHIGAN:
- Sb – SEBEWA LOAM – IN DEPRESSION AREAS, BROAD LOW-LYING AREA, AND DRAINAGEWAYS OF OUTWASH PLAINS, VALLEY TRAINS, AND TERRACES. SLOPE IS 0% TO 2%.
- FoB – FOX SANDY LOAM – IN UPLAND AREAS AND ON OUT WASH PLAINS, KAMES, VALLEY TRAINS, TERRACES, AND MORAINES. SLOPES ARE UNIFORM OR SHORT AND COMPLEX.
- MdA – MATHERTON SANDY LOAM – IN DEPRESSION AREAS, BROAD LOW-LYING AREAS, AND ALONG DRAINAGEWAYS, OUTWASH PLAINS, VALLEY TRAINS, AND TERRACES. NEARLY LEVEL TO GENTLY SLOPING.
- MfA – METAMORA SANDY LOAM – IN DEPRESSION AREAS, BROAD, LOW-LYING AREAS, AND ALONG DRAINAGEWAYS OF TILL PLAINS AND MORAINES.
- NaB – NAPPANEE SILTY CLAY LOAM – ON FOOT SLOPES AND ALONG DRAINAGEWAYS OF TILL PLAINS, MORAINES, AND LAKE PLAINS. NEARLY LEVEL TO GENTLY SLOPING.

| IMPERVIOUS PROJECT AREA |
|---|
| 27,240 ft2 – WALK = 0.625 AC |
| 16,700 ft2 – PATH = 0.383 AC |

| TOTAL AREA OF PROPOSED DISTURBANCE = 3.65 AC |
|---|
| 1.05 AC – STONE SCHOOL ROAD |
| 2.60 AC – ELLSWORTH ROAD |




## SILTSACK DETAIL

NOTE: THE SILTSACK WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS.

**REGULAR FLOW SILTSACK**

(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

| PROPERTIES | REQUIRED VALUE | TEST METHOD |
|---|---|---|
| GRAB TENSILE STRENGTH | ASTM D-4632 | 300 LBS |
| GRAB TENSILE ELONGATION | ASTM D-4632 | 20% |
| PUNCTURE | ASTM D-4833 | 120 LBS |
| MULLEN BURST | ASTM D-3786 | 800 PSI |
| TRAPEZOID TEAR | ASTM D-4533 | 120 LBS |
| UV RESISTANCE | ASTM D-4355 | 80% |
| APPARENT OPENING SIZE | ASTM D-4751 | 40 US SIEVE |
| FLOW RATE | ASTM D-4491 | 40 GAL/MIN/SQ FT |
| PERMITTIVITY | ASTM D-4491 | 0.55 SEC -1 |

**HI-FLOW SILTSACK**

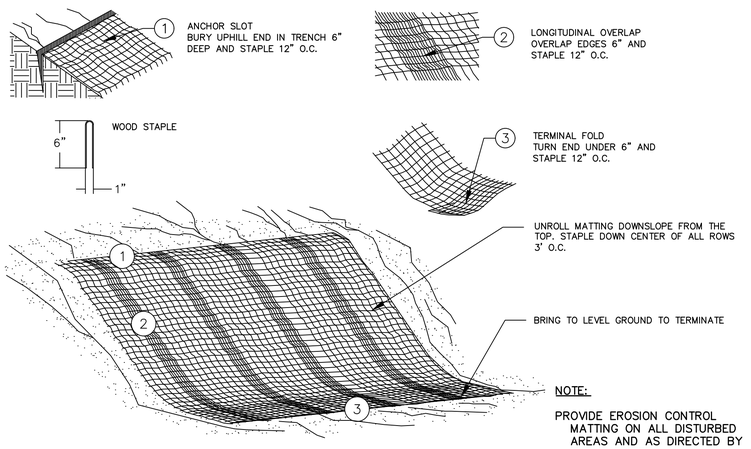
(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

| PROPERTIES | REQUIRED VALUE | TEST METHOD |
|---|---|---|
| GRAB TENSILE STRENGTH | ASTM D-4632 | 265 LBS |
| GRAB TENSILE ELONGATION | ASTM D-4632 | 20% |
| PUNCTURE | ASTM D-4833 | 135 LBS |
| MULLEN BURST | ASTM D-3786 | 420 PSI |
| TRAPEZOID TEAR | ASTM D-4533 | 45 LBS |
| UV RESISTANCE | ASTM D-4355 | 90% |
| APPARENT OPENING SIZE | ASTM D-4751 | 20 US SIEVE |
| FLOW RATE | ASTM D-4491 | 200 GAL/MIN/SQ FT |
| PERMITTIVITY | ASTM D-4491 | 1.5 SEC-1 |

**OIL-ABSORBANT SILTSACK**

(FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN-OFF OR SPILLS)

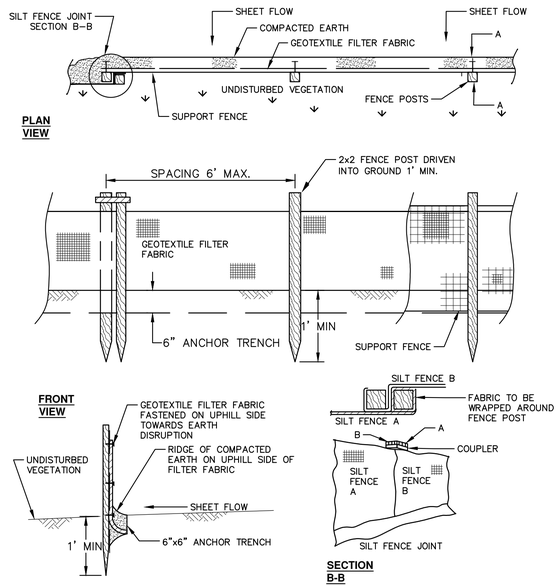
IT IS THE INTENT OF THE PLANS AND SPECIFICATIONS THAT THE CONTRACTOR INSTALL THE REBAR AS SHOWN IN THIS DETAIL TO PROVIDE A FULLY FUNCTIONING UNIT. ALL COSTS ASSOCIATED WITH FURNISHING, CLEANING AS MANY TIMES AS REQUIRED, DISPOSAL OF SEDIMENT, AND REMOVING THE INLET FILTER WHEN NO LONGER NEEDED IS INCLUDED IN THE ITEM OF WORK AND WILL NOT BE PAID FOR SEPARATELY.




NOTE:
PROVIDE EROSION CONTROL MATTING ON ALL DISTURBED AREAS AND AS DIRECTED BY THE ENGINEER.

## MULCH BLANKET DETAIL

APPLIES TO ALL AREAS TO BE PERMANENTLY RESTORED WITH GRASS. SEE LANDSCAPE PLANS FOR MORE DETAILS.




## SILT FENCE SD-EC-3

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

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 00 | PATH - PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |

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PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

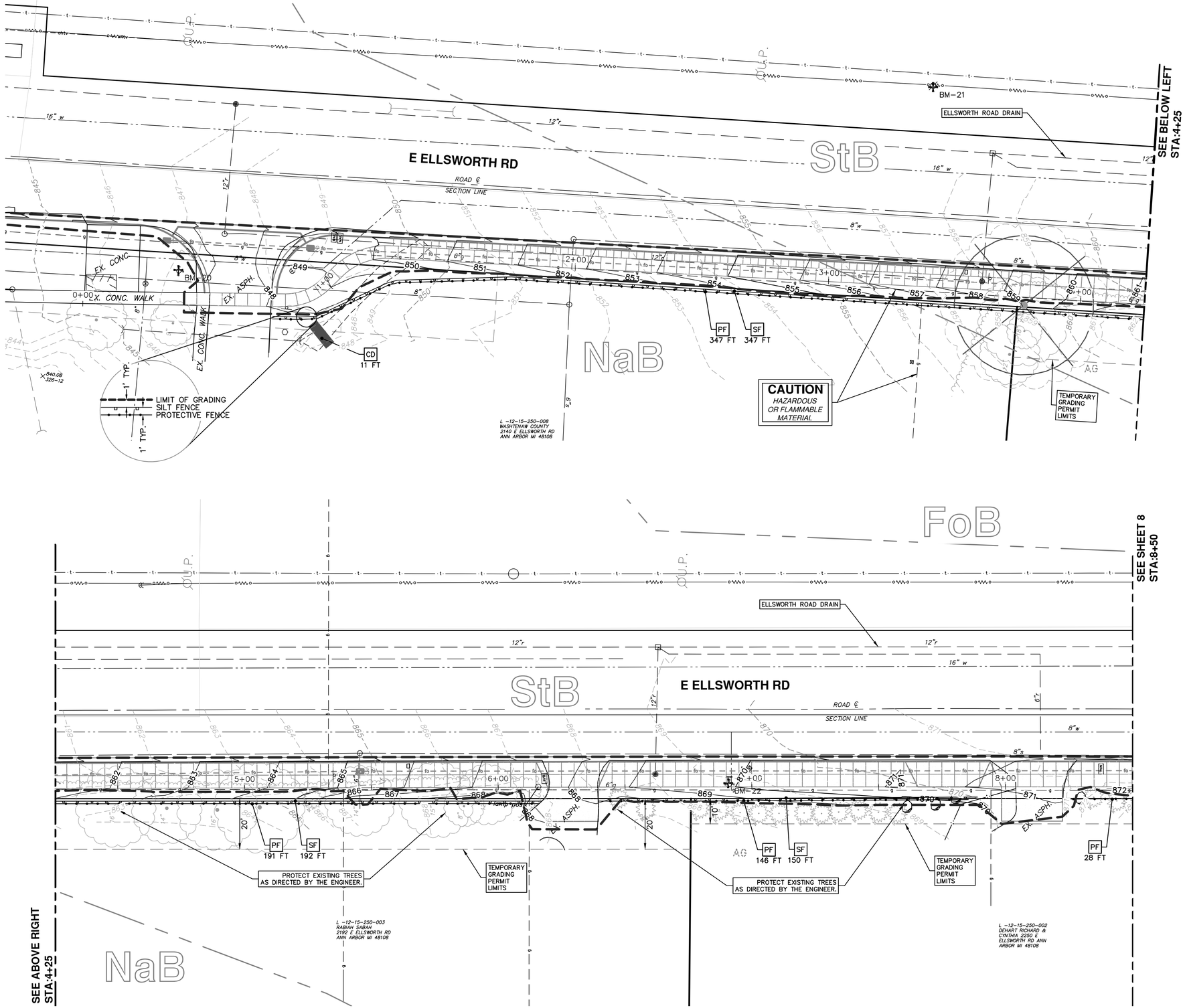
PHASE 1 - SIDEWALK & BOARDWALK

SESC NOTES AND DETAILS

SCALE: N.T.S.

DRAWING No. 2014031-6

SHEET No. 6 OF 37




## SESC MEASURES KEY

| KEY | DESCRIPTION |
|---|---|
| SF | INSTALL SILT FENCE |
| PF | INSTALL PROTECTIVE FENCING |
| CD | INSTALL CHECK DAM, STONE |
| ID | INTERCEPTING DITCH |
| RR | INSTALL RIP–RAP |
| SB | TEMPORARY SEDIMENT BASIN |
| TS | TEMPORARY INLET STRUCTURE |
| BAG | SAND BAG |
| TM | TEMPORARY SEEDING/MULCH BLANKET |
| GFB | GRAVEL FILTER BERM |
| MB | MULCH BLANKET, HIGH VELOCITY |
| OS | INSTALL OUTLET STRUCTURE |
| IP | INSTALL INLET FILTER |

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

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10–22–15 | CEC | DAD |
| 01 | OUT FOR BID | 4–15–16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4–20–16 | CEC/DPF | DAD |

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**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

**PHASE 1 - SIDEWALK & BOARDWALK**

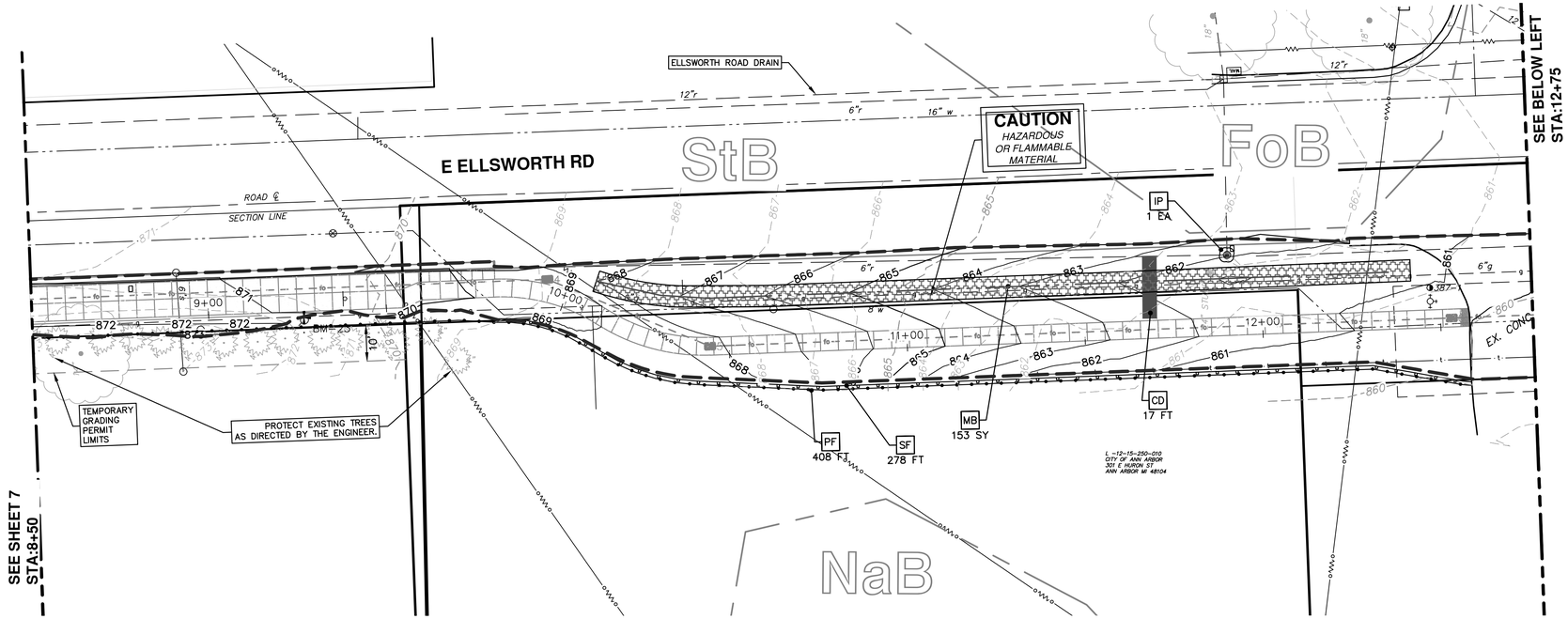
**SOIL EROSION CONTROLS AND WATER QUALITY IMPROVEMENTS**

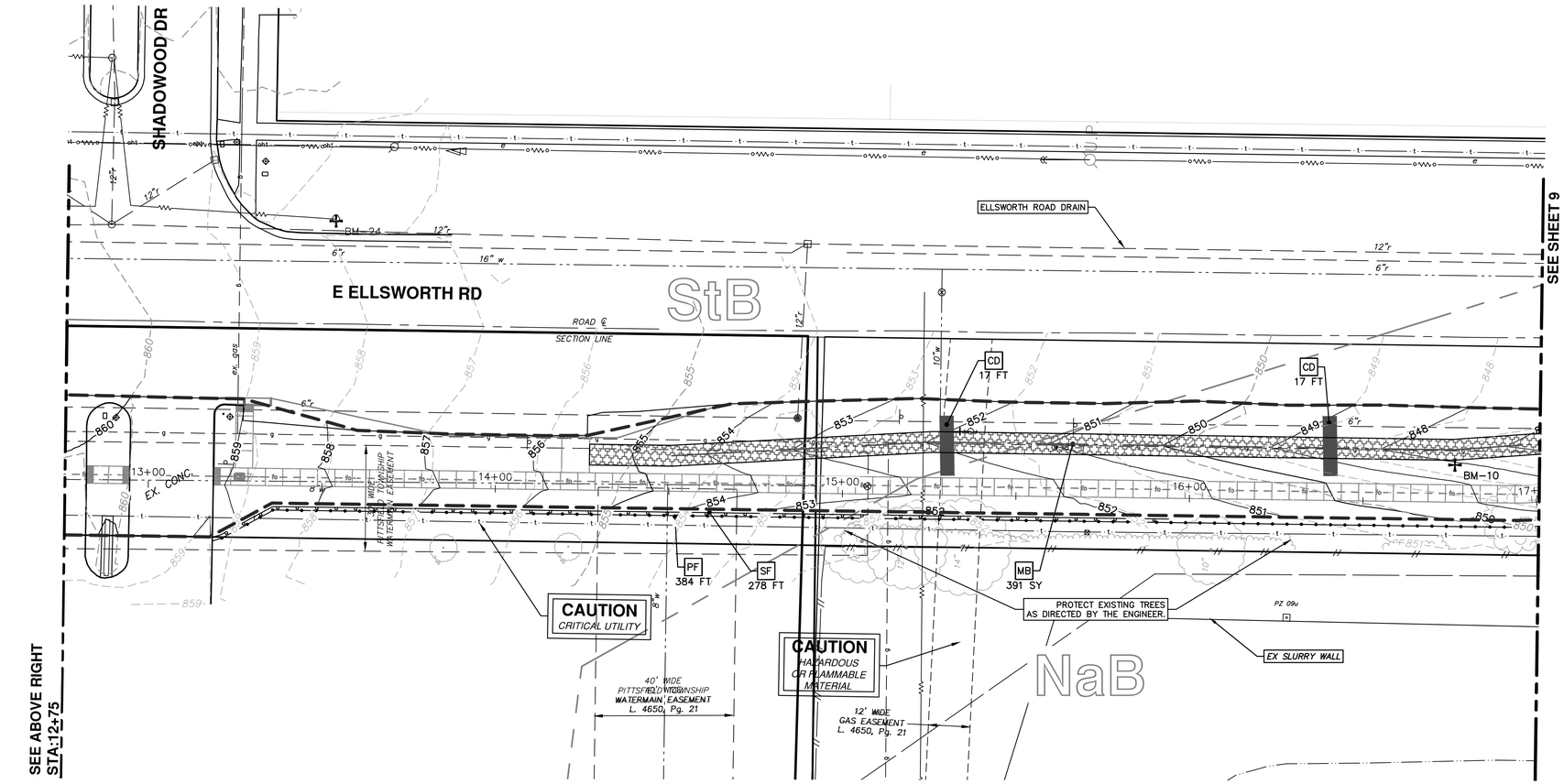
**ELLSWORTH ROAD STA. 0+00 - STA. 8+50**

SCALE **PLAN: 1" = 20'**

DRAWING No. **2014031-7**

SHEET No. **7 OF 37**

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**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

**PHASE 1 - SIDEWALK & BOARDWALK**

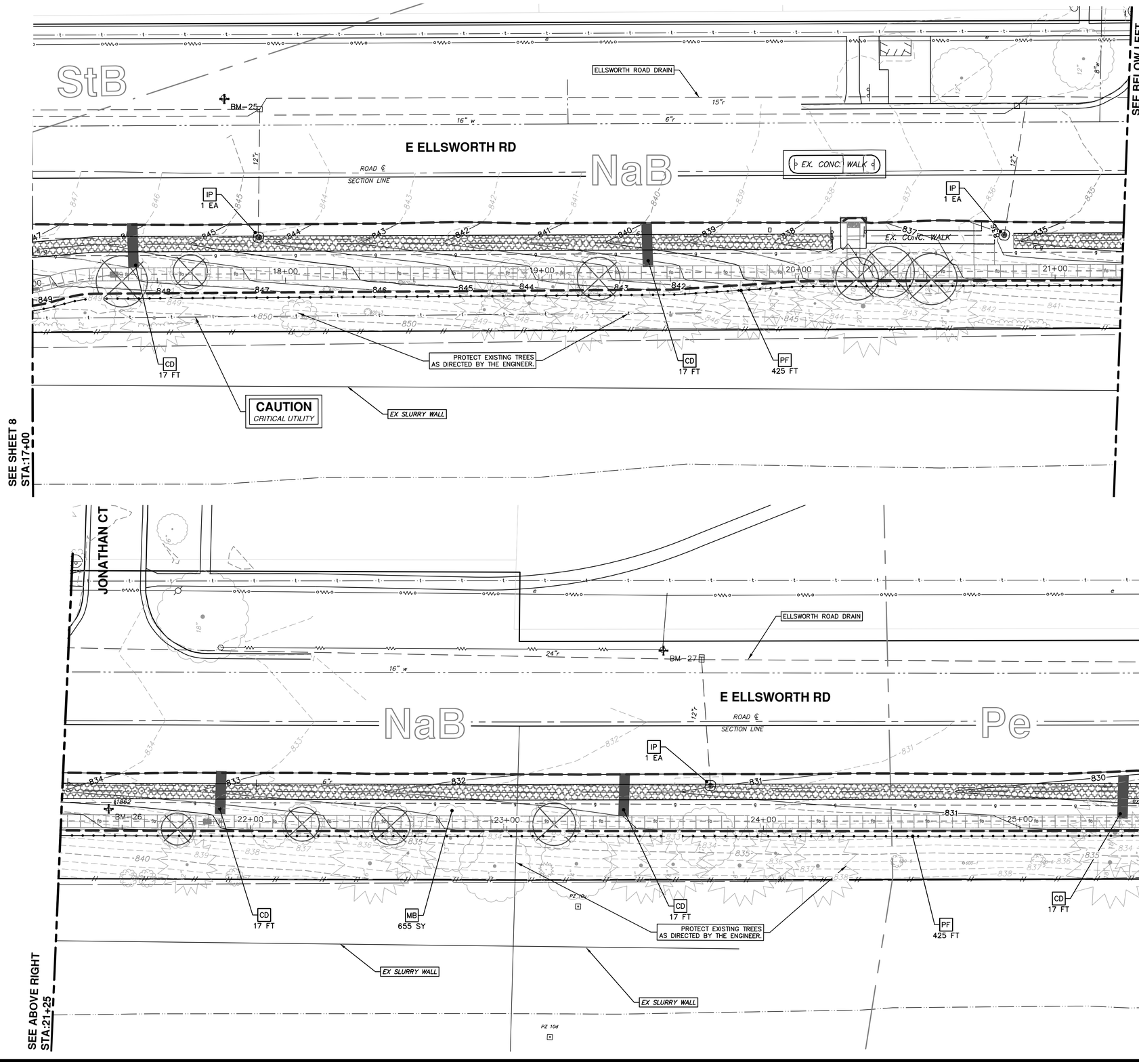
**SOIL EROSION CONTROLS AND WATER QUALITY IMPROVEMENTS**

**ELLSWORTH ROAD STA. 8+50 - STA. 17+00**

SCALE PLAN: 1" = 20'

DRAWING No. 20140031-8

SHEET No. 8 OF 37




## SESC MEASURES KEY

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| 00 | PATH - PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
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# PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

## PHASE 1 - SIDEWALK & BOARDWALK

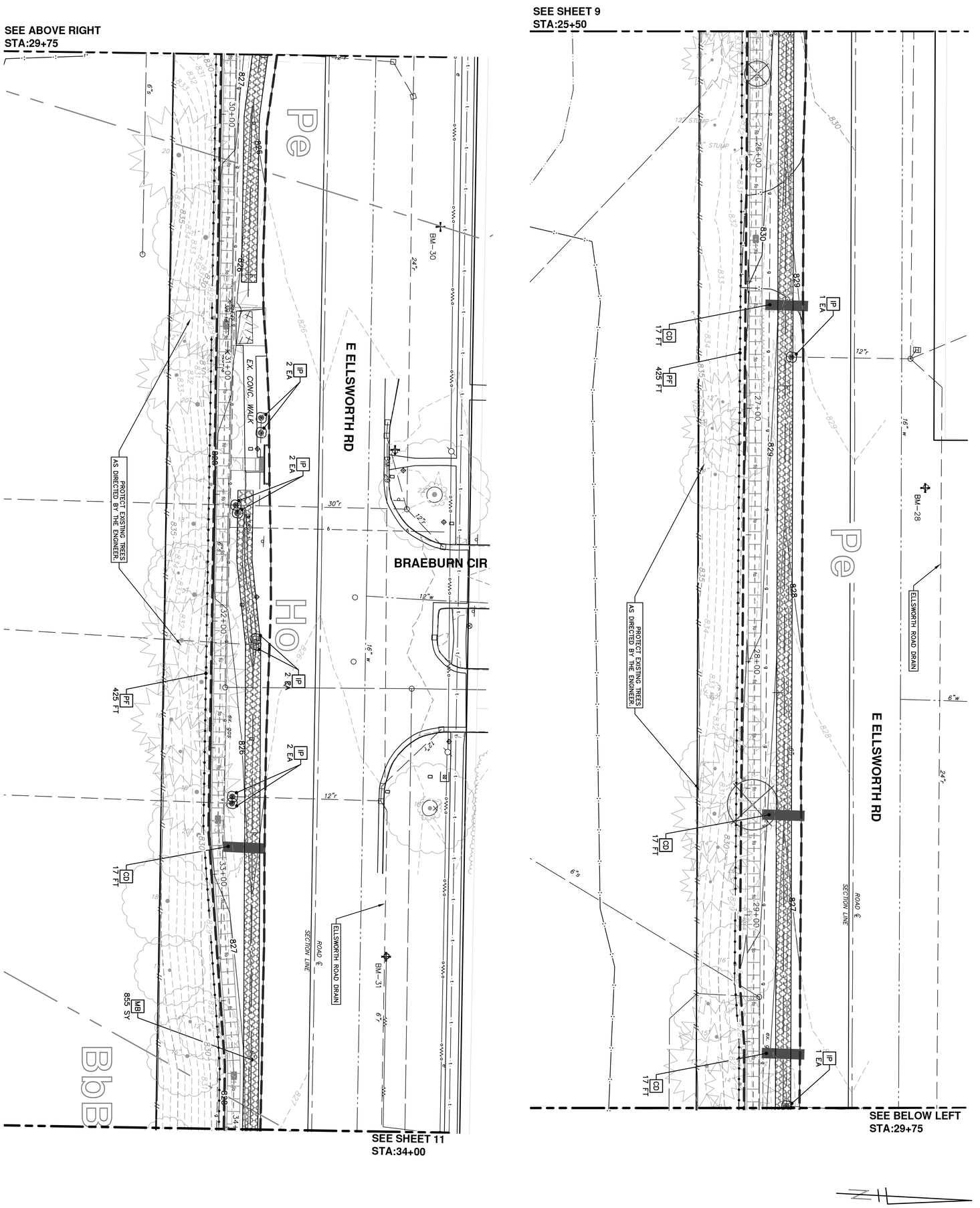
### SOIL EROSION CONTROLS AND WATER QUALITY IMPROVEMENTS

### ELLSWORTH ROAD STA. 17+00 - STA. 25+50

SCALE PLAN: 1" = 20'

DRAWING No. 2014031-9

SHEET No. 9 OF 37

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| OS | INSTALL OUTLET STRUCTURE |
| IP | INSTALL INLET FILTER |

SHEET No. 10 OF 37

**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

SCALE PLAN: 1" = 20'

DRAWING No. 2014031-10

**PHASE 1 - SIDEWALK & BOARDWALK**

**SOIL EROSION CONTROLS AND WATER QUALITY IMPROVEMENTS**

**ELLSWORTH ROAD STA. 25+50 - STA. 34+00**

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|---|---|---|---|---|
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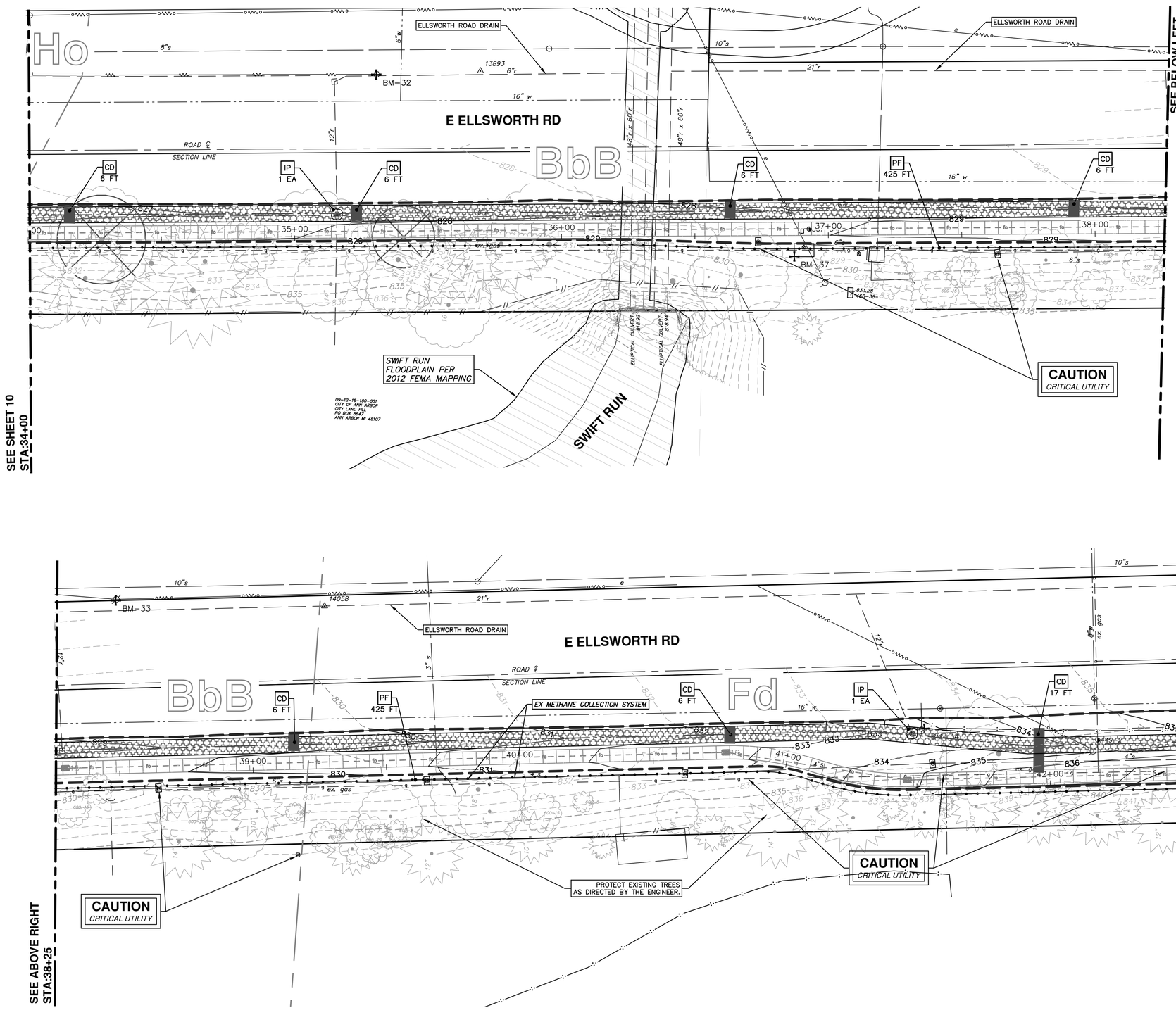


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# PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

## PHASE 1 - SIDEWALK & BOARDWALK

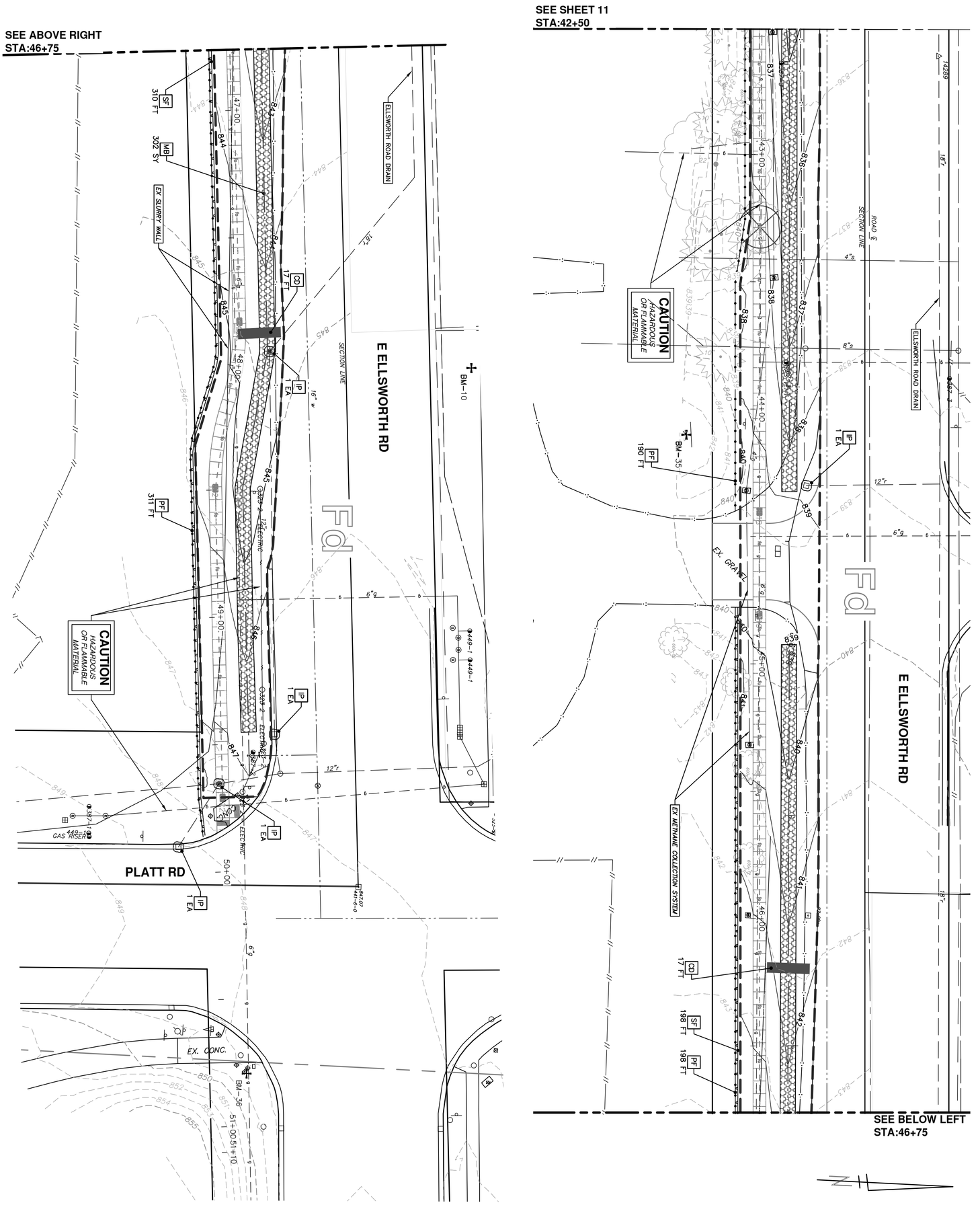
SOIL EROSION CONTROLS AND WATER QUALITY IMPROVEMENTS

ELLSWORTH ROAD STA. 34+00 - STA. 42+50

SCALE PLAN: 1" = 20'

DRAWING No. 2014031-11

SHEET No. 11 OF 37

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**SESC MEASURES KEY**

SHEET No. 12 OF 37

**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

SCALE PLAN: 1" = 20'

DRAWING No. 2014031-12

**PHASE 1 - SIDEWALK & BOARDWALK**

**SOIL EROSION CONTROLS AND WATER QUALITY IMPROVEMENTS**

**ELLSWORTH ROAD STA. 42+50 - P.O.E.**

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|---|---|---|---|---|
| | | | | |
| | | | | |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
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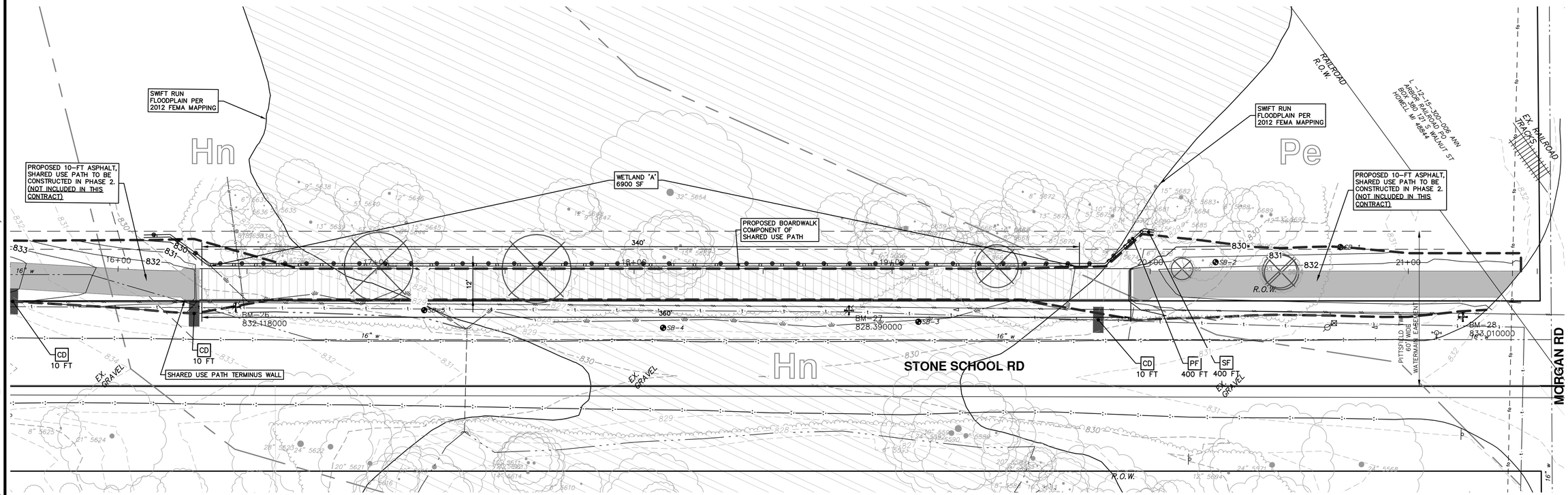


## SESC MEASURES KEY

| KEY | DESCRIPTION |
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| PF | INSTALL PROTECTIVE FENCING |
| CD | INSTALL CHECK DAM, STONE |
| ID | INTERCEPTING DITCH |
| RR | INSTALL RIP-RAP |
| SB | TEMPORARY SEDIMENT BASIN |
| TS | TEMPORARY INLET STRUCTURE |
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**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

# PHASE 1 - SIDEWALK & BOARDWALK

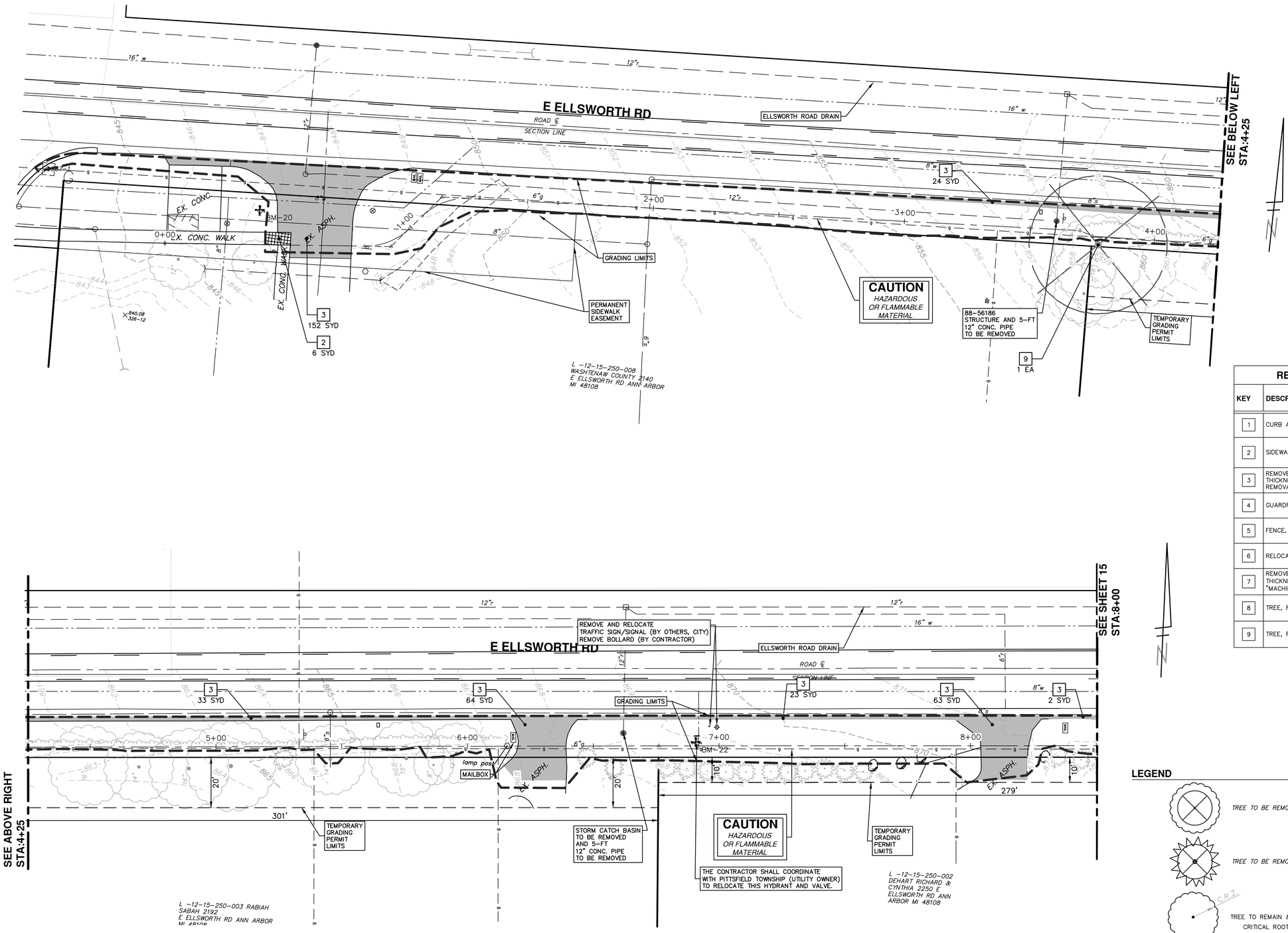
## SOIL EROSION CONTROLS AND WATER QUALITY IMPROVEMENTS

### STONE SCHOOL ROAD BOARDWALK

SCALE PLAN: 1" = 20'

DRAWING No. 2014031-13

SHEET No. 13 OF 37




## REMOVAL KEY

| KEY | DESCRIPTION |
|---|---|
| 1 | CURB AND GUTTER, REM |
| 2 | SIDEWALK, REM |
| 3 | REMOVE EXISTING PAVEMENT – ANY THICKNESS, SAWCUT FULL DEPTH AT REMOVAL LIMITS |
| 4 | GUARDRAIL, REM |
| 5 | FENCE, REM |
| 6 | RELOCATE BY OWNER |
| 7 | REMOVE EXISTING GRAVEL – ANY THICKNESS, (INCLUDED IN WORK ITEM "MACHINE GRADING, MODIFIED, ____") |
| 8 | TREE, REM, 6 INCH TO 18 INCH |
| 9 | TREE, REM, 19 INCH TO 36 INCH |

## LEGEND

TREE TO BE REMOVED (DECIDUOUS)

TREE TO BE REMOVED (CONIFEROUS)

C.R.Z.

TREE TO REMAIN & PROTECT (DECIDUOUS)
CRITICAL ROOT ZONE (C.R.Z.) = DIAMETER BREAST HEIGHT (INCHES) X 10

C.R.Z.

TREE TO REMAIN & PROTECT (CONIFEROUS)
CRITICAL ROOT ZONE (C.R.Z.) = DIAMETER BREAST HEIGHT (INCHES) X 10

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

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

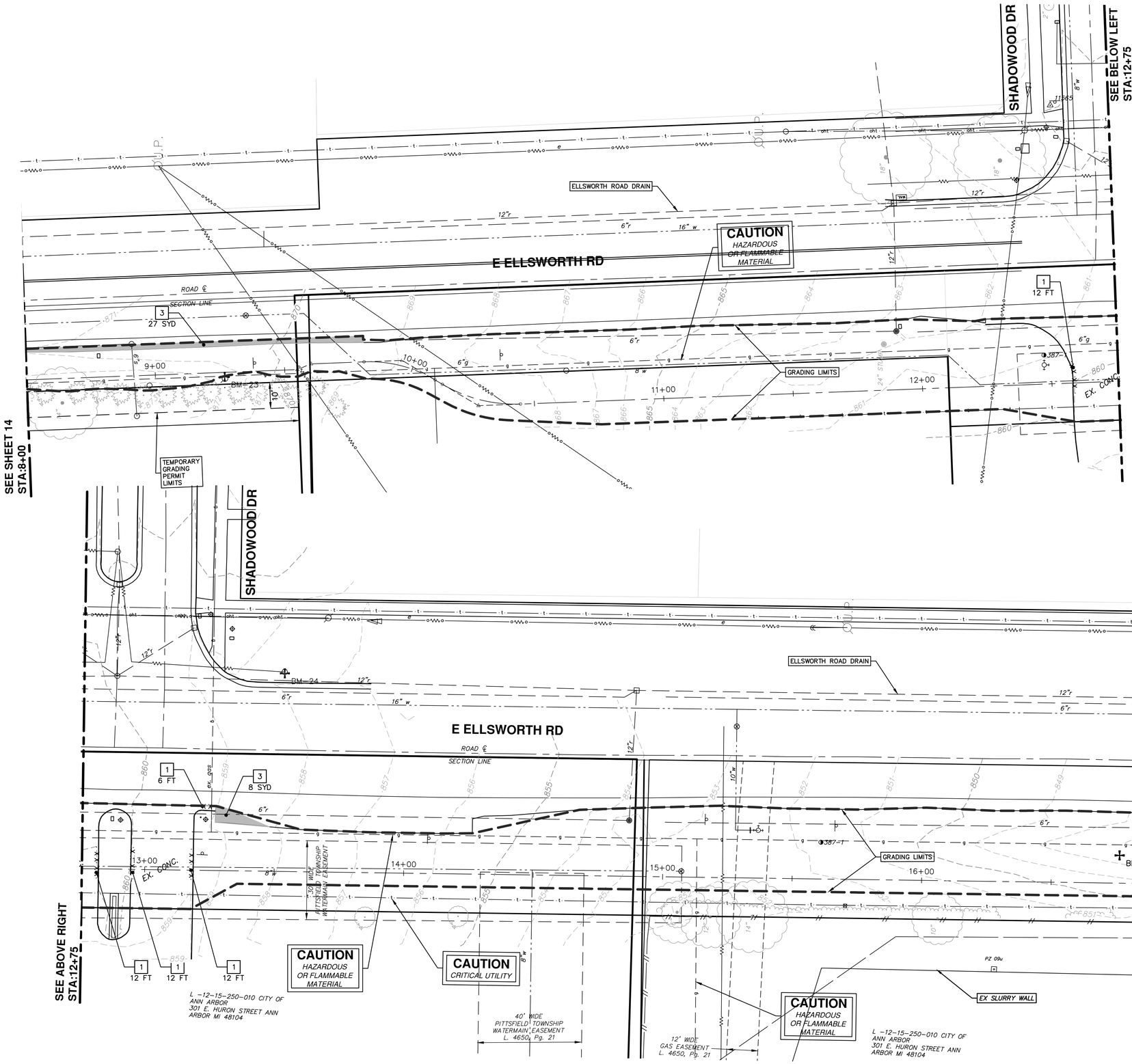
PHASE 1 - SIDEWALK & BOARDWALK

ELLSWORTH ROAD REMOVALSSTA. 0+00 - STA. 8+50

SCALE : 1" = 20'

DRAWING No. 2014031-14

SHEET No. 14 OF 37




## REMOVAL KEY

| KEY | DESCRIPTION |
|---|---|
| 1 | CURB AND GUTTER, REM |
| 2 | SIDEWALK, REM |
| 3 | REMOVE EXISTING PAVEMENT – ANY THICKNESS, SAWCUT FULL DEPTH AT REMOVAL LIMITS |
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| 8 | TREE, REM, 6 INCH TO 18 INCH |
| 9 | TREE, REM, 19 INCH TO 36 INCH |

Know what's below. Call before you dig. 811

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

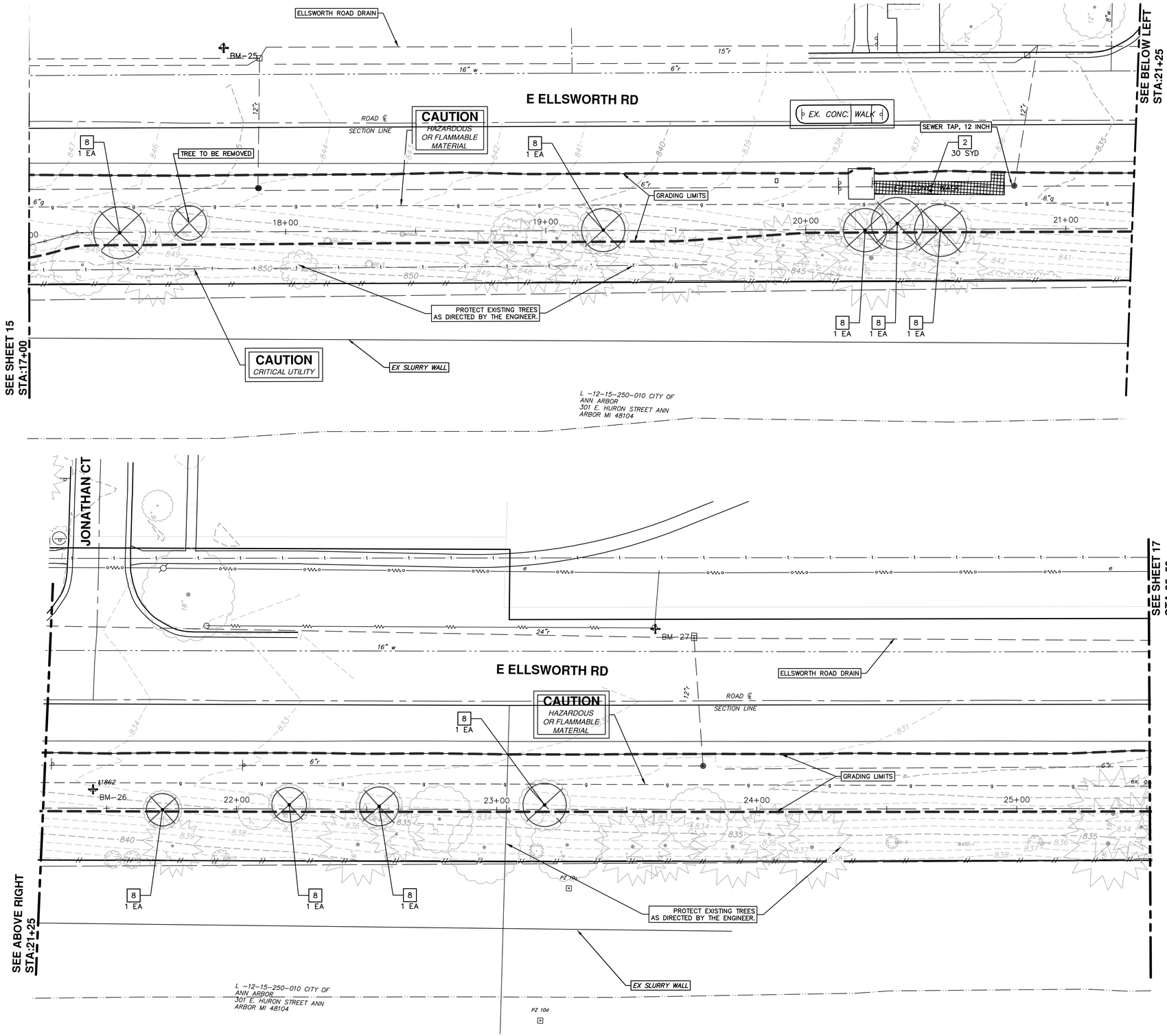
**PHASE 1 - SIDEWALK & BOARDWALK**

**ELLSWORTH ROAD REMOVALSSTA. 8+50 - STA. 17+00**

SCALE : 1" = 20'

DRAWING No. 2014031-15

SHEET No. 15 OF 37




## REMOVAL KEY

| KEY | DESCRIPTION |
|---|---|
| 1 | CURB AND GUTTER, REM |
| 2 | SIDEWALK, REM |
| 3 | REMOVE EXISTING PAVEMENT – ANY THICKNESS, SAWCUT FULL DEPTH AT REMOVAL LIMITS |
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| 7 | REMOVE EXISTING GRAVEL – ANY THICKNESS, (INCLUDED IN WORK ITEM "MACHINE GRADING, MODIFIED, ____") |
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Know what's below. Call before you dig.

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

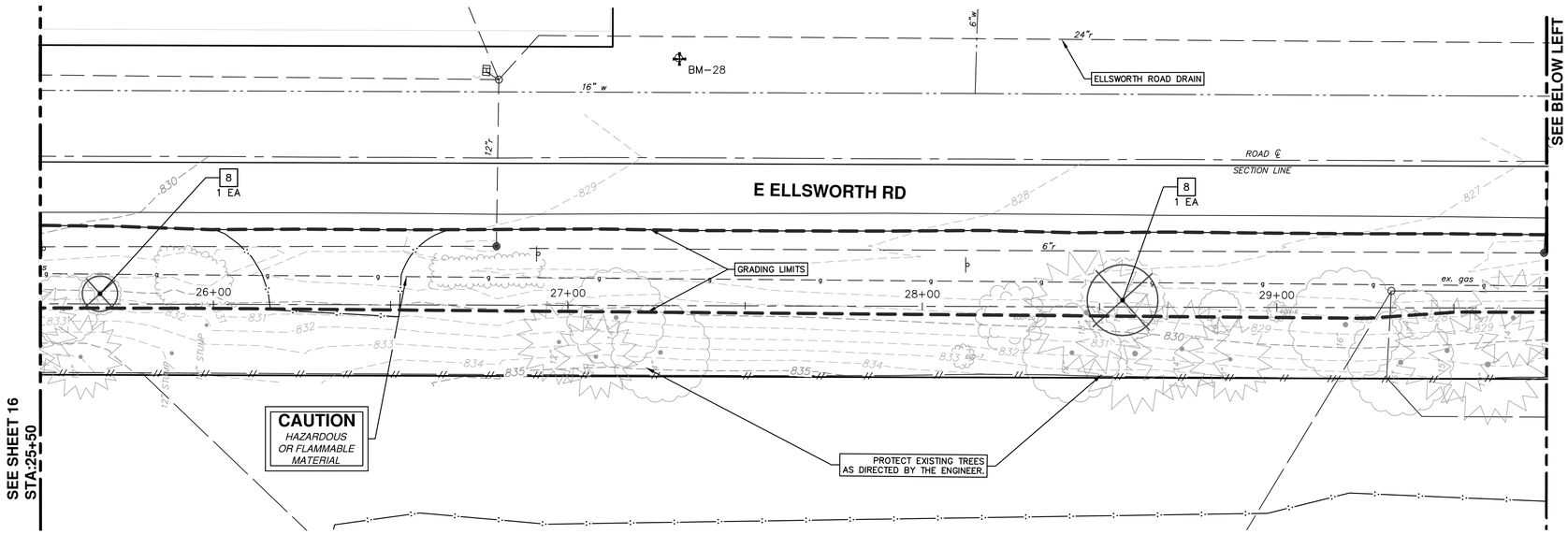
**PHASE 1 - SIDEWALK & BOARDWALK**

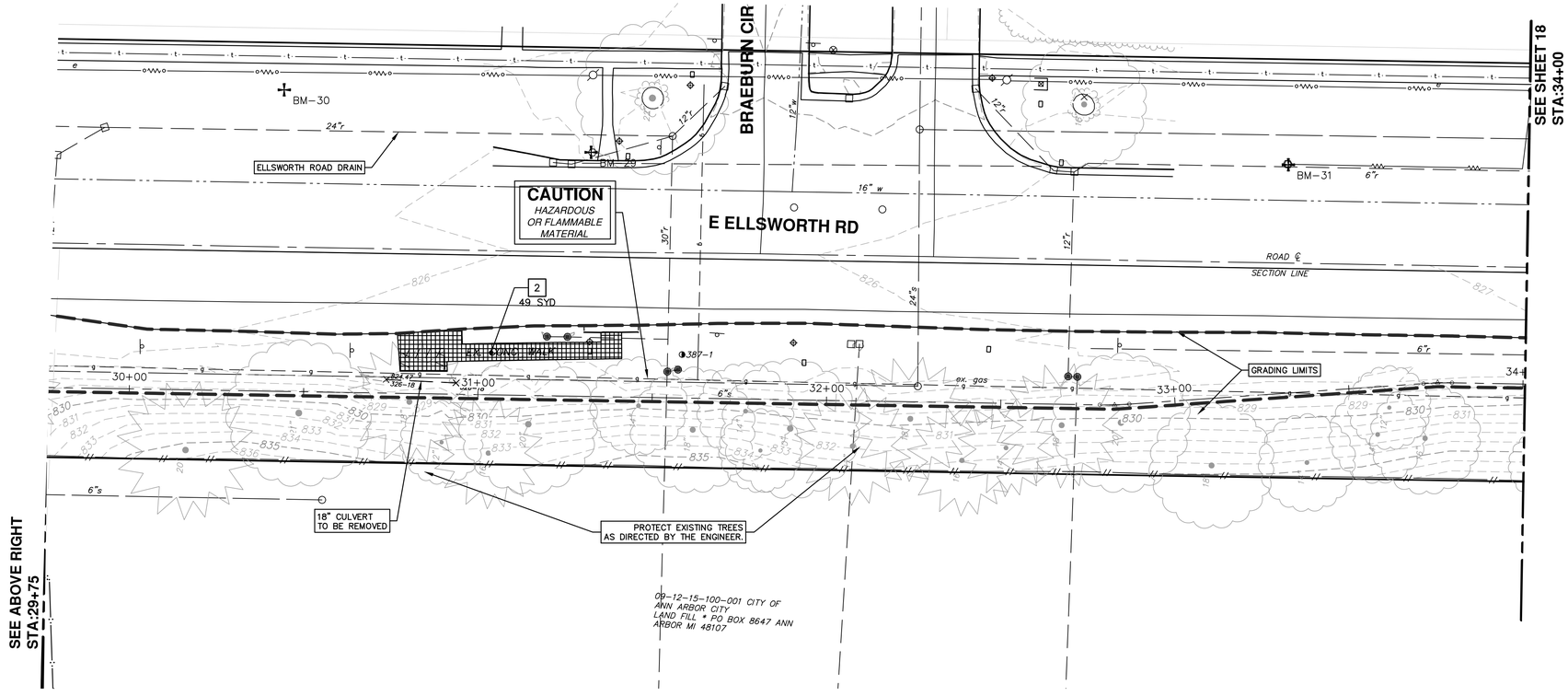
**ELLSWORTH ROAD REMOVALSSTA. 17+00 - STA. 25+50**

SCALE : 1" = 20'

DRAWING No. **2014031-16**

SHEET No. **16 OF 37**




## REMOVAL KEY

| KEY | DESCRIPTION |
|---|---|
| 1 | CURB AND GUTTER, REM |
| 2 | SIDEWALK, REM |
| 3 | REMOVE EXISTING PAVEMENT – ANY THICKNESS, SAWCUT FULL DEPTH AT REMOVAL LIMITS |
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| 9 | TREE, REM, 19 INCH TO 36 INCH |

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| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10–22–15 | CEC | DAD |
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CITY OF ANN ARBOR MICHIGAN

**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

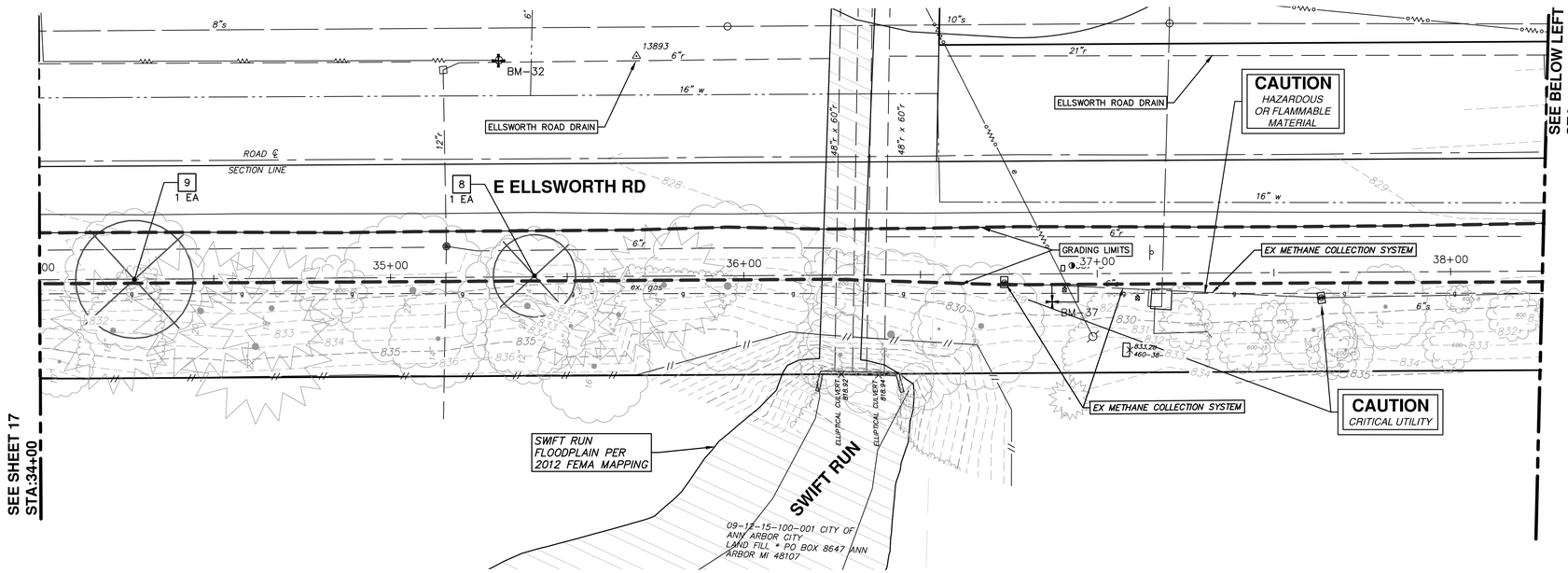
**PHASE 1 - SIDEWALK & BOARDWALK**

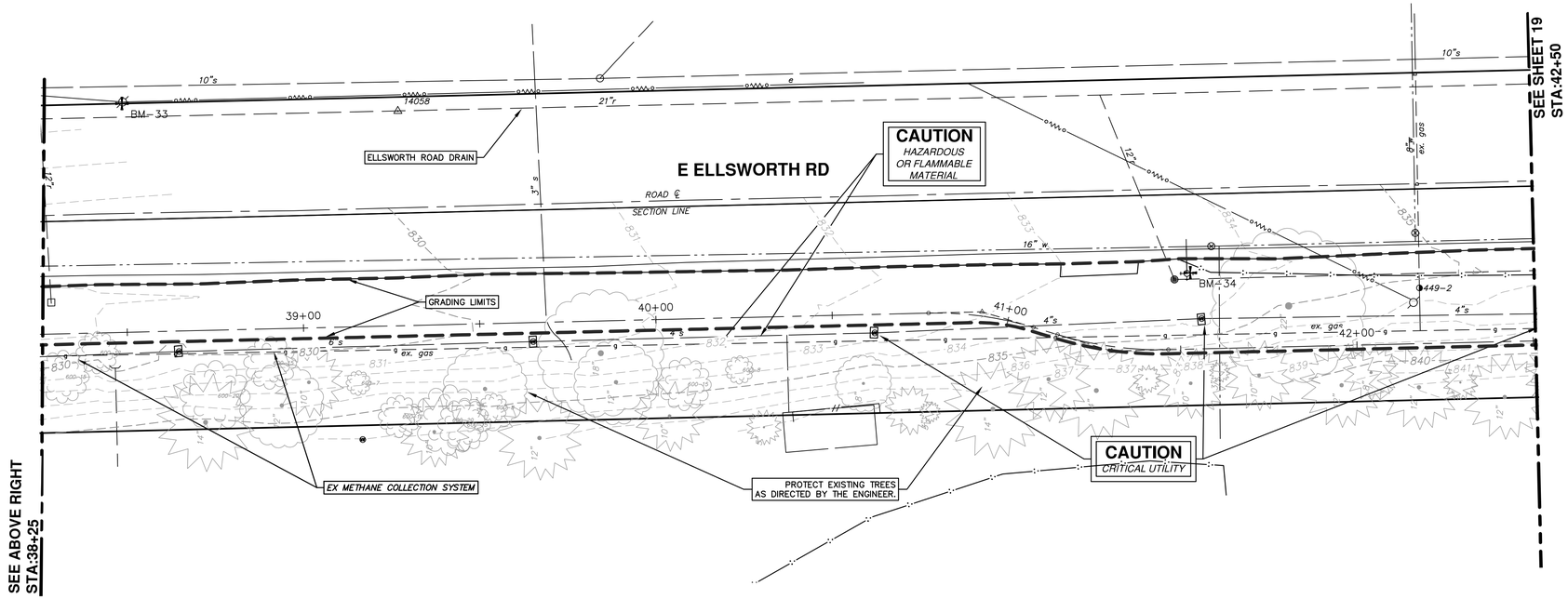
**ELLSWORTH ROAD REMOVALSSTA. 25+50 - STA. 34+00**

SCALE : 1" = 20'

DRAWING No.
**2014031-17**

SHEET No.
**17 OF 37**




## REMOVAL KEY

| KEY | DESCRIPTION |
|---|---|
| 1 | CURB AND GUTTER, REM |
| 2 | SIDEWALK, REM |
| 3 | REMOVE EXISTING PAVEMENT – ANY THICKNESS, SAWCUT FULL DEPTH AT REMOVAL LIMITS |
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| 6 | RELOCATE BY OWNER |
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| 9 | TREE, REM, 19 INCH TO 36 INCH |

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| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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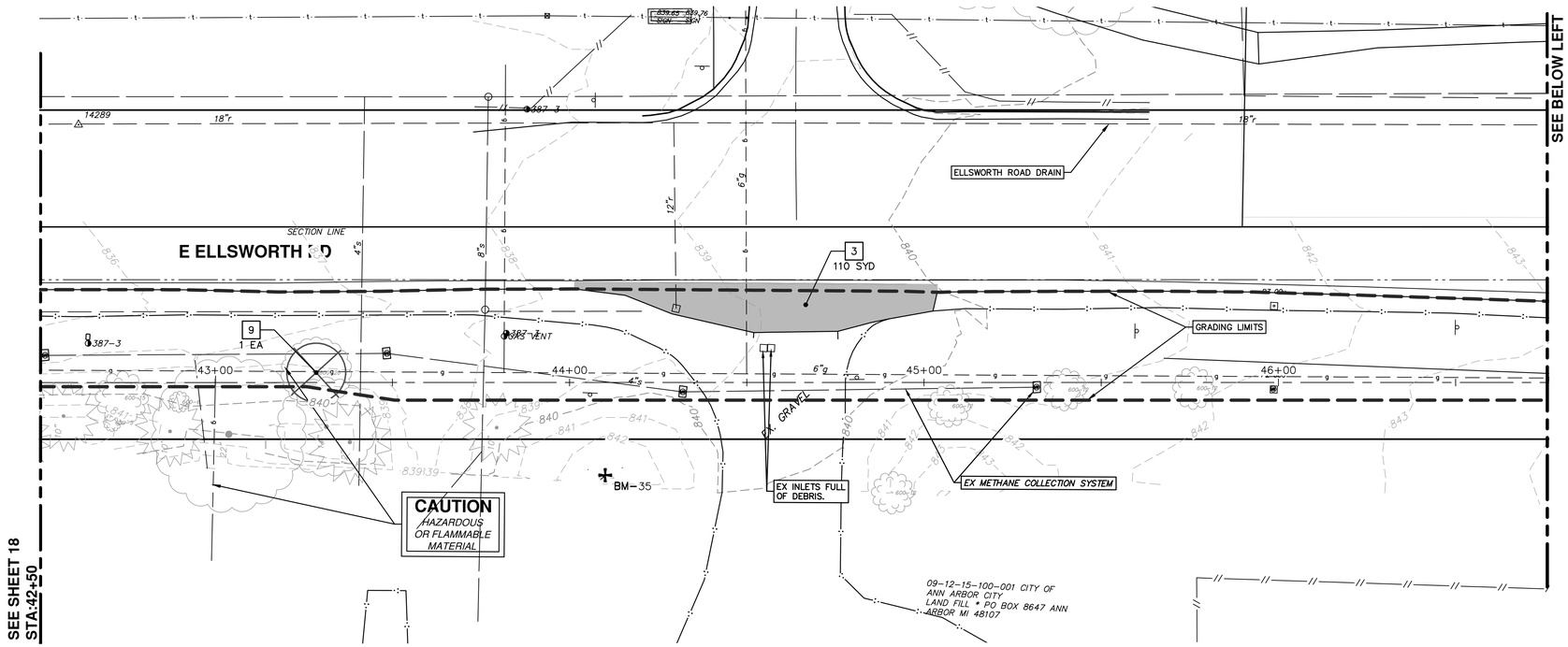
**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

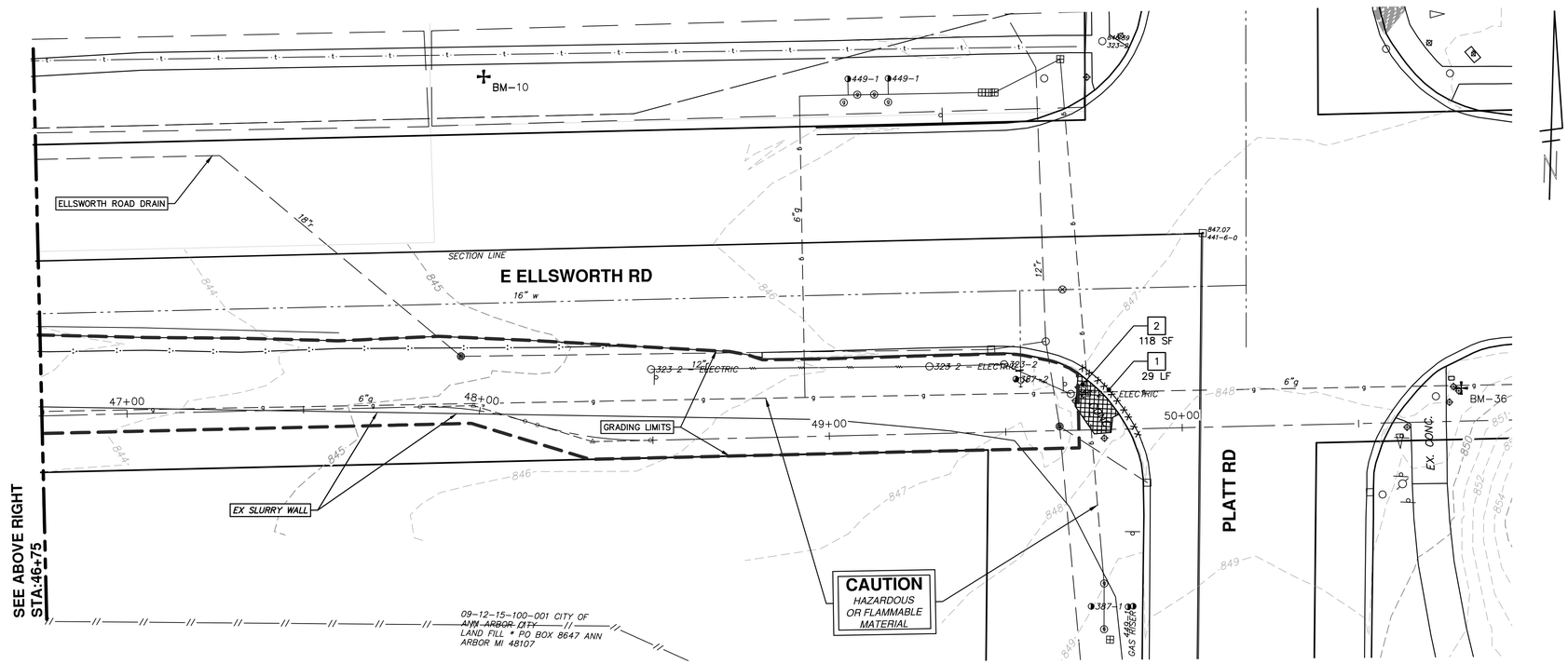
**PHASE 1 - SIDEWALK & BOARDWALK**
**ELLSWORTH ROAD REMOVALSSTA. 34+00 - STA. 42+50**

SCALE : 1" = 20'

DRAWING No.
**2014031-18**

SHEET No.
**18 OF 37**




## REMOVAL KEY

| KEY | DESCRIPTION |
|---|---|
| 1 | CURB AND GUTTER, REM |
| 2 | SIDEWALK, REM |
| 3 | REMOVE EXISTING PAVEMENT – ANY THICKNESS, SAWCUT FULL DEPTH AT REMOVAL LIMITS |
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| 5 | FENCE, REM |
| 6 | RELOCATE BY OWNER |
| 7 | REMOVE EXISTING GRAVEL – ANY THICKNESS, (INCLUDED IN WORK ITEM "MACHINE GRADING, MODIFIED, ____") |
| 8 | TREE, REM, 6 INCH TO 18 INCH |
| 9 | TREE, REM, 19 INCH TO 36 INCH |

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|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

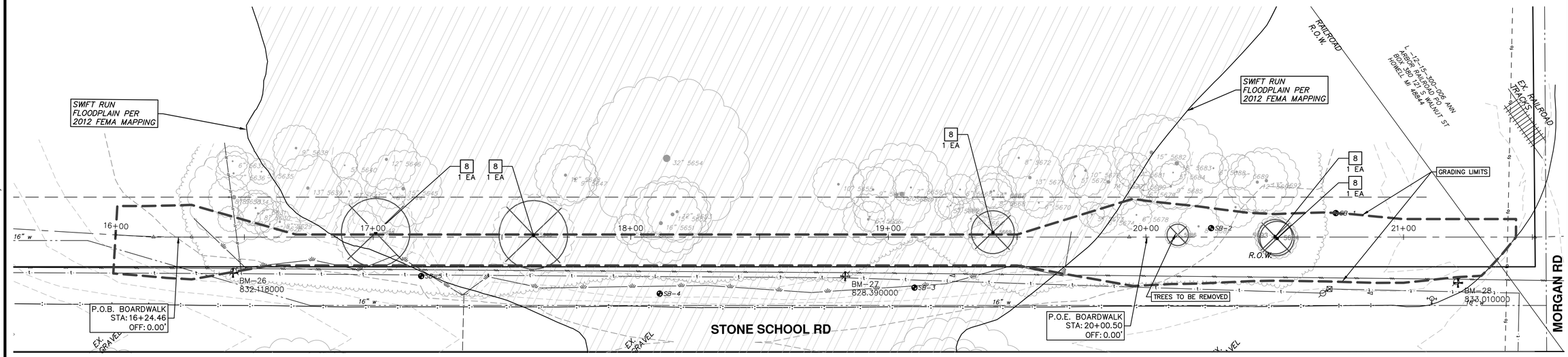
**PHASE 1 - SIDEWALK & BOARDWALK**

ELLSWORTH ROAD REMOVALSSTA. 42+50 - P.O.E.

SCALE : 1" = 20'

DRAWING No. 2014031-19

SHEET No. 19 OF 37




## REMOVAL KEY

| KEY | DESCRIPTION |
|---|---|
| 1 | CURB AND GUTTER, REM |
| 2 | SIDEWALK, REM |
| 3 | REMOVE EXISTING PAVEMENT – ANY THICKNESS, SAWCUT FULL DEPTH AT REMOVAL LIMITS |
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| 5 | FENCE, REM |
| 6 | RELOCATE BY OWNER |
| 7 | REMOVE EXISTING GRAVEL – ANY THICKNESS, (INCLUDED IN WORK ITEM "MACHINE GRADING, MODIFIED, ____") |
| 8 | TREE, REM, 6 INCH TO 18 INCH |
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Know what's **below.** **Call before you dig.**

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|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10–22–15 | CEC | DAD |
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**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

SCALE: 1" = 20'

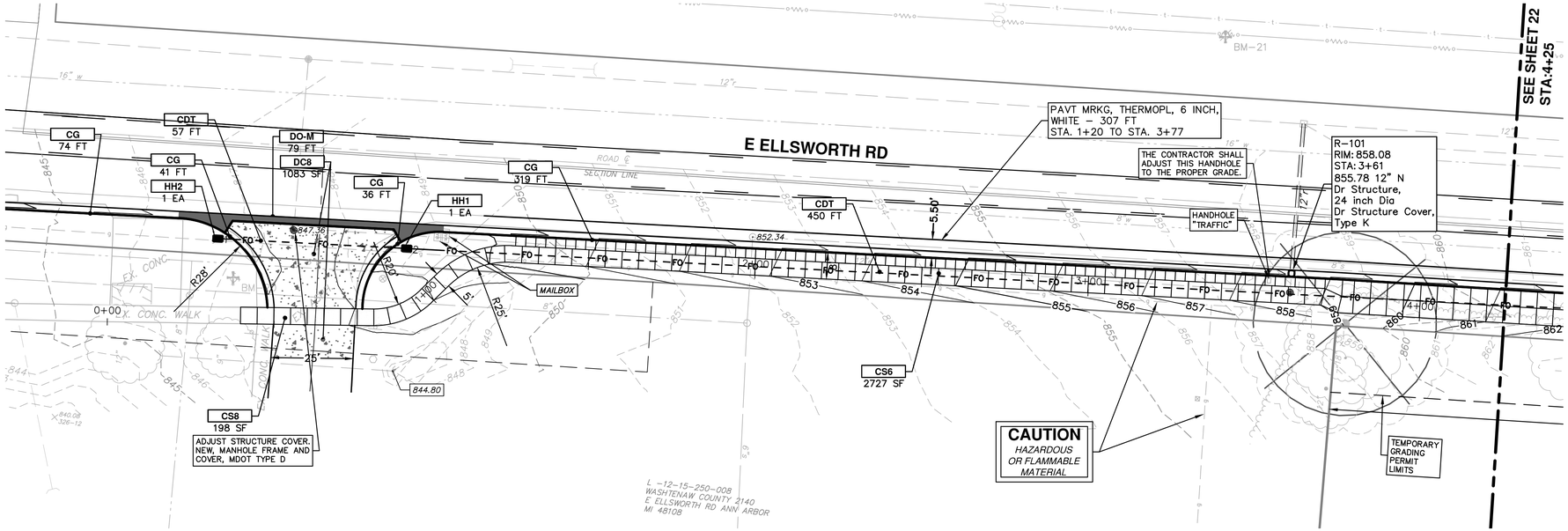
# PHASE 1 - SIDEWALK & BOARDWALK

## STONE SCHOOL ROAD REMOVALS

## BOARDWALK

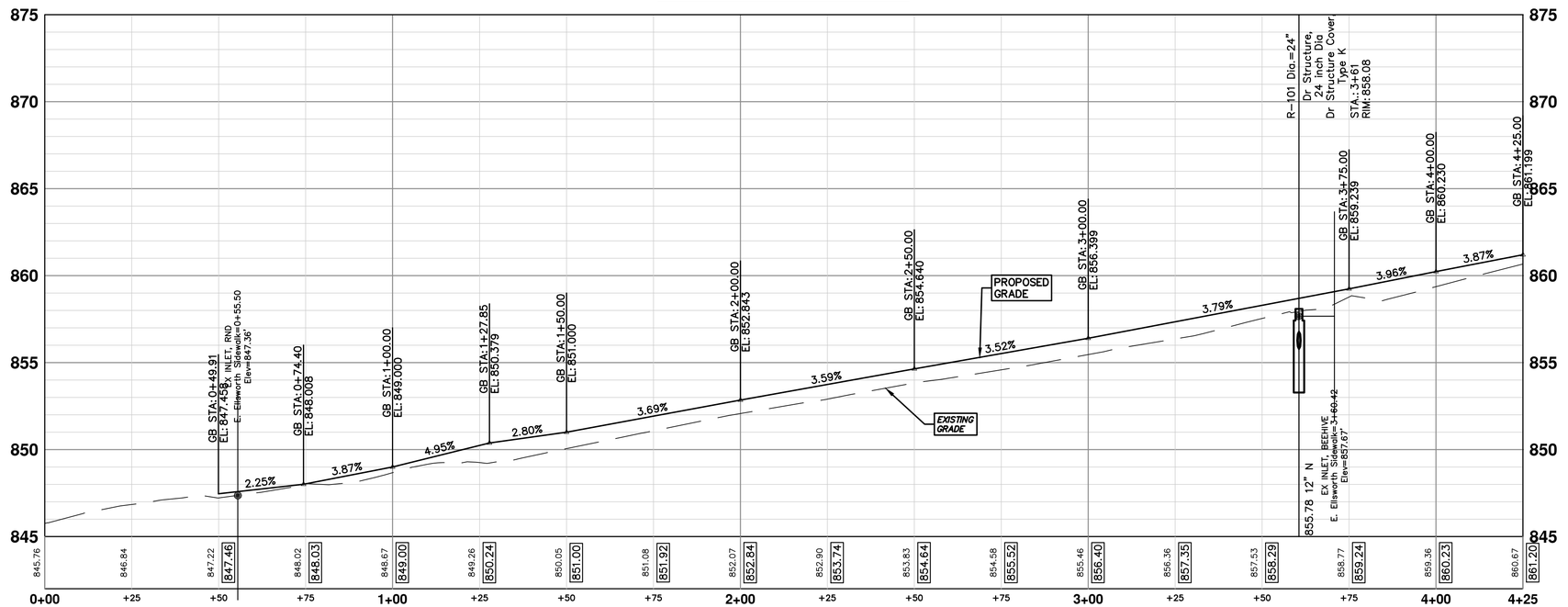
DRAWING No.
**2014031-20**

SHEET No.
**20 OF 37**




| CONSTRUCTION KEY | |
|---|---|
| **KEY** | **DESCRIPTION** |
| CS4 | PLACE SIDEWALK, CONC, 4 INCH, SPECIAL |
| CS6 | PLACE SIDEWALK, CONC, 6 INCH, SPECIAL |
| CS8 | PLACE SIDEWALK, CONC, 8 INCH, SPECIAL |
| CSR8 | PLACE SIDEWALK RAMP, CONC, 8 INCH, ADA, MOD |
| DH | PLACE 4" HMA DRIVE OR WALK |
| ABO | ADJUST BY OTHERS |
| DWS | DETECTABLE WARNING SURFACE, MODIFIED |
| CDT | CONDUIT, DB, 2, 3 INCH |
| HH1 | HANDHOLE ASSEMBLY, 12 INCH X 18 INCH |
| HH2 | HANDHOLE ASSEMBLY, 17 INCH X 30 INCH |

## E. ELLSWORTH SIDEWALK




**CONSTRUCTION NOTES:**

1. FOR SIDEWALK AND PAVEMENT REMOVALS, SAWCUT EXISTING MATERIAL FULL–DEPTH AT REMOVAL LIMITS AS DIRECTED BY THE ENGINEER.
2. PLACE SIDEWALK AS DIRECTED BY THE ENGINEER IN ACCORDANCE WITH PAVING DETAIL SHEETS, GRADING DETAIL SHEETS, AND PROJECT SPECIFICATIONS. SEE PAVING DETAIL SHEETS FOR SIDEWALK JOINT LAYOUT AND OTHER RELEVANT INFORMATION.
3. THE CONTRACTOR SHALL CAREFULLY PROTECT FROM DAMAGE OR INJURY DURING CONSTRUCTION OPERATIONS ALL UTILITIES NOT DESIGNATED FOR REMOVAL OR ABANDONMENT. EXISTING FACILITIES NOT DESIGNATED FOR REMOVAL OR ABANDONMENT BUT WHICH ARE DAMAGED BY THE CONTRACTOR'S OPERATION SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR AT HIS SOLE EXPENSE, AS DETERMINED BY THE ENGINEER.
4. SEE THE LANDSCAPING SHEETS FOR FENCING TO BE REMOVED, SAVED, OR PLACED AS PART OF THIS PROJECT.
5. THE EXISTING PEDESTRIAN SIGNALS AND PUSHBUTTONS SHALL BE REMOVED AND RELOCATED DURING THE PROJECT BY THE CITY OF ANN ARBOR SIGNS AND SIGNALS UNIT.

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

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|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10–22–15 | CEC | DAD |
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| 02 | ADDENDUM #4 | 4–20–16 | CEC/DPF | DAD |

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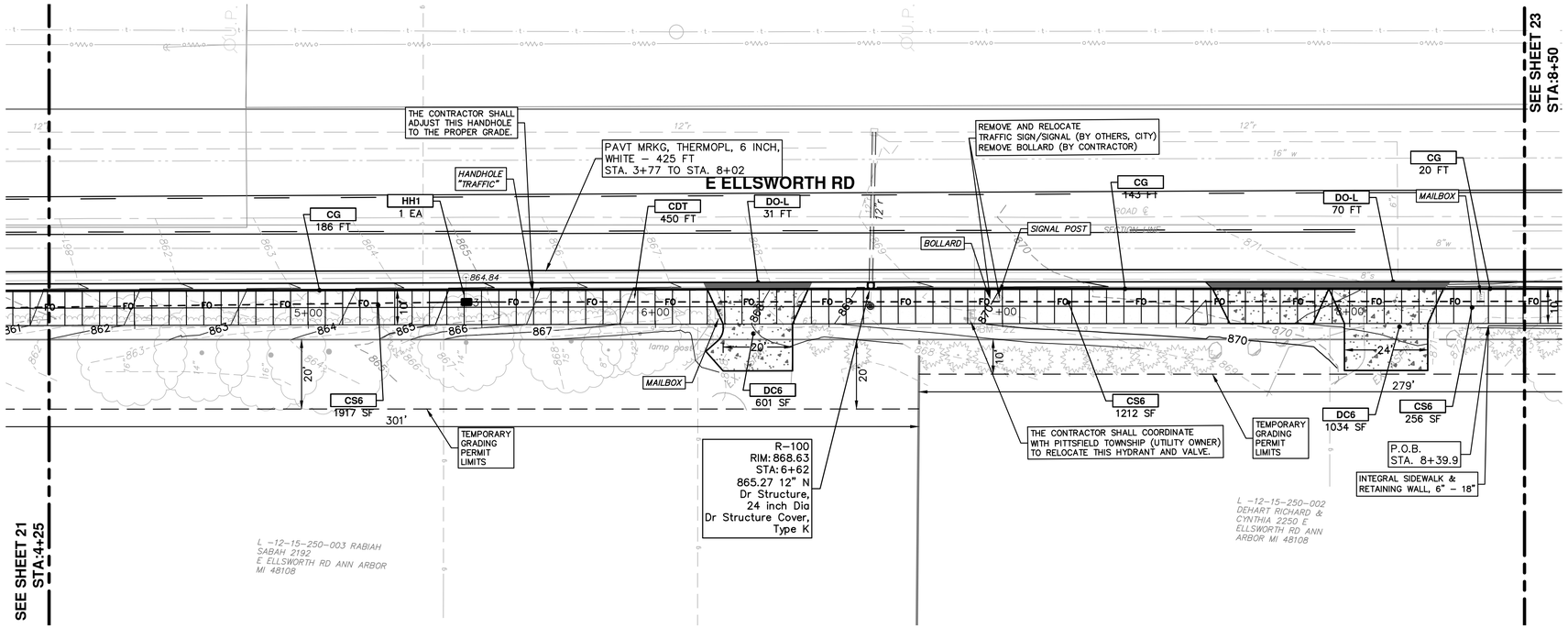
**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

**PHASE 1 - SIDEWALK & BOARDWALK**
**ELLSWORTH ROAD SIDEWALK PLAN AND PROFILE**
**STA. 0+00 - STA. 4+25**

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

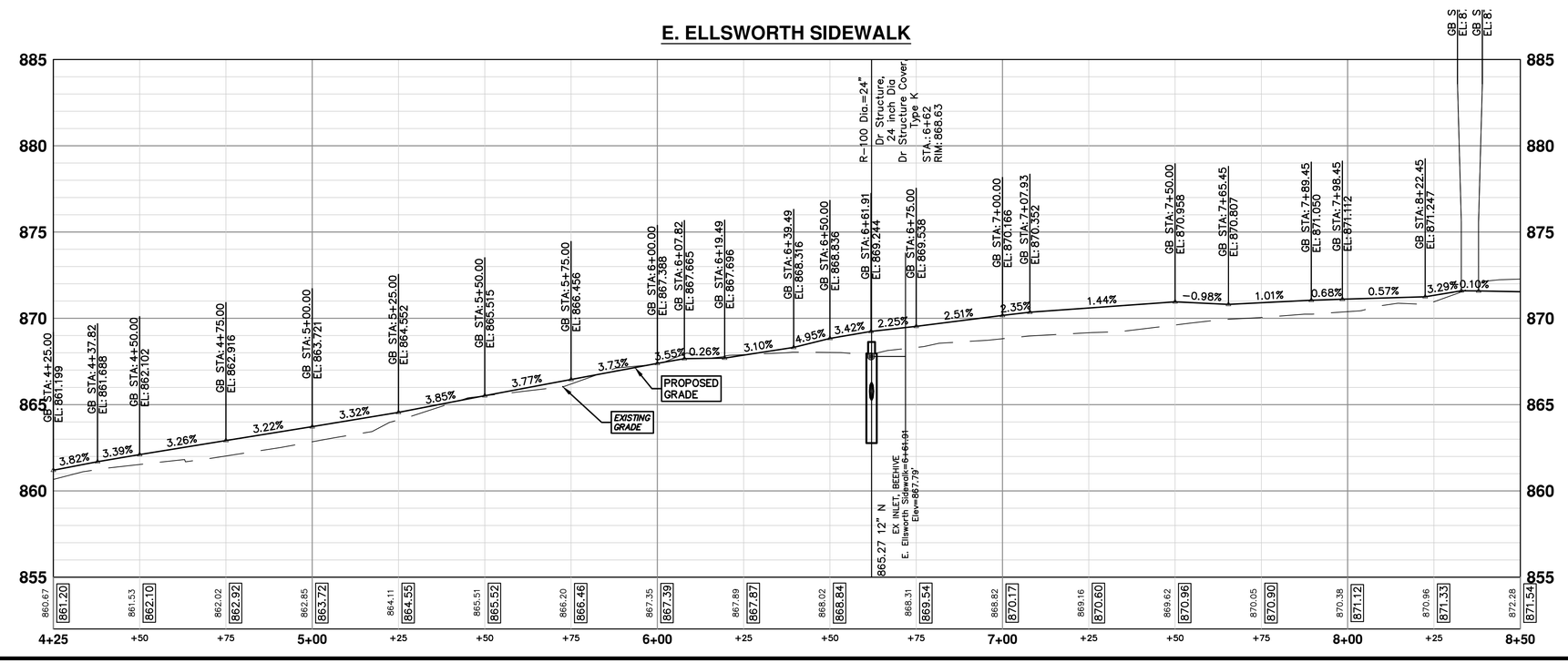
DRAWING No. **2014031-21**

SHEET No. **21 OF 37**




## CONSTRUCTION KEY

| KEY | DESCRIPTION |
|---|---|
| CS4 | PLACE SIDEWALK, CONC, 4 INCH, SPECIAL |
| CS6 | PLACE SIDEWALK, CONC, 6 INCH, SPECIAL |
| CS8 | PLACE SIDEWALK, CONC, 8 INCH, SPECIAL |
| CSR8 | PLACE SIDEWALK RAMP, CONC, 8 INCH, ADA, MOD |
| DH | PLACE 4" HMA DRIVE OR WALK |
| ABO | ADJUST BY OTHERS |
| DWS | DETECTABLE WARNING SURFACE, MODIFIED |
| CDT | CONDUIT, DB, 2, 3 INCH |
| HH1 | HANDHOLE ASSEMBLY, 12 INCH X 18 INCH |
| HH2 | HANDHOLE ASSEMBLY, 17 INCH X 30 INCH |






| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10–22–15 | CEC | DAD |
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# PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

## PHASE 1 - SIDEWALK & BOARDWALK

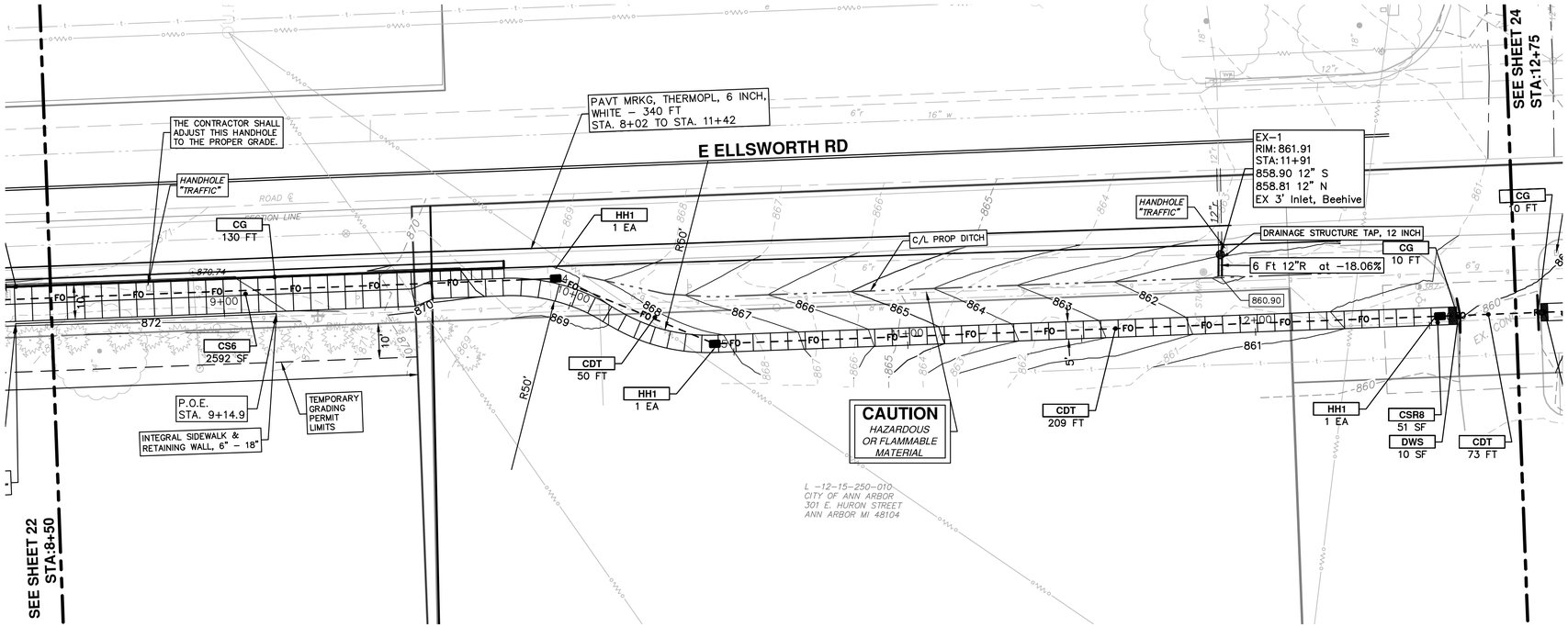
### ELLSWORTH ROAD SIDEWALK PLAN AND PROFILE

STA. 4+25 - STA. 8+50

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

DRAWING No. 2014031-22

SHEET No. 22 OF 37




## CONSTRUCTION KEY

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| CS6 | PLACE SIDEWALK, CONC, 6 INCH, SPECIAL |
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| CSR8 | PLACE SIDEWALK RAMP, CONC, 8 INCH, ADA, MOD |
| DH | PLACE 4" HMA DRIVE OR WALK |
| ABO | ADJUST BY OTHERS |
| DWS | DETECTABLE WARNING SURFACE, MODIFIED |
| CDT | CONDUIT, DB, 2, 3 INCH |
| HH1 | HANDHOLE ASSEMBLY, 12 INCH X 18 INCH |
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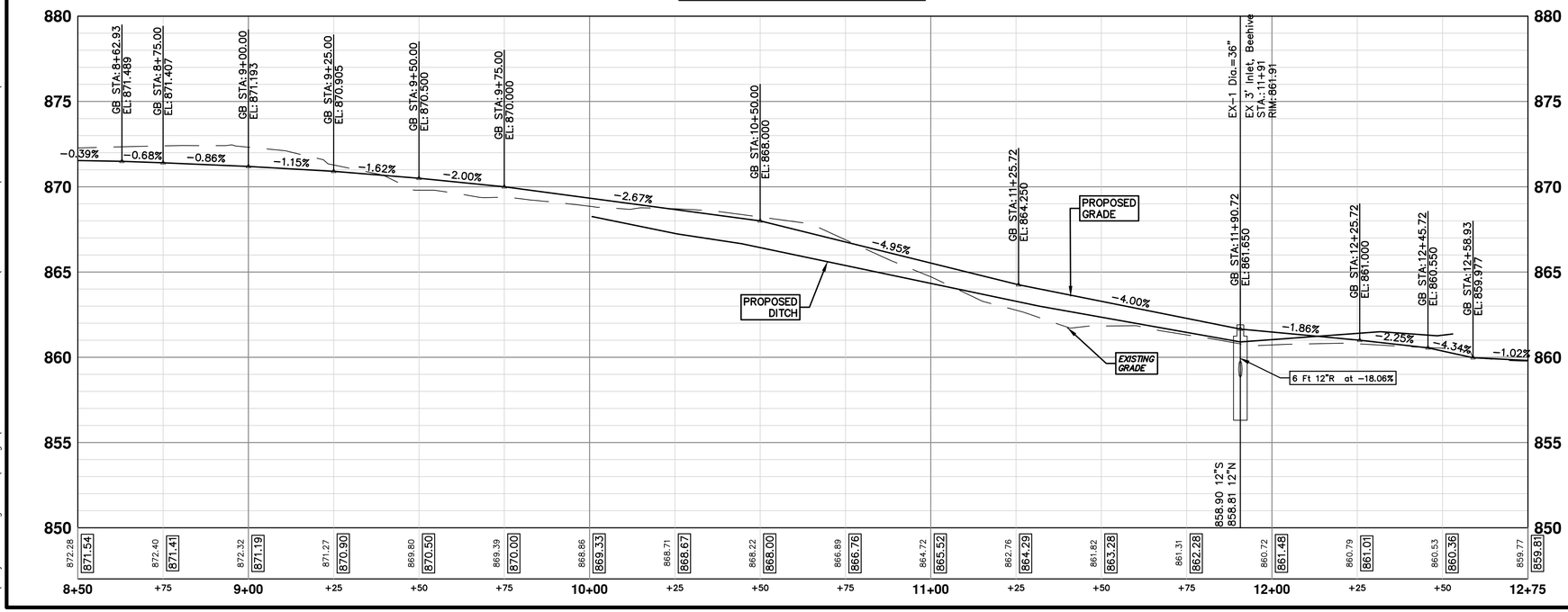
## E. ELLSWORTH SIDEWALK





| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10–22–15 | CEC | DAD |
| 01 | OUT FOR BID | 4–15–16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4–20–16 | CEC/DPF | DAD |



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**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

**PHASE 1 - SIDEWALK & BOARDWALK**

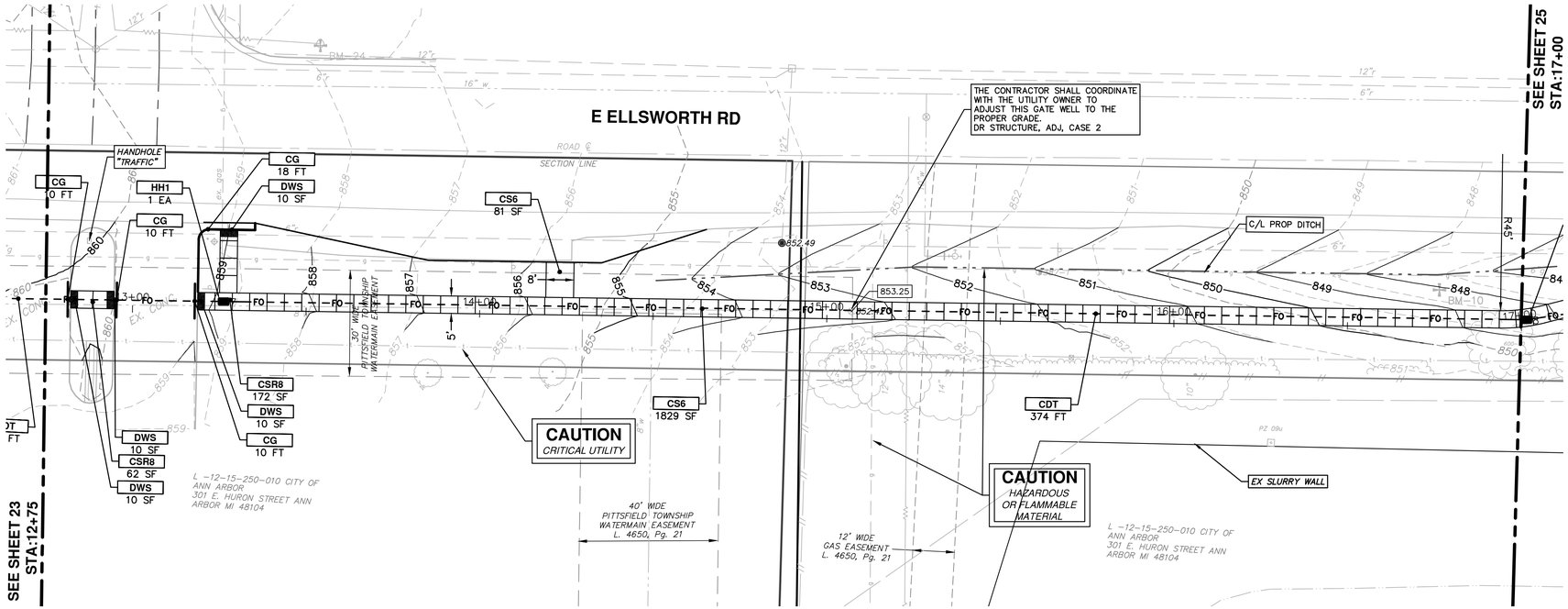
**ELLSWORTH ROAD SIDEWALK PLAN AND PROFILE**

**STA. 8+50 - STA. 12+75**

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

DRAWING No. **2014031-23**

SHEET No. **23 OF 37**




## CONSTRUCTION KEY

| KEY | DESCRIPTION |
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| CS6 | PLACE SIDEWALK, CONC, 6 INCH, SPECIAL |
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| DH | PLACE 4" HMA DRIVE OR WALK |
| ABO | ADJUST BY OTHERS |
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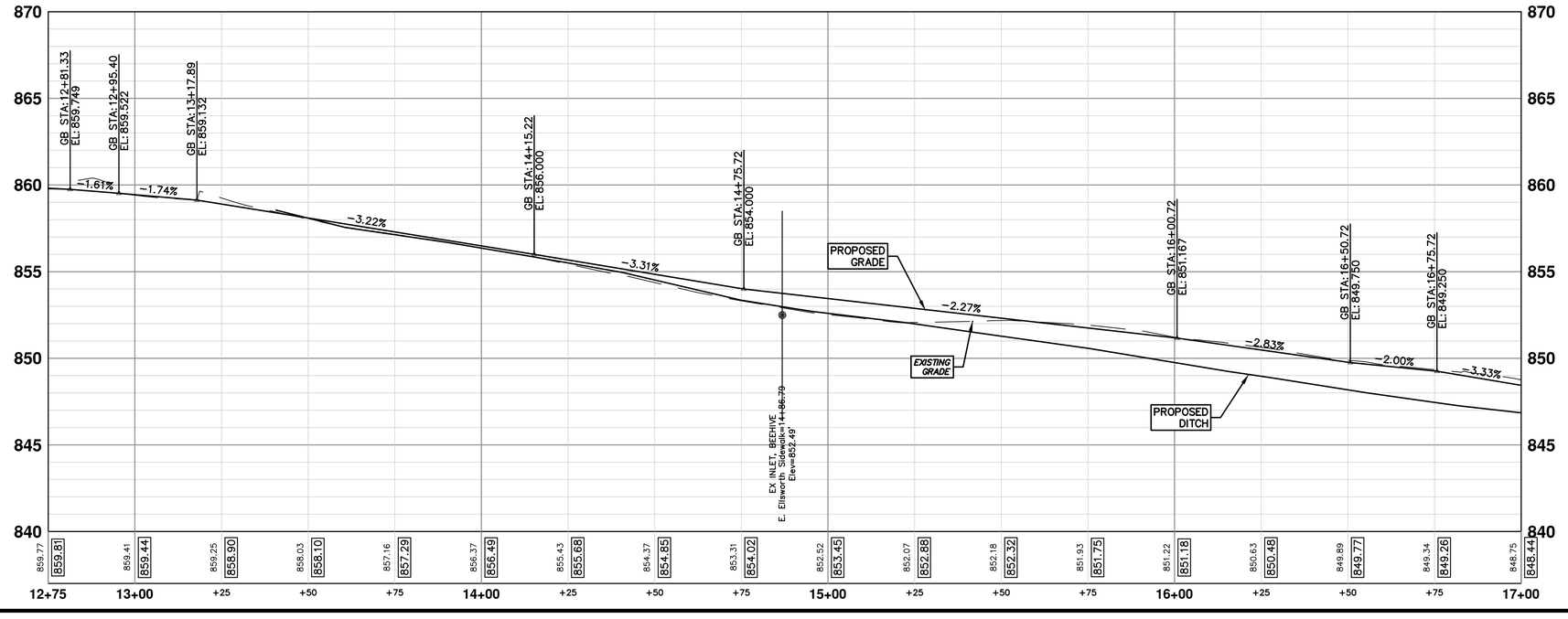
| CDT | CONDUIT, DB, 2, 3 INCH |
| HH1 | HANDHOLE ASSEMBLY, 12 INCH X 18 INCH |
| HH2 | HANDHOLE ASSEMBLY, 17 INCH X 30 INCH |

## E. ELLSWORTH SIDEWALK




| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
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**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

**PHASE 1 - SIDEWALK & BOARDWALK**

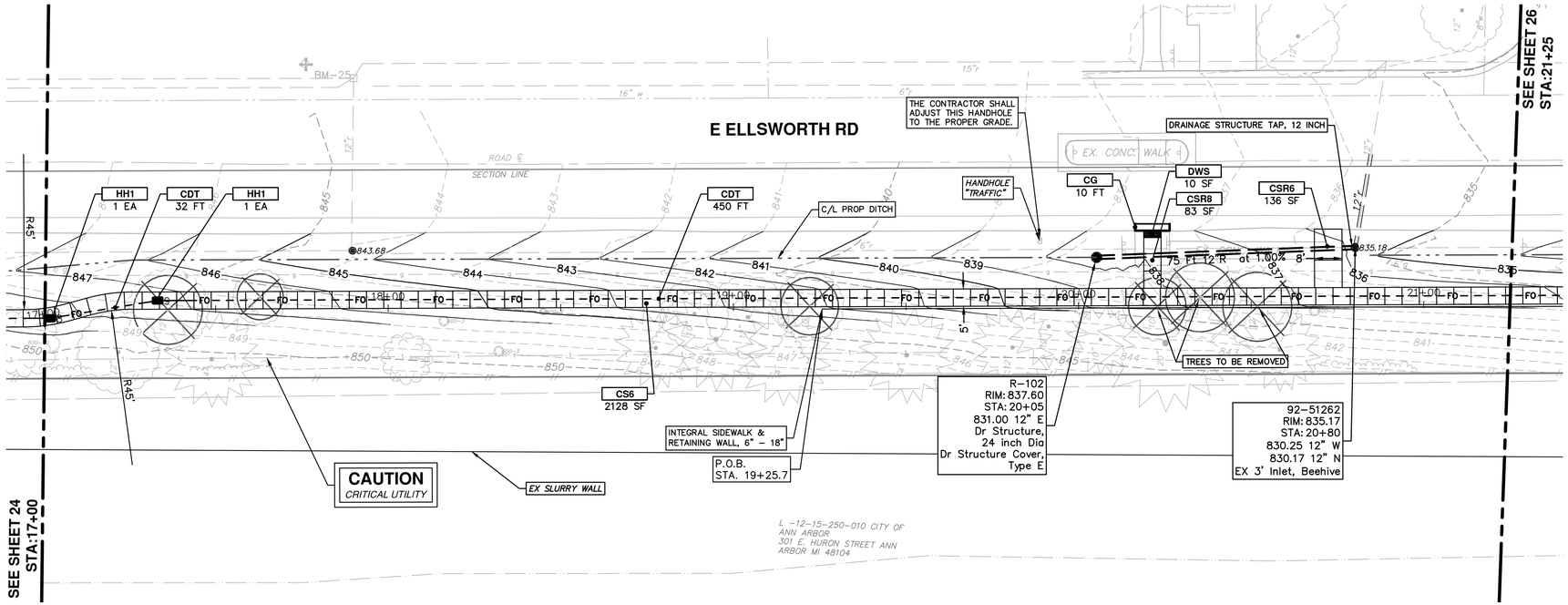
**ELLSWORTH ROAD SIDEWALK PLAN AND PROFILE**

**STA. 12+75 - STA. 17+00**

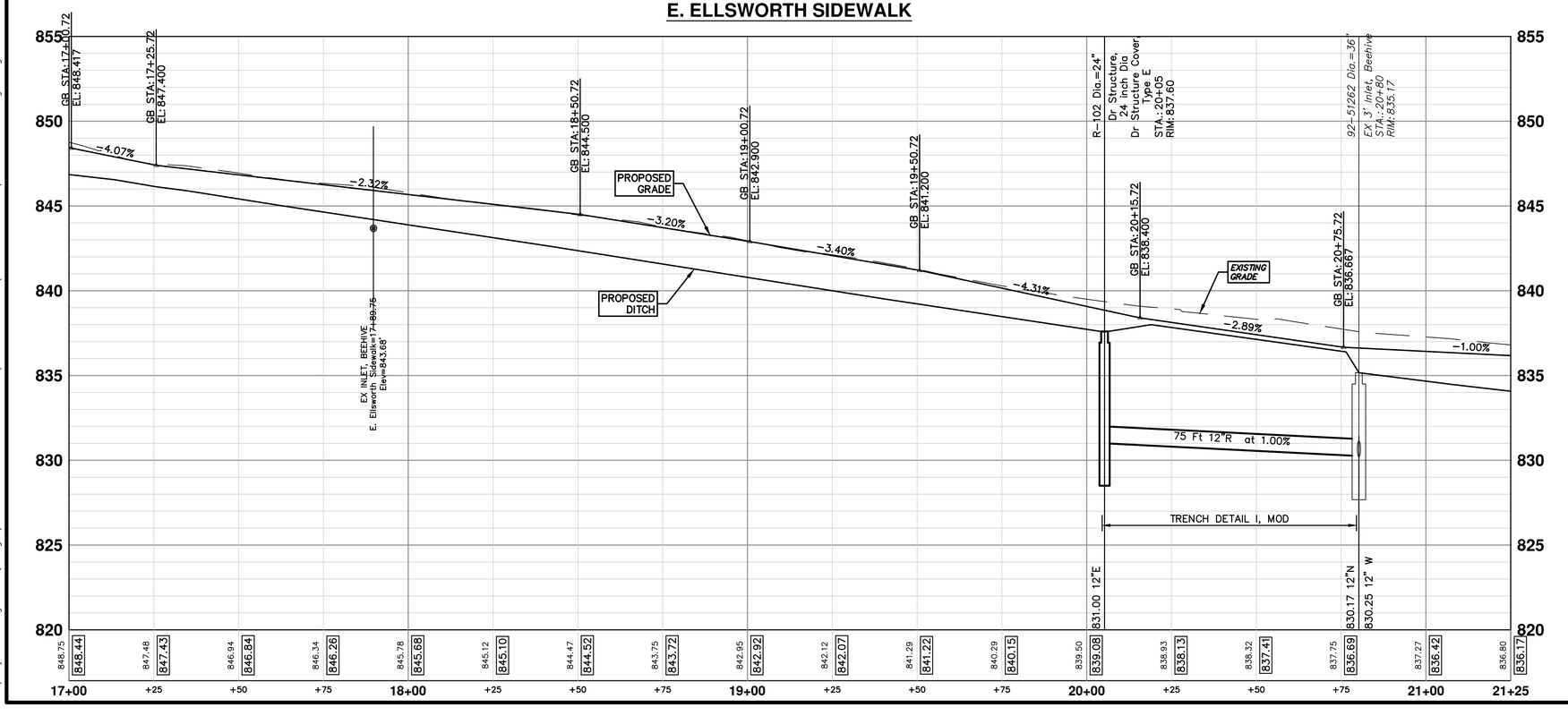
SCALE PLAN: 1" = 20' PROFILE: 1" = 4'

DRAWING No. 2014031-24

SHEET No. 24 OF 37




## E. ELLSWORTH SIDEWALK




### CONSTRUCTION KEY

| KEY | DESCRIPTION |
|---|---|
| CS4 | PLACE SIDEWALK, CONC, 4 INCH, SPECIAL |
| CS6 | PLACE SIDEWALK, CONC, 6 INCH, SPECIAL |
| CS8 | PLACE SIDEWALK, CONC, 8 INCH, SPECIAL |
| CSR8 | PLACE SIDEWALK RAMP, CONC, 8 INCH, ADA, MOD |
| DH | PLACE 4" HMA DRIVE OR WALK |
| ABO | ADJUST BY OTHERS |
| DWS | DETECTABLE WARNING SURFACE, MODIFIED |
| CDT | CONDUIT, DB, 2, 3 INCH |
| HH1 | HANDHOLE ASSEMBLY, 12 INCH X 18 INCH |
| HH2 | HANDHOLE ASSEMBLY, 17 INCH X 30 INCH |

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

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

PHASE 1 - SIDEWALK & BOARDWALK

ELLSWORTH ROAD SIDEWALK PLAN AND PROFILE

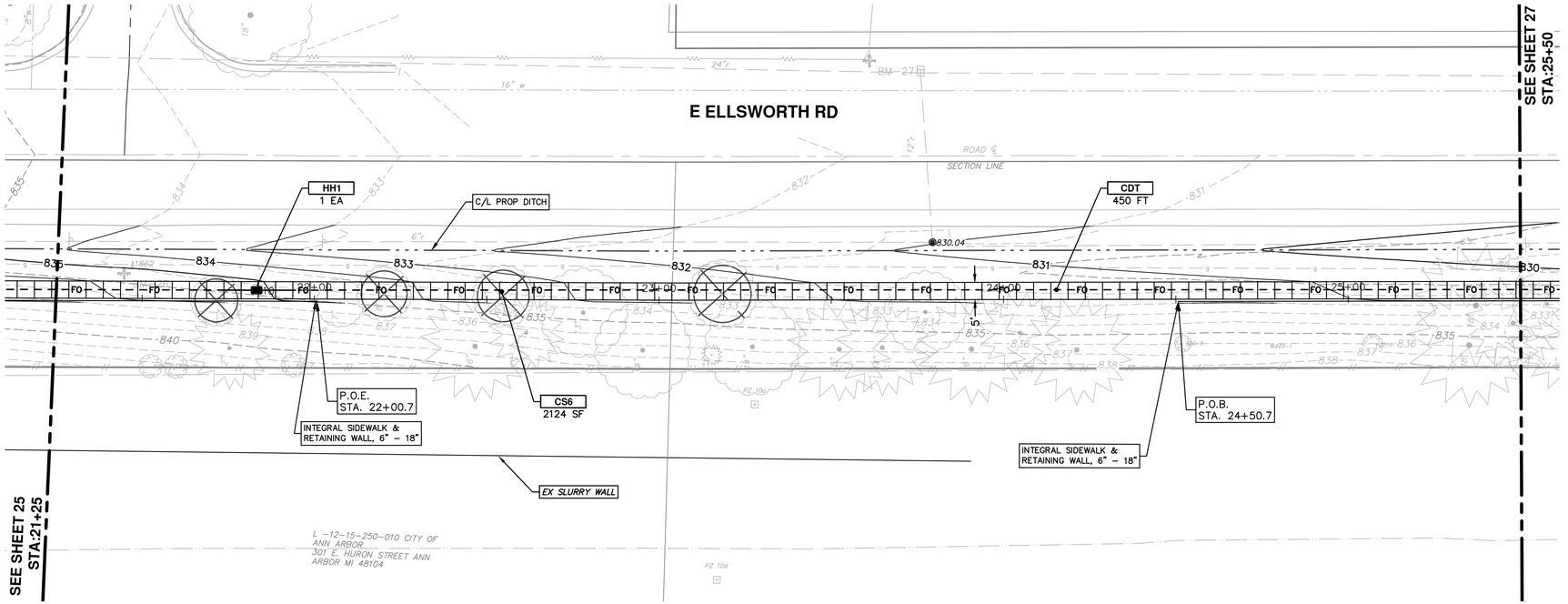
STA. 17+00 - STA. 21+25

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

DRAWING No. 2014031-25

SHEET No. 25 OF 37

S:\Project Management\Design\2014031 Wheeler Center PUD\Plan Production\Construction Set\2014031PPSW.dwg Dwg Created: 18-Aug-15 – _a2 standard bw.stb – Plot Date: 25-May-16




| CONSTRUCTION KEY | |
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| KEY | DESCRIPTION |
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| CS6 | PLACE SIDEWALK, CONC, 6 INCH, SPECIAL |
| CS8 | PLACE SIDEWALK, CONC, 8 INCH, SPECIAL |
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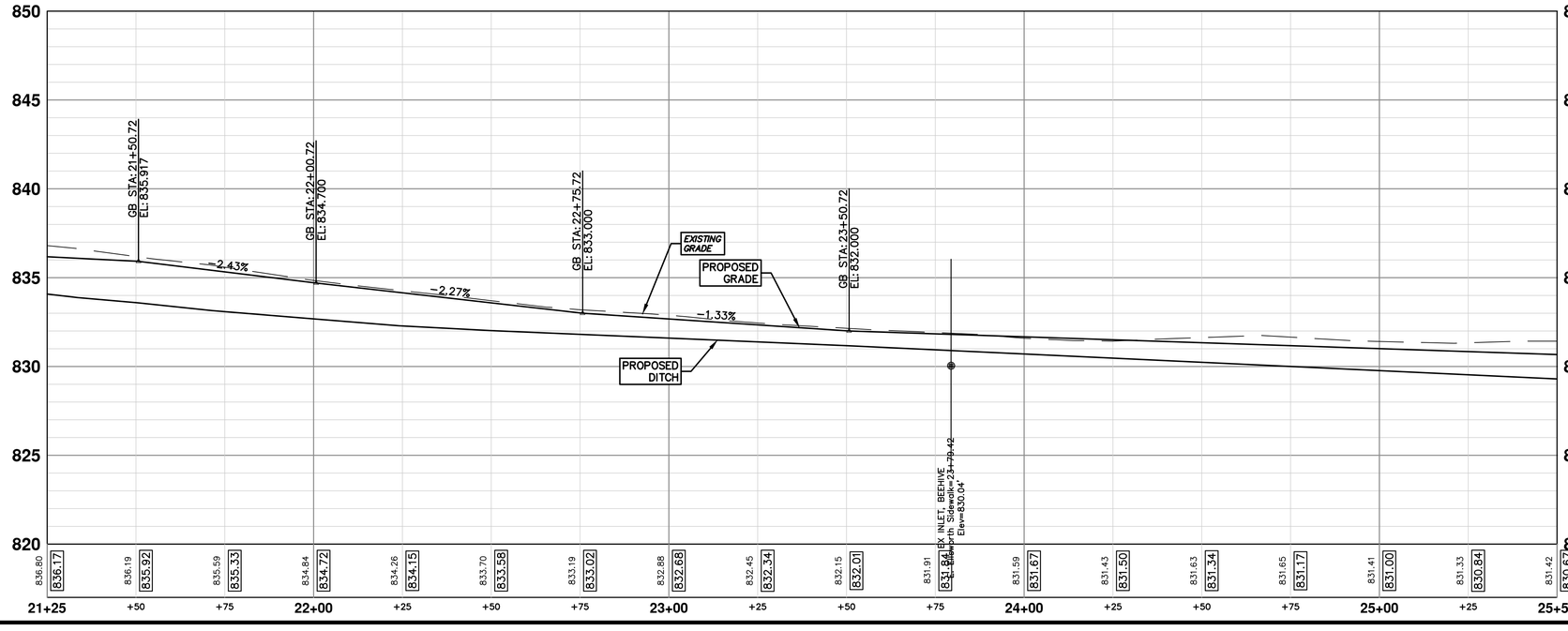
## E. ELLSWORTH SIDEWALK




Know what's below. Call before you dig.

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10–22–15 | CEC | DAD |
| 01 | OUT FOR BID | 4–15–16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4–20–16 | CEC/DPF | DAD |

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PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

PHASE 1 - SIDEWALK & BOARDWALK

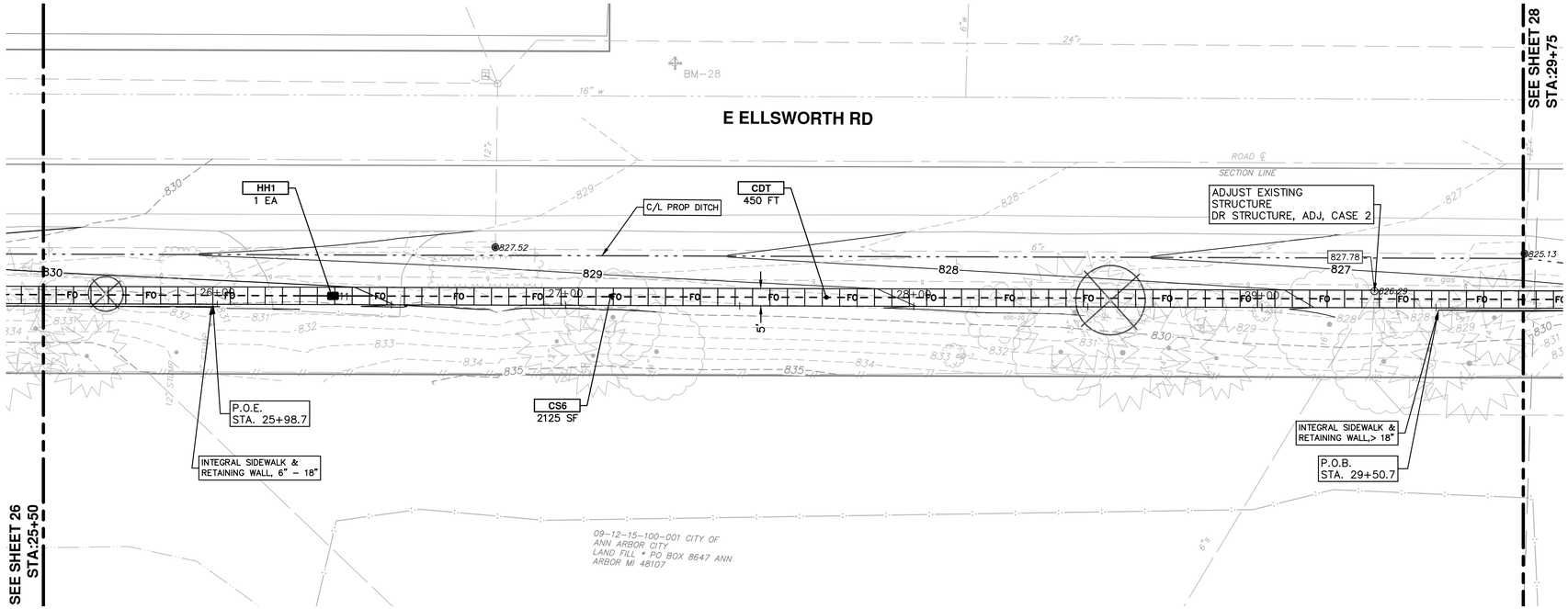
ELLSWORTH ROAD SIDEWALK PLAN AND PROFILE

STA.21+25 - STA. 25+50

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

DRAWING No. 2014031-26

SHEET No. 26 OF 37




## CONSTRUCTION KEY

| KEY | DESCRIPTION |
|---|---|
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| CS6 | PLACE SIDEWALK, CONC, 6 INCH, SPECIAL |
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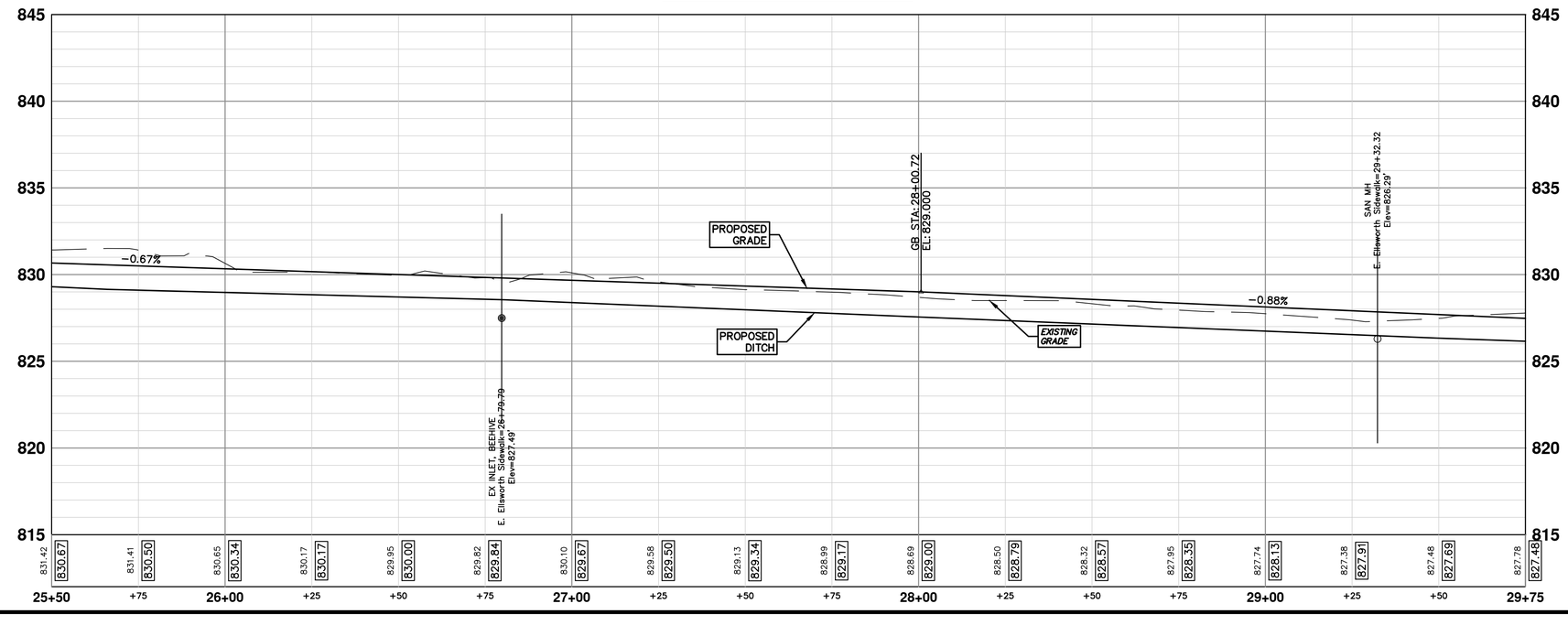
## E. ELLSWORTH SIDEWALK




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

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10–22–15 | CEC | DAD |
| 01 | OUT FOR BID | 4–15–16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4–20–16 | CEC/DPF | DAD |

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**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

**PHASE 1 - SIDEWALK & BOARDWALK**

**ELLSWORTH ROAD SIDEWALK PLAN AND PROFILE**

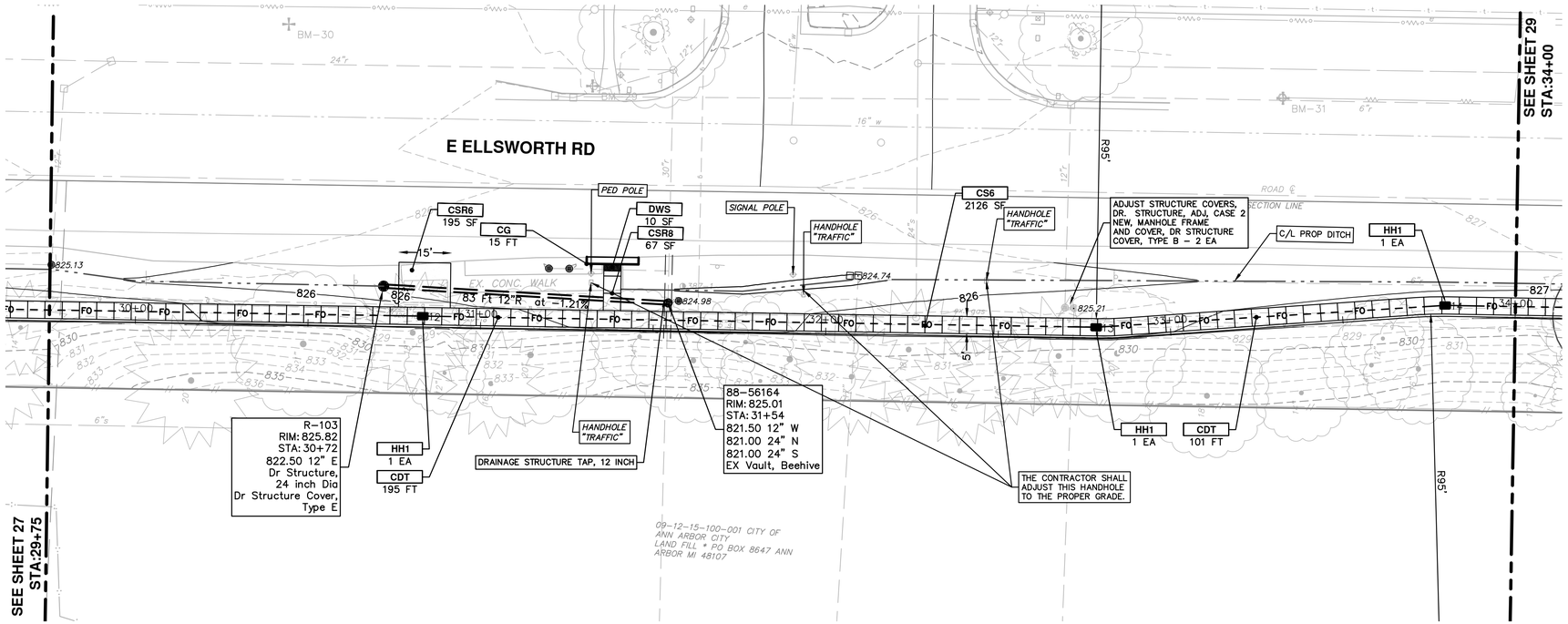
**STA. 25+50 - STA. 29+75**

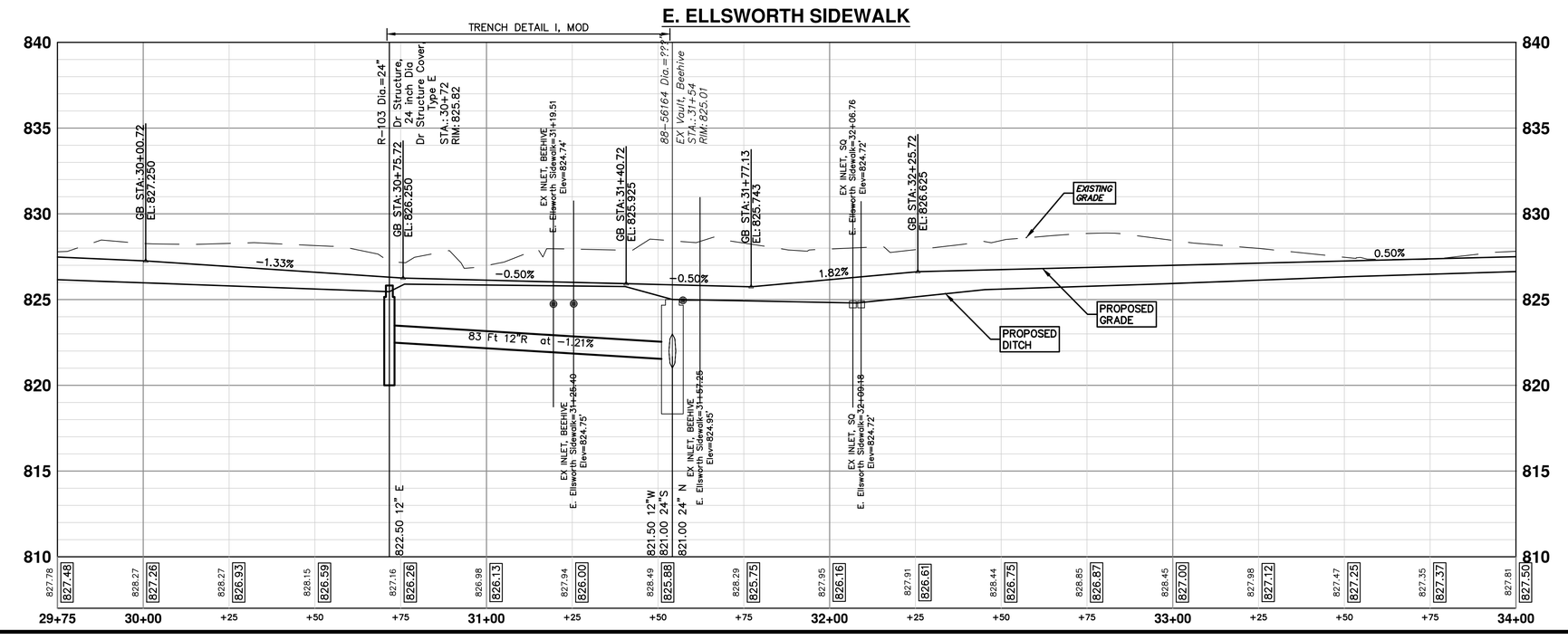
SCALE PLAN: 1" = 20' PROFILE: 1" = 4'

DRAWING No. **2014031-27**

SHEET No. **27 OF 37**

S:\Project Management\Design\2014031 Wheeler Center PUD\Plan Production\Construction Set\2014031PPSW.dwg Dwg Created: 18-Aug-15 – _a2 standard bw.stb – Plot Date: 25-May-16




## CONSTRUCTION KEY

| KEY | DESCRIPTION |
|---|---|
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| DWS | DETECTABLE WARNING SURFACE, MODIFIED |
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| HH1 | HANDHOLE ASSEMBLY, 12 INCH X 18 INCH |
| HH2 | HANDHOLE ASSEMBLY, 17 INCH X 30 INCH |

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| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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**PHASE 1 - SIDEWALK & BOARDWALK**

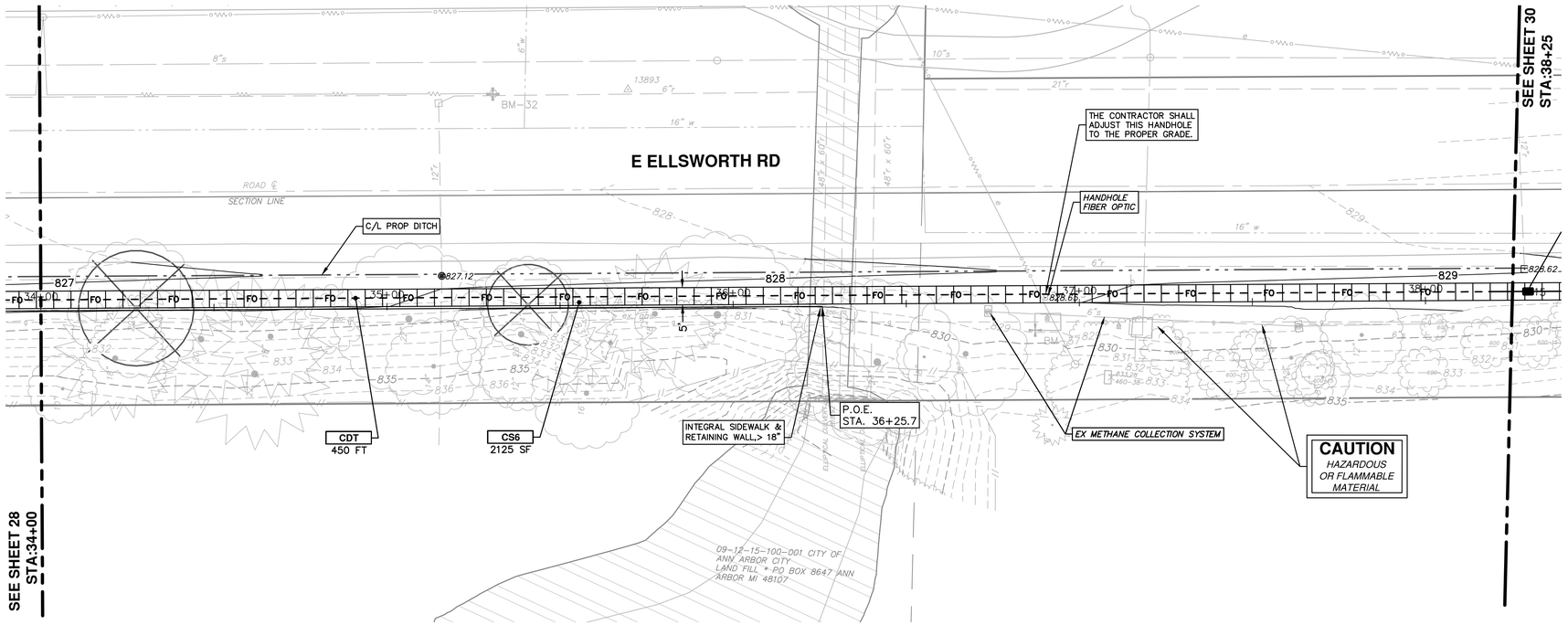
**ELLSWORTH ROAD SIDEWALK PLAN AND PROFILE**

**STA. 29+75 - STA. 34+00**

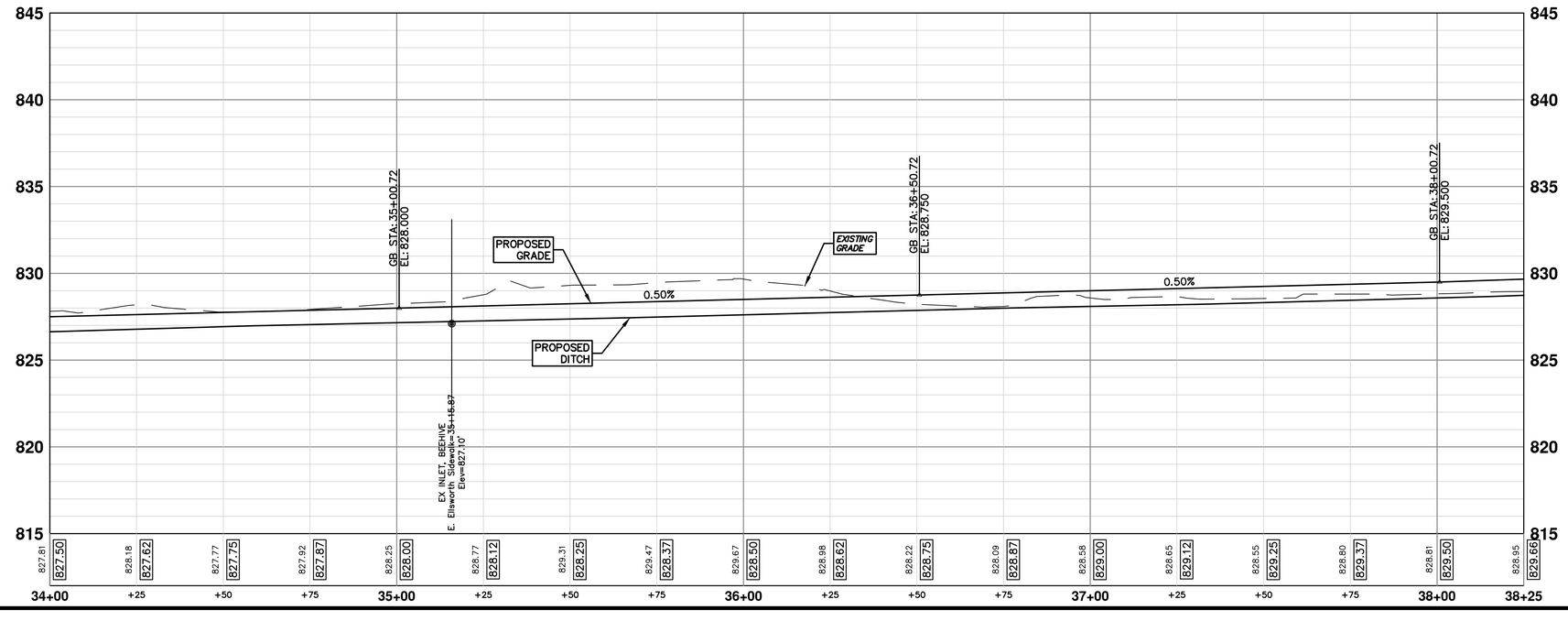
SCALE PLAN: 1" = 20' PROFILE: 1" = 4'

DRAWING No. 2014031-28

SHEET No. 28 OF 37




## E. ELLSWORTH SIDEWALK




## CONSTRUCTION KEY

| KEY | DESCRIPTION |
|---|---|
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| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

# PHASE 1 - SIDEWALK & BOARDWALK

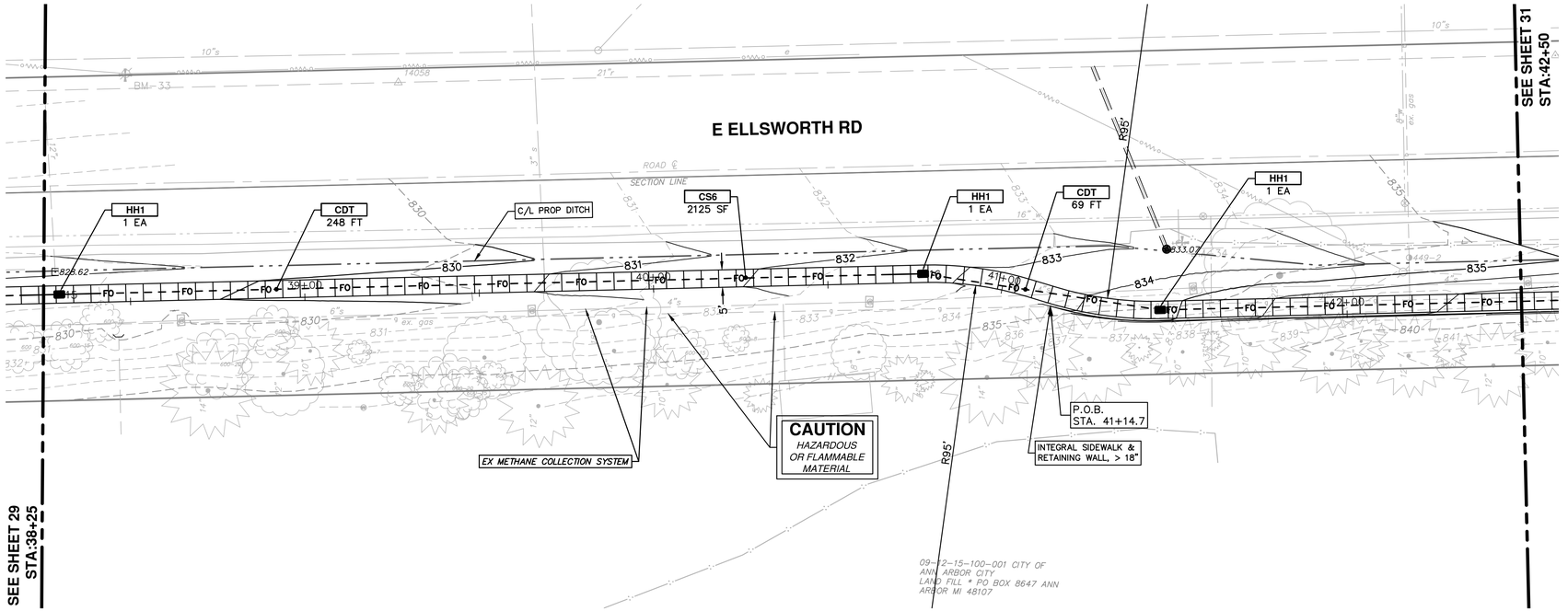
## ELLSWORTH ROAD SIDEWALK PLAN AND PROFILE

**STA. 34+00 - STA. 38+25**

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

DRAWING No. **2014031-29**

SHEET No. **29 OF 37**




## CONSTRUCTION KEY

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|---|---|
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| CS6 | PLACE SIDEWALK, CONC, 6 INCH, SPECIAL |
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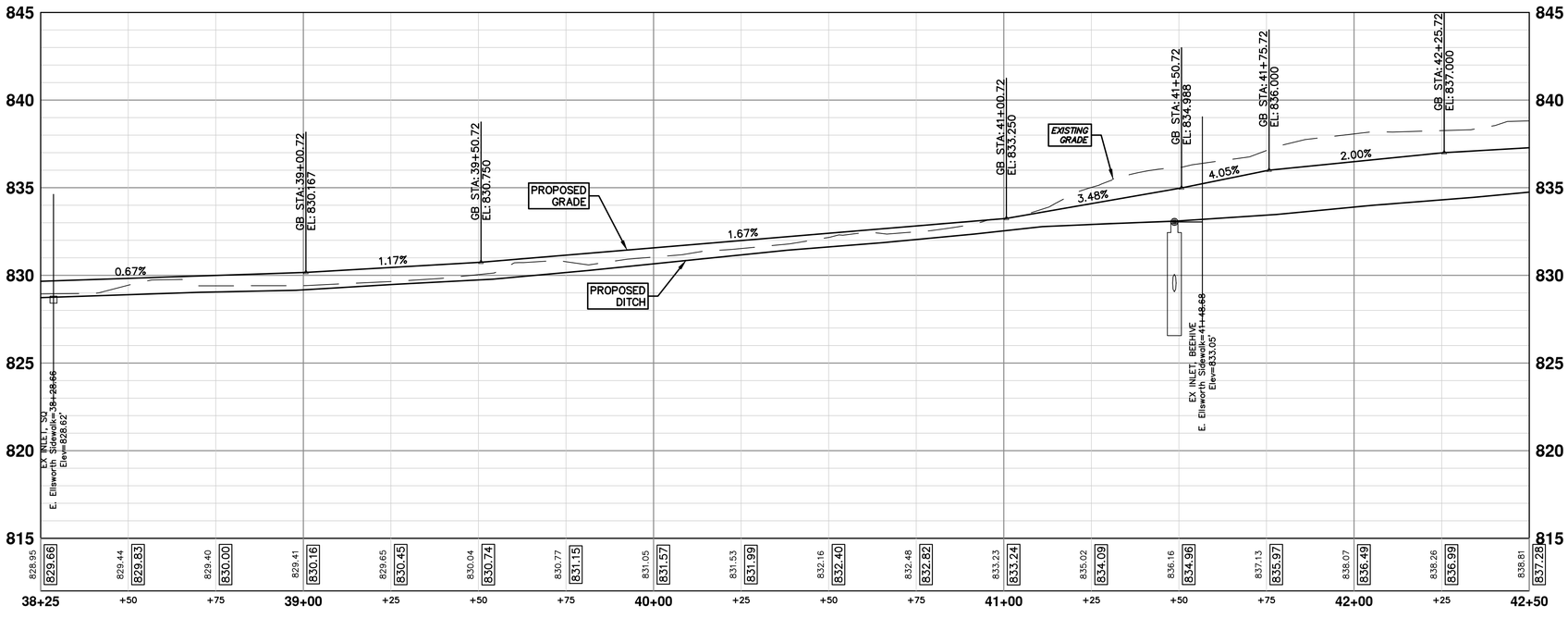
## E. ELLSWORTH SIDEWALK




| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH - PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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# PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

## PHASE 1 - SIDEWALK & BOARDWALK

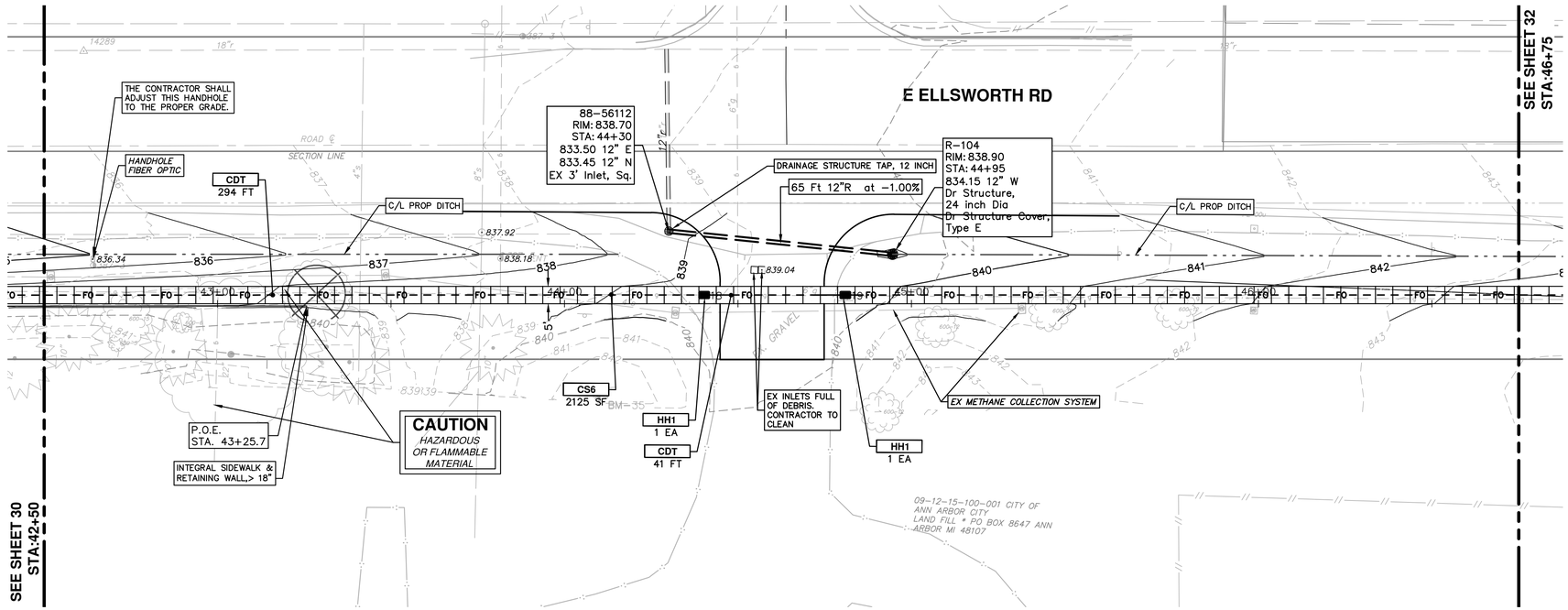
ELLSWORTH ROAD SIDEWALK PLAN AND PROFILE

STA. 38+25 - STA. 42+50

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

DRAWING No. 2014031-30

SHEET No. 30 OF 37




## CONSTRUCTION KEY

| KEY | DESCRIPTION |
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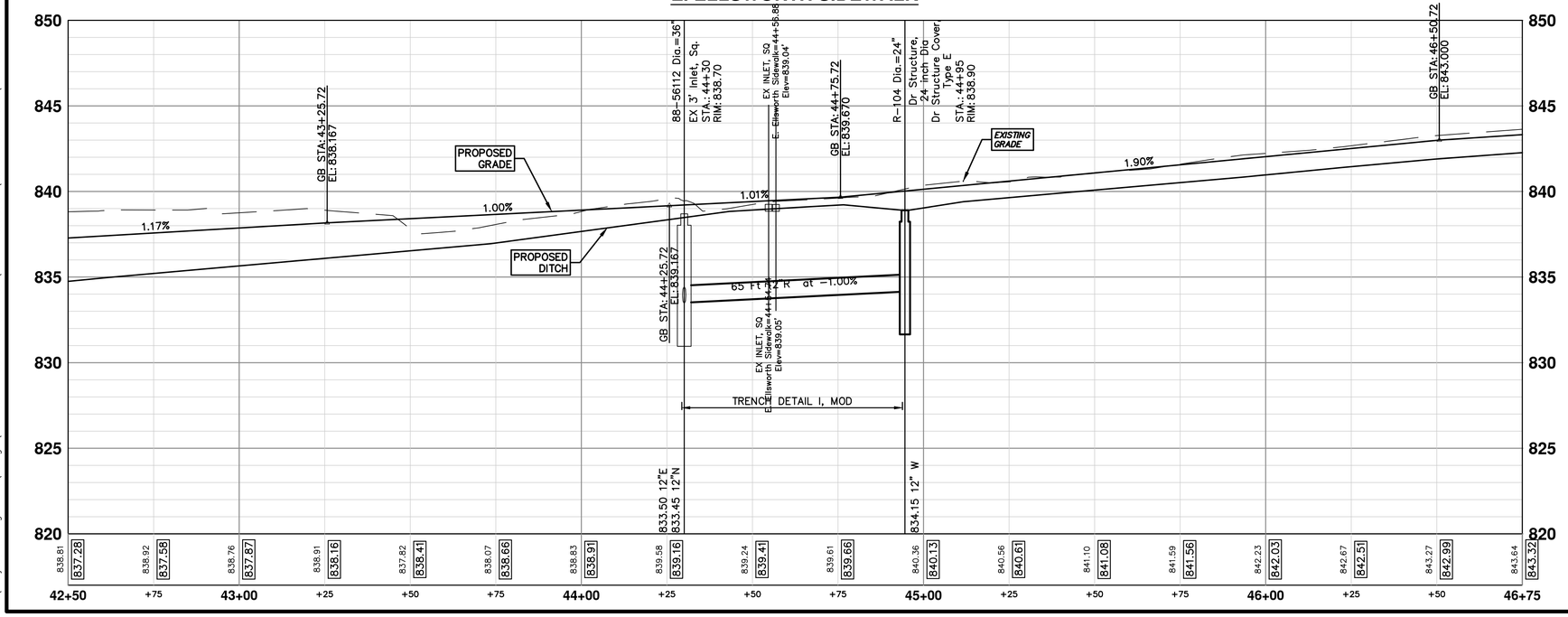
## E. ELLSWORTH SIDEWALK






| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

**PHASE 1 - SIDEWALK & BOARDWALK**

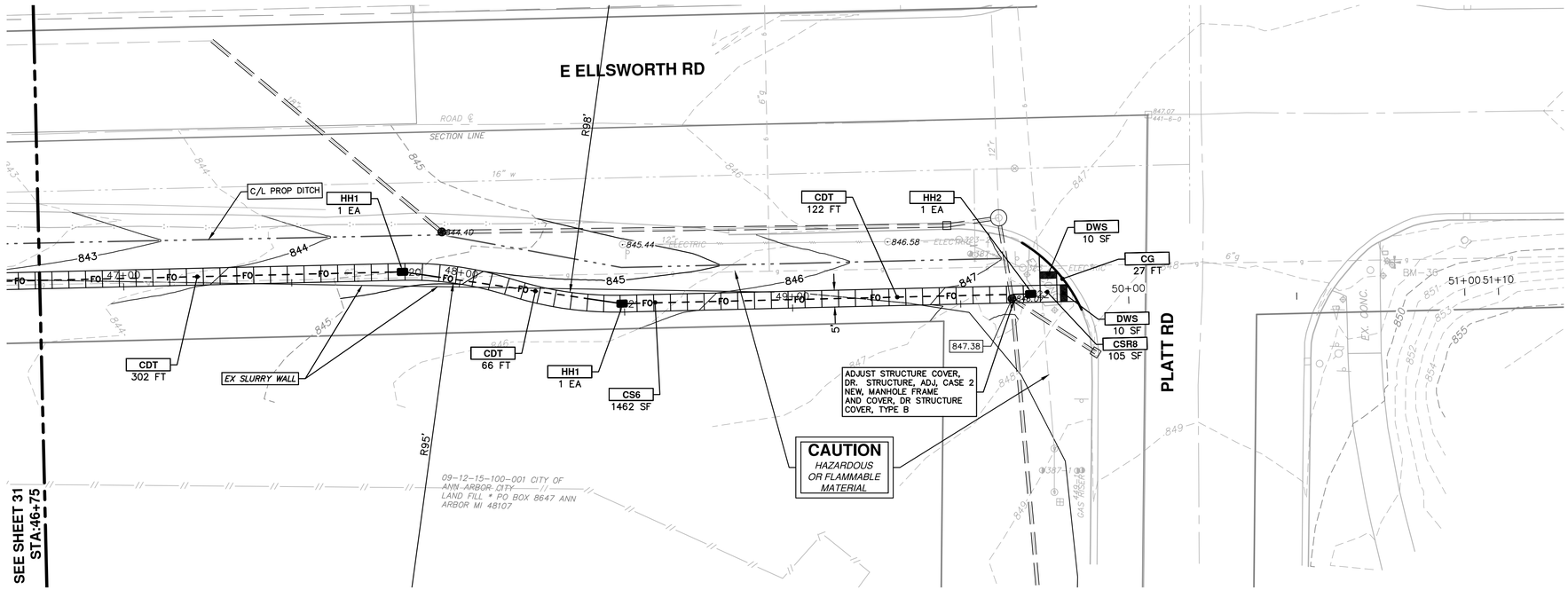
**ELLSWORTH ROAD SIDEWALK PLAN AND PROFILE**

**STA. 42+50 - STA. 46+75**

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

DRAWING No. 2014031-31

SHEET No. 31 OF 37




## CONSTRUCTION KEY

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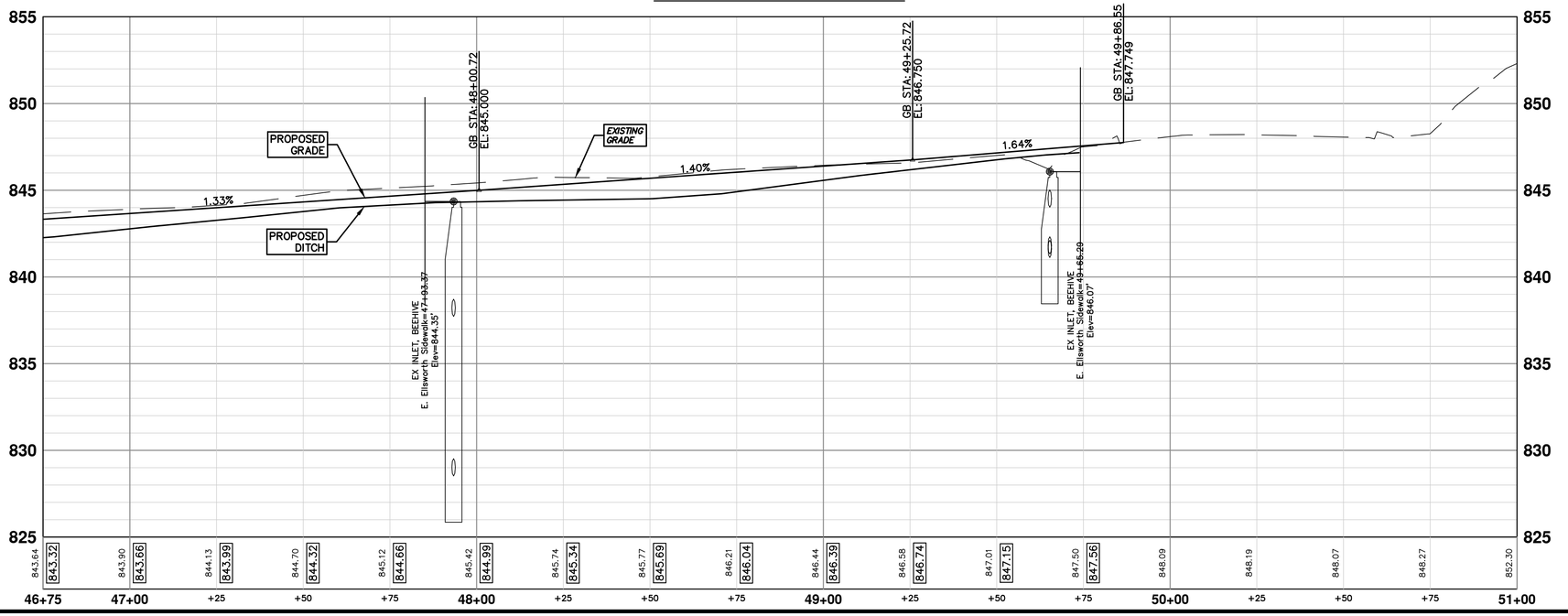
## E. ELLSWORTH SIDEWALK




| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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# PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

## PHASE 1 - SIDEWALK & BOARDWALK

ELLSWORTH ROAD SIDEWALK PLAN AND PROFILE

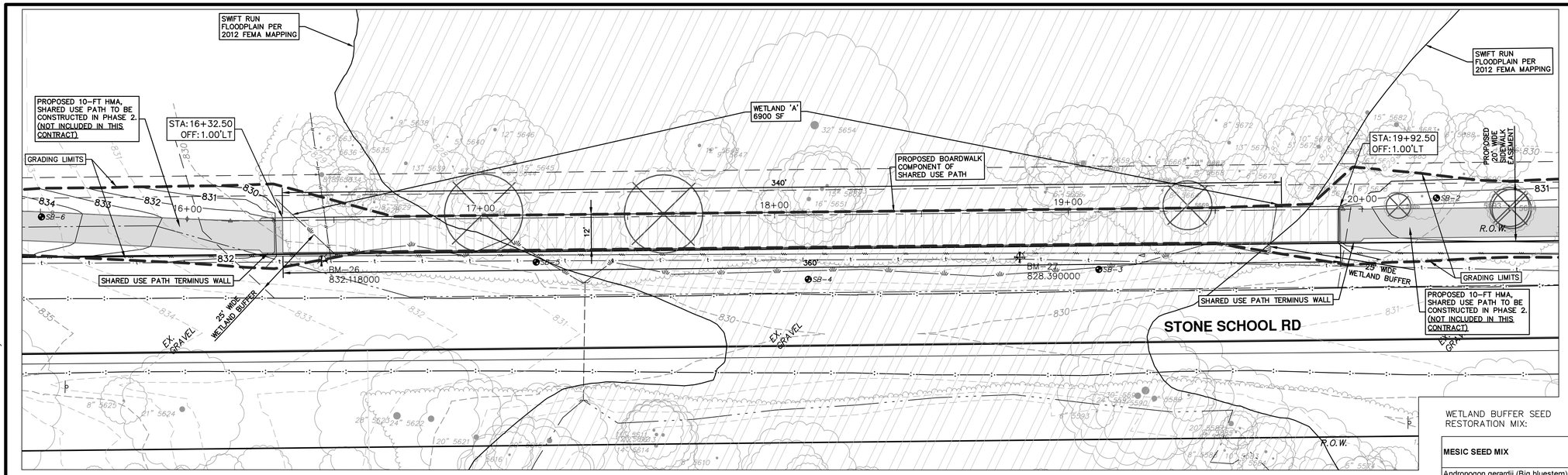
STA. 46+75 - POE

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

DRAWING No. 2014031-32

SHEET No. 32 OF 37

S:\Project Management\Design\2014031 Wheeler Center PUD\Plan Production\Construction Set\2014031PPSW.dwg Dwg Created: 18-Aug-15 – _a2 standard bw.stb – Plot Date: 25-May-16




## CONSTRUCTION KEY

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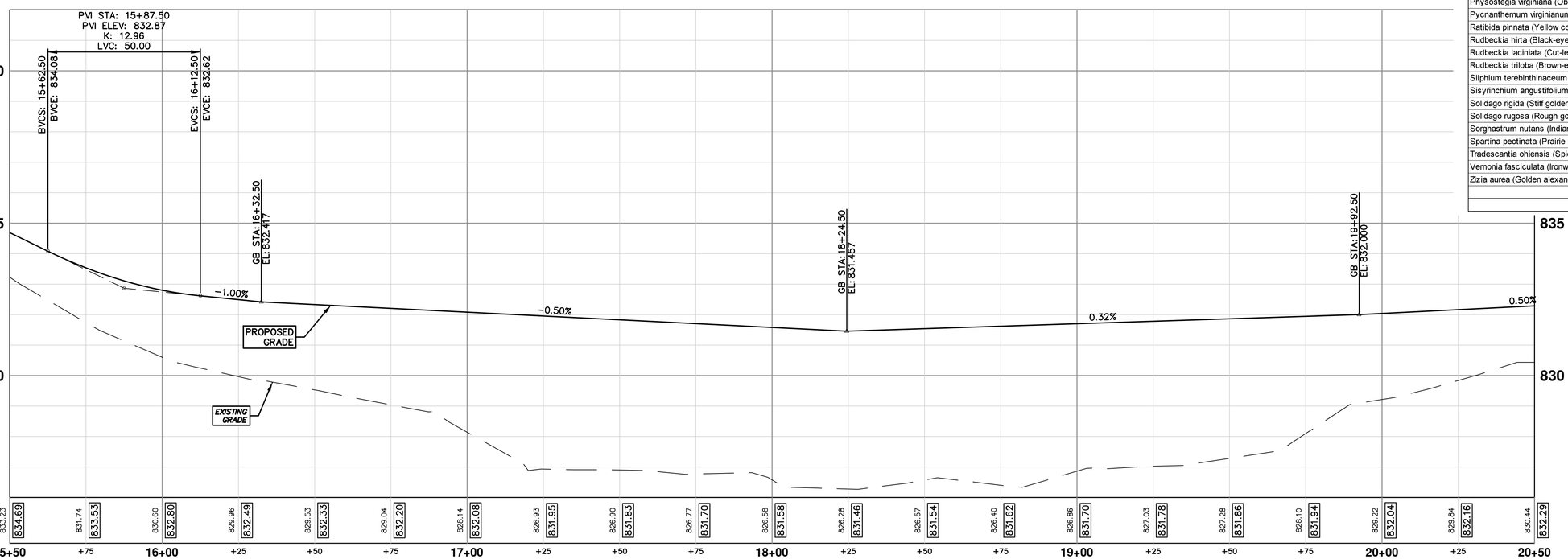
| HH1 | HANDHOLE ASSEMBLY, 12 INCH X 18 INCH |
| HH2 | HANDHOLE ASSEMBLY, 17 INCH X 30 INCH |

WETLAND BUFFER SEED RESTORATION MIX:

| MESIC SEED MIX | Indicator Status | Proportion by Weight | PLS Lbs./acre |
|---|---|---|---|
| Andropogon gerardii (Big bluestem) | FAC- | 22.4% | 3.00 |
| Anemone canadensis (Thimbleweed) | FACW | 0.7% | 0.10 |
| Aster ericoides (Heath aster) | FACU- | 0.9% | 0.13 |
| Aster nova-angliae (New England aster) | FACW | 0.6% | 0.08 |
| Baptisia leucantha (Wild white indigo) | FACU+ | 0.7% | 0.09 |
| Coreopsis tripteris (Tall coreopsis) | FAC | 0.6% | 0.08 |
| Desmodium canadense (Showy tick-trefoil) | FAC- | 0.4% | 0.06 |
| Elymus canadensis (Canada wild rye) | FAC- | 14.9% | 2.00 |
| Elymus villosus (Silky wild rye) | FACU | 14.9% | 2.00 |
| Elymus virginicus (Virginia wild rye) | FACW- | 14.9% | 2.00 |
| Euthamia graminifolia (Grass-leaved goldenrod) | FACW- | 0.1% | 0.01 |
| Helenium autumnale (Sneezeweed) | FACW+ | 0.6% | 0.08 |
| Helianthus grosseratus (Saw-tooth sunflower) | FACW- | 0.9% | 0.13 |
| Liatris spicata (Dense blazing star) | FAC | 1.9% | 0.25 |
| Monarda fistulosa (Wild bergamot) | FACU | 0.4% | 0.05 |
| Panicum virgatum (Switch grass) | FAC+ | 0.9% | 0.13 |
| Parthenium integrifolium (Wild quinine) | UPL | 1.1% | 0.15 |
| Physostegia virginiana (Obedient plant) | FACW- | 0.4% | 0.06 |
| Pycnanthemum virginianum (Mountain mint) | FACW+ | 0.2% | 0.03 |
| Ratibida pinnata (Yellow coneflower) | UPL | 1.3% | 0.18 |
| Rudbeckia hirta (Black-eyed Susan) | FACU | 0.7% | 0.10 |
| Rudbeckia laciniata (Cut-leaved coneflower) | FACW+ | 0.9% | 0.13 |
| Rudbeckia triloba (Brown-eyed Susan) | FAC- | 1.9% | 0.25 |
| Silphium terebinthinaceum (Prairie dock) | FACU | 0.9% | 0.13 |
| Sisyrinchium angustifolium (Blue-eyed grass) | FACW- | 0.1% | 0.01 |
| Solidago rigida (Stiff goldenrod) | FACU- | 0.9% | 0.13 |
| Solidago rugosa (Rough goldenrod) | FAC+ | 1.3% | 0.18 |
| Sorghastrum nutans (Indian grass) | FACU+ | 0.9% | 0.13 |
| Spartina pectinata (Prairie cord grass) | FACW+ | 3.7% | 0.50 |
| Tradescantia ohiensis (Spiderwort) | FACU+ | 7.5% | 1.00 |
| Vernonia fasciculata (Ironweed) | FACW | 1.5% | 0.20 |
| Zizia aurea (Golden alexander) | FAC+ | 0.4% | 0.05 |
| | | | |
| TOTAL: | | 100% | 13.39 |

# STONE SCHOOL PATH




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

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

PHASE 1 - SIDEWALK & BOARDWALK

STONE SCHOOL ROAD PLAN AND PROFILE

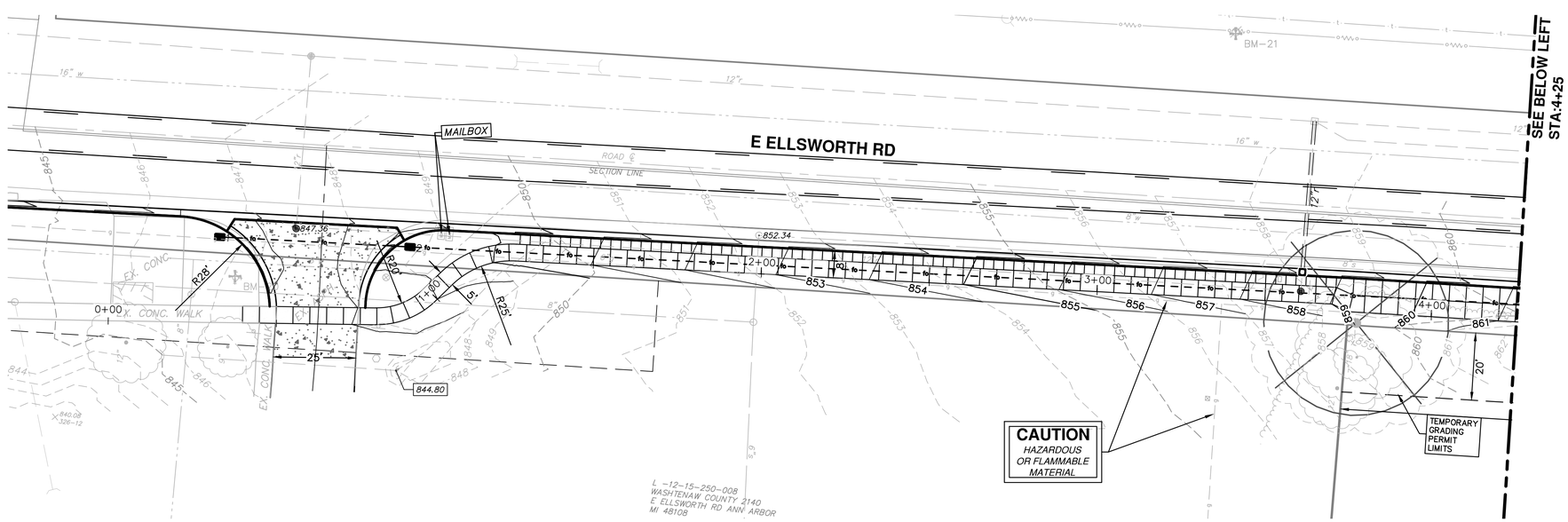
BOARDWALK

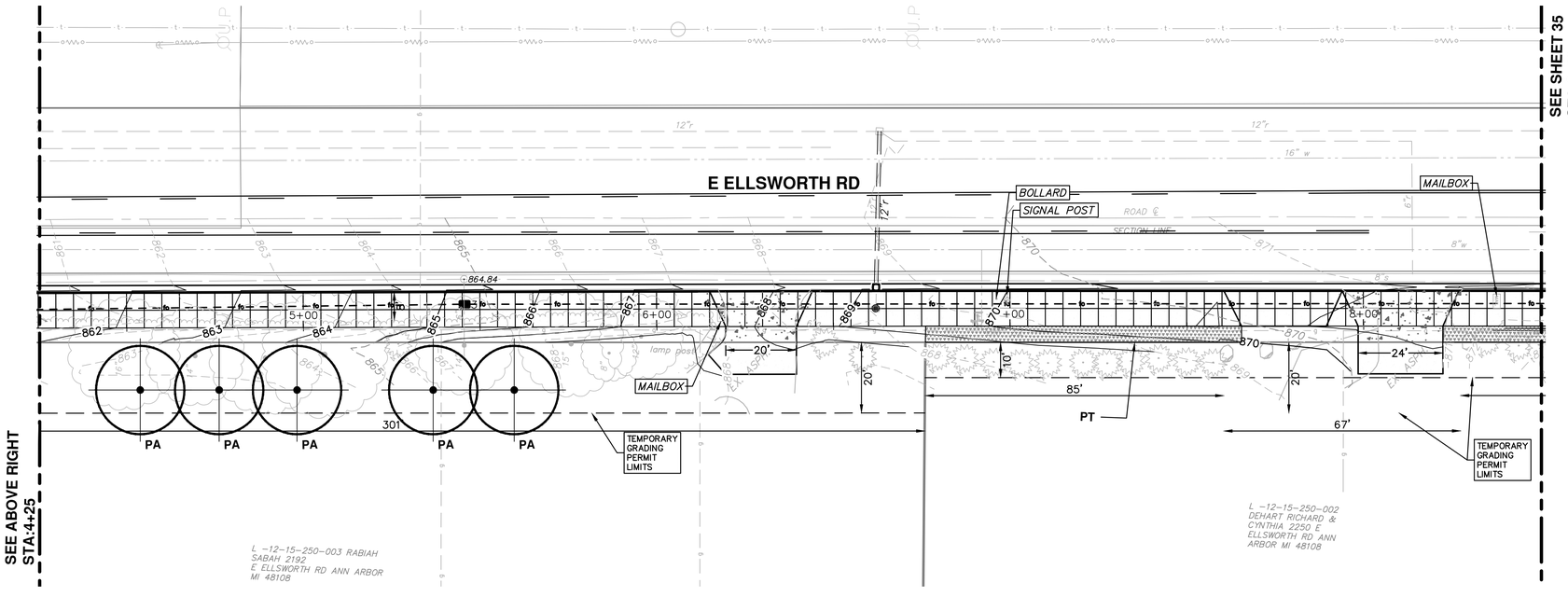
SCALE PLAN: 1" = 20' PROFILE 1" = 2'

DRAWING No. 2014031-33

SHEET No. 33 OF 37

S:\Project Management\Design\2014031 Wheeler Center PUD\Plan Production\Construction Set\2014031PPSW1.dwg Dwg Created: 19-Aug-15 -- _o2 standard bw.stb -- Plot Date: 25-May-16




## Plant Schedule

B&B Trees

| Key | QTY | Botanical Name | Common Name | Spacing | Form |
|---|---|---|---|---|---|
| PA | 5 | Picea abies | Norway Spruce | see plan | 2 1/2" caliper B and B |
| PT | | Packysandra Terminalis | Japanese Packysandra | 6"-8" o.c. | plug |
| | | | | | |
| | | | | | |
| FG | 4 | Fagus grandifolia | American Beech | see plan | 2 1/2" caliper B and B |
| GYd | 2 | Gymnocladus dioicus | Kentucky Coffee Tree | see plan | 2 1/2" caliper B and B |
| QBi | 3 | Quercus bicolor | Swamp White Oak | see plan | 2 1/2" caliper B and B |
| QM | 2 | Quercus macrocarpa | Bur Oak | see plan | 2 1/2" caliper B and B |
| QRu | 2 | Quercus rubra | Red Oak | see plan | 2 1/2" caliper B and B |
| PG | 2 | Picea glauca | White Spruce | see plan | 2 1/2" caliper B and B |

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

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH - PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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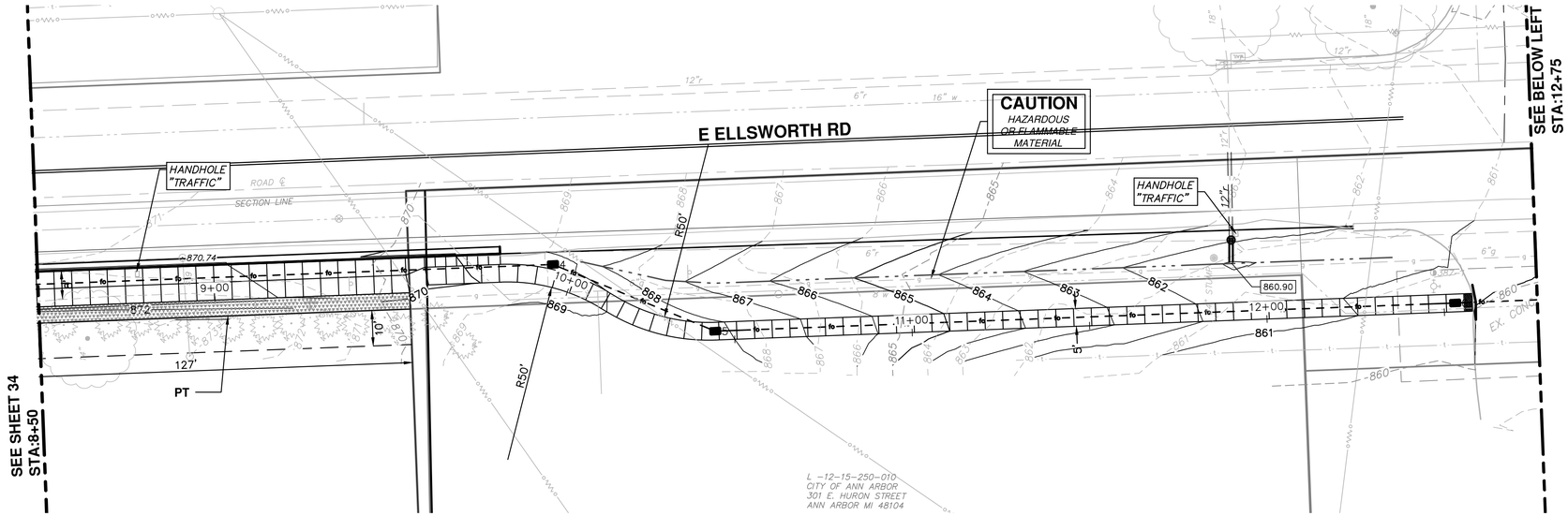
PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

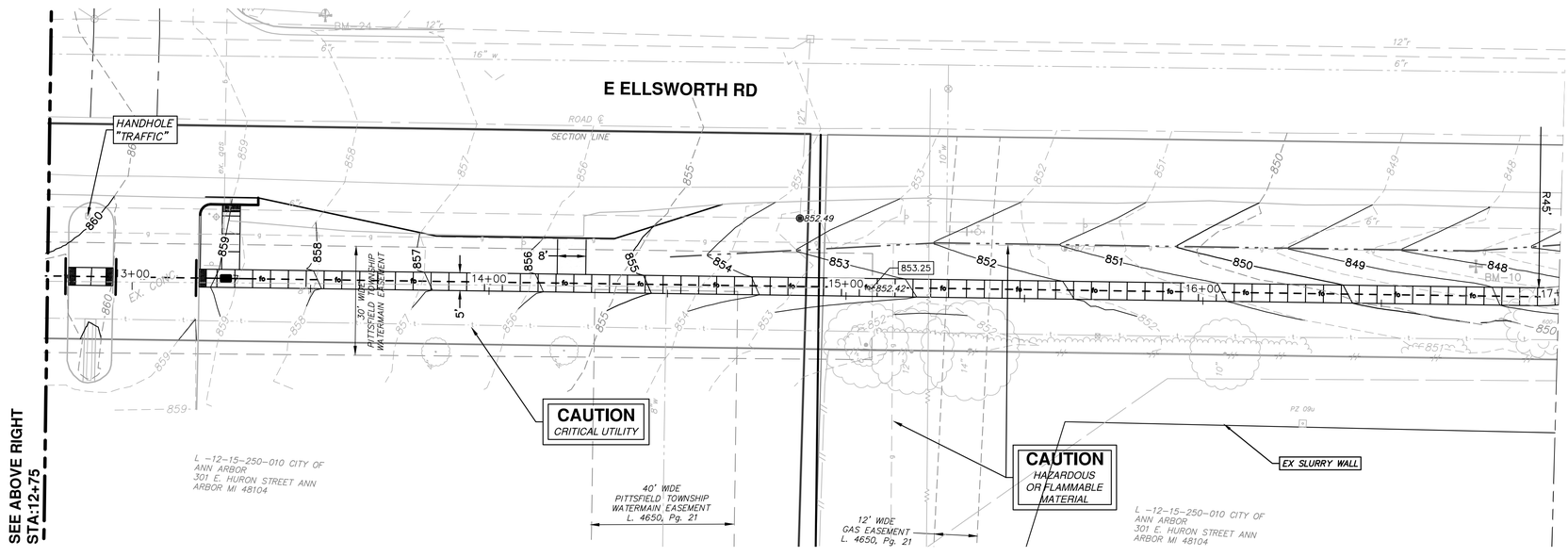
PHASE 1 - SIDEWALK & BOARDWALK
ELLSWORTH ROAD TREE REPLACEMENT
STA. 0+00 - STA. 8+50

SCALE **PLAN: 1" = 20'**

DRAWING No.
**2014031-34**

SHEET No.
**34 OF 37**




## Plant Schedule

B&B Trees

| Key | QTY | Botanical Name | Common Name | Spacing | Form |
|---|---|---|---|---|---|
| COc | 2 | Celtis occidentalis | Hackberry | see plan | 2 1/2" caliper B and B |
| FG | 4 | Fagus grandifolia | American Beech | see plan | 2 1/2" caliper B and B |
| GYd | 2 | Gymnocladus dioicus | Kentucky Coffee Tree | see plan | 2 1/2" caliper B and B |
| QBi | 3 | Quercus bicolor | Swamp White Oak | see plan | 2 1/2" caliper B and B |
| QM | 2 | Quercus macrocarpa | Bur Oak | see plan | 2 1/2" caliper B and B |
| QRu | 2 | Quercus rubra | Red Oak | see plan | 2 1/2" caliper B and B |
| PG | 2 | Picea glauca | White Spruce | see plan | 2 1/2" caliper B and B |

Know what's below. Call before you dig.

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH - PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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# PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

## PHASE 1 - SIDEWALK & BOARDWALK

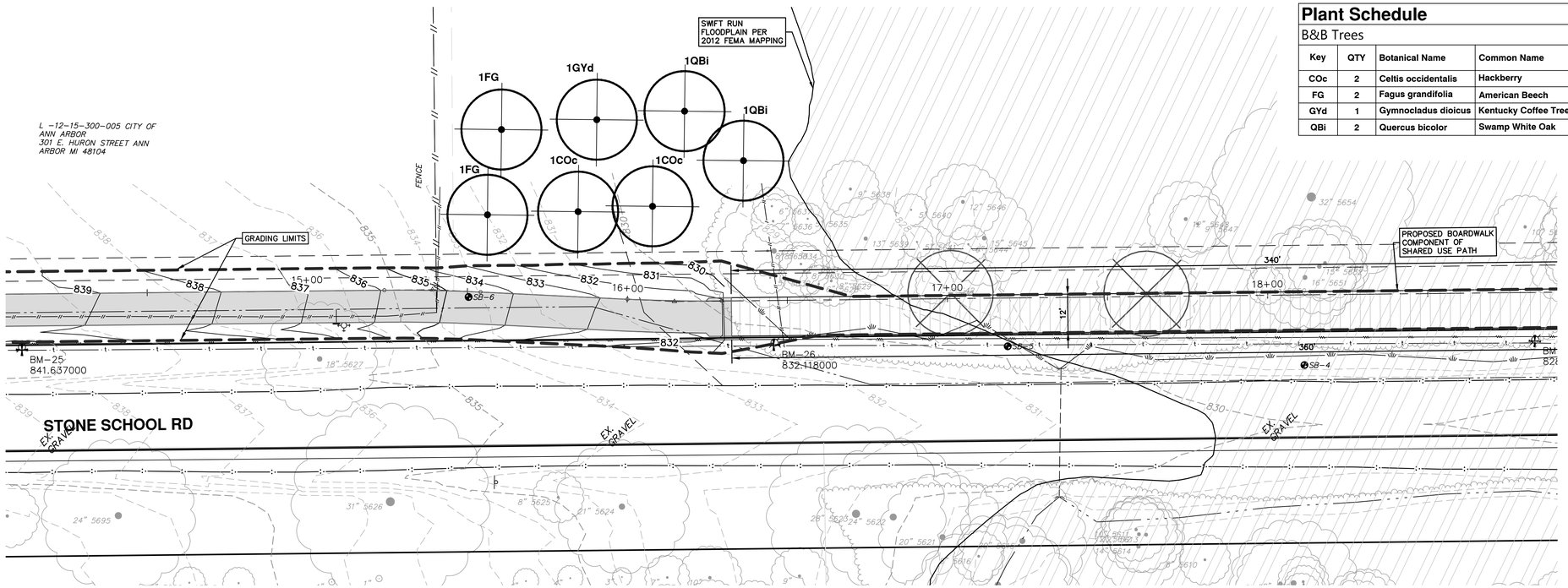
ELLSWORTH ROAD TREE REPLACEMENT

STA. 8+50 - STA. 17+00

SCALE PLAN: 1" = 20'

DRAWING No. 2014031-35

SHEET No. 35 OF 37




## Plant Schedule

B&B Trees

| Key | QTY | Botanical Name | Common Name | Spacing | Form |
|---|---|---|---|---|---|
| COc | 2 | Celtis occidentalis | Hackberry | see plan | 2 1/2" caliper B and B |
| FG | 2 | Fagus grandifolia | American Beech | see plan | 2 1/2" caliper B and B |
| GYd | 1 | Gymnocladus dioicus | Kentucky Coffee Tree | see plan | 2 1/2" caliper B and B |
| QBi | 2 | Quercus bicolor | Swamp White Oak | see plan | 2 1/2" caliper B and B |

Know what's below. Call before you dig.

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH - PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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**PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR**

**PHASE 1 - SIDEWALK & BOARDWALK**

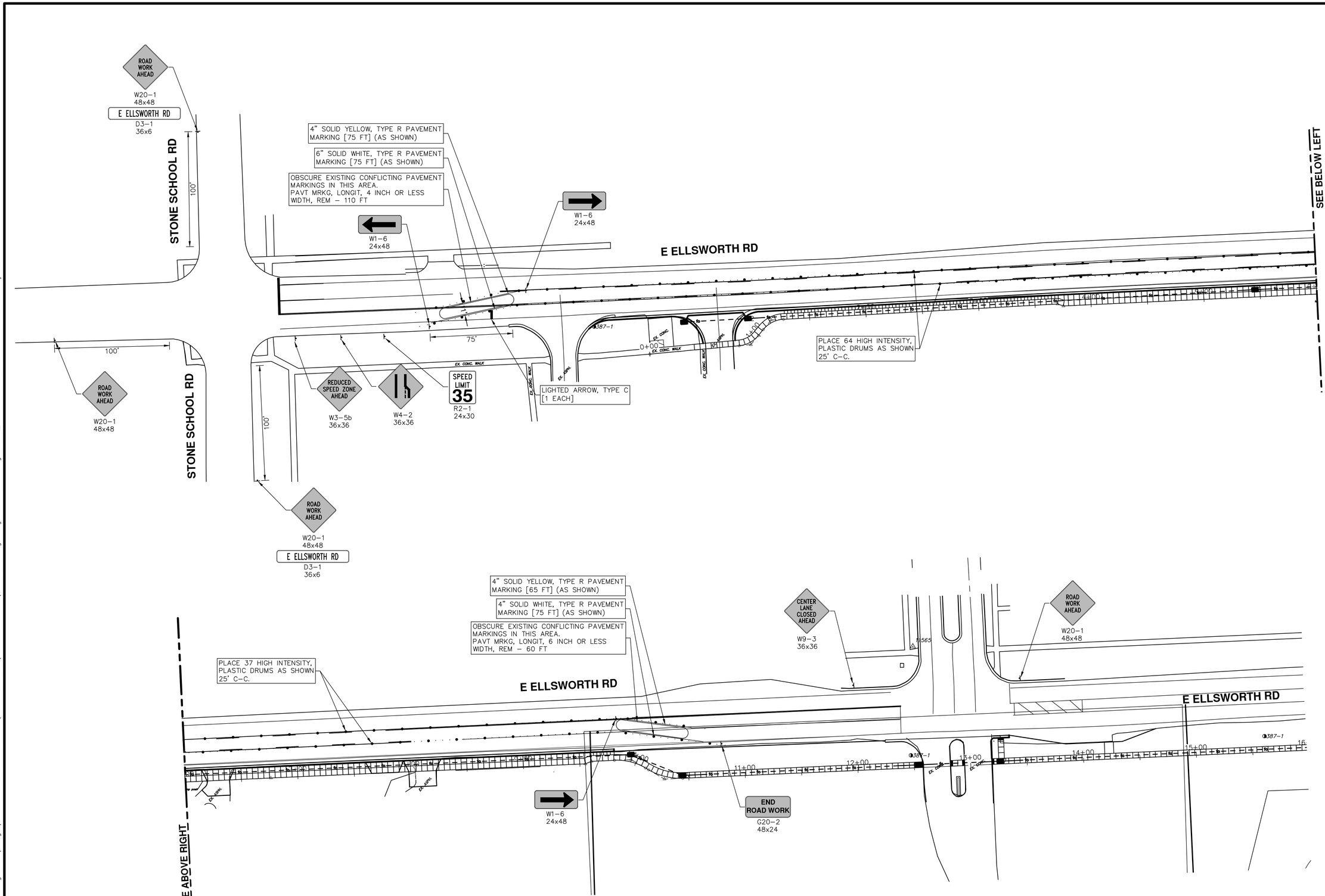
**STONE SCHOOL ROAD**

**TREE REPLACEMENT**

SCALE **PLAN: 1" = 20'**

DRAWING No.
**2014031-36**

SHEET No.
**36 OF 37**

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Know what's below. Call before you dig.

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 00 | PATH – PER PITTSFIELD TWP COMMENTS | 10-22-15 | CEC | DAD |
| 01 | OUT FOR BID | 4-15-16 | CEC/DPF | DAD |
| 02 | ADDENDUM #4 | 4-20-16 | CEC/DPF | DAD |

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PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR

PHASE 1 - SIDEWALK & BOARDWALK

ELLSWORTH ROAD TRAFFIC CONTROL

SCALE PLAN: 1" = 40'

DRAWING No. 2014031-37

SHEET No. 37 OF 37