

**REQUEST FOR PROPOSALS  
FOR  
TROY SCHOOL DISTRICT 2024 SITE IMPROVEMENTS PAVING PROJECTS  
RFP #2324-03**

**TROY SCHOOL DISTRICT  
Attention: Jennifer Vente  
Administration Building  
4400 Livernois Road  
Troy, Michigan 48098  
Telephone: (248) 823-4000  
Fax: (248) 823-4013  
Email: [jvente@troy.k12.mi/us](mailto:jvente@troy.k12.mi/us)**

## **I. OVERVIEW**

### **1.1. PURPOSE**

The purpose of the Request For Proposals (“RFP”) is for Troy School District (the “School District”) to obtain proposals from qualified contractors for RFP Number 2324-03 – Troy School District 2024 Site Improvements Paving Projects. (the “Work”). This work is located at Baker Middle School, Troy Learning Center, Transportation Center, Administration & Service Buildings, Wattles Elementary School, and Athens High School.

### **1.2. SELECTION TIMELINE**

**NOTE:** Throughout the remainder of this RFP, a prospective contractor is referred to as the “Contractor.”

The School District’s **anticipated timeline** for its selection process is:

Issuance of this RFP November 6, 2023

There is no Pre-Proposal Meeting

Deadline for written Requests For Clarifications 4 pm local time, November 14, 2023

**DUE DATE FOR PROPOSALS 11:30 a.m. Local Time, November 21, 2023**

School District’s Consideration of the Contract December 12, 2023

Commencement of Work June 17, 2024

School Completion of Work August 16, 2024

**PLEASE NOTE:** The School District reserves the right, in its sole and absolute discretion, to make modifications to the above selection timeline as it determines to be in its best interest.

## **II. SUBMISSION OF PROPOSALS**

### **2.1. PROPOSAL SUBMISSION DEADLINE AND REQUIREMENTS**

The Due Date for receipt of Proposals is:

**Tuesday, November 21, 2023 at 11:30 a.m Local Time (the “Due Date”)**

2.1.1. Sealed proposals should be submitted through Buildingconnect.com with the following link:  
<https://app.buildingconnected.com/public/5cc9d7f637c1a90018cb55dc>. No physical bids will be accepted in person or via delivery service.

2.1.2. **Late Proposals:** Each Contractor is responsible for submission of its Proposal. Proposals or Proposal revisions received after the Due Date will not be accepted or considered. The School District is not liable for any delivery or postal delays.

- 2.1.3. Returned Proposals:** All Proposals received after the Due Date will be unopened and made available to the respective Contractor for pick-up, at its sole cost and expense.
- 2.1.4. Signed Original Proposal:** Each Proposal must be signed by an authorized member of the Contractor's firm. This member should be the highest-ranking officer at the local level. NO ORAL, FAX, or E-MAILED Proposals will be accepted. Each Proposal must be submitted on the Proposal Forms attached to this RFP.
- 2.1.5. Opening of Proposals:** At the Due Date stated above and with the following virtual link: [meet.google.com/avu-ptiy-nmq](https://meet.google.com/avu-ptiy-nmq) or phone number (510) 358-8040 PIN 732 873 816#, all submitted Proposals shall be publicly opened and read aloud. Any interested parties may attend. No immediate decision will be rendered.
- 2.1.6. E-Mail Clarifications:** The School District intends to communicate with Contractors via e-mail (e.g., RFP clarifications and addenda). Except for the delivery of the Proposal itself, references in this RFP to "written" form of communications include e-mail.
- 2.1.7. Additional Requests For Clarification:** Prospective Contractors may request that the School District clarify information contained in this RFP. All such requests must be made in writing via email. The School District will attempt to provide a written response to all written Requests For Clarification within five (5) business days after the receipt of such request. The School District will not respond to any Request For Clarification received after **4 p.m. on November 14, 2023**. Requests For Clarification and inquiries must be made via e-mail. All Requests For Clarification must be directed to Jennifer Vente at [jvente@troy.k12.mi.us](mailto:jvente@troy.k12.mi.us). (Subject Line: \_\_\_\_\_ RFP Request For Clarification). No response will be made to any oral questions. All questions and answers will be posted on the School District's website. It is each Contractor's responsibility to check the School District's website prior to the RFP Due Date to ensure that it has received all of the information, including, but not limited to, all Addenda to this RFP.
- 2.1.8. Restrictions On Communication:** From the issue date of this RFP until a Contractor is selected and the selection announced, a prospective Contractor shall not communicate about the subject of this RFP or a Contractor's Proposal with the School District, its Board of Education, or any individual member, administrators, faculty, staff, students, employees, or its Construction Manager, if any, except for additional Requests For Clarification in accordance with Paragraph 2.1.7 above, or as otherwise required by applicable law.

- 2.1.9. Addenda to the RFP:** If it becomes necessary to revise any part of this RFP, notice of the revision will be e-mailed to all parties that requested a copy of this RFP. All addenda will be issued through the School District's website and all addenda shall become a part of this RFP. Each Contractor must in its Proposal, to avoid any miscommunication, acknowledge all addenda which it has received, but the failure of a Contractor to receive, or acknowledge receipt of, any addendum shall not relieve the Contractor of the responsibility for complying with the terms thereof.
- 2.1.10. RFP/Proposal Information Controlling:** The School District intends that all Contractors shall have equal access to information relative to this RFP, and that this RFP contains adequate information. No information communicated, either verbally or in writing, to or from a Contractor shall be effective unless confirmed by written communication contained in an addendum to this RFP, a Request For Clarification or other written response thereto, or in the Proposal.
- 2.1.11. Finality of Decision:** Any decision made by the School District, including the Contractor selection, shall be final.
- 2.1.12. Reservation of Rights:** The School District reserves the right, in its sole and absolute discretion (for this provision and all other provisions contained in this RFP), to accept or reject, in whole or in part, any or all Proposals with or without cause. The School District further reserves the right to waive any irregularity or informality in the RFP process or any Proposal, and the right to award the Contract to other than the Contractor(s) submitting the best financial Proposal (low bidder). The School District reserves the right to request additional information from any or all Contractors. The School District reserves the right to select one or more Contractors to perform the Work on behalf of the School District. In the event the Contractor's Proposal is accepted by the School District and the Contractor asserts exceptions, special considerations or conditions after acceptance, the School District, in its sole and absolute discretion, reserves the right to reject the Proposal and award the Contract to another contractor.
- 2.1.13. Release of Claims:** Each Contractor by submitting its Proposal releases the School District from any and all claims arising out of, and related to, this RFP process and selection of a Contractor.
- 2.1.14. Contractor Bears Proposal Costs:** A recipient of this RFP is responsible for any and all costs and liabilities incurred by it or others acting on its behalf in preparing or submitting a Proposal, or otherwise responding to this RFP, or any negotiations incidental to its Proposal or this RFP.
- 2.1.15. Irrevocability of Proposals:** All Proposals submitted shall not be withdrawn and shall be irrevocable for a minimum period of ninety (90) calendar days following the Due Date for receipt of Proposals set forth above.
- 2.1.16. Collusive Bidding:** The Contractor certifies that its Proposal is made without any previous understanding, agreement, or connection with any person, firm or corporation making a Proposal for the same Work and is in all respects fair, without outside control, collusion, fraud, or otherwise illegal action.



## **2.2. PROPOSAL REQUIREMENTS AND FORMAT**

This outlines the information that must be provided by each Contractor and the required format for its Proposal. Any Proposal not providing the required information, or not conforming to the format specified, may be disqualified on that basis. Please also refer to Sections 2.1, 4.1, and 4.2 of this RFP for additional Proposal requirements. Attached to this RFP is a form of contract under which the Work requested under this RFP shall be provided by the successful Contractor (the “Contract” and referred to throughout the Contract as the “Agreement”) (See also Section 3.1 of this RFP). The Contract contains many details relative to the Work requested by the School District, the terms and conditions under which the Work shall be provided by the Contractor, and should be reviewed carefully by each Contractor prior to submitting a Proposal.

**Any exceptions to the terms and conditions contained in this RFP or the form of Contract attached to this RFP, or any other special considerations or conditions requested or required by the Contractor MUST be specifically enumerated by the Contractor and be submitted as part of its Proposal, together with an explanation as to the reason such terms and conditions of the RFP or form of Contract cannot be met by, or, in the Contractor’s opinion, are not applicable to, the Contractor. The Contractor shall be required and expected to meet the specifications and requirements as set forth in this RFP and the form of Contract in their entirety, except to the extent exceptions or special considerations or conditions are expressly set forth in the Contractor’s Proposal and those exceptions or special considerations or conditions are expressly accepted by the School District. All Pricing factors must be clearly indicated in the Proposal Forms provided as part of the Contractor’s Proposal.**

Each Proposal must include, at a minimum, the following:

- 2.2.1** A detailed list setting forth any exceptions to this RFP and/or the Contract, or other special considerations or conditions of the Contractor, including explanations of such exceptions or the reason such terms and conditions of the RFP or form of Contract cannot be met by, or on the Contractor’s opinion are not applicable to, the Contractor.
- 2.2.2** References – Each Proposal must include detailed evidence that the Contractor is currently providing Work for other K-12 public school districts or educational institutions. The Contractor must provide this information, including contact names, addresses, phone numbers, and type and scope of work provided. This should include school districts of similar size and scope as the School District.
- 2.2.3** Evidence of the Contractor’s ability to provide adequate insurance coverages as required by this RFP and the Contract to protect the interests of the Contractor and the School District.
- 2.2.4** Demonstrate that the Contractor understands and will comply with all regulatory laws, codes, and requirements of any Local, State, and Federal law that apply to the requirements and obligations under this RFP and the Contract.
- 2.2.5** A completed Proposal Pricing Form provided as **ATTACHMENT A**.
- 2.2.6** A completed Familial Disclosure Affidavit provided as **ATTACHMENT B**.

**2.2.7** A completed Iran Economics Sanctions Act Affidavit of Compliance provided as **ATTACHMENT C.**

**2.3. SPECIFICATIONS**

<b><u>#</u></b>	<b><u>Description</u></b>	<b><u>Pages</u></b>
310516	Soils and Aggregates	6
311000	Site Clearing	5
312213	Rough Grading	4
312316	Excavation	3
312317	Trenching	4
312323	Fill	3
312513	Erosion Controls	3
321216	Asphalt Paving	7
321313	Concrete Paving	12
321723	Pavement Markings	5
329113	Soil Preparation	2
329119	Landscape Grading	2
329219	Seeding	6
330513	Manholes and Structures	6
334100	Storm Utility Drainage and Piping	5
334600	Subdrainage	3

## 2.4. **DRAWINGS**

<b><u>#</u></b>	<b><u>Description</u></b>	<b><u>Date</u></b>
C-0.0	Cover Sheet	10/31/23
Baker Middle School		
C-1.1	Topographic Survey and Demolition Plan	10/31/23
C1.1A	Topographic Survey and Demolition Plan	10/31/23
C-2.1	Engineering and Dimension Plan	10/31/23
C-2.1A	Engineering and Dimension Plan	10/31/23
C-3.1	Grading and SESC Plan	10/31/23
C-3.1A	Grading and SESC Plan	10/31/23
Troy Learning Center		
C-1.2	Topographic Survey and Demolition Plan	10/31/23
C-2.2	Engineering and Dimension Plan	10/31/23
C-3.2	Grading and SESC Plan	10/31/23
Troy Learning Center		
C-1.3	Topographic Survey and Demolition Plan	10/31/23
C-2.3	Engineering and Dimension Plan	10/31/23
C-3.3	Grading and SESC Plan	10/31/23
Transportation Administration and Service Building		
C-1.4	Administration Topographic Survey and Demolition Plan	10/31/23
C-1.5	Service Topographic Survey and Demolition Plan	10/31/23
C-2.4	Administration Engineering and Dimension Plan	10/31/23
C-2.5	Service Engineering and Dimension Plan	10/31/23
C-3.4	Administration Grading and SESC Plan	10/31/23
C-3.5	Service Grading and SESC Plan	10/31/23
Wattles Elementary School		
C-2.6	Engineering Plan	10/31/23
Troy Athens High School		
C-2.7	Engineering Plan	10/31/23
Notes and Details		
C-4.0	Notes and Details	10/31/23
C-4.1	Notes and Details	10/31/23
Troy Standard Details		
D	SESC Details	10/31/23
E	Standard Storm Details	10/31/23

### III. CONTRACTUAL OBLIGATIONS

#### 3.1. FORM OF CONTRACT

**3.1.1. Form of Contract:** This is a Request For Proposals only. Proposals will be treated as offers to enter into the Contract (as defined above) with the School District. The School District and successful Contractor shall memorialize their contractual relationship and obligations using the form of Contract attached hereto as **ATTACHMENT D**. The Contract contains many details relative to the Work required under this RFP, as well as the terms and conditions under which the Work shall be provided by the successful Contractor. The Contract should be reviewed carefully by each Contractor prior to submitting a Proposal. Any exceptions to the terms and conditions contained in the Contract, or any other special considerations or conditions requested or required by the Contractor relative to this RFP or the form of Contract shall be expressly/specifically enumerated by the Contractor and be submitted as part of its Proposal, together with an explanation as to the reason such terms and conditions cannot be met by, or, in the Contractor's opinion are not applicable to, the Contractor, provided however, that exceptions or special conditions of the Contractor will not be binding upon the School District unless those exceptions or special conditions are expressly accepted by the School District, and incorporated into the final Contract. Following the selection of the successful Contractor by the School District, the Contract will be finalized by the parties. The below sections contain information relative to selected provisions of the Contract and/or the expectations of the School District relative to the provision of the Work.

**3.1.1.1. Familial Disclosure Affidavit:** All Contractors must provide familial disclosure in compliance with MCL 380.1267 and attach this information to its Proposal. The Proposal must be accompanied by a sworn and notarized statement disclosing any familial relationship that exists between the owner and/or any employee of the Contractor and any member of the School District's Board of Education or the School District's Superintendent. The School District will not accept a Proposal that does not include this sworn and notarized disclosure statement. The Familial Disclosure Affidavit is attached to this RFP as **ATTACHMENT B**.

**3.1.1.2. Iran Economic Sanctions Act:** In accordance with Michigan Public Act No. 517 of 2012, all Proposals must be accompanied by a sworn and notarized statement certifying that the Contractor is not an Iran Linked Business. The School District will not accept a Proposal that does not include this sworn and notarized statement. The Affidavit of Compliance – Iran Economic Sanctions Act is attached to this RFP as **ATTACHMENT C**.

- 3.1.1.3. Bid Security:** Contractors must submit with its Proposal bid security in the form of a Bid Bond issued by a qualified surety or certified check/money order in an amount of five percent (5%) of the Proposal (“Bid Security”). Failure to include this Bid Security with the Contractor’s Proposal will result in the rejection of your Proposal. If a Bid Bond is posted by a Contractor, it shall be from a Treasury Surety licensed to do business in the State of Michigan, and the attorney-in-fact who executes the Bid Bond on behalf of the Contractor shall attach a certified, current copy of its power of attorney. In the event a certified check/money order is submitted, it shall be made payable to “Troy School District.” The School District shall not be liable for any interest earned thereon. The Bid Security shall be forfeited as liquidated damages, and not as a penalty, if the Contractor withdraws its Proposal after the Due Date for submission of Proposals or, upon acceptance of its Proposal by the School District, the Contractor fails to execute the form of Contract acceptable to the School District, substantially evidencing and incorporating this RFP and its Proposal and fails to provide the required Performance Bond and/or Payment Bond, if any, and the required insurance certificates, within fifteen (15) days of an award of a Contract to the Contractor. Bid Bonds shall be duly executed by the Contractor, as principal and by a surety that is properly licensed and authorized to do business in the state in which the Work is to be performed. All sureties providing bonds for this Project must be listed in the latest version of the Department of Treasury’s Circular 570, entitled “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies”, with the bond amount less than or equal to the underwriting limitation, and/or have an A.M. best rating of A- or better. Bid Security shall be returned to all non-successful Contractors within a reasonable time after the award of a Contract and execution of a Contract by the successful Contractor. The bid bond can be included with the proposal as submitted through Buildingconnected.com. If the bid security is a certified check/money order, this must be delivered to the following address: 1140 Rankin Street, Troy, MI 48083 prior to the bid due date and time.
- 3.1.1.4. Performance Bond:** Successful Contractors whose Proposals are \$50,000 or more will be required to furnish Performance and Payment Bonds, in a form satisfactory to the School District, in the amount of 100% of its Proposal by a Treasury-listed Surety licensed to do business in the State of Michigan, and the attorney-in-fact who executed the Performance and Payment Bonds on behalf of the Contractor shall attach a certified, current copy of its power of attorney. The cost of the Bonds shall be included in each Proposal.

- 3.1.1.5. Governing Law:** The Contract shall be governed by and construed in accordance with the laws of the State of Michigan. The parties hereby agree to the exclusive jurisdiction and venue of courts sitting in Oakland County, Michigan.
- 3.1.1.6. General Indemnification:** Contractor shall indemnify, defend and hold harmless the School District, its Board of Education, its Board Members, in their official and individual capacities, its administrators, employees, agents, contractors, successors and assignees, from and against any and all claims, counter claims, suits, debts, demands, actions, judgments, liens, costs, expenses, damages, injuries and liabilities, including actual attorney's fees and actual expert witness fees arising out of or in connection with Contractor's performance of the Contract and/or from Contractor's violation of any of the terms of the Contract, including, but not limited to: (i) the negligent acts or willful misconduct of the Contractor, its officers, directors, employees, successors, assignees, contractors and agents; (ii) any breach of the terms of the Contract by the Contractor, its officers, directors, employees, successors, assignees, contractors and agents; (iii) any violation or breach of any applicable Federal, State or local law, rule, regulation, ordinance, policy and/or licensing and permitting requirements applicable to the Contract; or (iv) any breach of any representation or warranty by the Contractor, its officers, directors, employees, successors, assignees, contractors and agents under the Contract. The Contractor shall notify the School District by certified mail, return receipt requested, immediately upon actual knowledge of any claim, suit, action, or proceeding for which Troy School District may be entitled to indemnification under the Contract. This paragraph shall survive the expiration or earlier termination of the Contract.
- 3.1.1.7. Compliance With Laws:** Contractor shall comply with any and all applicable federal, state, and local laws, rules, ordinances, policies, and regulations, including any licensing and permitting requirements, under the Contract. Contractor, including its personnel, employees, contractors, consultants, and agents shall be responsible for knowing the School District's policies concerning appropriate behavior of persons in School District facilities and, on School District properties, including for example, the prohibitions of sexual harassment and smoking, and shall comply with all such policies. Contractor represents and warrants to the School District that it shall at all times be in compliance with any and all applicable federal and state laws, rules, ordinances, policies and regulations, and licensing and permitting requirement applicable to the Contract. Contractor shall indemnify, defend, and hold School District harmless from any liability from its failure to so comply.

**3.1.1.8. Right to Terminate on Breach:** Each party shall have, in addition to all other remedies available to it, the right to terminate the Contract immediately upon written notice to the other party that the other party has committed a material breach of any of its obligations herein and such material party has committed a material breach of any of its obligations herein and such material breach shall not have been cured or corrected within ten (10) days following written notice of the same. Furthermore, if the School District must regularly request that the Contractor cure breaches of the Contract, such circumstances shall be grounds for termination of the Contract for cause, even if each breach on its own would not be material.

- i. **Events Upon Termination:** Upon termination of the Contract by either party for Breach or default of the other party, each party shall be entitled to exercise any other right, remedy or privilege which may be available to it under applicable law or proceed by appropriate court action to enforce the terms of the Contract or to recover damages for the breach of the Contract. Upon termination of the Contract, the Contractor shall immediately provide the School District with any and all drawings and documentation regarding the Work. In the event of termination, title to all supplies, materials, equipment or products purchased by the Contractor for integration into the Work shall pass to the School District, and Contractor shall deliver possession of said supplies, materials, equipment or products to the School District at a location to be designated by the School District.

**3.1.1.9. Pricing:** Prices quoted are to be F.O.B. to Troy School District. All purchases Prices shall be net; including transportation, insurance and delivery charges fully prepaid by the successful Contractor to destinations indicated in the Proposal.

**3.1.1.10. Taxes:** This project is NOT exempt from taxes.

**3.1.1.11. Proposal Withdrawal:** Contractors may withdraw its Proposals any time before the Due Date. Proposals may not be withdrawn for at least 90 days after the Due Date.

- 3.1.1.12. Competition:** The name of a model, manufacturer, or brand in this RFP shall not be considered as exclusive of other brands. Brands and models specified in this RFP are preferred. The School District expects all supplies, materials, equipment, or products bid by a Contractor to meet or exceed the Specifications set forth in this RFP. Further, it is the School District's intent that this RFP permit competition. Accordingly, the use of any patent, proprietary name, or manufacturer's name is for demonstrative purposes only and is not intended to curtail competition. Whenever any supplies, material, equipment, or products requested in this RFP are specified by patent, proprietary name or by the name of the manufacturer, unless stated differently, such specification shall be considered as if followed by the words "or comparable equivalent," whether or not such words appear. The School District in its sole and absolute discretion, shall have the right to determine if the proposed equivalent products/brands submitted by the Contractor meet the Specifications contained in this RFP and possess equivalent and/or better qualities. It is the Contractor's responsibility to notify the School District in writing if any Specifications or suggested comparable equivalent products/brands require clarification by the School District prior to the Due Date for Proposals. Any and all deviations from Specifications must be noted on the Proposal Form.

## **IV. PROPOSAL**

### **4.1. PROPOSAL FORMS**

Each Contractor shall submit its Proposal using the Proposal Pricing Form attached hereto as **ATTACHMENT A**, along with any other information required by this RFP or deem necessary and appropriate by the Contractor for evaluation of its Proposal.

### **4.2. PROPOSAL CHECKLIST**

In addition to the Proposal Pricing Form and any information required under Section 4.1 above, please attach copies of the following documents to your Proposal:

- 4.2.1.** Proposal Pricing Form and detailed list setting forth any exceptions to the RFP and/or Contract, or other special considerations or conditions of the Contractor, including explanations of such exceptions or the reason such terms and conditions of the RFP or form of Contract cannot be met by, or are not applicable to, the Contractor.
- 4.2.2.** List of Contractor's References (K-12 references preferred) with which Contractor has contracted to perform Work or services similar to the Work described herein. The Contractor must provide this information, including contact names, addresses, phone numbers, and type and scope of Work/services provided.
- 4.2.3.** Contractor's Verification of addenda to the RFP, if any.



- 4.2.4. Evidence of the Contractor's ability to provide adequate insurance coverages as required by this RFP and the Contract to protect the interests of the Contractor and the School District.
- 4.2.5. A completed Familial Disclosure Affidavit, which is attached hereto as **ATTACHMENT B.**
- 4.2.6. A completed Iran Sanctions Act Affidavit of Compliance, which is attached hereto as **ATTACHMENT C.**

**ATTACHMENT A**

**PROPOSAL PRICING FORM**

**CONTRACTOR INFORMATION:**

**CONTRACTOR'S NAME:** \_\_\_\_\_

**CONTACT PERSON:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

**CITY/STATE:** \_\_\_\_\_

**TELEPHONE NUMBER:** \_\_\_\_\_

**FAX NUMBER:** \_\_\_\_\_

**E-MAIL ADDRESS:** \_\_\_\_\_

**A. CONTRACTOR PRICING**

**BASE BID**

**Baker Middle School**

Base Bid Amount: \$ \_\_\_\_\_

Bond Amount: \$ \_\_\_\_\_

Allowance Amount: \$ 5,000.00

Permit Allowance Amount: \$ 5,500.00

Undercut Allowance of 1,500 Cubic Yards Amount: \$ \_\_\_\_\_

4" Drain Tile Allowance of 1,000 Lineal Feet Amount: \$ \_\_\_\_\_

**Troy Learning Commons**

Base Bid Amount: \$ \_\_\_\_\_

Bond Amount: \$ \_\_\_\_\_

Allowance Amount: \$ 5,000.00

Permit Allowance Amount: \$ 5,500.00

Undercut Allowance of 225 Cubic Yards Amount: \$ \_\_\_\_\_

4" Drain Tile Allowance of 300 Lineal Feet Amount: \$ \_\_\_\_\_

**Administration and Service Building**

Base Bid Amount: \$ \_\_\_\_\_

Bond Amount: \$ \_\_\_\_\_

Allowance Amount: \$ 5,000.00

Permit Allowance Amount Transportation Center: \$ 5,500.00

Undercut Allowance of 130 Cubic Yards Amount: \$ \_\_\_\_\_

4" Drain Tile Allowance of 350 Lineal Feet Amount: \$ \_\_\_\_\_

**Wattles Elementary School**

Base Bid Amount: \$ \_\_\_\_\_

Bond Amount: \$ \_\_\_\_\_

Allowance Amount: \$ 5,000.00

Undercut Allowance of 5 Cubic Yards Amount: \$ \_\_\_\_\_

**Athens High School**

Base Bid Amount: \$ \_\_\_\_\_

Bond Amount: \$ \_\_\_\_\_

Allowance Amount: \$ 5,000.00

Undercut Allowance of 13 Cubic Yards Amount: \$ \_\_\_\_\_

4" Drain Tile Allowance of 100 Lineal Feet Amount: \$ \_\_\_\_\_

**Grand Total Base Bid -** \$ \_\_\_\_\_

**ALTERNATE #1 – TROY LEARNING CENTER**

Remove existing grass, topsoil and sub-graded in order to re-grade and restore the grass area north of the building and between the two drive approaches to eliminate the berms area as indicated on Sheets C-1.2 and C-3.2 of the construction plans and per the project specifications. Place a new concrete sidewalk from the existing walk on north side of the building to the existing public walk along Big Beaver as indicated on Sheets C-1.2, C-2.2, C-3.2 and C-4.1 of the construction plans and per the project specifications.

Alternate #1 Bid Amount: \$ \_\_\_\_\_

Alternate #1 Bond Amount: \$ \_\_\_\_\_

**Grand Total Alternate #1 -** \$ \_\_\_\_\_

## ALTERNATE #2 – TRANSPORTATION CENTER

Complete all work the Transportation Center per the drawings and specifications.

Alternate #2 Amount:	\$ _____
Alternate #2 Bond Amount:	\$ _____
Alternate #2 Allowance Amount:	\$ 5,000.00
Alternate #2 Permit Allowance Amount:	\$ 5,500.00
Alternate #2 Undercut Allowance of 675 Cubic Yards Amount:	\$ _____
Alternate #2 4" Drain Tile Allowance of 400 Lineal Feet Amount:	\$ _____
<b>Grand Total Alternate #2 -</b>	<b>\$ _____</b>

## UNIT PRICING

### Description

### Units   Unit Price

Remove Sidewalk	SF	\$ _____
Remove Asphalt Pavement	SF	\$ _____
Remove Concrete Pavement	SF	\$ _____
Remove Curbing	LF	\$ _____
Sawcut Pavement	LF	\$ _____
Cold Milling Bituminous Surface (2")	SF	\$ _____
Mill and Pave 24" Wide Butt Joint	SF	\$ _____
Excavation and Disposal of Unsuitable Soil Prior to Proof Roll/Compaction	CY	\$ _____
Backfill with Suitable Fill from Excavation Depth to Subgrade Elevation (CIP)	CY	\$ _____
Subgrade Undercutting	CY	\$ _____
4" HDPE Single Walled Underdrain with Sock	LF	\$ _____
6" HDPE Single Walled Underdrain with Sock	LF	\$ _____
6" PVC SDR 26 Storm Sewer	LF	\$ _____
8" PVC SDR 26 Storm Sewer	LF	\$ _____

**UNIT PRICING CONT.****Description****Units   Unit Price**

10" PVC SDR 26 Storm Sewer	LF	\$ _____
12" RCP Storm Sewer	LF	\$ _____
15" RCP Storm Sewer	LF	\$ _____
18" RCP Storm Sewer	LF	\$ _____
24" RCP Storm Sewer	LF	\$ _____
Adjust Fire Hydrant	EA	\$ _____
Adjust Utility Manhole/Catch Basin (12-Inches or Less)	EA	\$ _____
Adjust Non Manhole Utility Structure (12-Inches or Less)	EA	\$ _____
Reconstruct Utility Manhole/Catch Basin (After 1 <sup>st</sup> 12-Inches)	VF	\$ _____
Replace Manhole/Catch Basin Frame and Cover	EA	\$ _____
Replace Non-Manhole Utility Cover/Box	EA	\$ _____
6" MDOT 3,500 Concrete Curb & Gutter (18" Wide) w/4" Agg. Base	LF	\$ _____
4" MDOT 3,500 Mountable Concrete Curb & Gutter (18" Wide) w/4" Agg. Base	LF	\$ _____
6" MDOT 3,500 Integral Concrete Sidewalk & Curb w/4" Sand Base	SF	\$ _____
4" MDOT 3,500 Concrete Sidewalk w/4" Sand Base	SF	\$ _____
8" MDOT 3,500 Concrete Pavement	SY	\$ _____
2" MDOT 5EML Asphalt Overlay	SY	\$ _____
4" MDOT 5EML/4ELM Asphalt Pavement	SY	\$ _____
5" MDOT 5EML/4EML Asphalt Pavement	SY	\$ _____
6" 21AA Crushed Limestone Aggregate (CIP)	SY	\$ _____
8" 21AA Crushed Limestone Aggregate (CIP)	SY	\$ _____
10" 21AA Crushed Limestone Aggregate (CIP)	SY	\$ _____
1" x 3" Crushed Concrete Aggregate (CIP)	SY	\$ _____
Coal Tar Sealcoat (2 coats)	SF	\$ _____

**UNIT PRICING CONT.****Description****Units   Unit Price**

Asphalt Joint & Crack Routing & Sealing	LF	\$ _____
6" Steel Bollard – Concrete Filled	EA	\$ _____
Parking Lot Striping (2 coats)	LF	\$ _____
Parking Lot Symbols (Arrows, Stop, Etc.) (2 coats)	LF	\$ _____
Cross Walk Hatching (2 coats)	EA	\$ _____
Add Parking Lot Striping (2 coats)	LF	\$ _____
Add Parking Symbols (2 coats)	EA	\$ _____
Signage (Stop, Yield, PED Crossing, Etc.) with Post Only	EA	\$ _____
Signage (Stop, Yield, PED Crossing, Etc.) with Post/Bollard	EA	\$ _____
ADA Sign with Post/Bollard	EA	\$ _____
Tensar Tri-Axial Geo-Grid	SF	\$ _____

NOTE: Unit prices are for work items to be added or removed from the contract

**B.     ACKNOWLEDGEMENT OF ADDENDA TO RFP**

The Contractor acknowledges receipt of the following addenda:

Addendum Number \_\_\_\_\_ dated \_\_\_\_\_

Addendum Number \_\_\_\_\_ dated \_\_\_\_\_

Addendum Number \_\_\_\_\_ dated \_\_\_\_\_

The undersigned understands that the School District reserves the right to accept or reject in whole or in part any and all Proposals, to waive informalities and irregularities therein, and to award the Contract to other than the Contractor(s) submitting the best financial Proposal (low bidder) and to award the Contract to one (1) or more Contractors in the School District's sole and absolute discretion.

If award is made to our firm based upon our Proposal, we agree to enter into the attached form of Contract with the School District to furnish the Work in strict accordance with this Request For Proposal, the Contract, and our Proposal.

My signature certifies that the Proposal as submitted complies with all terms and conditions as set forth in this Request For Proposal and the Contract, unless specifically enumerated as an exception as part of our Proposal.

I hereby certify that I am authorized to sign as a Representative for the firm.

**CONTRACTOR HEREBY SUBMITS THIS PROPOSAL PRICING FORM IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF THE RFP.**

Name of Contractor: \_\_\_\_\_

\_\_\_\_\_  
(Signature/Principal)

\_\_\_\_\_  
(Name Printed)

Date: \_\_\_\_\_

# FAMILIAL DISCLOSURE AFFIDAVIT

List any Familial Relationships:

Its: \_\_\_\_\_

This instrument was acknowledged before me on the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by \_\_\_\_\_.

Acting in the County of: \_\_\_\_\_



**IRAN ECONOMIC SANCTIONS ACT AFFIDAVIT OF COMPLIANCE**  
**Michigan Public Act No. 517 of 2012**

The Contractor further acknowledges that any person who is found to have submitted a false certification is responsible for a civil penalty of not more than \$250,000.00 or 2 times the amount of the contract or proposed contract for which the false certification was made, whichever is greater, the cost of the School District's investigation, and reasonable attorney fees, in addition to the fine. Moreover, any person who submitted a false certification shall be ineligible to bid on a request for proposal for three (3) years from the date that it is determined that the person has submitted the false certification.

## Name of Contractor

Date: \_\_\_\_\_

COUNTY OF \_\_\_\_\_)

---

County, \_\_\_\_\_

Acting in the County of \_\_\_\_\_

**ATTACHMENT D**

**CONTRACT**

## CONTRACT

I. This Contract ("Contract") is made on \_\_\_\_\_, 20\_\_ ("Effective Date"), between **TROY SCHOOL DISTRICT**, a Michigan public school district ("School District"), whose address is 4400 Livernois Road, Troy, Michigan 48098 and \_\_\_\_\_, a \_\_\_\_\_ ("Contractor"), whose address is \_\_\_\_\_. The School District and Contractor may each be referred to herein as a "Party" and collectively as the "Parties."

## RECITALS

A. The School District issued a Request For Proposal For \_\_\_\_\_ dated \_\_\_\_\_, as amended by [INSERT ADDENDA BY NAME AND DATE HERE] (collectively the "RFP"), the purpose of which was to solicit proposals from qualified contractors to furnish to the School District all of the materials and labor required to \_\_\_\_\_ identified in the RFP in accordance with the terms and conditions contained in the RFP and the Specifications attached thereto (the "Work").

B. In response to the RFP, the Contractor submitted to the School District a Proposal dated \_\_\_\_\_, to perform the Work contemplated by the RFP.

C. The Parties have, in accordance with the provisions of the RFP, conducted negotiations concerning the Contractor's Proposal to the RFP. The Contractor's Proposal together with written clarifications of the Parties, if any, are attached hereto, incorporated by reference, and marked as **Exhibit A** (collectively referred to as the "Proposal").

D. Pursuant to the terms of the RFP, the Contractor is required to enter into a written contract in accordance with the School District's written acceptance of its Proposal.

E. The Parties agree that certain terms, conditions, and provisions of the RFP and the Proposal must be further clarified and that certain additional terms and conditions need to be expressly set forth by way of this Contract.

**NOW THEREFORE**, in consideration of the foregoing and the mutual covenants set forth herein, the Parties agree as follows:

### • **1. RESTATEMENT CONSTITUTES THE CONTRACT**

(a) **Incorporation By Reference.** The object of this Contract is to formalize in one document the complete agreement between the Parties, and to do so by specifically incorporating by reference into this Contract the RFP, the Proposal, and other related documents, and by including certain additional necessary or appropriate Contract terms, particularly where the Contract terms agreed to by the Parties during the RFP negotiation process do not correspond with the RFP and/or the Proposal.

**(b) Order of Precedence.** The Contract Documents, which are all incorporated herein by reference, include the following:

This Contract, including all Attachments hereto;  
The RFP, including the Specifications attached thereto; and  
Contractor's Proposal.

To the extent that the terms and conditions of the Contract Documents are in conflict, the terms and conditions shall be interpreted in the above-referenced order from 1 to 3. However, the Parties also agree that where there is not a conflict between any of the terms and conditions contained in the above-referenced Contract Documents, all of the Contract Documents shall be binding upon both Parties, except to the extent the exceptions contained in the Contractor's Proposal are not expressly accepted by the School District in writing and incorporated into this Contract.

## • 2. TERM AND TERMINATION

**(a)** This Agreement shall commence as of the Effective Date and all Work hereunder shall be completed no later than \_\_\_\_\_ and shall be in compliance with the Project Schedule attached hereto as **Exhibit B**.

**(b)** Each Party shall have, in addition to all other remedies available to it, the right to terminate this Contract upon written notice to the other Party that the other Party has committed a material breach of any of its obligations herein and such material breach shall not have been cured or corrected within ten (10) days following written notice of the same. Furthermore, in addition to the rights of the School District under this Paragraph if the School District must regularly request that the Contractor to cure breaches of this Contract, such circumstances shall be grounds for termination of this Contract for cause, even if each breach on its own would not be material. Upon termination of this Contract by the School District for breach or default of the Contractor pursuant to this Paragraph, the School District shall be entitled to exercise any other right, remedy, or privilege which may be available to it under applicable law or proceed by appropriate court action to enforce the terms of the Contract or to recover damages for the breach of this Contract. If this Contract is terminated in accordance with any of the provisions contained herein, all rights of the Contractor under this Contract shall cease. Regardless of the basis for termination, the School District shall neither be liable to, nor obligated to pay, the Contractor for any incidental or consequential damages or lost profits, or costs incurred for Work not actually performed.

**(c)** Notwithstanding anything contained herein to the contrary, the School District may terminate this Contract at any time and for any reason or no reason at all upon written notice to the Contractor.

## 3. WARRANTY

The Contractor warrants and represents that its Work, will be in accordance with all applicable federal, state, and local laws and regulations for a minimum of two (2) years from completion of the Work.

#### **4. INSURANCE**

The Contractor shall maintain, at its expense, during the term of this Contract the following insurance:

(a) Worker's Compensation Insurance with statutory limits and Employer's Liability Insurance with a minimum limit of \$1,000,000 each occurrence.

(b) Comprehensive General Liability Insurance with a minimum combined single limit of \$1,000,000 per occurrence and \$3,000,000 in the aggregate, in the same amount made for bodily injury and property damage. The policy is to include products and completed operations, cross liability, broad form property damage, independent bidders, and contractual liability coverage. The policy shall be endorsed to provide thirty (30) days written notice to the School District of any material change of coverage, cancellation, or non-renewal of coverage.

(c) If Subcontractors are likely to be used, the Comprehensive General Liability policy shall include coverage for independent contractors.

(d) Automobile Liability insurance covering all owned, hired, and non-owned vehicles with personal protection insurance and property insurance to comply with the provisions of the Michigan no-fault Insurance Law, including residual liability insurance with a minimum combined single limit of \$1,000,000 each occurrence of bodily injury and property damage.

(e) All insurance policies shall be issued by companies licensed to do business in the State of Michigan. The companies issuing the policies must be domestic (on-shore) companies and have an A-rating by AM Best.

(f) The Contractor shall be responsible for payment of all deductibles contained in any insurance policy required in this Contract.

(g) Other requirements: Evidence of your insurance coverages, required herein, is to be provided to the School District and must indicate:

1. A Best's rating for each of your insurance carrier at A-VII or better,
2. "Troy School District" is endorsed as an additional insured on the General Liability policies.
3. All consultants must be listed as additional insured.

#### **5. CONTRACTOR'S COMPENSATION**

Based upon the School District's RFP and the Contractor's Proposal, the School District shall pay the Contractor for its Work as follows:

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## 6. MISCELLANEOUS

**(a) Notices.** All notices hereunder shall be in writing and shall be effective when sent by facsimile or electronic mail (provided, however, that any notice which could materially affect the rights of either Party shall also be sent by courier as provided herein) or a nationally known courier service such as DHL or Federal Express, addressed to the addresses written below, or to such other address as either Party may have last designated in writing in the manner herein provided. Such notice shall be deemed given when received, but in any event no later than four (4) days after sent by the internationally known courier. All notices shall be sent to the following address:

If to the Contractor:

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Attention:

Copy To:

---

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If to the School District:      Troy School District  
4400 Livernois Road  
Troy, Michigan 48098

**(b) Assignment.** This Contract and any other interest herein may not be assigned or transferred, in whole or in part, by either Party without the prior written consent of the other Party, which consent shall not be unreasonably withheld, and any assignment or transfer without such consent shall be null and void. This Contract shall be binding upon the successors, and subject to the above, assigns of either Party.

**(c) Severability.** If any provision of this Contract is held invalid or unenforceable, the remainder of this Contract shall nevertheless remain in full force and effect. If any provision is held invalid or unenforceable with respect to particular circumstances, it shall nevertheless remain in full force and effect in all other circumstances.

**(d) Independent Contractor; No Joint Venture.** It is expressly agreed that Contractor is acting hereunder as an independent contractor and under no circumstances shall any of the employees of either Party be deemed the employees of the other for any purpose. This Contract shall not be construed as authority for either Party to act for the other Party in any agency or other capacity or to make commitments of any kind for the account of, or on behalf of, the other Party, except to the extent, and for the purposes, expressly provided for and set forth herein, and no partnership or joint venture is created hereby.

**(e) Modifications.** No provision of this Contract or any Exhibit hereto may be modified without the prior written consent of both Parties.

**(f) Captions.** The captions used in this Contract are for convenience only and shall not affect in any way the meaning or interpretation of the provisions of this Contract.

**(g) Governing Law.** This Contract shall be construed in accordance with, and its performance governed by, the laws of the State of Michigan. The Parties hereby agree to the exclusive jurisdiction and venue of courts sitting in Oakland County, Michigan.

**(h) Taxes.** Contractor is responsible for sales taxes and any other applicable taxes related to the Work provided under this Contract.

**(i) Entire Agreement.** This Contract and all Exhibits and documents incorporated herein by reference constitute the entire agreement between the Parties, and supersedes all previous agreements, whether written or oral.

IN WITNESS WHEREOF, the undersigned have caused this Contract to be duly executed on the dates indicated below.

**CONTRACTOR:**

**SCHOOL DISTRICT:**

By: \_\_\_\_\_

By: \_\_\_\_\_

Its: \_\_\_\_\_

Its: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**EXHIBIT A**

**WRITTEN CLARIFICATIONS**



**EXHIBIT B**  
**PROJECT SCHEDULE**

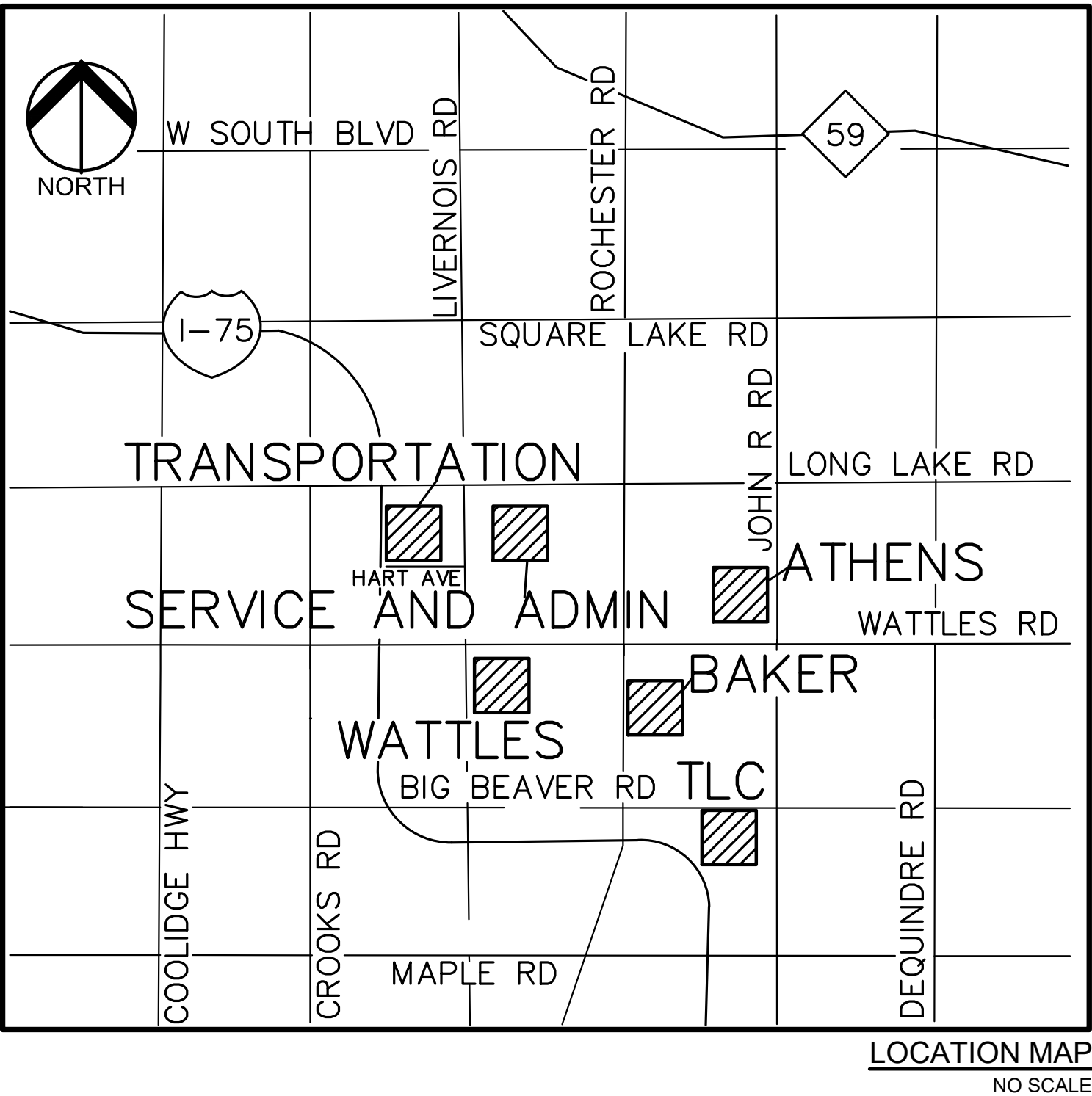
CONSTRUCTION PLANS

# TSD 2024 SITE IMPROVEMENTS

## PAVING PROJECTS

TROY, OAKLAND COUNTY, MICHIGAN

PERMIT / APPROVAL SUMMARY		
DATE SUBMITTED	DATE APPROVED	PERMIT / APPROVAL
		CITY OF TROY ENGINEERING
		CITY OF TROY SESC



INDEX OF DRAWINGS	
NUMBER	TITLE
	COVER SHEET
	BAKER MIDDLE SCHOOL
C-1.1	TOPOGRAPHIC SURVEY AND DEMOLITION PLAN
C-1.1A	TOPOGRAPHIC SURVEY AND DEMOLITION PLAN
C-2.1	ENGINEERING AND DIMENSION PLAN
C-2.1A	ENGINEERING AND DIMENSION PLAN
C-3.1	GRADING AND SESC PLAN
C-3.1A	GRADING AND SESC PLAN
	TROY LEARNING CENTER
C-1.2	TOPOGRAPHIC SURVEY AND DEMOLITION PLAN
C-2.2	ENGINEERING AND DIMENSION PLAN
C-3.2	GRADING AND SESC PLAN
	TRANSPORTATION CENTER
C-1.3	TOPOGRAPHIC SURVEY AND DEMOLITION PLAN
C-2.3	ENGINEERING AND DIMENSION PLAN
C-3.3	GRADING AND SESC PLAN
	TRANSPORTATION ADMINISTRATION AND SERVICE BUILDING
C-1.4	ADMINISTRATION TOPOGRAPHIC SURVEY AND DEMOLITION PLAN
C-1.5	SERVICE TOPOGRAPHIC SURVEY AND DEMOLITION PLAN
C-2.4	ADMINISTRATION ENGINEERING AND DIMENSION PLAN
C-2.5	SERVICE ENGINEERING AND DIMENSION PLAN
C-3.4	ADMINISTRATION GRADING AND SESC PLAN
C-3.5	SERVICE GRADING AND SESC PLAN
	WATTLES ELEMENTARY SCHOOL
C-2.6	ENGINEERING PLAN
	ATHENS HIGH SCHOOL
C-2.7	ENGINEERING PLAN
	NOTES AND DETAILS
C-4.0	NOTES AND DETAILS
C-4.1	NOTES AND DETAILS
	TROY STANDARD DETAILS
D	SESC DETAILS
E	STORM SEWER DETAILS

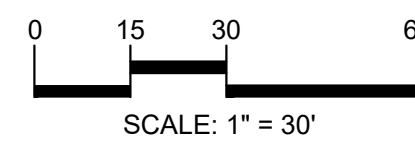
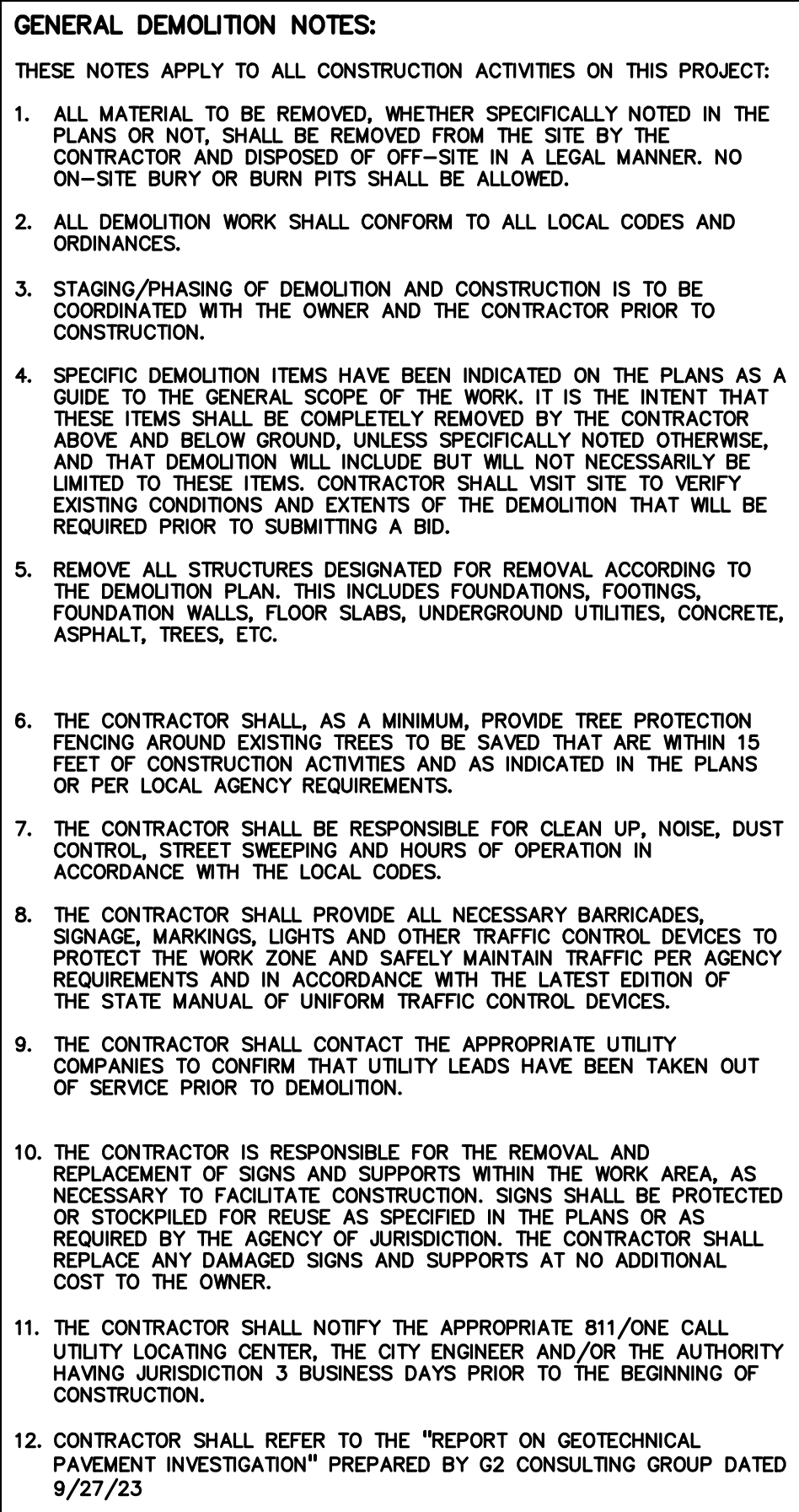
DESIGN TEAM

OWNER	CIVIL ENGINEER
TROY SCHOOL DISTRICT 1140 RANKIN DRIVE TROY, MI 48063 CONTACT: ROB CARSON PHONE: 248.923.4067 EMAIL: RCARSON@TROY.K12.MI.US	PEA GROUP 1849 POND RUN AUBURN HILLS, MI 48326 CONTACT: ROBERT ROCHON, P.E. PHONE: (248) 689-9090 EXT. 1161 FAX: (248) 689-1044 EMAIL: RROCHON@PEAGROUP.COM

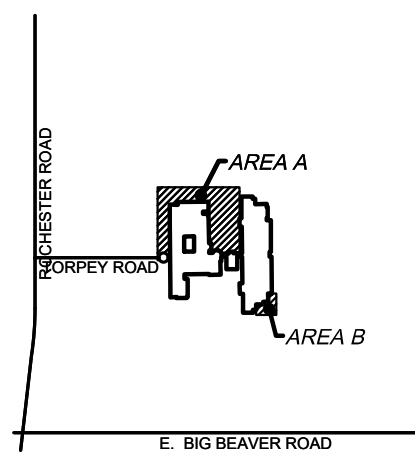


REVISIONS	
DESCRIPTION	DATE
ISSUE FOR BID	10/31/2023












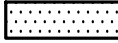


**CAUTION!!**  
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.



CLIENT  
**TROY SCHOOLS**  
1140 RANKIN DRIVE  
TROY, MI 48063

PROJECT TITLE  
**BAKER MIDDLE  
SCHOOL**  
1359 TORPEY ROAD  
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

### DEMOLITION LEGEND:

ITEM TO BE PROTECTED	
ITEM TO BE REMOVED	
CURB/FENCE REMOVAL	
CONCRETE PAVEMENT AND SIDEWALK REMOVAL	
AREA OR ITEMS TO BE REMOVED	
UTILITY REMOVAL	
ABANDON UTILITY	
ASPHALT REMOVAL	
TREE REMOVAL	
SAWCUT LINE	

DEMOLITION QUANTITIES:	
REMOVE CURB	933 LF
REMOVE ASPHALT:	92,310 SF
REMOVE CONCRETE:	5,413 SF
REMOVE BOLLARD	10 EA
SAWCUT PAVEMENT:	453 LF
REMOVE SIGN AND POST:	9 EA
TOPSOIL, GRASS, SOIL REMOVAL	4,625 SF
REMOVE FRAME AND COVER	2 EA

## LEGEND:

—OH-ELEC—W—O—	EX. OH. ELEC. POLE & GUY WIRE
—UG-CATV—	EX. U.G. CABLE TV & PEDESTAL
—UG-COM—	EX. U.G. COMMUNICATION LINE, PEDESTAL & MANHOLE
—UG-ELEC—ELEC—	EX. U.G. ELEC. MANHOLE, METER & HANDHOLE
---	EX. GAS LINE
⑩ ⑩	EX. GAS VALVE & GAS LINE MARKER
II II	EX. TRANSFORMER & IRRIGATION VALVE
---	EX. WATER MAIN
⌋ ⌋	EX. HYDRANT, GATE VALVE & POST INDICATOR VALVE
④ ④	EX. WATER VALVE BOX & SHUTOFF
---	EX. SANITARY SEWER
② ②	EX. SANITARY CLEANOUT & MANHOLE
---	EX. COMBINED SEWER MANHOLE
---	EX. STORM SEWER
② ②	EX. CLEANOUT & MANHOLE
⊠ ⊠	EX. SQUARE, ROUND & BEEHIVE CATCH BASIN
⊠ ⊠	EX. YARD DRAIN, U.G. ROOF DRAIN & DOWNSPOUT
⊠ ⊠	EX. UNIDENTIFIED STRUCTURE
⊠ ⊠	EX. MAIL BOX, SIGN, LIGHTPOLE & GUARD POST
---	EX. FENCE
⊠ ⊠	EX. GUARD RAIL
⊠ ⊠	EX. DEC. TREE, CONIFEROUS TREE & SHRUB
⊠ ⊠	EX. TREE TAG, & TREE LINE
⊠ ⊠	EX. SPOT ELEVATION
---	EX. CONTOUR
⊠ ⊠	EX. WETLAND
● ⊠	IRON FOUND / SET
● ⊠	NAIL FOUND / NAIL & CAP SET
⊠	BRASS PLUG SET
● ⊠	MONUMENT FOUND / SET
⊠	CORNER CORNER FOUND
R M C	RECORDED / MEASURED / CALCULATED

REFERENCE DRAWINGS:	
PEA JOB NO. 2018-192	
CABLE	WOW CABLE MAP, EMAIL DATED 09/08/2023
WATER MAIN	CITY OF TROY MAP, EMAIL DATED 09/08/2023
SANITARY SEWER	CITY OF TROY MAP, EMAIL DATED 09/08/2023
ELECTRIC	HAVE NOT RECEIVED MAPS AS OF 09/11/2023

**FLOODPLAIN NOTE:**  
BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AN AREA DETERMINED  
TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN, PER FLOOD  
INSURANCE RATE MAP NUMBER 26125C0553G, DATED JANUARY 16, 2009.

[illegible]

ORIGINAL ISSUE DATE:  
OCTOBER 31, 2023

DRAWING TITLE

**TOPO AND  
DEMOLITION  
PLAN**

PEA JOB NO.	2023-020
P.M.	F
DN.	F
DES.	F

DRAWING NUMBER:

## C-1.1





**CAUTION!!**  
LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

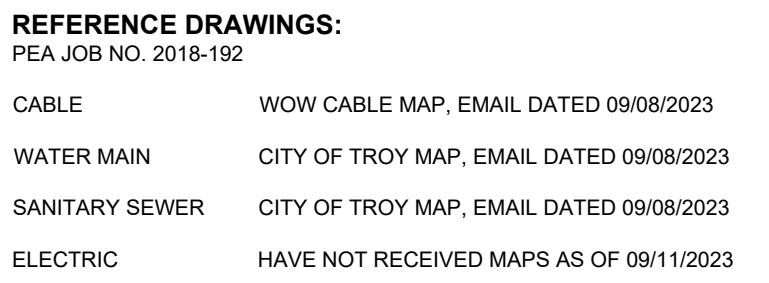


PROJECT TITLE  
**BAKER MIDDLE  
SCHOOL**  
159 TORPEY ROAD  
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

ORIGINAL ISSUE DATE:  
OCTOBER 31, 2023

EA JOB NO.	2023-0262
M.	RR
N.	RR
ES.	RM

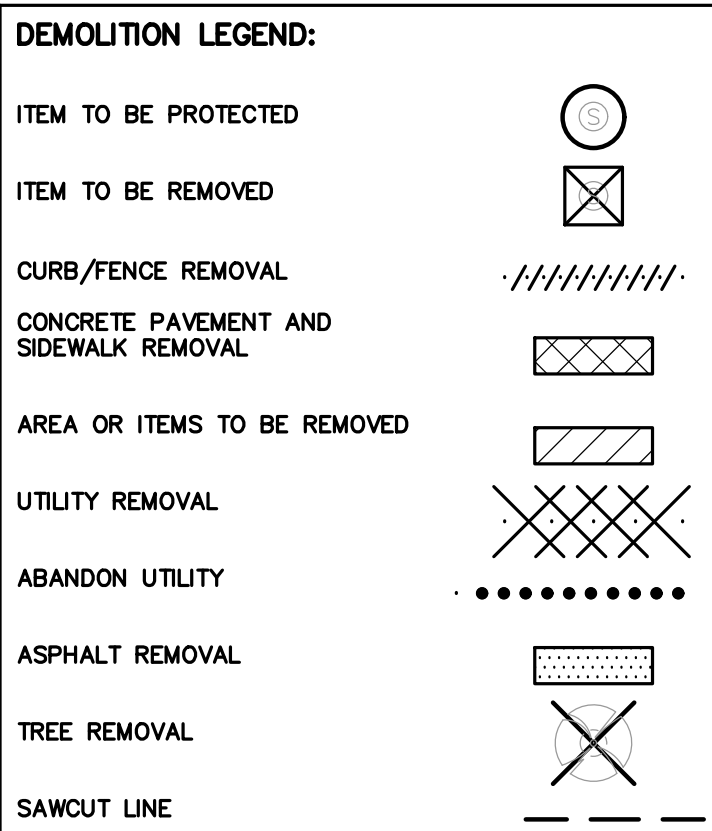
# C-1.1A



DEMOLITION QUANTITIES:

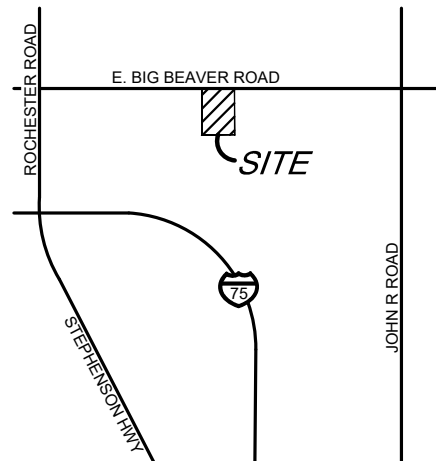
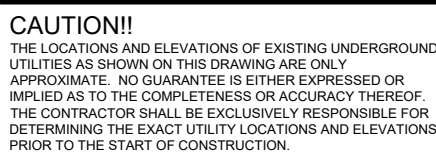
REMOVE ASPHALT:	2,516 SF
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1. ALL MATERIAL TO BE REMOVED, WHETHER SPECIFICALLY NOTED IN THE PLANS OR NOT, SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF OFF-SITE IN A LEGAL MANNER. NO ON-SITE BURY OR BURN PITS SHALL BE ALLOWED.
2. ALL DEMOLITION WORK SHALL CONFORM TO ALL LOCAL CODES AND ORDINANCES.
3. STAGING/PHASING OF DEMOLITION AND CONSTRUCTION IS TO BE COORDINATED WITH THE OWNER AND THE CONTRACTOR PRIOR TO CONSTRUCTION.
4. SPECIFIC DEMOLITION ITEMS HAVE BEEN INDICATED ON THE PLANS AS GUIDE TO THE GENERAL SCOPE OF THE WORK. IT IS THE INTENT THAT THESE ITEMS SHALL BE COMPLETELY REMOVED BY THE CONTRACTOR ABOVE AND BELOW GROUND, UNLESS SPECIFICALLY NOTED OTHERWISE, BUT WILL NOT NECESSARILY BE LIMITED TO THESE ITEMS. CONTRACTOR SHALL VISIT SITE TO VERIFY EXISTING CONDITIONS AND EXTENTS OF THE DEMOLITION THAT WILL BE REQUIRED PRIOR TO SUBMITTING A BID.
5. REMOVE ALL STRUCTURES DESIGNATED FOR REMOVAL ACCORDING TO THE DEMOLITION PLAN, THIS INCLUDES FOUNDATIONS, FOOTINGS, CONCRETE WALLS, FLOOR SLABS, UNDERGROUND UTILITIES, CONCRETE, ASPHALT, TREES, ETC.
6. THE CONTRACTOR SHALL, AS A MINIMUM, PROVIDE TREE PROTECTION FENCING AROUND EXISTING TREES TO BE SAVED THAT ARE WITHIN 15 FEET OF THE CONSTRUCTION ACTIVITIES AND AS INDICATED IN THE PLANS OR PER LOCAL AGENCY REQUIREMENTS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN UP, NOISE, DUST CONTROL, STREET SWEEPING AND HOURS OF OPERATION IN ACCORDANCE WITH THE LOCAL CODES.
8. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADES, SIGNAGE, MARKINGS, LIGHTS AND OTHER TRAFFIC CONTROL DEVICES TO PROTECT THE WORK ZONE AND SAFELY MAINTAIN TRAFFIC PER AGENCY REQUIREMENTS AND IN ACCORDANCE WITH THE LATEST EDITION OF THE STATE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
9. THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES TO CONFIRM THAT UTILITY LEADS HAVE BEEN TAKEN OUT OF SERVICE PRIOR TO DEMOLITION.
10. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND REPLACEMENT OF SIGNS AND SUPPORTS WITHIN THE WORK AREA, AS NOTED TO BE TO BE REMOVED OR REPLACED. SIGNS SHALL BE PROTECTED OR STOCKPILED FOR REUSE AS SPECIFIED IN THE PLANS OR AS REQUIRED BY THE AGENCY OF JURISDICTION. THE CONTRACTOR SHALL REPLACE ANY DAMAGED SIGNS AND SUPPORTS AT NO ADDITIONAL COST TO THE OWNER.
11. THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE 811/ONE CALL UTILITY LOCATING CENTER, THE CITY ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
12. CONTRACTOR SHALL REFER TO THE "REPORT ON GEOTECHNICAL PAVEMENT INVESTIGATION" PREPARED BY G2 CONSULTING GROUP DATED 9/27/23



**FLOODPLAIN NOTE:**  
BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AN AREA DETERMINED  
TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN, PER FLOOD  
INSURANCE RATE MAP NUMBER 26125C0553G, DATED JANUARY 16, 2009.





CLIENT  
**TROY SCHOOLS**  
1140 RANKIN DRIVE  
TROY, MI 48063

PROJECT TITLE  
**TROY  
LEARNING  
CENTER**  
1522 E. BIG BEAVER ROAD  
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

**REVISIONS**

**ORIGINAL ISSUE DATE:**  
**OCTOBER 31, 2023**

ORIGINAL ISSUE DATE:  
OCTOBER 31, 2023

DRAWING TITLE

# TOPO AND DEMOLITION PLAN

PEA JOB NO. 2023-0262P.M. RF

DN.	RF
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DES. RM

DRAWING NUMBER:

# C-1.2

THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT:

1. ALL MATERIAL TO BE REMOVED, WHETHER SPECIFICALLY NOTED IN THE PLANS OR NOT, SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF IN A PROPER MANNER. NO ON-SITE BURY OR BURN PITS SHALL BE ALLOWED.
2. ALL DEMOLITION WORK SHALL CONFORM TO ALL LOCAL CODES AND ORDINANCES.
3. STAGING/PHASING OF DEMOLITION AND CONSTRUCTION IS TO BE COORDINATED WITH THE OWNER AND THE CONTRACTOR PRIOR TO CONSTRUCTION.
4. SPECIFIC DEMOLITION ITEMS HAVE BEEN INDICATED ON THE PLANS. THE GENERAL SCOPE OF THE WORK, IT IS THE INTENT THAT THESE ITEMS SHALL BE COMPLETELY REMOVED BY THE CONTRACTOR ABOVE AND BELOW GROUND, UNLESS SPECIFICALLY NOTED OTHERWISE. THIS DEMOLITION WILL INCLUDE BUT WILL NOT NECESSARILY BE LIMITED TO THESE ITEMS. CONTRACTOR SHALL VISIT SITE TO VERIFY EXISTING CONDITIONS AND EXTENTS OF DEMOLITION THAT WILL BE REQUIRED PRIOR TO SUBMITTING A BID.
5. REMOVE ALL STRUCTURES DESIGNATED FOR REMOVAL ACCORDING TO THE DEMOLITION PLAN. THIS INCLUDES FOUNDATIONS, FOOTINGS, CONCRETE, ASPHALT, TREES, ETC.
6. THE CONTRACTOR SHALL, AS A MINIMUM, PROVIDE TREE PROTECTION FENCING AROUND EXISTING TREES TO BE SAVED THAT ARE WITHIN 15 FEET OF CONSTRUCTION ACTIVITIES AND AS SPECIFIED IN THE PLANS OR PER LOCAL AGENCY REQUIREMENTS.
7. THE CONTRACTOR SHALL PROVIDE FOR CLEAN UP, NOTED DUST EXTRACTION, STREET SWEEPING AND HOURS OF OPERATION IN ACCORDANCE WITH THE LOCAL CODES.
8. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADES, SIGNAGE, MARKINGS, LIGHTS AND OTHER TRAFFIC CONTROL DEVICES TO PROTECT THE WORK AREA SAFELY IN ACCORDANCE WITH ALL AGENCY REQUIREMENTS AND IN ACCORDANCE WITH THE LATEST EDITION OF THE STATE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
9. THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES TO CONFIRM THAT UTILITY LEADS HAVE BEEN TAKEN OUT OF SERVICE PRIOR TO DEMOLITION.
10. THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE STATE/ONE CALL UTILITY LOCATING CENTER, PRIVATE UTILITY LOCATOR, THE CITY ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
11. CONTRACTOR TO REMOVE TOPSOIL, GRASS, AND SUBGRADE, AS NECESSARY FOR PROPOSED PAVEMENT.
12. CONTRACTOR SHALL REFER TO THE "REPORT ON GEOTECHNICAL PAVEMENT INVESTIGATION" PREPARED BY G2 CONSULTING GROUP DATED 10/10/23

—UG-ELEC—W—O—X	EX. OH. ELEC. POLE & GUY WIRE
—UG-CATV—	EX. U.G. CABLE TV & PEDESTAL
—UG-COMM—X—	EX. U.G. COMMUNICATION LINE, PEDESTAL & MANHOLE
—UG-ELEC—O—X—	EX. U.G. ELEC. MANHOLE & METER
—	EX. GAS LINE
⊙	EX. GAS VALVE & GAS LINE MARKER
□	EX. TRANSFORMER & IRRIGATION VALVE
—	EX. WATER MAIN
⌋	EX. HYDRANT, GATE VALVE & POST INDICATOR VALVE
⌋	EX. WATER VALVE BOX & SHUTOFF
—	EX. SANITARY SEWER
⊙	EX. SANITARY CLEANOUT & MANHOLE
⊙	EX. COMBINED SEWER MANHOLE
—	EX. STORM SEWER
⊙	EX. CLEANOUT, MANHOLE & CULVERT
⊙	EX. SQUARE, ROUND & BEEHIVE CATCH BASIN
⊙	EX. YARD DRAIN, ROOF DRAIN & DOWNSPOUT
⊙	EX. UNIDENTIFIED STRUCTURE
⊙	EX. MAILBOX, SIGN & GUARD POST
⊙	EX. LIGHT POLE & YARD LIGHT
—X—	EX. FENCE
—	EX. GUARD RAIL
⊙	EX. DEC. TREE, CONIFEROUS TREE & SHRUB
⊙	EX. TREE TAG, & TREE LINE
⊙	EX. SPOT ELEVATION
—	EX. CONTOUR
⊙	SOIL BORING
⊙	IRON FOUND / SET
⊙	NAIL FOUND / NAIL & CAP SET
⊙	BRASS PLUG SET
⊙	MONUMENT FOUND / SET
⊙	SECTION CORNER FOUND
(R) (M) (C)	RECORDED / MEASURED / CALCULATED

ALTA/NSPS LAND TITLE SURVEY, PEA JOB NO. 2019-429, DATED  
11/01/2019





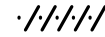


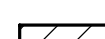


FIBER WOW CABLE MAP, EMAIL DATED 09/08/2023  
FIBER LINK MAP, EMAIL DATED 09/11/2023  
COMCAST CABLE MAP, EMAIL DATED 09/12/2023

## (GPS DERIVED - NAVD88)

BM #300  
ARROW ON A HYDRANT LOCATED APPROX. 148' SOUTH-WEST FROM  
THE SOUTHWEST BUILDING CORNER OF 1522 E. BIG BEAVER ROAD.  
ELEV. - 655.66

BM #301  
ARROW ON A HYDRANT LOCATED ON THE SOUTH WIDE OF E. BIG  
BEAVER ROAD, APPROX. 125' EAST FROM THE EASTERLY ENTRANCE  
DRIVE TO 1522 E. BIG BEAVER RD.  
ELEV. - 621.24

## ITEM TO BE PROTECTED

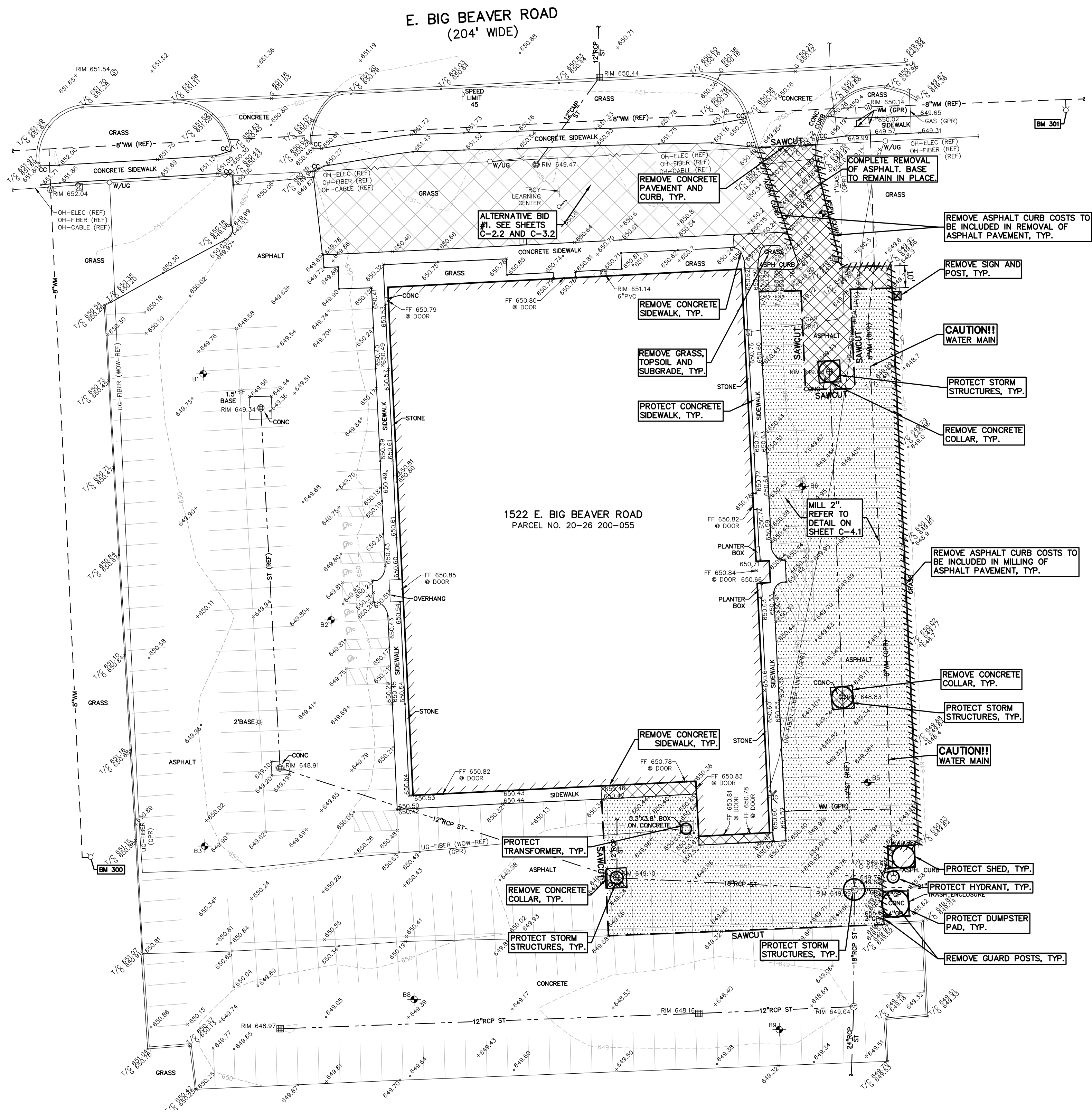
ITEM TO BE PROTECTED	
ITEM TO BE REMOVED	
CURB/FENCE REMOVAL	
CONCRETE PAVEMENT AND SIDEWALK REMOVAL	
AREA OR ITEMS TO BE REMOVED	
UTILITY REMOVAL	
ABANDON UTILITY	
ASPHALT REMOVAL	
TREE REMOVAL	
SAWCUT LINE	

1. CONTRACTOR TO VERIFY ALL QUANTITIES SHOWN ON THE PLANS. ANY DEVIATIONS TO THE PLAN QUANTITIES SHALL BE BROUGHT TO THE ATTENTION OF THE SCHOOL DISTRICT AND PEA GROUP, IN WRITING PER THE BID PACKAGE, FOR VERIFICATION PRIOR TO BIDDING.

2. ALL DIMENSIONS SHOWN ARE TO BACK OF CURB, FACE OF SIDEWALK, CENTER OF MANHOLE/CATCH BASIN UNLESS OTHERWISE NOTED.
3. DOWEL INTO EXISTING CURB AND GUTTER 9" WITH EPOXY CATCH #4 BAR CONTINUOUS BETWEEN EXISTING AND PROPOSED CURBING.
4. CONTRACTOR TO FIELD VERIFY ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION INCLUDING BUT NOT LIMITED TO: SITE LIGHTING, FIBER LINES, ETC.
5. REFER TO NOTES AND DETAIL SHEET FOR ON SITE PAVING DETAILS.

2" MILL	22,403 SF
REMOVE CONCRETE	673 SF
SAWCUT	363 LF
TOPSOIL REMOVAL	178 SF
4" ASPHALT REMOVAL	2800 SF

BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN PER FLOOD INSURANCE RATE MAP NUMBER 26125C0561G, DATED 01/16/2009.

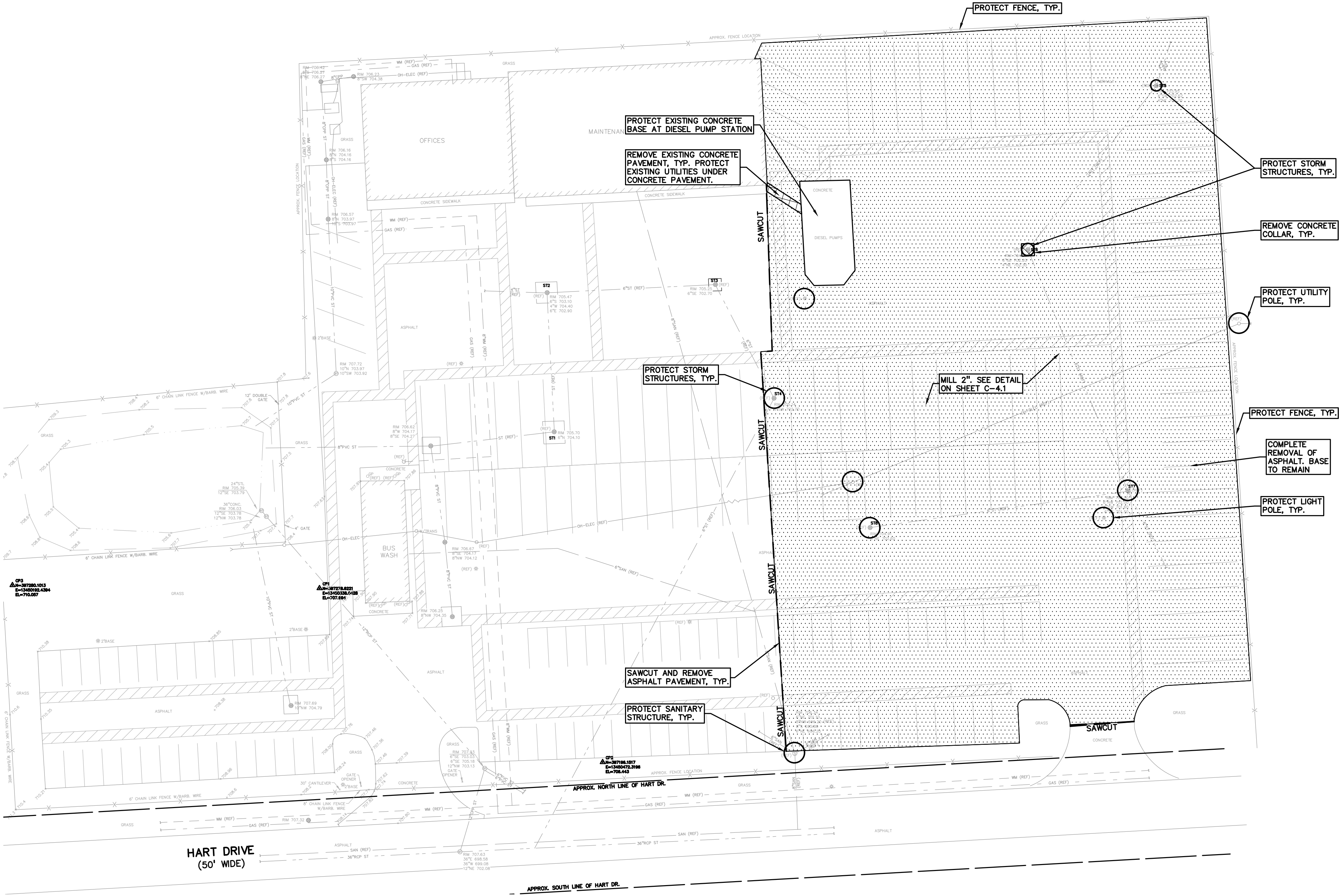


**FLOODPLAIN NOTE:**  
BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN, PER FLOOD INSURANCE RATE MAP NUMBER 26125C0553G, DATED JANUARY 16, 2009.



S:\PROJECTS\2023\03-0262-2024-205 SITE IMPROVEMENT PROJECT\LONG CONSTRUCTION-PAVING\03-TRMS CENTER\C-1-3\TOPO DEMO-TRANS-23-0262.dwg

**FLOODPLAIN NOTE:**  
BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X'. AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN, PER FLOOD INSURANCE RATE MAP NUMBER 26125C0553G, DATED JANUARY 16, 2009.



DEMOLITION QUANTITIES:		
2" MILL		70,448 SF
REMOVE CONCRETE		108 SF
SAWCUT PAVEMENT		622 LF

LEGEND:	
-OH-ELEC--W-O--	EX. OH. ELEC. POLE & GUY WIRE
-UG-CATV--X--	EX. U.G. CABLE TV & PEDESTAL
-UG-COMM--X--	EX. U.G. COMMUNICATION LINE, PEDESTAL & MANHOLE
-UG-ELEC--X--	EX. U.G. ELEC. MANHOLE & METER
-X--	EX. GAS LINE
⊗	EX. GAS VALVE & GAS LINE MARKER
⊠	EX. TRANSFORMER & IRRIGATION VALVE
-X--	EX. WATER MAIN
⊙	EX. HYDRANT, GATE VALVE & POST INDICATOR VALVE
⊙	EX. WATER VALVE BOX & SHUTOFF
⊙	EX. SANITARY SEWER
⊙	EX. SANITARY CLEANOUT & MANHOLE
⊙	EX. COMBINED SEWER MANHOLE
-X--	EX. STORM SEWER
⊙	EX. CLEANOUT, MANHOLE & CULVERT
⊙	EX. SQUARE, ROUND & BEEHIVE CATCH BASIN
⊙	EX. YARD DRAIN, ROOF DRAIN & DOWNSPOUT
⊙	EX. UNIDENTIFIED STRUCTURE
⊙	EX. MAILBOX, SIGN & GUARD POST
⊙	EX. LIGHT POLE & YARD LIGHT
-X--	EX. FENCE
⊙	EX. GUARD RAIL
⊙	EX. DEC. TREE, CONIFEROUS TREE & SHRUB
⊙	EX. TREE TAG, & TREE LINE
⊙	EX. SPOT ELEVATION
⊙	EX. CONTOUR
⊙	SOIL BORING
⊙	IRON FOUND / SET
⊙	NAIL FOUND / NAIL & CAP SET
⊙	BRASS PLUG SET
⊙	MONUMENT FOUND / SET
⊙	SECTION CORNER FOUND

REFERENCE DRAWINGS:	
PEA JOB NO. 2022-1281 & 2020-403	
ELECTRIC	DTE ELECTRIC MAP 316-396, DATED 09/18/2023
CABLE	AT&T MAP A1, DATED 09/15/2023
FIBER OPTIC	FIBER LINK MAP, EMAIL DATED 09/11/2023
WATER MAIN	CITY OF TROY MAP, EMAIL DATED 09/08/2023
SANITARY SEWER	CITY OF TROY MAP, EMAIL DATED 09/08/2023
STORM SEWER	CITY OF TROY MAP, EMAIL DATED 09/08/2023

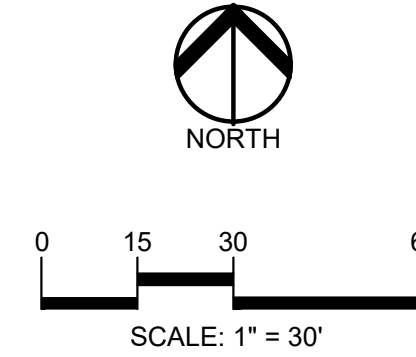
BENCHMARKS:	
(GPS DERIVED - NAVD88)	
BM #300	MAG NAIL IN THE NORTH FACE OF A LIGHT POLE LOCATED ON THE NORTH SIDE OF HART AVENUE, APPROX. 160' EAST FROM THE ENTRANCE. ELEV. - 708.55
BM #301	DIMPLE ON FLANGE ARROW ON A HYDRANT LOCATED APPROX. 10' NORTH OF THE BUS WASH BUILDING. ELEV. - 709.89
BM #302	SET BENCH TIE IN THE WEST FACE OF A POWER POLE LOCATED ON THE EAST SIDE OF THE PARKING LOT. ELEV. - 704.67

DEMOLITION LEGEND:	
ITEM TO BE PROTECTED	⊙
ITEM TO BE REMOVED	⊗
CURB/FENCE REMOVAL	////
CONCRETE PAVEMENT AND SIDEWALK REMOVAL	XXXX
AREA OR ITEMS TO BE REMOVED	////
UTILITY REMOVAL	----
ABANDON UTILITY	.....
ASPHALT REMOVAL	----
TREE REMOVAL	⊗
SAWCUT LINE	----

- GENERAL DEMOLITION NOTES:**
- THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT:
- ALL MATERIAL TO BE REMOVED, WHETHER SPECIFICALLY NOTED IN THE PLANS OR NOT, SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF OFF-SITE IN A LEGAL MANNER. NO ON-SITE BURY OR BURN PITS SHALL BE ALLOWED.
  - ALL DEMOLITION WORK SHALL CONFORM TO ALL LOCAL CODES AND ORDINANCES.
  - STAGING/PHASING OF DEMOLITION AND CONSTRUCTION IS TO BE COORDINATED WITH THE OWNER AND THE CONTRACTOR PRIOR TO CONSTRUCTION.
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  - REMOVE ALL STRUCTURES DESIGNATED FOR REMOVAL ACCORDING TO THE DEMOLITION PLAN. THIS INCLUDES FOUNDATIONS, CONCRETE, ASPHALT, TREES, ETC.
  - THE CONTRACTOR SHALL, AS A MINIMUM, PROVIDE TREE PROTECTION FENCING AROUND EXISTING TREES TO BE SAVED THAT ARE WITHIN 15 FEET OF CONSTRUCTION ACTIVITIES AND AS INDICATED IN THE PLANS OR PER LOCAL AGENCY REQUIREMENTS.
  - THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN UP, NOISE, DUST CONTROL, STREET SWEEPING AND HOURS OF OPERATION IN ACCORDANCE WITH THE LOCAL CODES.
  - THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADES, SIGNAGE, MARKINGS, LIGHTS AND OTHER TRAFFIC CONTROL DEVICES TO PROTECT THE WORK ZONE AND SAFELY MAINTAIN TRAFFIC PER AGENCY REQUIREMENTS AND IN ACCORDANCE WITH THE LATEST EDITION OF THE STATE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
  - THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES TO CONFIRM THAT UTILITY LEADS HAVE BEEN TAKEN OUT OF SERVICE PRIOR TO DEMOLITION.
  - THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE 811/ONE CALL UTILITY LOCATING CENTER, PRIVATE UTILITY LOCATOR, THE CITY ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
  - CONTRACTOR SHALL REFER TO THE "REPORT ON GEOTECHNICAL PAVEMENT INVESTIGATION" PREPARED BY G2 CONSULTING GROUP DATED 9/27/23

- NOTES:**
- CONTRACTOR TO VERIFY ALL QUANTITIES SHOWN ON THE PLANS. ANY DEVIATIONS TO THE PLAN QUANTITIES SHALL BE BROUGHT TO THE ATTENTION OF THE SCHOOL DISTRICT AND PEA GROUP, IN WRITING PER THE BID PACKAGE, FOR VERIFICATION PRIOR TO BIDDING.

**PEA GROUP**  
t: 844.813.2949  
www.peagroup.com



**CAUTION!!**  
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.



**CLIENT**  
**TROY SCHOOLS**  
1140 RANKIN DRIVE  
TROY, MI 48065

**PROJECT TITLE**  
**TRANSPORTATION CENTER**  
120 HART AVE, TROY, MI

REVISIONS	

ORIGINAL ISSUE DATE:  
OCTOBER 31, 2023

DRAWING TITLE  
**TOPOGRAPHIC SURVEY AND DEMOLITION PLAN**

PEA JOB NO. 2023-0262

P.M. RR

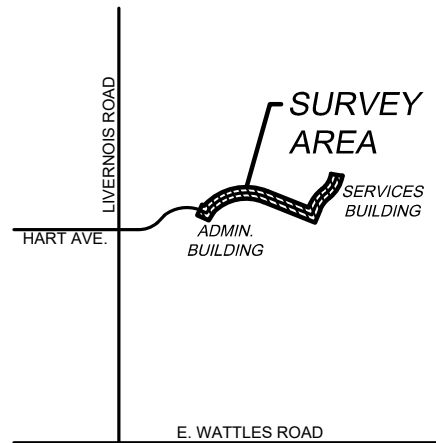
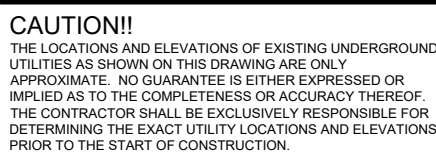
DN. RR

DES. RM

DRAWING NUMBER:

**C-1.3**





CLIENT  
**TROY SCHOOLS**  
1140 RANKIN DRIVE  
TROY, MI 48063

PROJECT TITLE  
**SERVICES  
BUILDING**  
4420 LIVERNOIS ROAD  
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

## REVISIONS

ORIGINAL ISSUE DATE:  
OCTOBER 31, 2023

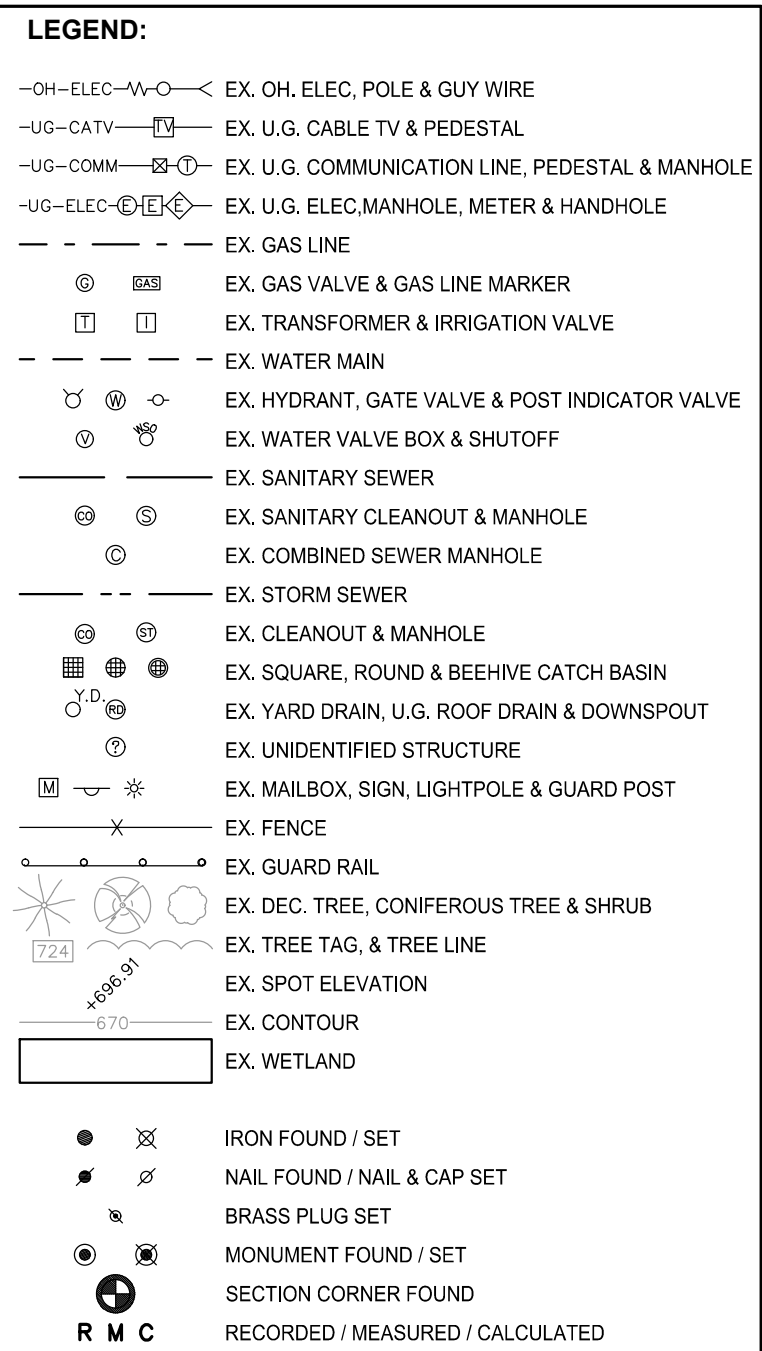
DRAWING TITLE

## PFA JOB NO 2023-0262

P.M.	RF
DN.	RF
DES.	RM

DRAWING NUMBER

## C-1.4



**BENCHMARKS:**  
(GPS DERIVED - NAVD88)

BM #300  
ARROW ON A HYDRANT LOCATED APPROX. 47" WEST FROM THE NORTHWEST BUILDING  
CORNER OF 4420 LIVERNOIS ROAD.  
ELEV. - 686.54

BM #301  
ARROW ON A HYDRANT LOCATED ON THE NORTHWEST SIDE OF THE PARKING LOT, ON  
THE EAST SIDE OF THE DRIVE.  
ELEV. - 687.04

BM #302  
MAG NAIL IN A LIGHT POLE BASE LOCATED APPROX. 210' WEST FROM THE PARKING LOT  
ON THE NORTH SIDE OF THE DRIVE.  
ELEV. - 686.56

BM #303  
CHISELED '+' ON A LIGHT POLE BASE LOCATED ON THE NORTH SIDE OF THE DRIVE,  
APPROX. 120' NORTHEAST FROM THE ADMINISTRATION BUILDING PARKING LOT.  
ELEV. - 692.40

**REFERENCE DRAWINGS:**

PEA JOB NO. 2022-1281

CABLE	WOW CABLE MAP, EMAIL DATED 09/08/2023
FIBER OPTIC	FIBER LINK MAP, EMAIL DATED 09/11/2023
WATER MAIN	CITY OF TROY MAP, EMAIL DATED 09/08/2023
SANITARY SEWER	CITY OF TROY MAP, EMAIL DATED 09/08/2023
STORM SEWER	CITY OF TROY MAP, EMAIL DATED 09/08/2023



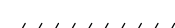

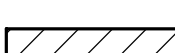
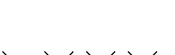




**REFERENCE DRAWINGS:**

CABLE AT&T MAP A1, DATED 10/28/2022  
WOW EMAIL DATED 10/27/2022

FIBER OPTIC	MAP, FIBER LINK EMAIL DATED 3/8/2010
WATER MAIN	CITY OF TROY GIS MAP DATED 10/26/2022
SANITARY SEWER	CITY OF TROY GIS MAP DATED 10/26/2022
STORM SEWER	CITY OF TROY GIS MAP DATED 10/26/2022
ELECTRIC	HAVE NOT RECEIVED AS OF 11/09/2022

REFERENCE FROM PEA JOB NO. 2012-144:  
SITE EXISTING CONDITIONS

**DEMOLITION LEGEND:**

ITEM TO BE PROTECTED	
ITEM TO BE REMOVED	
CURB/FENCE REMOVAL	
CONCRETE PAVEMENT AND SIDEWALK REMOVAL	
AREA OR ITEMS TO BE REMOVED	
UTILITY REMOVAL	
ABANDON UTILITY	
ASPHALT REMOVAL	
TREE REMOVAL	
SAWCUT LINE	

**GENERAL DEMOLITION NOTES:**

THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT:

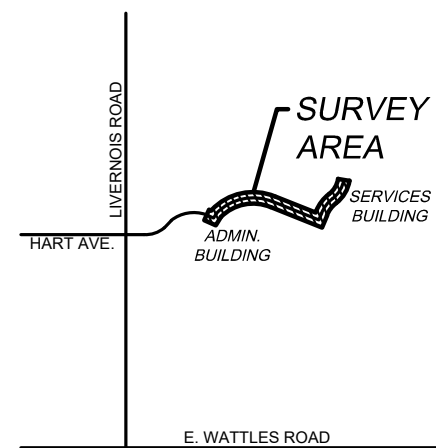
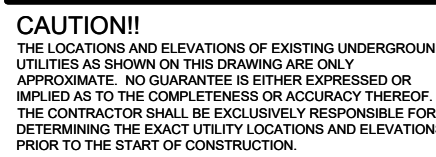
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9. THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES TO CONFIRM THAT ANY UTILITY LEADS HAVE BEEN TAKEN OUT OF SERVICE PRIOR TO DEMOLITION.
10. THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE 911/CALL CENTER FOR LONG DISTANCE, EMERGENCY UTILITY LOCATOR, THE CITY ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
11. THE CONTRACTOR SHALL REFER TO THE "REPORT ON GEOTECHNICAL PAVEMENT INVESTIGATION" PREPARED BY G2 CONSULTING GROUP DATE 1/4/23.

**DEMOLITION QUANTITIES:**

REMOVE ASPHALT	11,559 SF
REMOVE ASPHALT CURB	1,178 LF
SAWCUT	46 LF
2" MILL	1101 SF

**FLOODPLAIN NOTE:**  
BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN, PER FLOOD INSURANCE RATE MAP NUMBER 26125C0553G, DATED JANUARY 16, 2009.





**TROY SCHOOLS**  
1140 RANKIN DRIVE  
TROY, MI 48063

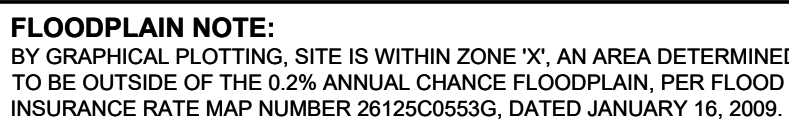
4420 LIVERNOIS ROAD  
CITY OF TROY, OAKLAND COUNTY, MICHIGAN







ORIGINAL ISSUE DATE:  
OCTOBER 31, 2023

# TOPO AND DEMOLITION PLAN

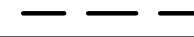
DRAWING NUMBER

# C-1.5



	IRON FOUND / SET
	NAIL FOUND / NAIL & CAP SET
	BRASS PLUG SET
	MONUMENT FOUND / SET
	SECTION CORNER FOUND
	RECORDED / MEASURED / CALCULATED

**SAWCUT LINE**



REMOVE ASPHALT AND BASE	917 SF
REMOVE CURB	715 LF
REMOVE CONCRETE	38 SF
SAWCUT PAVEMENT	162 LF
REMOVE TOPSOIL, GRASS, SOIL	2057 SF
REMOVE FENCE	189 LF
MILL 2"	117 SF
REMOVE FRAME AND COVER	2 EA

(GPS DERIVED - NAVD83)

BM #300  
ARROW ON A HYDRANT LOCATED APPROX. 47' WEST FROM THE NORTHWEST BUILDING CORNER OF 4420 LIVERNOIS ROAD.  
ELEV. - 686.54

BM #301  
ARROW ON A HYDRANT LOCATED ON THE NORTHWEST SIDE OF THE PARKING LOT, ON THE EAST SIDE OF THE DRIVE.  
ELEV. - 687.04

BM #302  
MAG NAIL IN A LIGHT POLE BASE LOCATED APPROX. 210' WEST FROM THE PARKING LOT ON THE NORTH SIDE OF THE DRIVE.  
ELEV. - 686.56

BM #303  
CHISELED "x" ON A LIGHT POLE BASE LOCATED ON THE NORTH SIDE OF THE DRIVE, APPROX. 120' NORTHEAST FROM THE ADMINISTRATION BUILDING PARKING LOT.

CABLE	WOW CABLE MAP, EMAIL DATED 09/08/2023
FIBER OPTIC	FIBER LINK MAP, EMAIL DATED 09/11/2023
WATER MAIN	CITY OF TROY MAP, EMAIL DATED 09/08/2023
SANITARY SEWER	CITY OF TROY MAP, EMAIL DATED 09/08/2023
STORM SEWER	CITY OF TROY MAP, EMAIL DATED 09/08/2023

THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT:

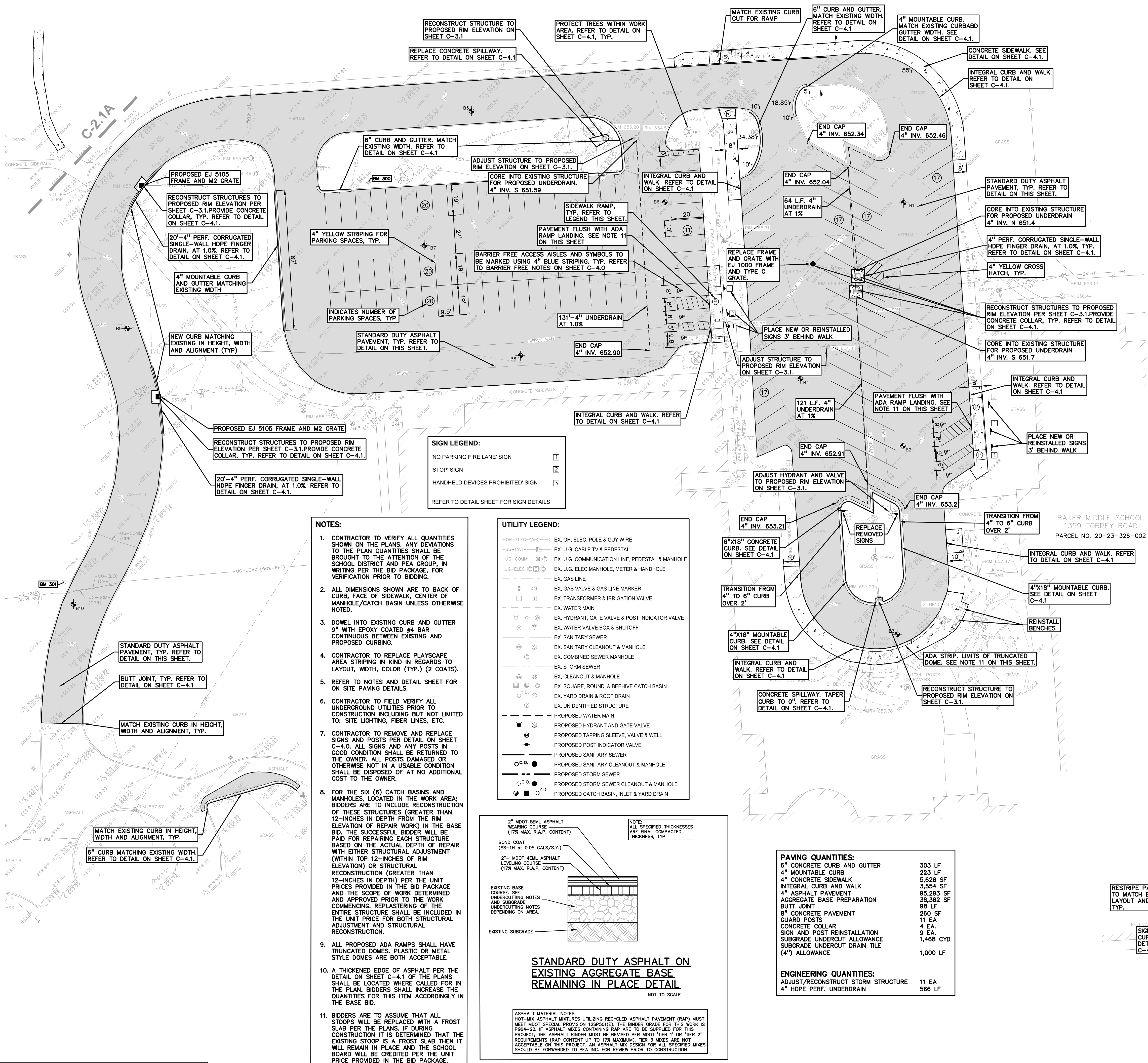
1. ALL MATERIAL TO BE REMOVED, WHETHER SPECIFICALLY NOTED IN THE PLANS OR NOT, SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF OFF-SITE IN A LEGAL MANNER. NO ON-SITE BURY OR BURN PITS SHALL BE ALLOWED.
2. ALL DEMOLITION WORK SHALL CONFORM TO ALL LOCAL CODES AND ORDINANCES.
3. STAGING/PHASING OF DEMOLITION AND CONSTRUCTION IS TO BE COORDINATED WITH THE OWNER AND THE CONTRACTOR PRIOR TO CONSTRUCTION.
4. SPECIFIC DEMOLITION ITEMS HAVE BEEN INDICATED ON THE PLANS AS GUIDE TO THE GENERAL SCOPE OF THE WORK. IT IS THE INTENT THAT THESE ITEMS SHALL BE COMPLETELY REMOVED BY THE CONTRACTOR ABOVE AND BELOW GROUND, UNLESS SPECIFICALLY NOTED OTHERWISE, AND THAT DEMOLITION WILL INCLUDE BUT WILL NOT NECESSARILY BE LIMITED TO THESE ITEMS. CONTRACTOR SHALL VISIT SITE TO VERIFY EXISTING CONDITIONS AND EXTENTS OF THE DEMOLITION THAT WILL BE REQUIRED PRIOR TO SUBMITTING A BID.
5. REMOVE ALL STRUCTURES DESIGNATED FOR REMOVAL ACCORDING TO THE DEMOLITION PLAN. THIS INCLUDES FOUNDATIONS, FOOTINGS, CONCRETE, ASPHALT, TRAIL.
6. THE CONTRACTOR SHALL, AS A MINIMUM, PROVIDE TREE PROTECTION FENCING AROUND EXISTING TREES TO BE SAVED THAT ARE WITHIN FEET OF CONSTRUCTION ACTIVITIES AND AS INDICATED IN THE PLANS OR PER LOCAL AGENCY REQUIREMENTS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN UP, NOISE, DUST CONTROL, STREET SWEEPING AND HOURS OF OPERATION IN ACCORDANCE WITH THE LOCAL CODES.
8. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADES, SIGNAGE, MARKINGS, LIGHTS AND OTHER TRAFFIC CONTROL DEVICES TO PROTECT THE WORK AREA AND MAINTAIN TRAFFIC PER AGENCY REQUIREMENTS AND IN ACCORDANCE WITH THE LATEST EDITION OF THE STATE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
9. THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES TO CONFIRM THAT UTILITY LEADS HAVE BEEN TAKEN OUT OF SERVICE PRIOR TO DEMOLITION.
10. THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE 811/ONE CALL UTILITY LOCATING CENTER, PRIVATE UTILITY LOCATOR, THE CITY ENGINEER AND/OR LOCAL JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
11. DISTRICT TO REMOVE CABLE ELECTRICAL COMPONENTS. CONTRACTOR SHALL REMOVE FENCE, GATE, AND FOOTINGS.

\\PROJECTS\2023\23-0262 2024 TDS SITE IMPROVEMENT PROJECTS\OWG\CONSTRUCTION-PAVING\7\_TRANS SERVICE BUILDING\C-14\TOPO DEMO-230262 TRANS SERVICE BUILDING.dwg



S:\PROJECTS\2023\2023-02-02-2024 205 SITE IMPROVEMENT PROJECT\DWG\CONSTRUCTION\PAVING\BANKER (C-2).DWG, ENG-2/2023, BANKER.dwg

**FLOODPLAIN NOTE:**  
BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE "X", AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN, PER FLOOD INSURANCE RATE MAP NUMBER 26125C0553G, DATED JANUARY 16, 2009.



- UNDERCUTTING NOTES: WEST PARKING LOT**
- AS PART OF THE PAVEMENT REMOVAL AND EARTHWORK PAY ITEMS REMOVE THE EXISTING AGGREGATE BASE AND REMOVE TO ALLOW FOR THE PROPOSED THICKNESS OF AGGREGATE. PAVEMENT TO BE PLACED, ANY EXISTING BASE MATERIAL REMOVED BELOW THIS ELEVATION WILL BE CONSIDERED PART OF THE SUBGRADE UNDERCUTTING PAY ITEM.
  - THE EXISTING BASE BEING REMOVED FOR THE PLACEMENT OF THE ASPHALT COULD BE STOCKPILED AND REUSED FOR UNDERCUTS IF DEEMED ACCEPTABLE BY THE QUALIFIED ENGINEERING TECHNICIAN ON SITE.
  - SUBGRADE UNDERCUT SHALL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE IF SUBGRADE STABILIZATION IS NECESSARY. UNDERCUT EXCAVATIONS SHALL BE BACKFILLED WITH MDOT 21AA DENSE GRADED AGGREGATE PLACED IN AN ENGINEERED MANNER. LIFT THICKNESS SHALL NOT EXCEED 9 INCHES. BACKFILLING BACK TO THE TOP OF AGGREGATE BASE ELEVATION SHALL BE INCLUDED IN THE SUBGRADE UNDERCUTTING PAY ITEM. USE OF TRI-AXIAL GEOGRID MAY BE USED TO REDUCE UNDERCUT DEPTHS, AS APPROVED BY THE DISTRICT AND PER THE UNIT PRICE PROVIDED WITH THE CONTRACTORS BID.
  - ALL ENGINEERED FILL SHALL BE COMPACTED TO A DENSITY OF AT LEAST 95 PERCENT OF THE MAXIMUM DENSITY DETERMINED BY THE MODIFIED PROCTOR (ASTM D1557) METHOD OF TESTING. ALL ENGINEERED FILL MATERIAL SHALL BE PLACED AND COMPACTED AT APPROXIMATELY THE OPTIMUM MOISTURE CONTENT. FROZEN MATERIAL SHALL NOT BE USED AS FILL, NOR SHOULD FILL BE PLACED ON A FROZEN SUBGRADE.
  - THE QUANTITY FOR SUBGRADE UNDERCUT FOR EACH SITE SHALL BE INCLUDED IN THE BASE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL FOOTAGE OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.
  - SUBGRADE UNDERCUT DRAIN TILE SHALL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE IF SUBGRADE STABILIZATION IS NECESSARY. DRAIN TILE SHALL BE PLACED WITHIN ANY UNDERCUT AREA AND CONNECTED TO THE CLOSEST CATCH BASIN TO PREVENT GROUNDWATER FROM POOLING WITHIN THE GRANULAR SOILS IN UNDERCUTS AND CREATING "BATHTUBS" IN THE COHESIVE SOILS.
  - THE IMPORTING, ADDING, FINE GRADING AND COMPACTING ADDITIONAL PAVEMENT AGGREGATE BASE MATERIAL (MDOT 21AA CRUSHED LESTONE) REQUIRED TO ACHIEVE THE PROPOSED TOP OF BASE ELEVATIONS AND PRIOR TO PLACING THE ASPHALT PAVEMENT WILL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE THE VOLUME OF ADDITIONAL MATERIAL REQUIRED PER THE PROJECT PLANS.
  - THE QUANTITY FOR "ADD AGGREGATE TO EXISTING BASE" FOR EACH SITE SHALL BE INCLUDED IN THE BASE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL FOOTAGE OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.
  - CONTRACTOR SHALL REFER TO THE "REPORT ON GEOTECHNICAL PAVEMENT INVESTIGATION" PREPARED BY G2 CONSULTING GROUP DATED 9/27/23.

- PAVEMENT PREPARATION NOTES: EAST PARKING LOT**
- PAVEMENT PREPARATION SHALL FOLLOW THE PROCESS SUMMARIZED BELOW:
    - REMOVE AND STOCKPILE THE EXISTING AGGREGATE BASE FOR RE-USE IN THE PAVEMENT OPERATION. EXCAVATE THE EXISTING BASE UP TO 2-INCHES ABOVE THE SUBGRADE TO REDUCE THE CHANCE FOR CONTAMINATION. ALL AGGREGATE 2 INCHES AND LESS ABOVE THE SUBGRADE IS TO BE REMOVED AND HAULED OFF WITH NEW AGGREGATE BEING PLACED BACK TO THE EXISTING ELEVATION AS PART OF THE SUBGRADE UNDERCUTTING PAY ITEM.
    - PROOFROLL EXISTING BASE AND SUBGRADE PER PLANS, SPECS, AND GEOTECH REPORT. DETERMINE AREAS THAT FAIL THE PROOFROLL. SUBGRADE UNDERCUTS SHALL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE IF SUBGRADE STABILIZATION IS NECESSARY. DRAIN TILE SHALL BE PLACED WITHIN ANY UNDERCUT AREA AND CONNECTED TO THE CLOSEST CATCH BASIN TO PREVENT GROUNDWATER FROM POOLING WITHIN THE GRANULAR SOILS IN UNDERCUTS AND CREATING "BATHTUBS" IN THE COHESIVE SOILS.
    - TO MINIMIZE SUBGRADE INSTABILITY AND UNDERCUTS, THE SUBGRADE SHALL NOT BE LEFT EXPOSED TO PRECIPITATION AND CONSTRUCTION OPERATIONS AND SHOULD BE PERFORMED DURING THE SUMMER MONTHS TO ENSURE DRY, WARM, WEATHER. ADDITIONALLY, THE SUBGRADE MAY BECOME UNSTABLE UNDER REPEATED LOADING OF CONSTRUCTION EQUIPMENT. THEREFORE, CONSTRUCTION EQUIPMENT SHOULD BE LIMITED ON THE EXPOSED SUBGRADE.
  - SUBGRADE UNDERCUT SHALL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE IF SUBGRADE STABILIZATION IS NECESSARY. UNDERCUT EXCAVATIONS SHALL BE BACKFILLED WITH MDOT 21AA DENSE GRADED AGGREGATE PLACED IN AN ENGINEERED MANNER. LIFT THICKNESS SHALL NOT EXCEED 9 INCHES. THE USE OF TRI-AXIAL GEOGRID MAY BE USED TO REDUCE UNDERCUT DEPTHS, AS APPROVED BY THE DISTRICT AND PER THE UNIT PRICE PROVIDED WITH THE CONTRACTORS BID.
  - ALL ENGINEERED FILL SHALL BE COMPACTED TO A DENSITY OF AT LEAST 95 PERCENT OF THE MAXIMUM DENSITY DETERMINED BY THE MODIFIED PROCTOR (ASTM D1557) METHOD OF TESTING. ALL ENGINEERED FILL MATERIAL SHALL BE PLACED AND COMPACTED AT APPROXIMATELY THE OPTIMUM MOISTURE CONTENT. FROZEN MATERIAL SHALL NOT BE USED AS FILL, NOR SHOULD FILL BE PLACED ON A FROZEN SUBGRADE.
  - THE QUANTITY FOR "SUBGRADE UNDERCUT" FOR EACH SITE SHALL BE INCLUDED IN THE BASE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL FOOTAGE OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.
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  - THE QUANTITY FOR "ADD AGGREGATE TO EXISTING BASE" FOR EACH SITE SHALL BE INCLUDED IN THE BASE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL FOOTAGE OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.
  - CONTRACTOR SHALL REFER TO THE "REPORT ON GEOTECHNICAL PAVEMENT INVESTIGATION" PREPARED BY G2 CONSULTING GROUP DATED 9/27/23.

PEA GROUP

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STATE OF MICHIGAN

ROBERT SCOTT KESCHEN

License No. 6201046143

NORTH

0 15 30 60

SCALE: 1" = 30'

811

Know what's below.

Call before you dig.

CAUTION!!

THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE OR OTHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

CLIENT

TROY SCHOOLS

1140 RANKIN DRIVE

TROY, MI 48065

PROJECT TITLE

BAKER MIDDLE SCHOOL

1359 TORPEY ROAD

CITY OF TROY, OKLAHOMA COUNTY, MICHIGAN

REVISIONS

ORIGINAL ISSUE DATE:

OCTOBER 31, 2023

DRAWING TITLE

ENGINEERING AND DIMENSION PLAN

PEA JOB NO.

2023-0262

P.M.

RR

D.N.

RR

DES.

RM

DRAWING NUMBER:

C-2.1



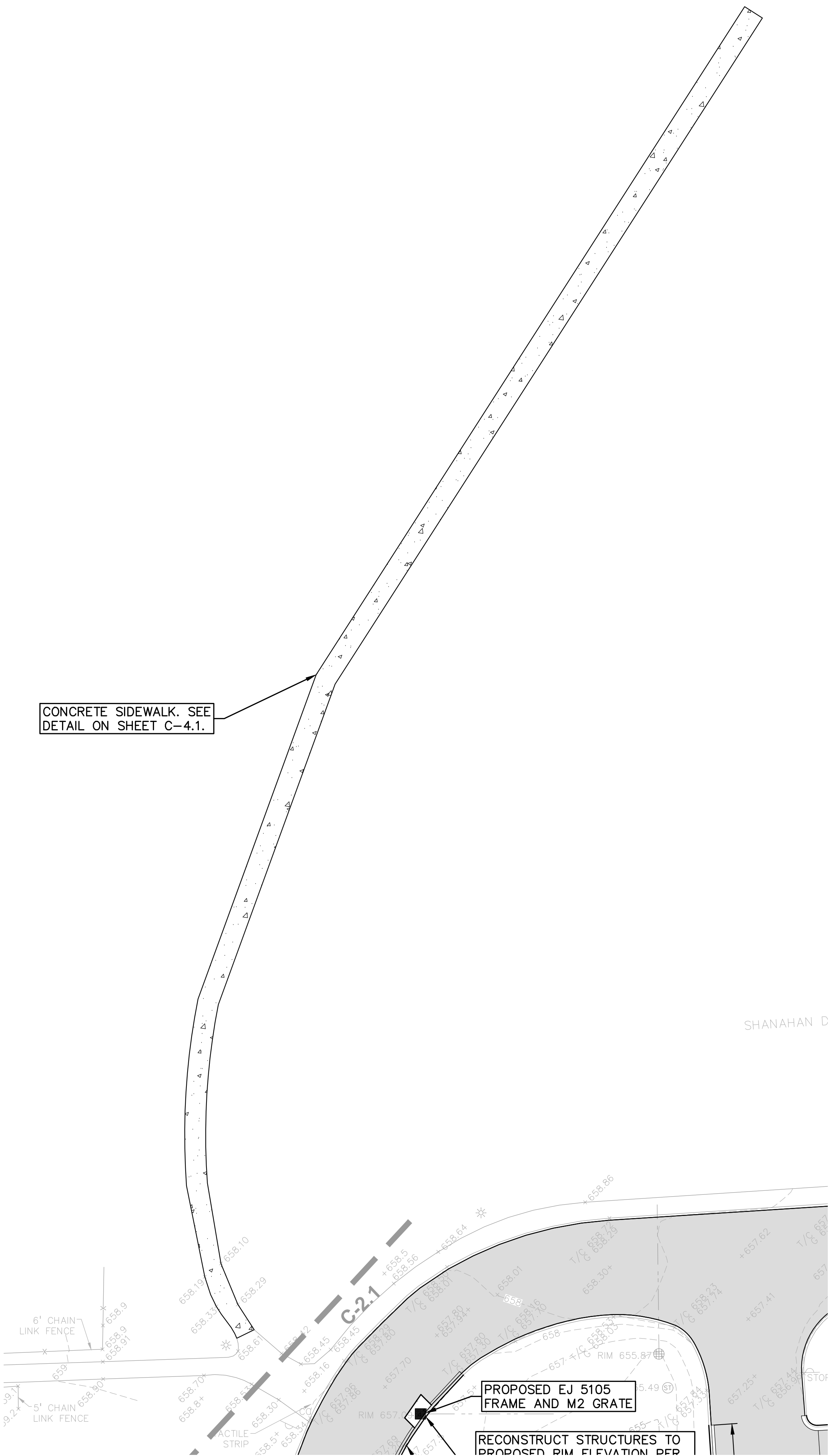
S:\PROJECTS\2023\23-0262\_2024\_205 SITE IMPROVEMENT PROJECT\DWG\CONSTRUCTION\PAVING\1\_BAKER\1\_C-2.1A.DWG ENG-2/20262\_BAKER.dwg

**FLOODPLAIN NOTE:**  
BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN, PER FLOOD INSURANCE RATE MAP NUMBER 26125C0553G, DATED JANUARY 16, 2009.

**PAVING QUANTITIES:**  
4" CONCRETE SIDEWALK 2,516 SF

- NOTES:**
- CONTRACTOR TO VERIFY ALL QUANTITIES SHOWN ON THE PLANS. ANY DEVIATIONS TO THE PLAN QUANTITIES SHALL BE BROUGHT TO THE ATTENTION OF THE SCHOOL DISTRICT AND PEA GROUP, IN WRITING PER THE BID PACKAGE, FOR VERIFICATION PRIOR TO BIDDING.
  - ALL DIMENSIONS SHOWN ARE TO BACK OF CURB, FACE OF SIDEWALK, CENTER OF MANHOLE/CATCH BASIN UNLESS OTHERWISE NOTED.
  - DOWEL INTO EXISTING CURB AND GUTTER 9" WITH EPOXY COATED #4 BAR CONTINUOUS BETWEEN EXISTING AND PROPOSED CURBING.
  - CONTRACTOR TO REPLACE PLAYSCAPE AREA STRIPING IN KIND IN REGARDS TO LAYOUT, WIDTH, COLOR (TYP.) (2 COATS).
  - REFER TO NOTES AND DETAIL SHEET FOR ON SITE PAVING DETAILS.
  - CONTRACTOR TO FIELD VERIFY ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION INCLUDING BUT NOT LIMITED TO: SITE LIGHTING, FIBER LINES, ETC.
  - CONTRACTOR TO REMOVE AND REPLACE SIGNS AND POSTS PER DETAIL ON SHEET C-4.0. ALL SIGNS AND ANY POSTS IN GOOD CONDITION SHALL BE RETURNED TO THE OWNER. ALL POSTS DAMAGED OR OTHERWISE NOT IN A USABLE CONDITION SHALL BE DISPOSED OF AT NO ADDITIONAL COST TO THE OWNER.
  - FOR THE SIX (6) CATCH BASINS AND MANHOLES LOCATED IN THE WORK AREA: BIDDERS ARE TO INCLUDE RECONSTRUCTION OF THESE STRUCTURES (GREATER THAN 12-INCHES IN DEPTH FROM THE RIM ELEVATION OF REPAIR WORK) IN THE BASE BID. THE SUCCESSFUL BIDDER WILL BE PAID FOR REPAIRING EACH STRUCTURE BASED ON THE ACTUAL DEPTH OF REPAIR WITH EITHER STRUCTURAL ADJUSTMENT (WITHIN TOP 12-INCHES OF RIM ELEVATION) OR STRUCTURAL RECONSTRUCTION (GREATER THAN 12-INCHES IN DEPTH) PER THE UNIT PRICES PROVIDED IN THE BID PACKAGE AND THE SCOPE OF WORK DETERMINED AND APPROVED PRIOR TO THE WORK COMMENCING. REPLASTERING OF THE ENTIRE STRUCTURE SHALL BE INCLUDED IN THE UNIT PRICE FOR BOTH STRUCTURAL ADJUSTMENT AND STRUCTURAL RECONSTRUCTION.
  - ALL PROPOSED ADA RAMPS SHALL HAVE TRUNCATED DOMES, PLASTIC OR METAL STYLE DOMES ARE BOTH ACCEPTABLE.
  - A THICKENED EDGE OF ASPHALT PER THE DETAIL ON SHEET C-4.1 OF THE PLANS SHALL BE LOCATED WHERE CALLED FOR IN THE PLAN. BIDDERS SHALL INCREASE THE QUANTITIES FOR THIS ITEM ACCORDINGLY IN THE BASE BID.
  - BIDDERS ARE TO ASSUME THAT ALL STOOPS WILL BE REPLACED WITH A FROST SLAB PER THE PLANS. IF DURING CONSTRUCTION IT IS DETERMINED THAT THE EXISTING STOOP IS A FROST SLAB THEN IT WILL REMAIN IN PLACE AND THE SCHOOL BOARD WILL BE CREDITED PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.

UTILITY LEGEND:	
-OH-ELEC-W-O-	EX. OH. ELEC. POLE & GUY WIRE
-UG-CATV-□-	EX. U.G. CABLE TV & PEDESTAL
-UG-COMM-□-O-	EX. U.G. COMMUNICATION LINE, PEDESTAL & MANHOLE
-UG-ELEC-□-E-□-	EX. U.G. ELEC. MANHOLE, METER & HANDHOLE
- - - - -	EX. GAS LINE
⊗	EX. GAS VALVE & GAS LINE MARKER
□	EX. TRANSFORMER & IRRIGATION VALVE
- - - - -	EX. WATER MAIN
⊕	EX. HYDRANT, GATE VALVE & POST INDICATOR VALVE
⊕	EX. WATER VALVE BOX & SHUTOFF
- - - - -	EX. SANITARY SEWER
⊕	EX. SANITARY CLEANOUT & MANHOLE
⊕	EX. COMBINED SEWER MANHOLE
- - - - -	EX. STORM SEWER
⊕	EX. CLEANOUT & MANHOLE
⊕	EX. SQUARE, ROUND, & BEEHIVE CATCH BASIN
⊕	EX. YARD DRAIN & ROOF DRAIN
⊕	EX. UNIDENTIFIED STRUCTURE
- - - - -	PROPOSED WATER MAIN
⊕	PROPOSED HYDRANT AND GATE VALVE
⊕	PROPOSED TAPPING SLEEVE, VALVE & WELL
⊕	PROPOSED POST INDICATOR VALVE
- - - - -	PROPOSED SANITARY SEWER
⊕	PROPOSED SANITARY CLEANOUT & MANHOLE
- - - - -	PROPOSED STORM SEWER
⊕	PROPOSED STORM SEWER CLEANOUT & MANHOLE
⊕	PROPOSED CATCH BASIN, INLET & YARD DRAIN



**PEA GROUP**

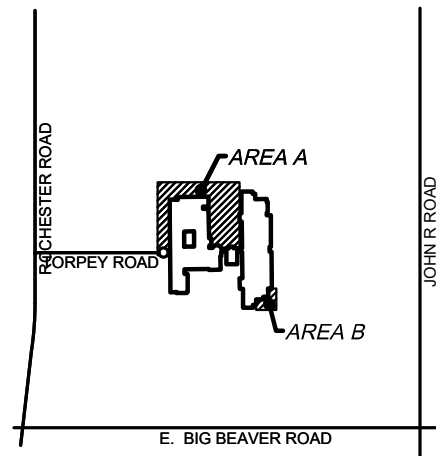
t: 844.813.2949  
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SCALE: 1" = 30'



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**CLIENT**  
**TROY SCHOOLS**  
1140 RANKIN DRIVE  
TROY, MI 48063

**PROJECT TITLE**  
**BAKER MIDDLE SCHOOL**  
1359 TORREY ROAD  
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

REVISIONS

**ORIGINAL ISSUE DATE:**  
OCTOBER 31, 2023

**DRAWING TITLE**  
**ENGINEERING AND DIMENSION PLAN**

PEA JOB NO.	2023-0262
P.M.	RR
DN.	RR
DES.	RM

**DRAWING NUMBER:**

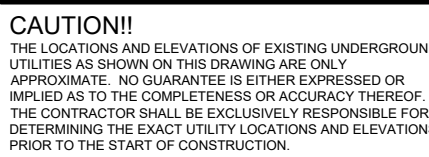
**C-2.1A**





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SCALE: 1" = 30'



PROJECT TITLE

**TROY  
CONTINUING  
EDUCATION**

1522 E. BIG BEAVER ROAD  
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

## REVISIONS

ORIGINAL ISSUE DATE:  
OCTOBER 31, 2023

DRAWING TITLE

**DIMENSION AND  
PAVING PLAN**

PEA JOB NO 2023-0261

PM

DN	RI
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DES. RM

DRAWING NUMBER:

000

## C-2.2

1. AS PART OF THE PAVEMENT REMOVAL AND EARTHWORK PAY ITEMS REMOVE THE EXISTING AGGREGATE BASE AND REMOVE TO ALLOW FOR THE EXISTING THICKNESS OF THE EXISTING PAVEMENT TO BE PLACED. ANY EXISTING BASE MATERIAL REMOVED BELOW THIS ELEVATION WILL BE CONSIDERED PART OF THE SUBGRADE UNDERCUTTING PAY ITEM.
2. THE EXISTING BASE BEING REMOVED FOR THE PLACEMENT OF THE NEW BASE SHOULD BE STOCKPILED AND REUSED FOR UNDERCUTS IF DEEMED ACCEPTABLE BY THE QUALIFIED ENGINEERING TECHNICIAN ON SITE.
3. SUBGRADE UNDERCUT SHALL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE IF THE STABILIZATION NEEDS TO BE USED. UNDERCUT EXCAVATION SHALL BE BACKFILLED WITH MDOT 21AA DENSE GRADED AGGREGATE PLACED IN AN ENGINEERED MANNER. LIFT THICKNESS SHALL BE APPROVED BY THE QUALIFIED ENGINEERING TECHNICIAN. BACKFILLING BACK TO THE TOP OF AGGREGATE BASE ELEVATION SHALL BE INCLUDED IN THE SUBGRADE UNDERCUTTING PAY ITEM. THE USE OF STABILIZATION GEOTECHNICALS TO REDUCE UNDERCUT DEPTHS, AS APPROVED BY THE DISTRICT AND PER THE UNIT PRICE PROVIDED WITH THE CONTRACTORS BID.
4. ALL ENGINEERED FILL SHALL BE COMPACTED TO A DENSITY OF AT LEAST 95 PERCENT OF THE MAXIMUM DENSITY DETERMINED BY THE MODIFIED PROCTOR (ASTM D1557) METHOD OF TESTING. ALL ENGINEERED FILL MATERIAL SHALL BE PLACED AND COMPACTED AT APPROXIMATELY THE SAME MOISTURE CONTENT AS THE NATURAL MATERIAL. SHALL NOT BE USED AS FILL, NOR SHOULD FILL BE PLACED ON A FROZEN SUBGRADE.
5. THE QUANTITY FOR 'SUBGRADE UNDERCUT' FOR EACH SITE SHALL BE INCLUDED IN THE BASE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL VOLUME OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.
6. SUBGRADE UNDERCUT DRAIN TILE SHALL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE IF SUBGRADE STABILIZATION IS REQUIRED. IF REQUIRED, TILE SHALL BE PLACED WITHIN ANY UNDERCUT AREA AND CONNECTED TO THE CLOSEST CATCH BASIN TO PREVENT GROUNDWATER FROM POOLING WITHIN THE UNDERCUT AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND CREATING "BATHTUBS" IN THE COHESIVE SOILS.
7. THE QUANTITY FOR 'SUBGRADE UNDERCUT DRAIN TILE (4")' FOR EACH SITE SHALL BE INCLUDED IN THE BASE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL FOOTAGE OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.
8. THE IMPORTING, ADDING, FINE GRADING AND COMPACTING ADDITIONAL PAVEMENT AGGREGATE BASE MATERIAL (MDOT 21AA CRUSHED LIMESTONE) REQUIRED TO ACHIEVE THE PROPOSED TOP OF BASE ELEVATIONS AT PROJECT LOCATIONS WHERE THE ASH PAVEMENT WILL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE THE VOLUME OF ADDITIONAL MATERIAL REQUIRED PER THE PROJECT PLANS.
9. THE QUANTITY FOR 'AS AGGREGATE TO EXISTING BASE' FOR EACH SITE SHALL BE INCLUDED IN THE BASE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL VOLUME OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.
10. CONTRACTOR SHALL REFER TO THE "REPORT ON GEOTECHNICAL PAVEMENT INVESTIGATION" PROVIDED BY G2 CONSULTING GROUP DATED 9/27/23.

BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN, PER FLOOD INSURANCE RATE MAP NUMBER 26125C0553G, DATED JANUARY 16, 2009.

8' WIDE CONCRETE SIDEWALK	369 SF
CONCRETE SIDEWALK	504 SF
4" ASPHALT PAVEMENT	2,800 SF
2" OVERLAY	20,132 SF
8" CONCRETE PAVEMENT	227 SF
4" MOUNTABLE CURB AND GUTTER	150 LF
SIGN AND POST	1 EA.
SUBGRADE UNDERCUT ALLOWANCE	205 CY
SUBGRADE UNDERCUT DRAIN TILE	
(4") ALLOWANCE	300 LF

RECONSTRUCT STRUCTURE	4 EA
4" HDPE PERF. UNDERDRAIN	160 L

1. TO MINIMIZE SUBGRADE INSTABILITY AND UNDERCUTS, THE SUBGRADE SHALL NOT BE LEFT EXPOSED TO PRECIPITATION AND CONSTRUCTION ACTIVITIES AND SHALL BE PERFORMED DURING THE SUMMER MONTHS TO ENSURE DRY, WARM, WEATHER. ADDITIONALLY, THE SUBGRADE MAY BE EXPOSED INSTANTANEOUSLY TO THE HEAVY LOADING OF CONSTRUCTION TRAFFIC; THEREFORE, CONSTRUCTION EQUIPMENT SHOULD BE LIMITED ON THE EXPOSED SUBGRADE.
2. SUBGRADE UNDERCUT SHALL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE THE SUBGRADE STABILITY. THE EXPOSED UNDERCUT EXCAVATIONS SHALL BE BACKFILLED WITH MOOT 21A DENSE GRADED AGGREGATE TO A MINIMUM OF AN EIGHT INCH MINIMUM THICKNESS SHALL NOT EXCEED 9 INCHES. THE USE OF TRI-AXIAL GEOTRID MAY BE USED TO STABILIZE UNDERCUTS. THE CONTRACTOR SHALL BEY THE DISTRICT AND PER THE UNIT PRICE PROVIDED WITH THE CONTRACTORS BID.
3. ALL ENGINEERED FILL SHALL BE COMPACTED TO A DENSITY OF AT LEAST 95 PERCENT OF THE MAXIMUM DENSITY DETERMINED BY THE MOHRIED AND ASTRA METHOD. THE ENGINEERED FILL SHALL BE PLACED AND COMPACTED AT APPROXIMATELY THE OPTIMUM MOISTURE CONTENT. FROZEN MATERIAL SHALL NOT BE USED. THE FILL SHALL BE PLACED ON A FROZEN SUBGRADE.
4. SUBGRADE UNDERCUT DRAIN TILE SHALL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE IF SUBGRADE STABILIZATION IS REQUIRED. DRAIN TILE SHALL BE PLACED WITHIN ANY UNDERCUT AREA AND CONNECTED TO THE CLOSEST CATCH BASIN TO PREVENT GROUNDWATER FROM POOLING WITHIN THE SUBGRADE. THE DRAIN TILE SHALL BE CREATING "BATHTUBS" IN THE COHESIVE SOILS.

NOT TO SCALE

'NO PARKING FIRE LANE' SIGN	1
'STOP' SIGN	2
'BARRIER FREE PARKING' SIGN	3
'VAN ACCESSIBLE' SIGN	4
'CROSSWALK' SIGN	5
'DO NOT ENTER' SIGN	6
'SIDEWALK ENDS' SIGN	7
'NO PARKING LOADING ZONE' SIGN	8

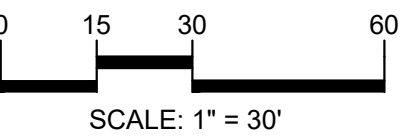
SIDEWALK RAMP 'TYPE R'	(R)
SIDEWALK RAMP 'TYPE F'	(F)
SIDEWALK RAMP 'TYPE P'	(P)
SIDEWALK RAMP 'TYPE C'	(C)
SIDEWALK RAMP 'TYPE D'	(D)
CURB DROP ONLY	(X)

1. REMOVE EXISTING GRASS, TOPSOIL AND SUBGRADE IN ORDER TO RE-GRADE AND RESTORE THE GRASS AREA NORTH OF THE BUILDING BETWEEN THE TWO DRIVE APPROACHES TO ELIMINATE THE BERMS AREA AS INDICATED IN SHEETS C-1.2 AND C-3.2 OF THE CONSTRUCTION PLANS AND PER THE PROJECT SPECIFICATIONS.

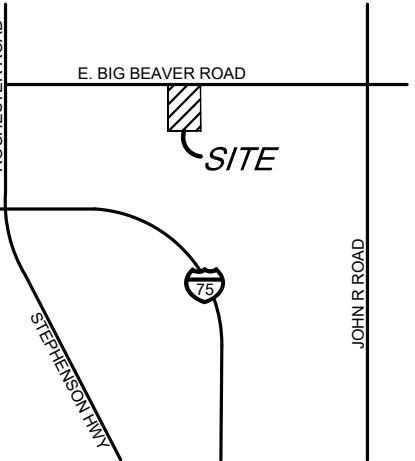
2. PLACE A NEW CONCRETE SIDEWALK FROM THE EXISTING WALK ON NORTH SIDE OF THE BUILDING TO THE EXISTING WALK ALONG BIG BEAVER AS INDICATED ON SHEETS C-1.2, C-2.2, C-3.2 AND C-4.1 OF THE CONSTRUCTION PLANS AND PER THE PROJECT SPECIFICATIONS.

BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN PER FLOOD INSURANCE RATE MAP NUMBER 26125C0561G, DATED 01/16/2009.





**CAUTION!!**  
LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.



CLIENT  
**TROY SCHOOLS**  
40 RANKIN DRIVE  
TROY, MI 48063

PROJECT TITLE  
**TRANSPORTATION  
ENTER**  
HART AVE, TROY, MI

[illegible]

ORIGINAL ISSUE DATE:  
OCTOBER 31, 2023

RAWING TITLE

**DIMENSION  
AND PAVING  
PLAN**

EA JOB NO 2023-0262

M.	RR
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N.	RR
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ES.	RM
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DRAWING NUMBER:

CCC

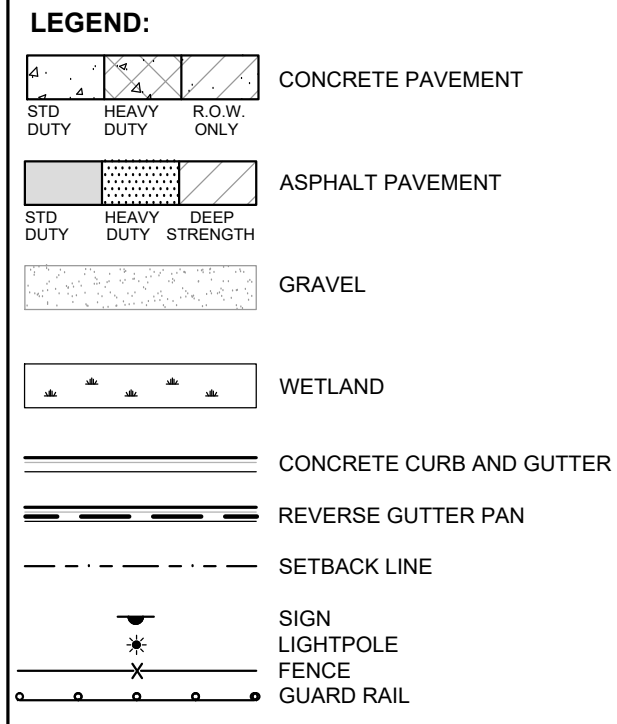
C-2.3

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**GENERAL NOTES:**

THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT.

1. ALL DIMENSIONS SHOWN ARE TO BACK OF CURB, FACE OF SIDEWALK, OUTSIDE FACE OF BUILDING, PROPERTY LINE, CENTER OF MANHOLE/CATCH BASIN OR CENTERLINE OF PIPE UNLESS OTHERWISE NOTED.
2. REFER TO NOTES & DETAILS SHEET FOR ON-SITE PAVING DETAILS.
3. REFER TO NOTES & DETAILS SHEET FOR ON-SITE SIDEWALK RAMP DETAILS

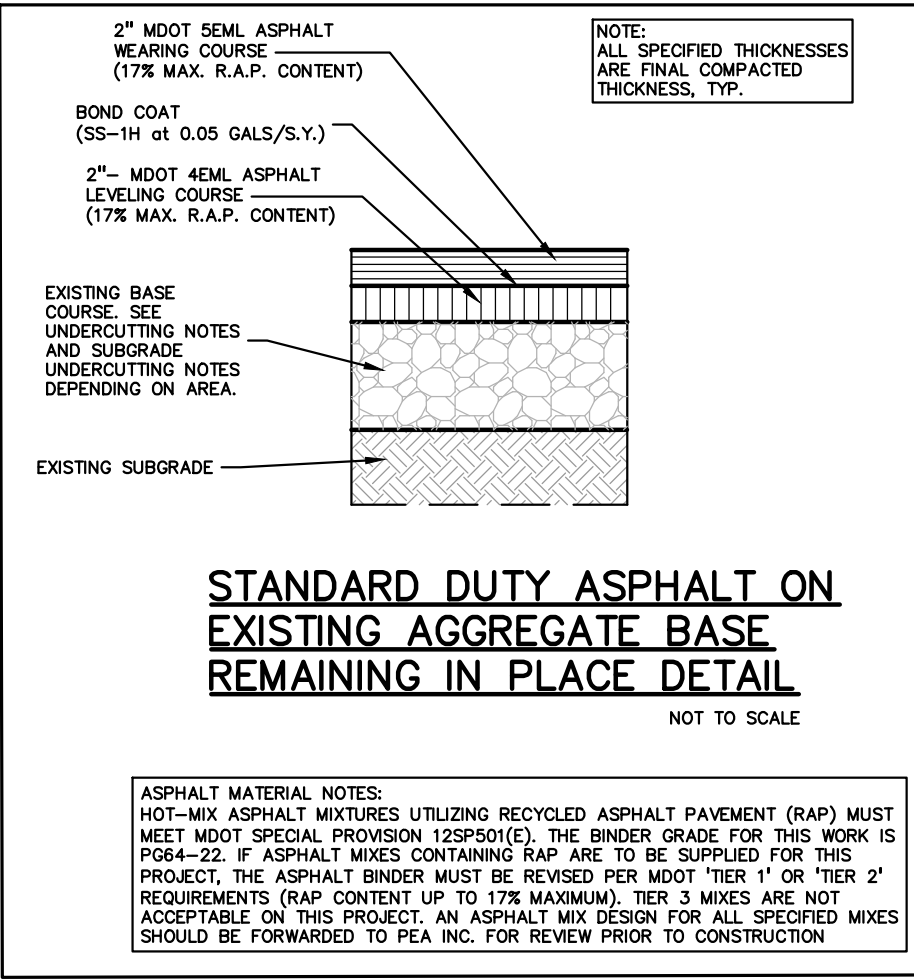


**NOTES:**

1. CONTRACTOR TO VERIFY ALL QUANTITIES SHOWN ON THE PLANS. ANY DEVIATIONS TO THE PLAN QUANTITIES SHALL BE BROUGHT TO THE ATTENTION OF THE SCHOOL DISTRICT AND PEA GROUP. BIDDING PER THE BID PACKAGE, FOR VERIFICATION PER TO BIDDING.
2. ALL DIMENSIONS SHOWN ARE TO BACK OF CURB, FACE OF SIDEWALK, CENTER OF MANHOLE/CATCH BASIN UNLESS OTHERWISE NOTED.
3. DOWEL INTO EXISTING CURB AND GUTTER 9" WITH EPOXY COATED #4 BAR CONTINUOUS BETWEEN EXISTING AND PROPOSED CURBING.
4. THE SIDEWALK THRU THE DRIVE APPROACH SHALL BE REMOVED, STRAIGHTENED, ALIGNED AND REPLACED BY THE CONTRACTOR TO MATCH EXISTING ALIGNMENT OF 8' WALK ON EITHER SIDE OF APPROACH. THE NEW SIDEWALK SHALL BE STRAIGHT WITH NO BENDS OR CURVES THAT EXTEND THRU DRIVE APPROACH.

3. CONTRACTOR TO FIELD VERIFY ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR IS LIMITED TO: SITE LIGHTING, FIBER LINES, ETC.
4. REFER TO NOTES AND DETAIL SHEET FOR ON SITE PAVING DETAILS.
5. CONTRACTOR TO REMOVE AND REPLACE CONCRETE TO REPAIR DETAILS ON SHEET C-4.0. ALL SIGNS AND ANY POSTS IN GOOD CONDITION SHALL BE RETURNED TO THE OWNER. ALL PORTED DAMAGED OR OTHERWISE POOR CONDITION, SHALL BE DISPOSED OF AT NO ADDITIONAL COST TO THE OWNER.
6. FOR THE FIVE (5) CATCH BASINS LOCATED IN THE WORK AREA; BIDDERS ARE TO INCLUDE RECONSTRUCTION OF THESE STRUCTURES (GREATER THAN 12-INCHES IN DEPTH FROM THE RIM ELEVATION OF REPAIR WORK) IN THE BASE BID. THE SUCCESSFUL BIDDER SHALL BE REQUIRED FOR REPAIRING EACH STRUCTURE BASED ON THE ACTUAL DEPTH OF REPAIR WITH EITHER STRUCTURAL ADJUSTMENT (WHICH MAY BE MORE THAN 12-INCHES OF RIM ELEVATION) OR STRUCTURAL RECONSTRUCTION (GREATER THAN 12-INCHES IN DEPTH) PER THE UNIT PRICES PROVIDED IN THE BASE BID. RACK AND THE SCOPE OF WORK DETERMINED AND APPROVED PRIOR TO THE WORK COMMENCING. REPLASTERING OF THE ENTIRE INTERIOR SURFACE SHALL BE INCLUDED IN THE UNIT PRICE FOR BOTH STRUCTURAL ADJUSTMENT AND STRUCTURAL RECONSTRUCTION.
7. A THICKENED EDGE OF ASPHALT PER THE DETAIL ON SHEET C-4.0 SHALL BE LOCATED WHERE CALLED FOR IN THE PLAN. BIDDERS SHALL INCREASE THE QUANTITIES FOR THIS ITEM ACCORDINGLY IN THE BASE BID.
8. CONTRACTOR SHALL REFER TO THE "REPORT ON SHERIDAN CONSTRUCTION INVESTIGATION" PREPARED BY G2 CONSULTING GROUP DATED 10/3/23

11. FOR FULL DEPTH PATCHES, THE BITUMINOUS CONCRETE SHOULD BE SAW-CUT A MINIMUM 2' FROM THE PATCHED AREA. THE EXPOSED AREA TO BE REMOVED, THE UNDERLYING AGGREGATE SHOULD BE PROOF COMPACTED WITH A VIBRATORY ROLLED AND AREAS THAT REMAIN UNSTABLE SHOULD BE UNDERCUT AND REPLACED WITH MDOT 21A AGRAGGREGATE. THE PATCHED AREA AND THE SECTION WITHIN FULL DEPTH PATCH AREAS MATCH THE REMOVED PAVEMENT THICKNESS AND CONSIST OF A TACK COAT, A 4" THICK BITUMINOUS CONCRETE LEVELING COURSE. PRIOR TO PLACING THE FULL-DEPTH PATCH, THE FULL DEPTH PATCH SHOULD BE TO THE SIDES OF THE SAW-CUT PAVEMENT. ADDITIONALLY, AFTER MILLING AND FULL DEPTH PATCHING, A TACK COAT OF 1" THICK BITUMINOUS TACK COAT MUST BE PLACED PRIOR TO PLACEMENT OF THE OVERLAY.
12. SURFACE COURSE SHALL BE PLACED ACROSS THE FUTURE PAVEMENT AREA AT THE SAME TIME.
13. CONTRACTOR TO REPLACE AREAS OF ASPHALT PAVEMENT WITH FULL DEPTH CONCRETE COLLARS WITH FULL DEPTH ASPHALT PAVEMENT AND BASE AS NEEDED. CONTRACT NOT TO BE PAID SEPARATELY BUT INCLUDED IN THE "PAY ITEM" OF THE CONTRACT.

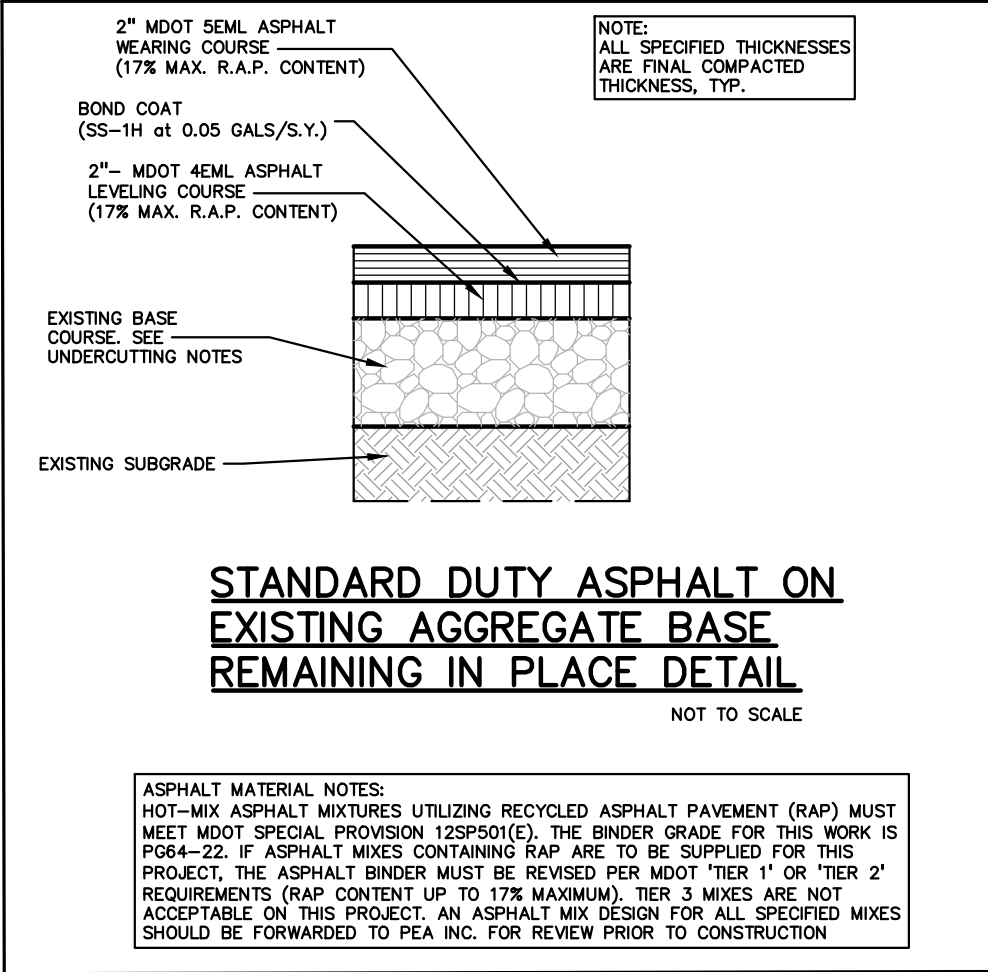
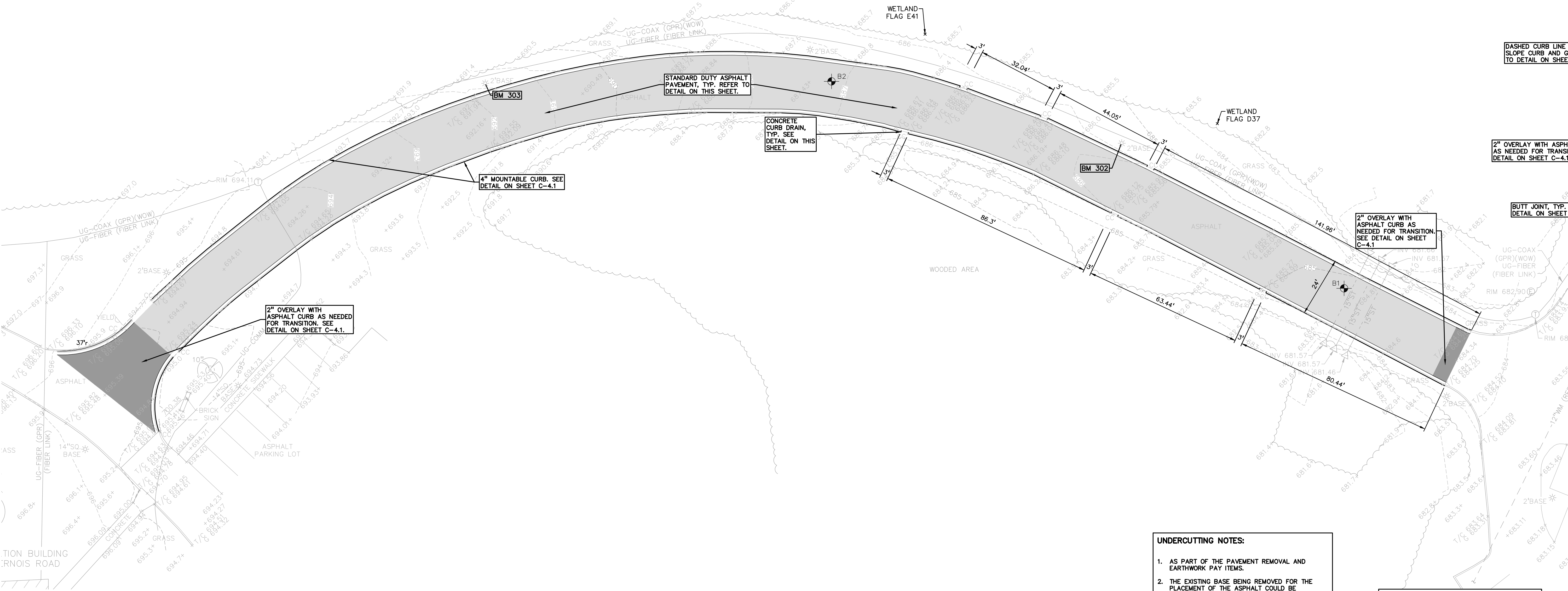


**FLOODPLAIN NOTE:**  
BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN, PER FLOOD INSURANCE RATE MAP NUMBER 26125C0553G, DATED JANUARY 16, 2009.



S:\PROJECTS\2023\2023-0262-2024-205 SITE IMPROVEMENT PROJECT\DWG\CONSTRUCTION\PAVING\7-TRANS SERVICE BUILDING-C-2.4.DWG-2023082-TRANS SERVICE BUILDING.dwg

**FLOODPLAIN NOTE:**  
BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE "X", AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN PER FLOOD INSURANCE RATE MAP NUMBER 26125C0553G, DATED JANUARY 16, 2009.



UTILITY LEGEND:	
---OH-ELEC-W-O---	EX. OH. ELEC. POLE & GUY WIRE
---UG-CATV---[ ]---	EX. U.G. CABLE TV & PEDESTAL
---UG-COMM---[ ]---	EX. U.G. COMMUNICATION LINE, PEDESTAL & MANHOLE
---UG-ELEC-[ ]-[ ]---	EX. U.G. ELEC. MANHOLE, METER & HANDHOLE
---	EX. GAS LINE
[ ]	EX. GAS VALVE & GAS LINE MARKER
[ ]	EX. TRANSFORMER & IRRIGATION VALVE
---	EX. WATER MAIN
[ ]	EX. HYDRANT, GATE VALVE & POST INDICATOR VALVE
[ ]	EX. WATER VALVE BOX & SHUTOFF
---	EX. SANITARY SEWER
[ ]	EX. SANITARY CLEANOUT & MANHOLE
[ ]	EX. COMBINED SEWER MANHOLE
---	EX. STORM SEWER
[ ]	EX. CLEANOUT & MANHOLE
[ ]	EX. SQUARE, ROUND, & BEEHIVE CATCH BASIN
[ ]	EX. YARD DRAIN & ROOF DRAIN
[ ]	EX. UNIDENTIFIED STRUCTURE
---	PROPOSED WATER MAIN
[ ]	PROPOSED HYDRANT AND GATE VALVE
[ ]	PROPOSED TAPPING SLEEVE, VALVE & WELL
[ ]	PROPOSED POST INDICATOR VALVE
---	PROPOSED SANITARY SEWER
[ ]	PROPOSED SANITARY CLEANOUT & MANHOLE
---	PROPOSED STORM SEWER
[ ]	PROPOSED STORM SEWER CLEANOUT & MANHOLE
[ ]	PROPOSED CATCH BASIN, INLET & YARD DRAIN

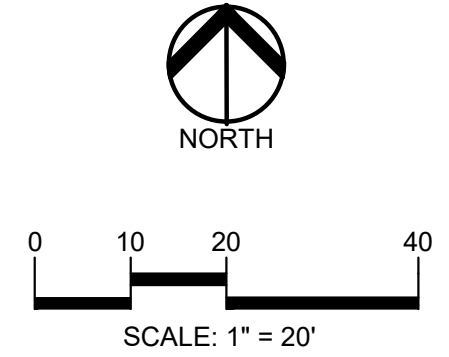
- NOTES:**
- CONTRACTOR TO VERIFY ALL QUANTITIES SHOWN ON THE PLANS. ANY DEVIATIONS TO THE PLAN QUANTITIES SHALL BE BROUGHT TO THE ATTENTION OF THE SCHOOL DISTRICT AND PEA GROUP, IN WRITING PER THE BID PACKAGE, FOR VERIFICATION PRIOR TO BIDDING.
  - ALL DIMENSIONS SHOWN ARE TO BACK OF CURB, FACE OF SIDEWALK, CENTER OF MANHOLE/CATCH BASIN UNLESS OTHERWISE NOTED.
  - DOWEL INTO EXISTING CURB AND GUTTER 9" WITH EPOXY COATED #4 BAR CONTINUOUS BETWEEN EXISTING AND PROPOSED CURBING.
  - THE SIDEWALK THRU THE DRIVE APPROACH SHALL BE REMOVED, STRAIGHTENED, ALIGNED AND REPLACED BY THE CONTRACTOR TO MATCH EXISTING ALIGNMENT OF 8' WALK ON EITHER SIDE OF APPROACH. THE NEW SIDEWALK SHALL BE STRAIGHT WITH NO BENDS OR CURVES THAT EXTEND THROUGH DRIVE APPROACH.
  - CONTRACTOR TO FIELD VERIFY ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION INCLUDING BUT NOT LIMITED TO: SITE LIGHTING, FIBER LINES, ETC.
  - REFER TO NOTES AND DETAIL SHEET FOR ON SITE PAVING DETAILS.
  - CONTRACTOR TO REMOVE AND REPLACE SIGNS AND POSTS PER DETAILS ON SHEET C-4.0. ALL SIGNS AND ANY POSTS IN GOOD CONDITION SHALL BE RETURNED TO THE OWNER. ALL POSTED DAMAGED OR IN OTHERWISE POOR CONDITION, SHALL BE DISPOSED OF AT NO ADDITIONAL COST TO THE OWNER.
  - FOR THE FOUR (4) CATCH BASINS, TWO (2) STORM MANHOLES AND ONE (1) GATE VALVE LOCATED IN THE DRIVE APPROACH, BIDDERS ARE TO INCLUDE RECONSTRUCTION OF THESE STRUCTURES (GREATER THAN 12-INCHES IN DEPTH FROM THE RIM ELEVATION OF REPAIR WORK) IN THE BASE BID. THE SUCCESSFUL BIDDER WILL BE PAID FOR REPAIRING EACH STRUCTURE BASED ON THE ACTUAL DEPTH OF REPAIR WITH EITHER STRUCTURAL ADJUSTMENT (WITHIN TOP 12-INCHES OF RIM ELEVATION) OR STRUCTURAL RECONSTRUCTION (GREATER THAN 12-INCHES IN DEPTH) PER THE UNIT PRICES PROVIDED IN THE BID PACKAGE AND THE SCOPE OF WORK DETERMINED AND APPROVED PRIOR TO THE WORK COMMENCING. REPLASTERING OF THE ENTIRE STRUCTURE SHALL BE INCLUDED IN THE UNIT PRICE FOR BOTH STRUCTURAL ADJUSTMENT AND STRUCTURAL RECONSTRUCTION.
  - A THICKENED EDGE OF ASPHALT PER THE DETAIL ON SHEET C-4.1 OF THE PLANS SHALL BE LOCATED WHERE CALLED FOR IN THE PLAN. BIDDERS SHALL INCREASE THE QUANTITIES FOR THIS ITEM ACCORDINGLY IN THE BASE BID.

- UNDERCUTTING NOTES:**
- AS PART OF THE PAVEMENT REMOVAL AND EARTHWORK PAY ITEMS.
  - THE EXISTING BASE BEING REMOVED FOR THE PLACEMENT OF THE ASPHALT COULD BE STOCKPILED AND REUSED FOR UNDERCUTS IF DEEMED ACCEPTABLE BY THE QUALIFIED ENGINEERING TECHNICIAN ON SITE.
  - SUBGRADE UNDERCUT SHALL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE IF SUBGRADE STABILIZATION IS NECESSARY. UNDERCUT EXCAVATIONS SHALL BE BACKFILLED WITH MDOT 21AA DENSE GRADED AGGREGATE PLACED IN AN ENGINEERED MANNER. LIFT THICKNESS SHALL NOT EXCEED 9 INCHES. BACKFILLING BACK TO THE TOP OF AGGREGATE BASE ELEVATION SHALL BE INCLUDED IN THE SUBGRADE UNDERCUTTING PAY ITEM. THE USE OF TRI-AXIAL GEGRID MAY BE USED TO REDUCE UNDERCUT DEPTHS, AS APPROVED BY THE DISTRICT AND PER THE UNIT PRICE PROVIDED WITH THE CONTRACTORS BID.
  - ALL ENGINEERED FILL SHALL BE COMPACTED TO A DENSITY OF AT LEAST 95 PERCENT OF THE MAXIMUM DENSITY DETERMINED BY THE MODIFIED PROCTOR (ASTM D1557) METHOD OF TESTING. ALL ENGINEERED FILL MATERIAL SHALL BE PLACED AND COMPACTED AT APPROXIMATELY THE OPTIMUM MOISTURE CONTENT. FROZEN MATERIAL SHALL NOT BE USED AS FILL, NOR SHOULD FILL BE PLACED ON A FROZEN SUBGRADE.
  - THE QUANTITY FOR 'SUBGRADE UNDERCUT' FOR EACH SITE SHALL BE INCLUDED IN THE BASE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL VOLUME OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.
  - SUBGRADE UNDERCUT DRAIN TILE SHALL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE IF SUBGRADE STABILIZATION IS NECESSARY. DRAIN TILE SHALL BE PLACED WITHIN ANY UNDERCUT AREA AND CONNECTED TO THE CLOSEST CATCH BASIN TO PREVENT GROUNDWATER FROM POOLING WITHIN THE GRANULAR SOILS IN UNDERCUTS AND CREATING "BATHTUBS" IN THE COHESIVE SOILS.
  - THE QUANTITY FOR 'SUBGRADE UNDERCUT DRAIN TILE (4")' FOR EACH SITE SHALL BE INCLUDED IN THE BASE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL FOOTAGE OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.
  - THE IMPORTING, ADDING, FINE GRADING AND COMPACTING ADDITIONAL PAVEMENT AGGREGATE BASE MATERIAL (MDOT 21AA CRUSHED Limestone) REQUIRED TO ACHIEVE THE PROPOSED TOP OF BASE ELEVATIONS AND PRIOR TO PLACING THE ASPHALT PAVEMENT WILL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE THE VOLUME OF ADDITIONAL MATERIAL REQUIRED PER THE PROJECT PLANS.
  - THE QUANTITY FOR 'ADD AGGREGATE TO EXISTING BASE' FOR EACH SITE SHALL BE INCLUDED IN THE BASE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL VOLUME OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.
  - CONTRACTOR SHALL REFER TO THE "REPORT ON GEOTECHNICAL PAVEMENT INVESTIGATION" PREPARED BY G2 CONSULTING GROUP DATED 9/27/23.

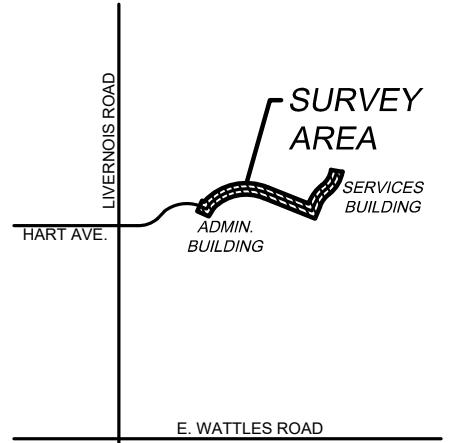
LEGEND:	
[ ]	CONCRETE PAVEMENT
[ ]	ASPHALT PAVEMENT
[ ]	GRAVEL
[ ]	ON SITE OR ENGINEERED FILL
[ ]	CONCRETE CURB AND GUTTER
[ ]	REVERSE SLOPE PAN
[ ]	SETBACK LINE
[ ]	SIGN LIGHTPOLE
[ ]	FENCE
[ ]	GUARD RAIL

PAVING QUANTITIES:	
4" ASPHALT PAVEMENT	11,559 SF
2" ASPHALT OVERLAY	1,011 SF
4" MOUNTABLE CURB AND GUTTER	1,066 LF
SUBGRADE UNDERCUTS	65 CYD

**PEA GROUP**  
t: 844.813.2949  
www.peagroup.com



**CAUTION!!**  
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**CLIENT**  
**TROY SCHOOLS**  
1140 RANKIN DRIVE  
TROY, MI 48063

**PROJECT TITLE**  
**SERVICES BUILDING**  
4420 LIVERNOIS ROAD  
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

REVISIONS	

ORIGINAL ISSUE DATE:  
OCTOBER 31, 2023

DRAWING TITLE  
**ENGINEERING AND DIMENSION PLAN**

PEA JOB NO. 2023-0262

P.M.	RR
DN.	RR
DES.	RM

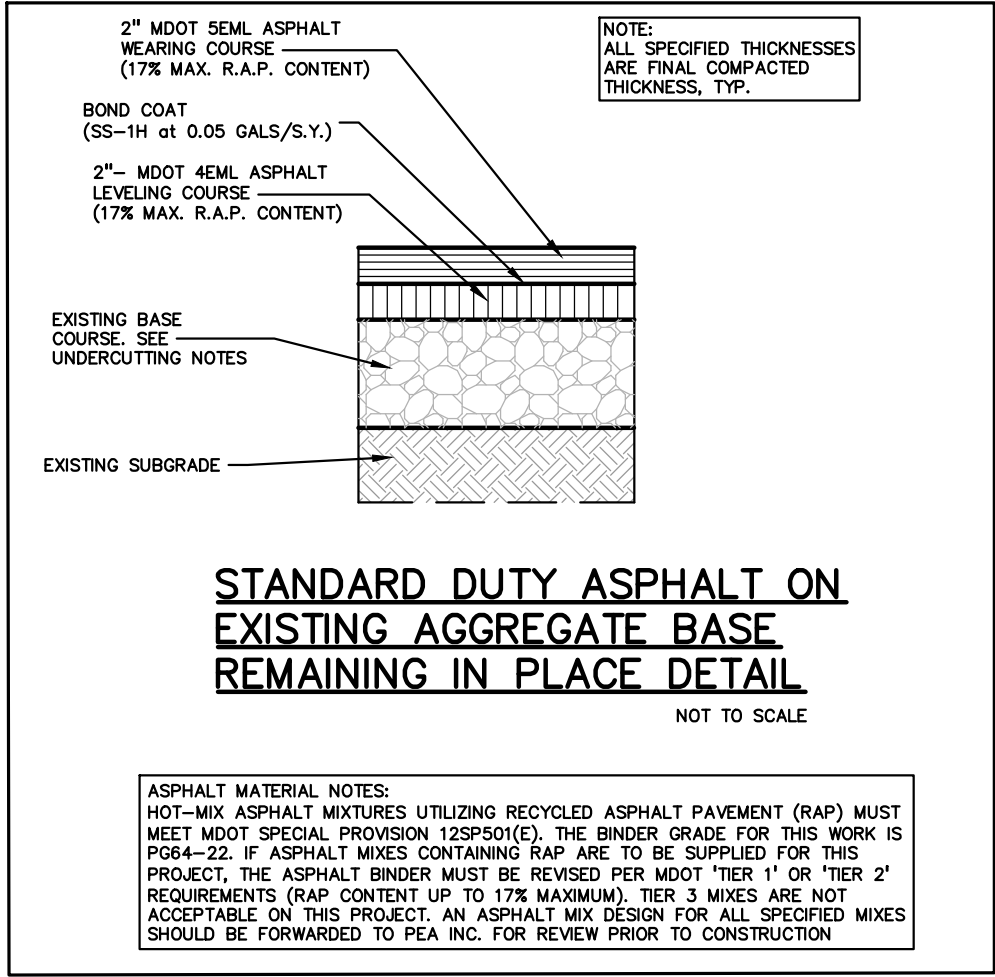
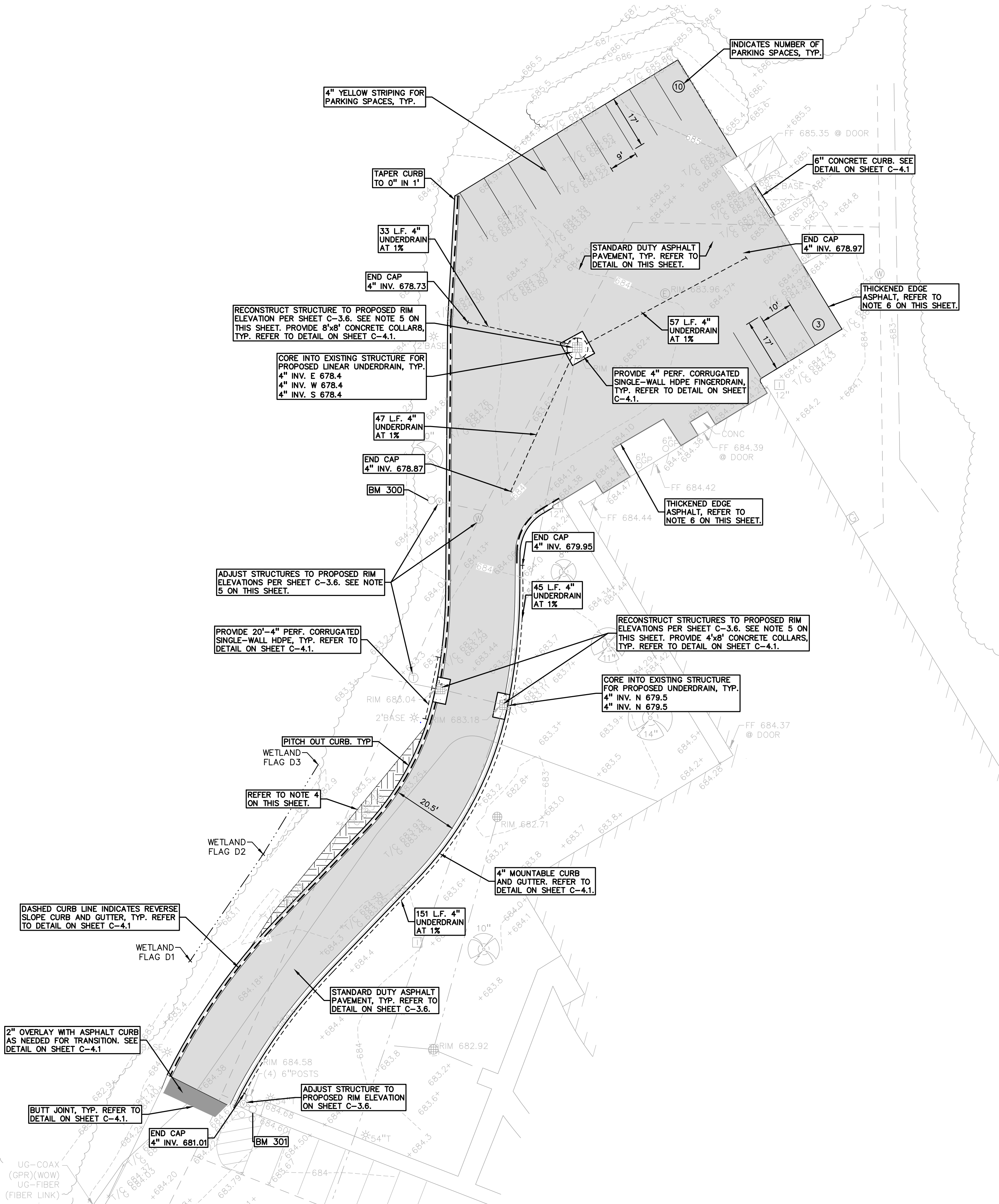
DRAWING NUMBER:

**C-2.4**



S:\PROJECTS\2023\2-0262 2024 TDS SITE IMPROVEMENT PROJECTS\DWG\CONSTRUCTION-PAVING\TRANS SERVICE BUILDING-C-2.5\DWG-20262-TRANS SERVICE BUILDING.dwg

**FLOODPLAIN NOTE:**  
BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X'. AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN, PER FLOOD INSURANCE RATE MAP NUMBER 26125C0553G, DATED JANUARY 16, 2009.



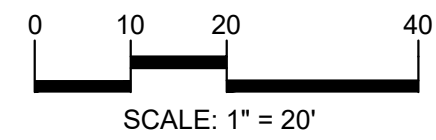
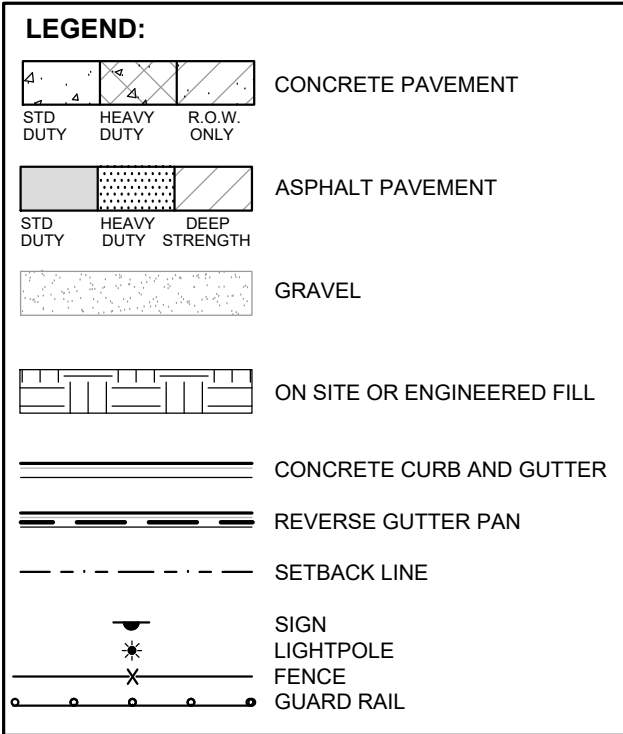
**NOTES:**

- CONTRACTOR TO VERIFY ALL QUANTITIES SHOWN ON THE PLANS. ANY DEVIATIONS TO THE PLAN QUANTITIES SHALL BE BROUGHT TO THE ATTENTION OF THE SCHOOL DISTRICT AND PEA GROUP, IN WRITING PER THE BID PACKAGE, FOR VERIFICATION PRIOR TO BIDDING.
- ALL DIMENSIONS SHOWN ARE TO BACK OF CURB, FACE OF SIDEWALK, CENTER OF MANHOLE/CATCH BASIN UNLESS OTHERWISE NOTED.
- DOWEL INTO EXISTING CURB AND GUTTER 9\"/>
- THE SIDEWALK THRU THE DRIVE APPROACH SHALL BE REMOVED, STRAIGHTENED, ALIGNED AND REPLACED BY THE CONTRACTOR TO MATCH EXISTING ALIGNMENT OF OF 8' WALK ON EITHER SIDE OF APPROACH. THE NEW SIDEWALK SHALL BE STRAIGHT WITH NO BENDS OR CURVES THAT EXTEND THROUGH DRIVE APPROACH.
- CONTRACTOR TO FIELD VERIFY ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION INCLUDING BUT NOT LIMITED TO: SITE LIGHTING, FIBER LINES, ETC.
- REFER TO NOTES AND DETAIL SHEET FOR ON SITE PAVING DETAILS.
- CONTRACTOR TO REMOVE AND REPLACE SIGNS AND POSTS PER DETAILS ON SHEET C-4.0. ALL SIGNS AND ANY POSTS IN GOOD CONDITION SHALL BE RETURNED TO THE OWNER. ALL POSTED DAMAGED OR IN OTHERWISE POOR CONDITION, SHALL BE DISPOSED OF AT NO ADDITIONAL COST TO THE OWNER.
- FOR THE THREE (3) CATCH BASINS LOCATED IN THE WORK AREA: BIDDERS ARE TO INCLUDE RECONSTRUCTION OF THESE STRUCTURES (GREATER THAN 12-INCHES IN DEPTH FROM THE RIM ELEVATION OF REPAIR WORK) IN THE BASE BID. THE SUCCESSFUL BIDDER WILL BE PAID FOR REPAIRING EACH STRUCTURE BASED ON THE ACTUAL DEPTH OF REPAIR WITH EITHER STRUCTURAL ADJUSTMENT (WITHIN TOP 12-INCHES OF RIM ELEVATION) OR STRUCTURAL RECONSTRUCTION (GREATER THAN 12-INCHES IN DEPTH) PER THE UNIT PRICES PROVIDED IN THE BID PACKAGE AND THE SCOPE OF WORK DETERMINED AND APPROVED PRIOR TO THE WORK COMMENCING. REPLASTERING OF THE ENTIRE STRUCTURE SHALL BE INCLUDED IN THE UNIT PRICE FOR BOTH STRUCTURAL ADJUSTMENT AND STRUCTURAL RECONSTRUCTION.
- THE THICKENED EDGE OF ASPHALT PER THE DETAIL ON SHEET C-4.1 OF THE PLANS SHALL BE LOCATED WHERE CALLED FOR IN THE PLAN. BIDDERS SHALL INCREASE THE QUANTITIES FOR THIS ITEM ACCORDINGLY IN THE BASE BID.

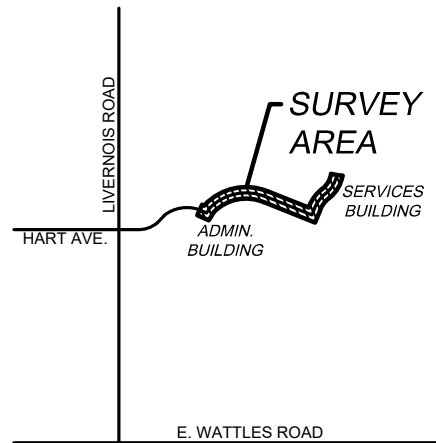
<b>PAVING QUANTITIES:</b>	
4\"/>	534 LF
6\"/>	12 LF
4\"/>	15,430 SF
8\"/>	15,430 SF
BUTT JOINT	24 LF
8\"/>	126 SF
2\"/>	117 SF
SUBGRADE UNDERCUT DRAIN TILE (4\") ALLOWANCE	350 LF
<b>ENGINEERING QUANTITIES:</b>	
ADJUST/RECONSTRUCT STORM STRUCTURE	5 EA
4\"/>	383 LF

**SUBGRADE UNDERCUTTING NOTES:**

- TO MINIMIZE SUBGRADE INSTABILITY AND UNDERCUTS, THE SUBGRADE SHALL NOT BE LEFT EXPOSED TO PRECIPITATION AND CONSTRUCTION OPERATIONS AND SHOULD BE PERFORMED DURING THE SUMMER MONTHS TO ENSURE DRY, WARM, WEATHER. ADDITIONALLY, THE SUBGRADE MAY BECOME UNSTABLE UNDER REPEATED LOADING OF CONSTRUCTION TRAFFIC; THEREFORE, CONSTRUCTION EQUIPMENT SHOULD BE LIMITED ON THE EXPOSED SUBGRADE.
- SUBGRADE UNDERCUT SHALL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE IF SUBGRADE STABILIZATION IS NECESSARY. UNDERCUT EXCAVATIONS SHALL BE BACKFILLED WITH MDOT 21AA DENSE GRADED AGGREGATE PLACED IN AN ENGINEERED MANNER. LIFT THICKNESS SHALL NOT EXCEED 9 INCHES. THE USE OF TRI-AXIAL GEOGRID MAY BE USED TO REDUCE UNDERCUT DEPTHS, AS APPROVED BY THE DISTRICT AND PER THE UNIT PRICE PROVIDED WITH THE CONTRACTORS BID.
- THE QUANTITY FOR 'SUBGRADE UNDERCUT' FOR EACH SITE SHALL BE INCLUDED IN THE BASE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL VOLUME OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.
- ALL ENGINEERED FILL SHALL BE COMPACTED TO A DENSITY OF AT LEAST 95 PERCENT OF THE MAXIMUM DENSITY DETERMINED BY THE MODIFIED PROCTOR (ASTM D1557) METHOD OF TESTING. ALL ENGINEERED FILL MATERIAL SHALL BE PLACED AND COMPACTED AT APPROXIMATELY THE OPTIMUM MOISTURE CONTENT. FROZEN MATERIAL SHALL NOT BE USED AS FILL, NOR SHOULD FILL BE PLACED ON A FROZEN SUBGRADE.
- SUBGRADE UNDERCUT DRAIN TILE SHALL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE IF SUBGRADE STABILIZATION IS NECESSARY. DRAIN TILE SHALL BE PLACED WITHIN ANY UNDERCUT AREA AND CONNECTED TO THE CLOSEST CATCH BASIN TO PREVENT GROUNDWATER FROM POOLING WITHIN THE GRANULAR SOILS IN UNDERCUTS AND CREATING "BATHTUBS" IN THE COHESIVE SOILS.
- THE QUANTITY FOR 'SUBGRADE UNDERCUT DRAIN TILE (4\")' FOR EACH SITE SHALL BE INCLUDED IN THE BASE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL FOOTAGE OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.



**CAUTION!!**  
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.



**CLIENT**

**TROY SCHOOLS**  
1140 RANKIN DRIVE  
TROY, MI 48065

**PROJECT TITLE**

**SERVICES BUILDING**  
4420 LIVERNOS ROAD  
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

**REVISIONS**

ORIGINAL ISSUE DATE:  
OCTOBER 31, 2023

**DRAWING TITLE**

**ENGINEERING AND DIMENSION PLAN**

PEA JOB NO. 2023-0262

P.M. RR

DN. RR

DES. RM

DRAWING NUMBER:








**C-2.5**



### LEGEND:

	CONCRETE PAVEMENT
	ASPHALT PAVEMENT
	GRAVEL
	WETLAND
	CONCRETE CURB AND GUTTER
	REVERSE GUTTER PAN
	SETBACK LINE
	SIGN
	LIGHT POLE
	FENCE
	GUARD RAIL

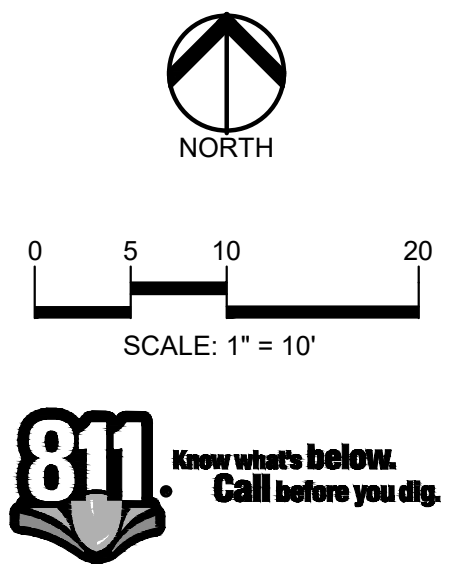
### DEMOLITION LEGEND:

ITEM TO BE PROTECTED	
ITEM TO BE REMOVED	
CURB/FENCE REMOVAL	
CONCRETE PAVEMENT AND SIDEWALK REMOVAL	
ASPHALT REMOVAL	
TREE REMOVAL	
SAWCUT LINE	

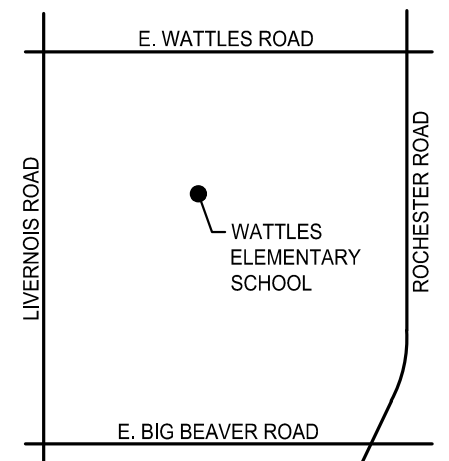
**NOTES:**

1. CONTRACTOR TO VERIFY ALL QUANTITIES SHOWN ON THE PLANS. ANY DEVIATIONS TO THE PLAN QUANTITIES SHALL BE BROUGHT TO THE ATTENTION OF THE SCHOOL DISTRICT AND PEA GROUP, IN WRITING PER THE BID PACKAGE, FOR VERIFICATION PRIOR TO BIDDING.

A circular professional engineer seal for the State of Michigan. The outer ring contains the text "STATE OF MICHIGAN" at the top and "LICENSED PROFESSIONAL ENGINEER" at the bottom, separated by two stars. The center of the seal contains the name "ROBERT SCOTT KOCHON" and the license number "License No. 6281046143".



**CAUTION!!**  
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.



CLIENT  
**TROY SCHOOLS**  
1140 RANKIN DRIVE  
TROY, MI 48063

PROJECT TITLE

**WATTLES  
ELEMENTARY  
SCHOOL**

3555 ELLENBORO DRIVE  
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

[illegible]

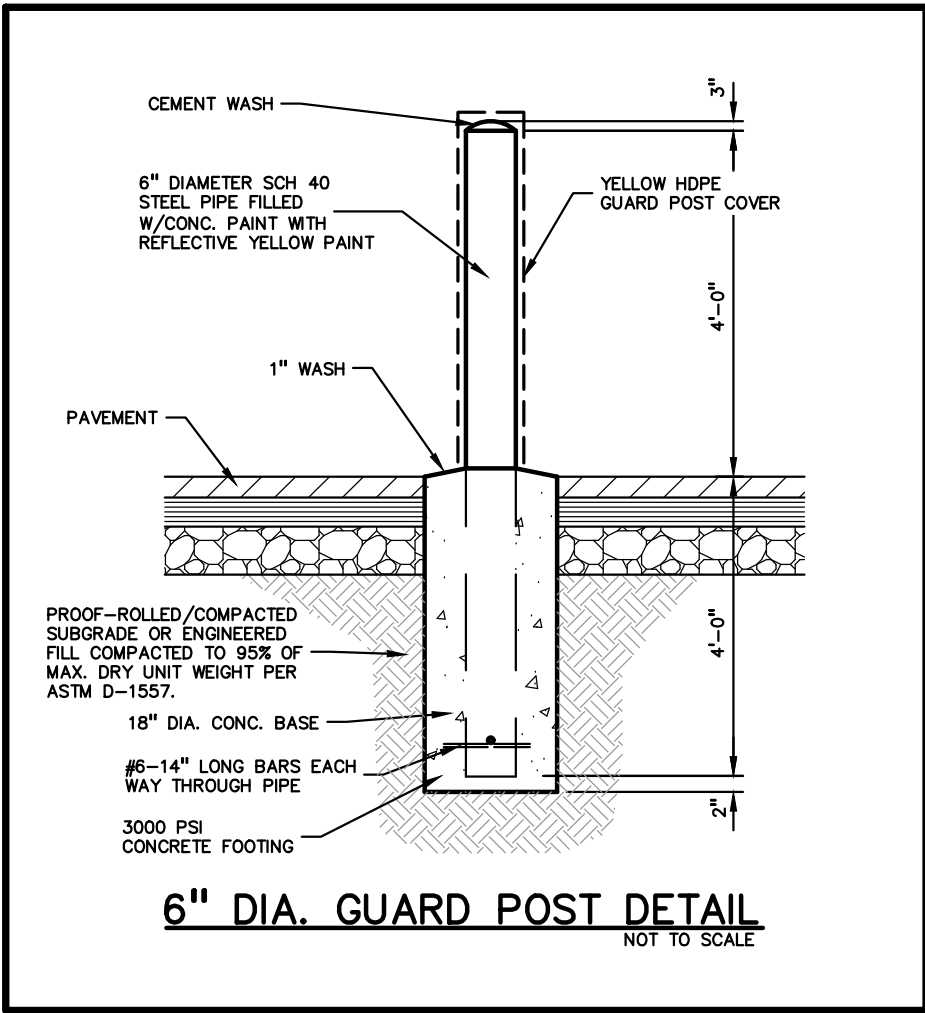
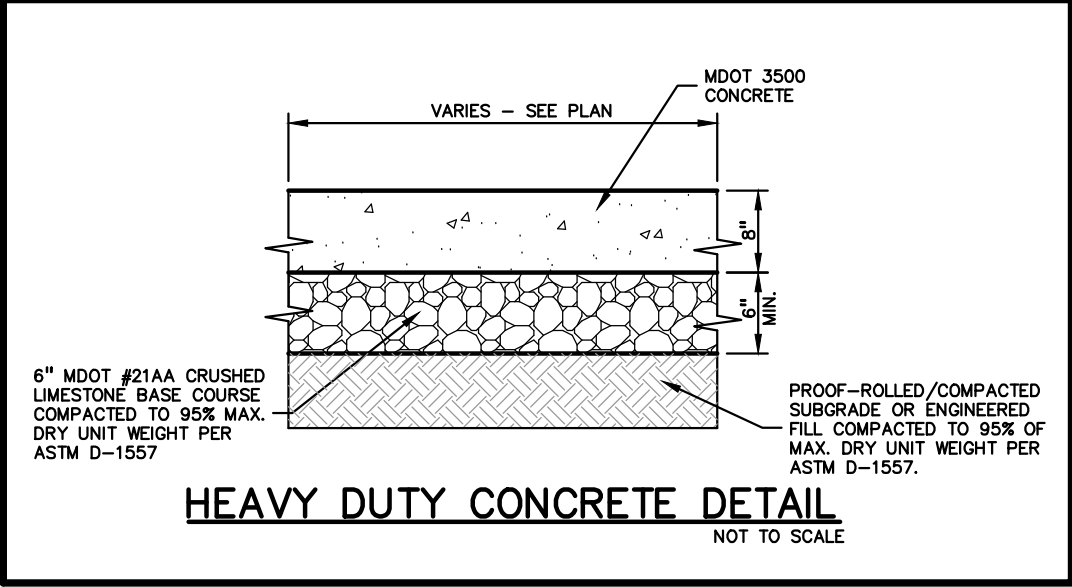
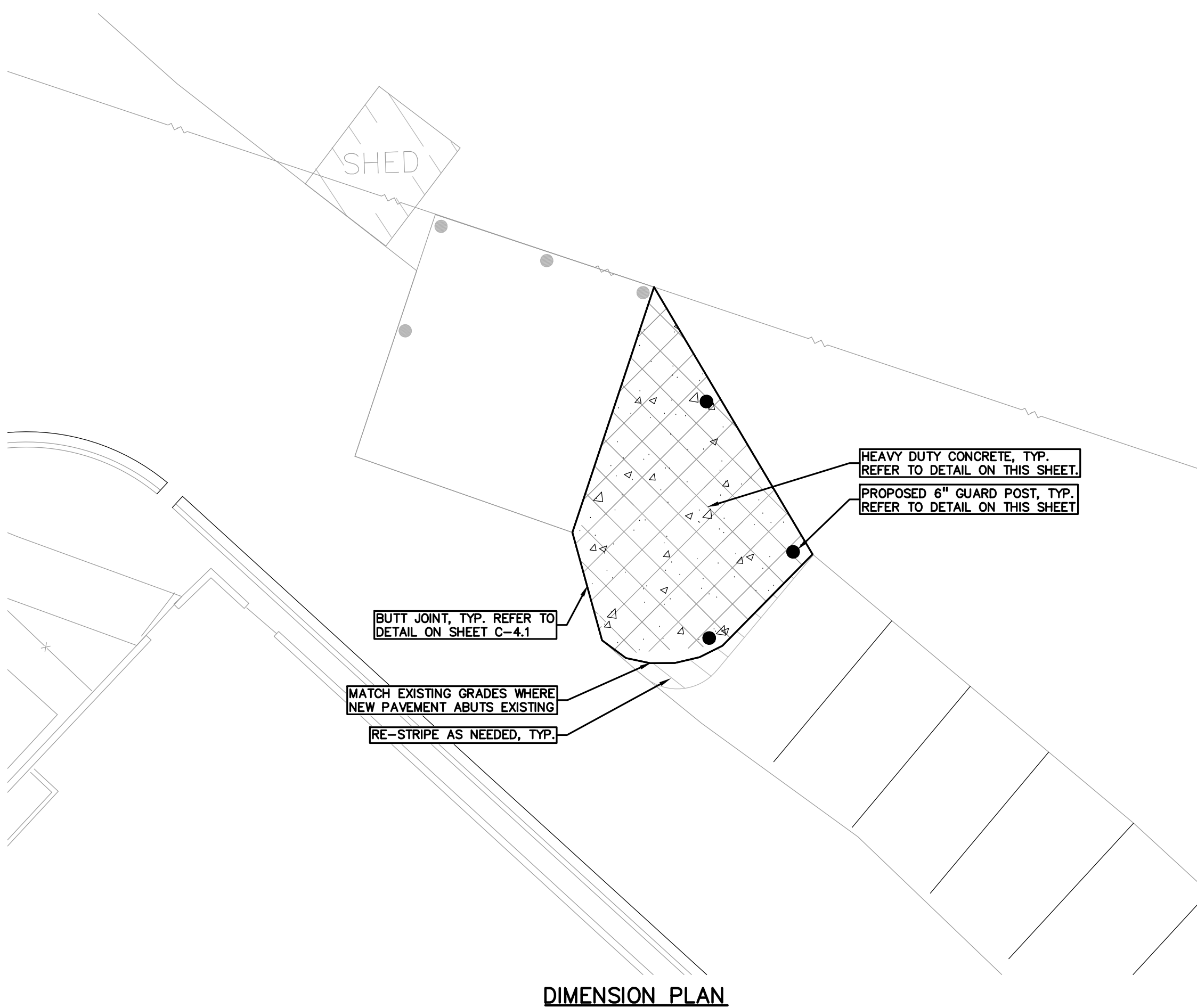
ORIGINAL ISSUE DATE:  
OCTOBER 31, 2023

DRAWING TITLE

**DEMOLITION  
AND  
ENGINEERING  
PLAN**

PEA JOB NO.	2023-0262
P.M.	RR
DN.	RR
DES.	RM
DRAWING NUMBER:	

C-2.6



**FLOODPLAIN NOTE:**  
BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN, PER FLOOD INSURANCE RATE MAP NUMBER 26125C0553G, DATED JANUARY 16, 2009.

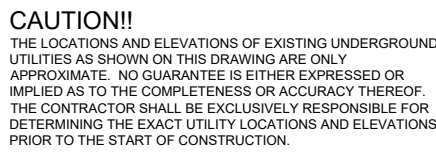


t: 844.813.2949  
www.peagroup.com



20 40 80

SCALE: 1" = 40'



CLIENT  
**TROY SCHOOLS**  
1140 RANKIN DRIVE  
TROY, MI 48063

PROJECT TITLE  
**ATHENS HIGH  
SCHOOL**  
4333 JOHN R ROAD  
TROY, MICHIGAN

## REVISIONS

ORIGINAL ISSUE DATE:  
OCTOBER 31, 2023

DRAWING TITLE

## DIMENSION AND PAVING PLAN

PEA JOB NO. 2023-0262

P.M.	RF
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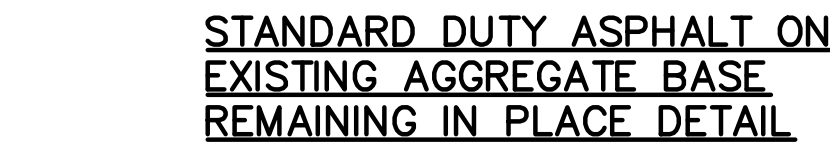
DN.	RF.
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DES. RM

DRAWING NUMBER:

C 27

## C-2.7



ASPHALT MATERIAL NOTES:  
HOT-MIX ASPHALT MIXTURES UTILIZING RECYCLED ASPHALT PAVEMENT (RAP) MUST MEET MDOT SPECIAL PROVISION 12SP501(E). THE BINDER GRADE FOR THIS WORK IS PG64-22. IF ASPHALT MIXES CONTAINING RAP ARE TO BE SUPPLIED FOR THIS PROJECT, THE ASPHALT BINDER MUST BE REVISED PER MDOT 'TIER 1' OR 'TIER 2' REQUIREMENTS (RAP CONTENT UP TO 17% MAXIMUM). TIER 3 MIXES ARE NOT ACCEPTABLE ON THIS PROJECT. AN ASPHALT MIX DESIGN FOR ALL SPECIFIED MIXES SHOULD BE FORWARDED TO PEI INC. FOR REVIEW PRIOR TO CONSTRUCTION

<b>DEMOLITION QUANTITIES:</b>	
REMOVE ASPHALT	1,683 SF
REMOVE CURB	10 LF

**NOTES:**

1. CONTRACTOR TO VERIFY ALL QUANTITIES SHOWN ON THE PLANS. ANY DEVIATIONS TO THE PLAN QUANTITIES SHALL BE BROUGHT TO THE ATTENTION OF THE SCHOOL DISTRICT AND PEA GROUP, IN WRITING PER THE BID PACKAGE, FOR VERIFICATION PRIOR TO BIDDING.
2. ALL DIMENSIONS SHOWN ARE TO BACK OF CURB, FACE OF SIDEWALK, CENTER OF MANHOLE/CATCH BASIN UNLESS OTHERWISE NOTED.
3. DOWEL INTO EXISTING CURBS AND GUTTER 6" W/ EPOXY COATED #4 BARS. ALL CONTINUOUS BETWEEN EXISTING AND PROPOSED CURBING.
4. CONTRACTOR TO REPLACE PLAYSCAPE AREA STRIPING IN KIND IN REGARDS TO LAYOUT, WIDTH, COLOR (TYP. 2 COATS).
5. REFER TO NOTES AND DETAIL SHEET FOR ON SITE PAVING DETAILS.
6. CONTRACTOR TO FIELD VERIFY ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION INCLUDING BUT NOT LIMITED TO: SITE LIGHTING, FIBER LINES, ETC.
7. CONTRACTOR TO REMOVE AND REPLACE SIGNS AND POSTS PER DETAIL ON SHEET C-4.0. ALL SIGNS AND ANY POSTS IN GOOD CONDITION WILL BE RETURNED TO THE OWNER. ALL POSTS DAMAGED OR OTHERWISE NOT IN A USABLE CONDITION SHALL BE DISPOSED OF AT NO ADDITIONAL COST TO THE OWNER.
8. FOR THE THREE (3) CATCH BASINS AND TWO (2) MANHOLES, LOCATED IN THE BASE BID AREA, BIDDERS ARE TO INCLUDE RECONSTRUCTION OF THESE STRUCTURES (GREATER THAN 12-INCHES IN DEPTH FROM THE RIM ELEVATION OF REPAIR WORK) AND THE BASE BID. THE SUCCESSFUL BIDDER WILL BE PAID FOR REPAIRING EACH STRUCTURE BASED ON THE ACTUAL DEPTH OF REPAIR WITH EITHER STRUCTURAL ADJUSTMENT (WHICH IS GREATER THAN 12-INCHES OF RIM ELEVATION) OR STRUCTURAL RECONSTRUCTION (GREATER THAN 12-INCHES IN DEPTH) PER THE UNIT PRICES PROVIDED IN THE BID PACKAGE AND THE SCOPE OF WORK DETERMINED AND APPROVED PRIOR TO THE WORK COMMENCING. REPLASTERING OF THE CURB AND STRUCTURES SHALL BE INCLUDED IN THE UNIT PRICE FOR BOTH STRUCTURAL ADJUSTMENT AND STRUCTURAL RECONSTRUCTION.
9. ALL PROPOSED ADA RAMPS SHALL HAVE TRUNCATED DOMES. PLASTIC OR METAL STYLE DOMES ARE BOTH ACCEPTABLE.
10. A THICKENED EDGE OF ASPHALT PER THE DETAIL ON SHEET C-4.1 OF THE PLANS AND THE LOCATION OF THE THICKENED EDGE IN THE PLAN. BIDDERS SHALL INCREASE THE QUANTITIES FOR THIS ITEM ACCORDINGLY IN THE BASE BID.
11. BIDDERS ARE TO ASSUME THAT ALL STOOPS WILL BE REPLACED WITH A FROST SLAB AND LOCATED PER THE DETAIL ON SHEET C-4.1 OF THE PLANS. IF DURING THE CONSTRUCTION IT IS DETERMINED THAT THE EXISTING STOOP IS A FROST SLAB THEN IT WILL REMAIN IN PLACE AND THE SCHOOL DISTRICT WILL BE PAID THE UNIT PRICE PROVIDED IN THE BID PACKAGE.

**GENERAL DEMOLITION NOTES:**

THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT:

1. ALL MATERIAL TO BE REMOVED, WHETHER SPECIFICALLY NOTED IN THE PLANS OR NOT, SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF OFF-SITE IN A LEGAL MANNER. NO ON-SITE BURY OR BURN PITS SHALL BE ALLOWED.
2. ALL DEMOLITION WORK SHALL CONFORM TO ALL LOCAL CODES AND ORDINANCES.
3. STAGING/PHASING OF DEMOLITION AND CONSTRUCTION IS TO BE COORDINATED WITH THE OWNER AND THE CONTRACTOR PRIOR TO CONSTRUCTION.
4. SPECIFIC DEMOLITION ITEMS HAVE BEEN INDICATED ON THE PLANS AS A GUIDE TO THE GENERAL SCOPE OF THE WORK; IT IS THE INTENT THAT THESE ITEMS SHALL BE COMPLETELY REMOVED BY THE CONTRACTOR ABOVE AND BELOW GROUND, UNLESS SPECIFICALLY NOTED OTHERWISE, AND THAT DEMOLITION WILL INCLUDE BUT WILL NOT NECESSARILY BE LIMITED TO THESE ITEMS. CONTRACTOR SHALL VISIT SITE TO VERIFY EXISTING CONDITIONS AND NOTIFY THE OWNER IF THE DEMOLITION THAT WILL BE REQUIRED PRIOR TO SUBMITTING A BID.
5. REMOVE ALL STRUCTURES DESIGNATED FOR REMOVAL ACCORDING TO THE DEMOLITION PLAN. THIS INCLUDES FOUNDATIONS, FOOTINGS, CONCRETE, ASPHALT, TREES, ETC.
6. THE CONTRACTOR SHALL, AS A MINIMUM, PROVIDE TREE PROTECTION FENCING AROUND EXISTING TREES TO BE SAVED. THE AREA WITHIN 15 FEET OF CONSTRUCTION ACTIVITIES AND AS INDICATED IN THE PLANS OR PER LOCAL AGENCY REQUIREMENTS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN UP, NOISE, DUST CONTROL, STREET SWEEPING AND HOURS OF OPERATION IN ACCORDANCE WITH THE LOCAL CODES.
8. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADES, SIGNAGE, MARKINGS, LIGHTS AND OTHER TRAFFIC CONTROL DEVICES TO PROTECT THE WORK ZONE AND SAFELY MAINTAIN TRAFFIC PER AGENCY REQUIREMENTS AND IN ACCORDANCE WITH THE LATEST EDITION OF THE STATE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
9. THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES TO CONDUCT ALL UTILITY LEADS HAVE BEEN TAKEN OUT OF SERVICE PRIOR TO DEMOLITION.
10. THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE 811/ONE CALL UTILITY LOCATING AGENCIES AND UTILITY LOCATOR, THE CITY ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

**UNCERCUTTING NOTES:**

1. AS PART OF THE PAVEMENT REMOVAL AND EARTHWORK PAY ITEMS.
2. THE EXISTING BASE BEING REMOVED FOR THE PLACEMENT OF THE ASPHALT COULD BE STOCKPILED AND REUSED FOR UNDERCUTS IF QUALIFIED AND ACCEPTED BY THE QUALIFIED ENGINEERING TECHNICIAN ON SITE.
3. SUBGRADE UNDERCUT SHALL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE IF SUBGRADE STABILIZATION IS NECESSARY. UNDERCUT EXCAVATIONS SHALL BE BACKFILLED WITH 21AA CRUSHED LIMESTONE AND PLACED IN AN ENGINEERED MANNER. LIFT THICKNESS SHALL NOT EXCEED 9 INCHES. BACKFILLING BACK TO THE TOP OF AGGREGATE TO EXISTING ELEVATION SHALL BE INCLUDED IN THE SUBGRADE UNDERCUTTING PAY ITEM. THE USE OF TRI-AXIAL GEOTEXT MAY BE USED TO PROVIDE UNDERCUT DEPTHS. THE UNIT PRICE FOR THIS DISTRICT AND PLOT THE UNIT PRICE REQUIRED WITH THE CONTRACTORS BID.
4. ALL ENGINEERED FILL SHALL BE COMPACTED TO A DENSITY OF AT LEAST 95 PERCENT OF THE MAXIMUM DENSITY DETERMINED BY THE MODIFIED PROCTOR (ASTM D1557) METHOD OF TESTING. ALL ENGINEERED FILL SHALL BE PLACED AND COMPACTED AT APPROXIMATELY THE OPTIMUM MOISTURE CONTENT. FROZEN MATERIAL SHALL NOT BE USED. THE UNIT PRICE SHOULD BE PLACED ON A FROZEN SUBGRADE.
5. THE QUANTITY FOR SUBGRADE UNDERCUT FOR BACKFILLING ADDITIONAL SHALL BE PAID IN THE BASE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL VOLUME OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.
6. SUBGRADE UNDERCUT DRAIN TILE SHALL BE BACKFILLED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE IF SUBGRADE STABILIZATION IS NECESSARY. DRAIN TILE SHALL BE PLACED WITHIN AN UNDERCUT AREA AND COMPACTED TO THE CLASS OF THE SUBGRADE TO PREVENT GROUNDWATER FROM POOLING WITHIN THE GRANULAR SOILS IN UNDERCUTS AND CREATING "BATHTUBS" IN THE COHESIVE SOILS.
7. THE QUANTITY FOR SUBGRADE UNDERCUT DRAIN TILE (4") FOR EACH SITE SHALL BE INCLUDED IN THE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL FOOTAGE OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.
8. THE IMPORTING, ADDING, FINE GRADING AND BACKFILLING ADDITIONAL PAYMENT AGGREGATE BASE MATERIAL (MDOT 21AA CRUSHED LIMESTONE) REQUIRED TO ACHIEVE THE PROPOSED TOP OF BASE ELEVATIONS AND PRIOR TO PLACING THE ASPHALT PAVEMENT WILL BE EVALUATED BY A QUALIFIED ENGINEERING TECHNICIAN TO DETERMINE THE VOLUME OF ADDITIONAL MATERIAL REQUIRED PER THE PROJECT PLANS.
9. THE QUANTITY FOR ADD AGGREGATE TO EXISTING BASE FOR EACH SITE SHALL BE INCLUDED IN THE BID. THIS ITEM IS CONSIDERED AN ALLOWANCE AND FINAL PAYMENT WILL BE BASED ON THE ACTUAL VOLUME OF COMPACTED IN PLACE STONE PER THE UNIT PRICE PROVIDED IN THE BID PACKAGE.

**FLOODPLAIN NOTE:**

BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN, PER FLOOD INSURANCE RATE MAP NUMBER 26125C0553G, DATED JANUARY 16, 2009.

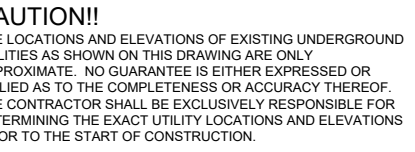
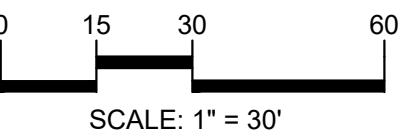












A map showing the location of the site. The site is marked with a hatched rectangle and labeled "SITE". It is located south of E. Big Beaver Road, west of John R Road, and east of I-75. A north arrow is present in the top right corner.

PROJECT TITLE  
**TROY  
CONTINUING  
EDUCATION**  
222 E. BIG BEAVER ROAD  
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

[illegible]

# GRADING & EROSION CONTROL PLAN

M.	RR
N.	RR
ES.	RM

## C-3.2

**NOTE:**

1. PER THE PROJECT SPECIFICATIONS; PRIOR TO THE PLACEMENT OF TOPSOIL THE SUCCESSFUL BIDDER TO SCHEDULE AN INSPECTION BY THE SCHOOL DISTRICT OR PEA GROUP TO CONFIRM THAT THE GRADE IS AT THE PROPER ELEVATION WHERE THE MINIMUM DEPTH OF TOPSOIL CAN BE PLACED THROUGHOUT THE AREA.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPORTING OR EXPORTING ALL MATERIALS AS REQUIRED TO PROPERLY GRADE THIS PROJECT TO THE FINISHED ELEVATIONS SHOWN ON THE APPROVED PLANS. THE CONTRACTOR SHALL MAKE THEIR OWN DETERMINATION OF CUT AND FILL QUANTITIES AND ALLOW FOR REMOVAL OF EXCESS OR IMPORTATION OF ADDITIONAL MATERIAL AT NO ADDITIONAL COST TO THE OWNER.

REFER TO THE FIRST SOIL EROSION AND SEDIMENTATION  
CONTROL DETAILS SHEET FOR ALL DEVICE DETAILS.

3. NLRB'S NOTICE OF COVERAGE IS NOT REQUIRED.

00 00 5

REFER TO GRADING NOTES ON SHEET C-4.0.

REFER TO GRADING NOTES ON SHEET C-4.0.

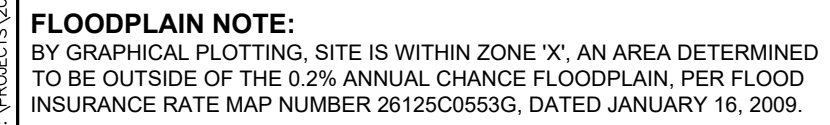
APPROACHES TO ELIMINATE THE BERMS  
AREA AS INDICATED IN SHEETS C-1.2 AND  
C-3.2 OF THE CONSTRUCTION PLANS AND  
PER THE PROJECT SPECIFICATIONS.

2. PLACE A NEW CONCRETE SIDEWALK  
FROM THE EXISTING WALK ON NORTH SIDE  
OF THE BUILDING TO THE EXISTING WALK  
ALONG BIG BEAVER AS INDICATED ON  
SHEETS C-1.2, C-2.2, C-3.2 AND C-4.1  
OF THE CONSTRUCTION PLANS AND PER  
THE PROJECT SPECIFICATIONS.

CHANGED AND MAINTAINED.

8. IF HIGH GROUNDWATER IS ANTICIPATED OR ENCOUNTERED DURING

CONSTRUCTION A DEWATERING PLAN MUST BE SUBMITTED TO THE CITY  
ENGINEERING DIVISION FOR REVIEW.





EROSION CONTROL QUANTITIES:

EROSION EEL 274 LF  
SILT SACKS 5 EA  
LAWN RESTORATION 727 SY

SOIL EROSION AND SEDIMENTATION CONTROL SEQUENCE OF CONSTRUCTION

- SEE CITY OF TROY SOIL EROSION AND SEDIMENTATION CONTROL DETAILS SHEET FOR ALL SOIL EROSION CONTROL RELATED DETAILS.
- PLACE SILT FENCE & INSTALL INLET FILTERS ON EXISTING STORM SEWER STRUCTURES, ACCORDING TO PLANS.
- INSTALL TEMPORARY CRUSHED CONCRETE ACCESS DRIVE AT ALL CONSTRUCTION ENTRANCES. (80'x24'x8" W/MINIMUM OF 1"-3" CRUSHED CONCRETE - NO FINES).
- REMOVE CURB, PAVEMENT, TREES, ETC. AS DIRECTED ON THE DEMOLITION PLAN.
- STRIP AND STOCKPILE TOPSOIL FOR RESTORATION REQUIREMENTS.
- DISPOSE OF ALL EXCESS, UNSUITABLE MATERIALS OFF SITE IN A LEGAL MANNER. NO BURN OR BURY PITS ALLOWED.
- UNSUITABLE MATERIALS CONSIST OF, BUT ARE NOT NECESSARILY LIMITED TO THE FOLLOWING: CONCRETE, ASPHALT, TREES, BRUSH, STUMPS, ROOTS, OR OTHER MISCELLANEOUS DEBRIS OR TRASH.
- MASS GRADE THE SITE IN ACCORDANCE WITH THE PLANS.
- INSTALL HYDROSEED AS SHOWN ON THE PLAN WITHIN 5 DAYS OF COMPLETION OF MASS GRADING OR WHENEVER DISTURBED AREAS WILL REMAIN UNCHANGED FOR 30 DAYS OR GREATER. MINIMUM 3"-4" TOPSOIL WILL BE USED WHERE VEGETATION IS REQUIRED.
- COMPLETE ROUGH GRADING OF SITE. PLACE INLET FILTERS AT ALL INLETS AND CATCH BASINS, AS SHOWN.
- FINISH GRADE AND PAVE SITE AS PROPOSED TO DRAIN TO STORM SEWER SYSTEM. REPAIR INLET FILTERS AS REQUIRED.
- APPLY TOPSOIL, HYDROSEED TO ALL DISTURBED AREAS UPON COMPLETION OF GRADING. THE CONTRACTOR SHALL STAGE CONSTRUCTION ACTIVITIES IN ORDER TO MINIMIZE THE EXPOSURE OF UNSTABILIZED AREAS.
- CLEAN PAVEMENT AND STORM SEWERS. REMOVE SILT FENCE AND TREE PROTECTION FENCE, AND INLET FILTERS ONCE VEGETATION HAS BEEN ESTABLISHED.
- ALL DIRT AND MUD TRACKED ONTO PUBLIC ROADS SHALL BE REMOVED DAILY.
- STREET CATCH BASINS TO BE PERIODICALLY CLEANED AND FILTER CLOTH CHANGED AND MAINTAINED.

SOIL EROSION MAINTENANCE SCHEDULE AND NOTES:

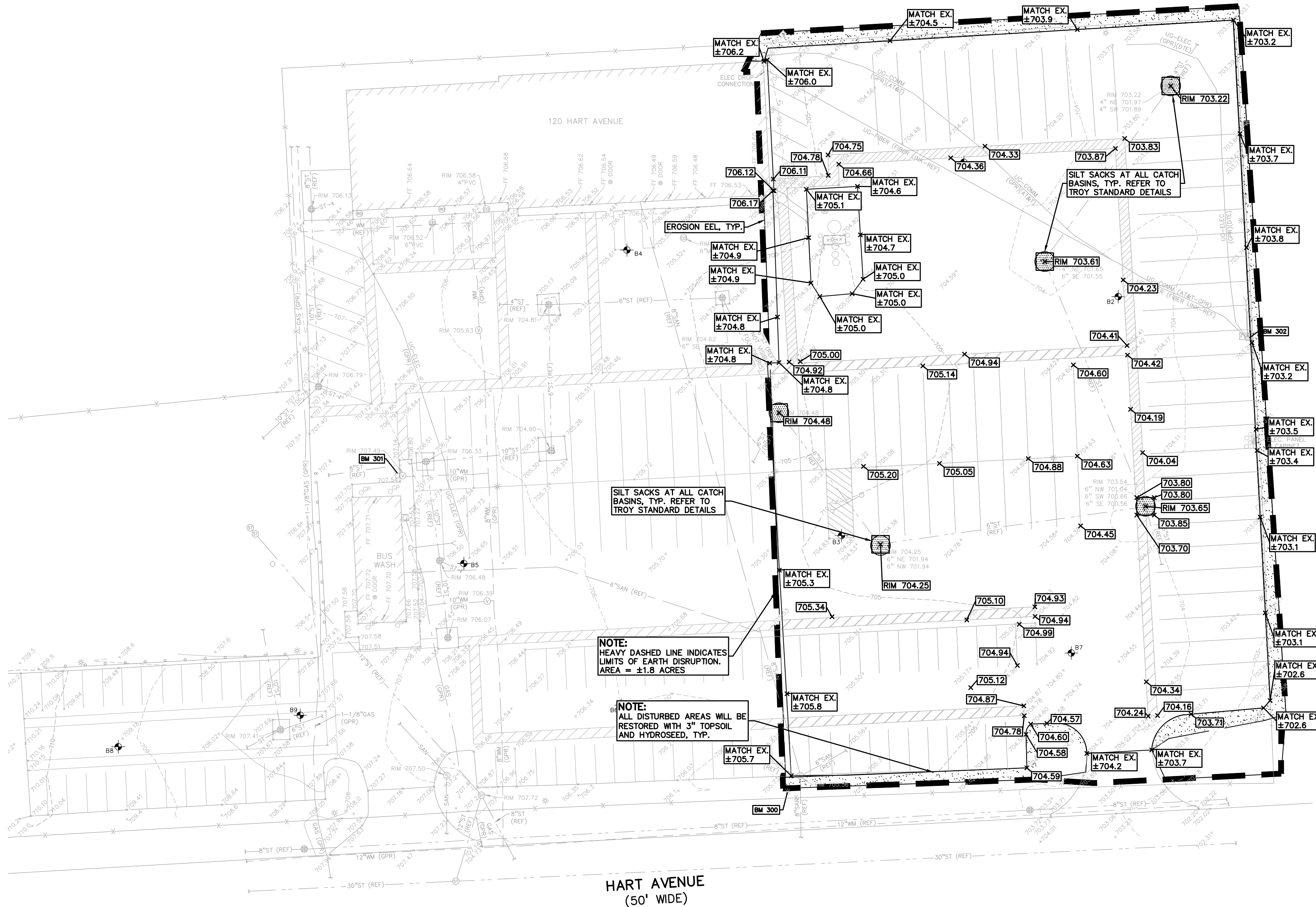
- THE SOIL EROSION CONTROLS WILL BE MAINTAINED WEEKLY AND AFTER EVERY STORM EVENT BY:  
ROB CARSON  
TROY SCHOOL DISTRICT  
1140 RANKIN  
TROY, OAKLAND COUNTY, MICHIGAN  
248-823-4067
- IF ANY DAMAGE HAS OCCURRED AS A RESULT OF STORM WATER DISCHARGE FROM THE SITE, THE FOLLOWING STEPS SHALL BE IMPLEMENTED.
- ANY DEBRIS OR DIRT ON ANY PAVED AREA RESULTING FROM CONSTRUCTION TRAFFIC SHALL BE CLEANED IN A PROMPT MANNER BY THE CONTRACTOR. THE CONSTRUCTION DRIVE SHALL BE CLEANED AT THE END OF EACH DAY.
- ALL DIRT AND MUD TRACKED ONTO PAVED AREAS SHALL BE REMOVED BY THE CONTRACTOR DAILY BY SCRAPING. STREET SWEEPING IS REQUIRED WEEKLY.
- SILT FENCE MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY BUILT UP SEDIMENT WHEN THE SEDIMENT HEIGHT ACCUMULATES TO 1/3 TO 1/2 OF THE HEIGHT OF THE FENCE. THE CONTRACTOR IS RESPONSIBLE TO REMOVE, REPLACE, RETRELL OR REDBACKFILL THE SILTATION FENCE SHOULD IT FALL OR BE DAMAGED DURING CONSTRUCTION.
- INLET FILTER MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY ACCUMULATED SILT OR OTHER DEBRIS. THE REMOVAL OF SILT SHOULD BE WITH THE USE OF A STIFF BRISTLE BROOM OR SQUARE POINT SHOVEL. IF INLET FILTERS CAN NOT BE CLEANED OR ARE DAMAGED, THEN THE FABRIC MUST BE REPLACED.
- CONTRACTOR TO PROVIDE WATER TRUCK TO WATER DOWN THE SITE ON A DAILY BASIS AS REQUIRED TO MAINTAIN DUST CONTROL.
- IF HIGH GROUNDWATER IS ANTICIPATED OR ENCOUNTERED DURING CONSTRUCTION A DEWATERING PLAN MUST BE SUBMITTED TO THE CITY ENGINEERING DIVISION FOR REVIEW.

SEQUENCE OF CONSTRUCTION:

START DAY	END DAY	
1	2	INSTALL TEMPORARY SOIL EROSION CONTROL MEASURES, SILT FENCES, INLET PROTECTION, ETC. AS NECESSARY.
1	90	MAINTAIN A 25' BUFFER OF VEGETATION AROUND PERIMETER OF SITE WHERE POSSIBLE.
1	5	STRIP AND STOCKPILE TOPSOIL AS REQUIRED RESTORATION. ALL STOCKPILES MUST BE GRADED AND SEED.
5	15	REMOVE ALL PAVEMENT, CURB, UTILITIES, ETC. AS REQUIRED TO INSTALL THE PROPOSED WORK AS SHOWN ON THE TOPOGRAPHIC SURVEY AND DEMOLITION PLAN.
10	15	DISPOSE OF ALL EXCESS/UNSUITABLE MATERIALS OFF SITE IN A LEGAL MANNER. NO ON-SITE BURN OR BURY PITS ALLOWED.
30	40	ROUGH GRADE SITE. SEED AND MULCH BLANKETS MUST BE INSTALLED AS SHOWN WITHIN 5 DAYS OF FINAL GRADE. REPAIR AND/OR RE-INSTALL ANY TEMPORARY SOIL EROSION CONTROL MEASURES THAT WERE DAMAGED DURING GRADING OPERATIONS.
15	90	TEMPORARY SEEDING MUST BE PROVIDED IN AREAS NOT TO BE WORKED ON FOR 15 DAYS OR LONGER.
40	50	FINE GRADE SITE AND PREPARE FOR SITE PAVING OPERATIONS.
50	80	INSTALL ALL PAVEMENT, SIDEWALKS, CURBING AS PROPOSED. IF PERMANENT LANDSCAPING IS NOT TO BE INSTALLED SOON AFTER PAVING IS COMPLETE, ALL AREAS WITHIN 20 FEET OF BACK OF CURB MUST BE TEMPORARILY SEED. REPAIR INLET PROTECTION, SILT FENCE AND ANY OTHER DAMAGED SOIL EROSION CONTROL MEASURES AS NECESSARY.
80	89	FINAL GRADE, REDISTRIBUTE STOCKPILED TOPSOIL, ESTABLISH VEGETATION AND INSTALL ALL PERMANENT LANDSCAPING IN ALL DISTURBED AREAS NOT BUILT.
88	90	CLEAN PAVEMENT AND REMOVE ALL TEMPORARY SOIL EROSION CONTROL MEASURES. RE-ESTABLISH VEGETATION AS REQUIRED.
90	90	REMOVE SEDIMENTATION CONTROLS ONCE ENTIRE SITE HAS BEEN PERMANENTLY STABILIZED.

FLOODPLAIN NOTE:

BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE "X", AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN, PER FLOOD INSURANCE RATE MAP NUMBER 26125C0553G, DATED JANUARY 16, 2009.



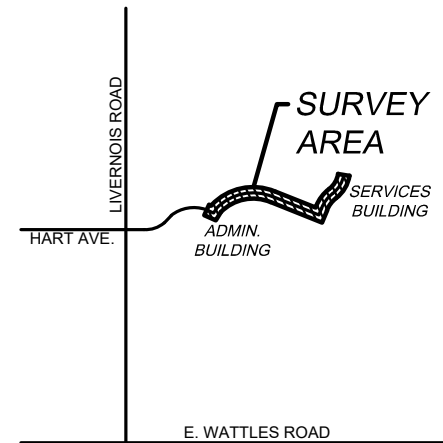




0 10 20 40  
SCALE: 1" = 20'



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CLIENT  
**TROY SCHOOLS**  
1140 RANKIN DRIVE  
TROY, MI 48063

PROJECT TITLE  
**ADMIN BUILDING**  
4420 LIVERS ROAD  
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

REVISIONS

ORIGINAL ISSUE DATE:  
OCTOBER 31, 2023

DRAWING TITLE  
**GRADING AND  
SESC PLAN**

PEA JOB NO. 2023-0262

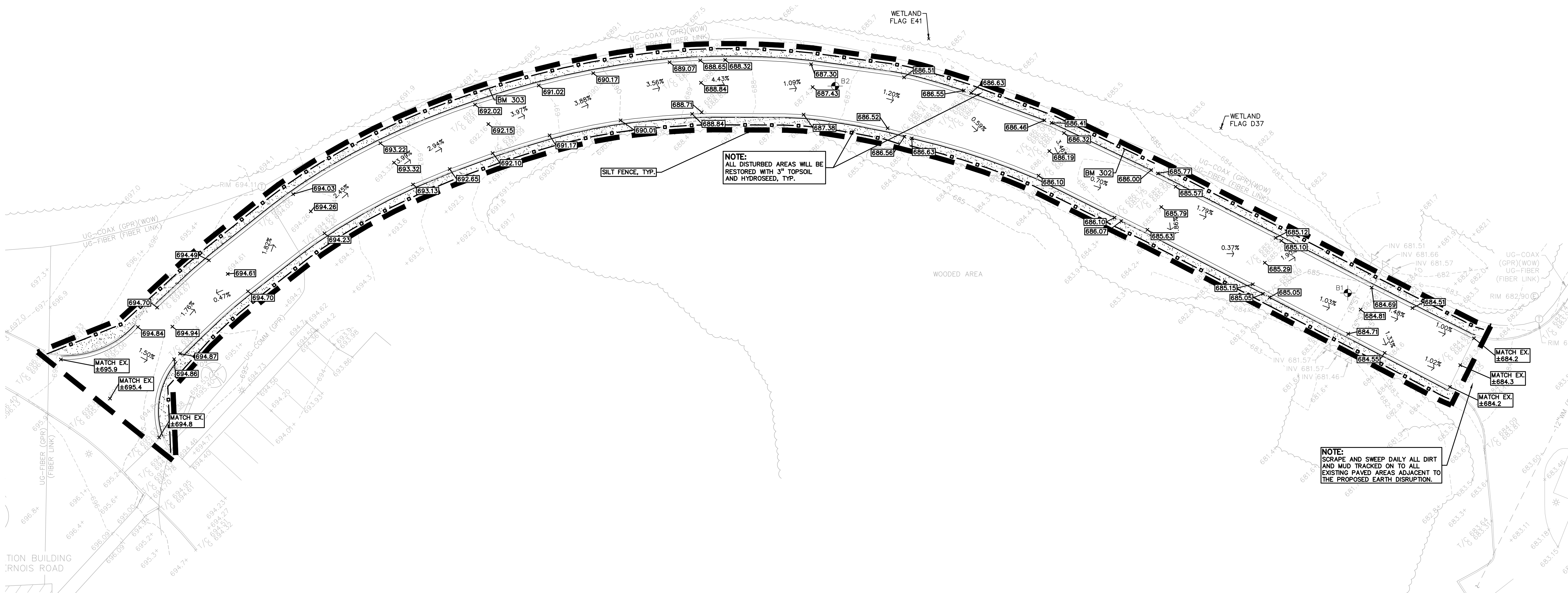
P.M. RR

DN. RR

DES. RM

DRAWING NUMBER:

C-3.4



SEQUENCE OF CONSTRUCTION:		
START DAY	END DAY	
1	2	INSTALL TEMPORARY SOIL EROSION CONTROL MEASURES, SILT FENCES, INLET PROTECTION, ETC. AS NECESSARY.
1	90	MAINTAIN A 25' BUFFER OF VEGETATION AROUND PERIMETER OF SITE WHERE POSSIBLE.
1	5	STRIP AND STOCKPILE TOPSOIL AS REQUIRED RESTORATION. ALL STOCKPILES MUST BE GRADED AND SEEDED.
5	15	REMOVE ALL PAVEMENT, CURB, UTILITIES, ETC. AS REQUIRED TO INSTALL THE PROPOSED WORK AS SHOWN ON THE TOPOGRAPHIC SURVEY AND DEMOLITION PLAN.
10	15	DISPOSE OF ALL EXCESS/UNSUITABLE MATERIALS OFF SITE IN A LEGAL MANNER. NO ON-SITE BURN OR BURY PITS ALLOWED.
30	40	ROUGH GRADE SITE. SEED AND MULCH BLANKETS MUST BE INSTALLED AS SHOWN WITHIN 5 DAYS OF FINAL GRADE. REPAIR AND/OR RE-INSTALL ANY TEMPORARY SOIL EROSION CONTROL MEASURES THAT WERE DAMAGED DURING GRADING OPERATIONS.
15	90	TEMPORARY SEEDING MUST BE PROVIDED IN AREAS NOT TO BE WORKED ON FOR 15 DAYS OR LONGER.
40	50	FINE GRADE SITE AND PREPARE FOR SITE PAVING OPERATIONS.
50	80	INSTALL ALL PAVEMENT, SIDEWALKS, CURBING AS PROPOSED. IF PERMANENT LANDSCAPING IS NOT TO BE INSTALLED SOON AFTER PAVING IS COMPLETE. ALL AREAS WITHIN 20 FEET OF BACK OF CURB MUST BE TEMPORARILY SEEDED. REPAIR INLET PROTECTION, SILT FENCE AND ANY OTHER DAMAGED SOIL EROSION CONTROL MEASURES AS NECESSARY.
80	89	FINAL GRADE, REDISTRIBUTE STOCKPILED TOPSOIL, ESTABLISH VEGETATION AND INSTALL ALL PERMANENT LANDSCAPING IN ALL DISTURBED AREAS NOT BUILT.
88	90	CLEAN PAVEMENT AND REMOVE ALL TEMPORARY SOIL EROSION CONTROL MEASURES. RE-ESTABLISH VEGETATION AS REQUIRED.
90	90	REMOVE SEDIMENTATION CONTROLS ONCE ENTIRE SITE HAS BEEN PERMANENTLY STABILIZED.

- NOTE:**
- PER THE 'SOIL EROSION AND SEDIMENTATION CONTROL SEQUENCE OF CONSTRUCTION' NOTES THE SUCCESSFUL BIDDER TO THE CLEAN THE STORM SEWER. THIS CLEANING SHALL INCLUDE CLEANING OUT THE STRUCTURES AND ENTIRE SEWER RUNS BETWEEN STRUCTURES USING HYDRAULICALLY PROPELLED, HIGH-VELOCITY JET, OR MECHANICALLY POWERED EQUIPMENT. SELECTION OF THE EQUIPMENT USED SHALL BE BASED ON THE CONDITIONS OF LINES AT THE TIME THE WORK COMMENCES. THE EQUIPMENT AND METHODS SELECTED SHALL BE SATISFACTORY TO THE SCHOOL DISTRICT'S REPRESENTATIVE. THE EQUIPMENT SHALL BE CAPABLE OF REMOVING DIRT, GREASE, ROCKS, SAND, AND OTHER MATERIALS AND OBSTRUCTIONS FROM THE SEWER LINES AND MANHOLES. IF CLEANING OF AN ENTIRE SECTION CANNOT BE SUCCESSFULLY PERFORMED FROM ONE MANHOLE, THE EQUIPMENT SHALL BE SET UP ON THE OTHER MANHOLE AND CLEANING AGAIN ATTEMPTED. IF, AGAIN, SUCCESSFUL CLEANING CANNOT BE PERFORMED OR THE EQUIPMENT FAILS TO TRAVERSE, THE ENTIRE MANHOLE SECTION, IT WILL BE ASSUMED THAT A MAJOR BLOCKAGE EXISTS AND THE CLEANING EFFORT SHALL BE ABANDONED.
  - PER THE PROJECT SPECIFICATIONS: PRIOR TO THE PLACEMENT OF TOPSOIL THE SUCCESSFUL BIDDER TO SCHEDULE AN INSPECTION BY THE SCHOOL DISTRICT OR PEA GROUP TO CONFIRM THAT THE GRADE IS AT THE PROPER ELEVATION WHERE THE MINIMUM DEPTH OF TOPSOIL CAN BE PLACED THROUGHOUT THE AREA.
  - CONTRACTOR TO FIELD VERIFY ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION INCLUDING BUT NOT LIMITED TO: SITE LIGHTING, FIBER LINES, ETC.

- SYMBOLS: EROSION CONTROL:**
- (SP-2) SILT FENCE
  - (SI-2A) LOW POINT INLET FILTER
  - (SI-3) RYCB INLET FILTER
  - LAWN RESTORATION AREA
- REFER TO THE TROY SOIL EROSION AND SEDIMENTATION CONTROL DETAILS SHEET FOR ALL DEVICE DETAILS.

- GENERAL SITE CONDITIONS:**
- ACCORDING TO THE GEOTECHNICAL INVESTIGATION BY G2 CONSULTING GROUP, LLC, DATED JANUARY 17, 2023, THE SITE CONSISTS OF THE FOLLOWING SOIL TYPES:  
STIFF TO VERY STIFF SILTY CLAY.
  - TOTAL DISTURBED AREA = ±0.47 ACRES
  - N.P.D.E.S. NOTICE OF COVERAGE IS NOT REQUIRED

- GRADING LEGEND:**
- EXISTING SPOT ELEVATION
  - PROPOSED SPOT ELEVATION: TYPICALLY TOP OF PAVEMENT IN PAVED AREAS, GUTTER GRADE IN CURB LINES.
  - EXISTING CONTOUR
  - PROPOSED CONTOUR
  - PROPOSED REVERSE GUTTER PAN
  - PROPOSED RIDGE LINE
  - PROPOSED SWALE/DITCH
- ABBREVIATIONS**
- |                       |                    |
|-----------------------|--------------------|
| T/C = TOP OF CURB     | G = GUTTER GRADE   |
| T/P = TOP OF PAVEMENT | FF = FINISH FLOOR  |
| T/S = TOP OF SIDEWALK | FG = FINISH GRADE  |
| T/W = TOP OF WALL     | RM = RIM ELEVATION |
| B/W = BOTTOM OF WALL  |                    |
- REFER TO GRADING NOTES ON SHEET C-4.0.

- EARTHWORK BALANCING NOTE:**
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPORTING OR EXPORTING ALL MATERIALS AS REQUIRED TO PROPERLY GRADE THIS PROJECT TO THE FINISHED ELEVATIONS SHOWN ON THE APPROVED PLANS. THE CONTRACTOR SHALL MAKE THEIR OWN DETERMINATION OF CUT AND FILL QUANTITIES AND ALLOW FOR REMOVAL OF EXCESS OR IMPORTATION OF ADDITIONAL MATERIAL AT NO ADDITIONAL COST TO THE OWNER.

- SOIL EROSION MAINTENANCE SCHEDULE AND NOTES:**
- THE SOIL EROSION CONTROLS WILL BE MAINTAINED WEEKLY AND AFTER EVERY STORM EVENT BY:  
ROB CARSON  
TROY SCHOOL DISTRICT  
1140 RANKIN  
TROY, OAKLAND COUNTY, MICHIGAN  
248-823-4087
  - IF ANY DAMAGE HAS OCCURRED AS A RESULT OF STORM WATER DISCHARGE FROM THE SITE, THE FOLLOWING STEPS SHALL BE IMPLEMENTED.
  - ANY DEBRIS OR DIRT ON ANY PAVED AREA RESULTING FROM CONSTRUCTION TRAFFIC SHALL BE CLEANED IN A PROMPT MANNER BY THE CONTRACTOR. THE CONSTRUCTION DRIVE SHALL BE CLEANED AT THE END OF EACH DAY.
  - ALL DIRT AND MUD TRACKED ONTO PAVED AREAS SHALL BE REMOVED BY THE CONTRACTOR DAILY BY SCRAPING. STREET SWEEPING IS REQUIRED WEEKLY.
  - SILT FENCE MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY BUILT UP SEDIMENT WHEN THE SEDIMENT HEIGHT ACCUMULATES TO 1/3 TO 1/2 OF THE HEIGHT OF THE FENCE. THE CONTRACTOR IS RESPONSIBLE TO REMOVE, REPLACE, RETRENCH OR REBACKFILL THE SILTATION FENCE SHOULD IT FALL OR BE DAMAGED DURING CONSTRUCTION.
  - INLET FILTER MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY ACCUMULATED SILT OR OTHER DEBRIS. THE REMOVAL OF SILT SHOULD BE WITH THE USE OF A STIFF BRISTLE BROOM OR SQUARE POINT SHOVEL. IF INLET FILTERS CAN NOT BE CLEANED OR ARE DAMAGED, THEN THE FABRIC MUST BE REPLACED.
  - CONTRACTOR TO PROVIDE WATER TRUCK TO WATER DOWN THE SITE ON A DAILY BASIS AS REQUIRED TO MAINTAIN DUST CONTROL.
  - IF HIGH GROUNDWATER IS ANTICIPATED OR ENCOUNTERED DURING CONSTRUCTION A DEWATERING PLAN MUST BE SUBMITTED TO THE CITY ENGINEERING DIVISION FOR REVIEW.

EROSION CONTROL QUANTITIES:	
SILT FENCE	1,201 LF
LAWN RESTORATION	422 SY

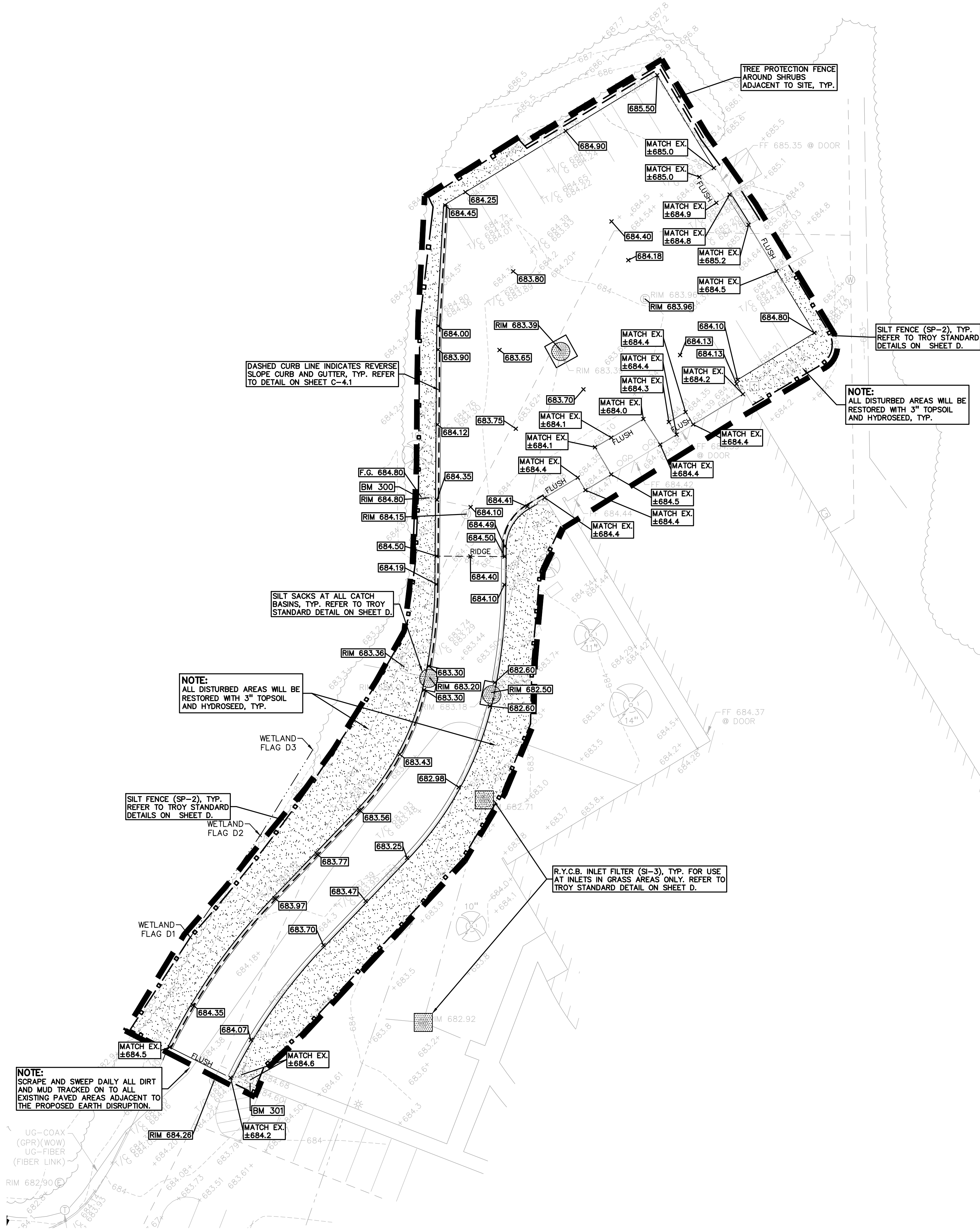
- SOIL EROSION AND SEDIMENTATION CONTROL SEQUENCE OF CONSTRUCTION**
- SEE CITY OF TROY SOIL EROSION AND SEDIMENTATION CONTROL DETAILS SHEET FOR ALL SOIL EROSION CONTROL RELATED DETAILS.
  - PLACE SILT FENCE & INSTALL INLET FILTERS ON EXISTING STORM SEWER STRUCTURES, ACCORDING TO PLANS.
  - INSTALL TEMPORARY CRUSHED CONCRETE ACCESS DRIVE AT ALL CONSTRUCTION ENTRANCES. (80'x24'x8" W/MINIMUM OF 1"-3" CRUSHED CONCRETE - NO FINES).
  - REMOVE CURB, PAVEMENT, TREES, ETC. AS DIRECTED ON THE DEMOLITION PLAN.
  - STRIP AND STOCKPILE TOPSOIL FOR RESTORATION REQUIREMENTS.
  - DISPOSE OF ALL EXCESS, UNSUITABLE MATERIALS OFF SITE IN A LEGAL MANNER. NO BURN OR BURY PITS ALLOWED.
  - UNSUITABLE MATERIALS CONSIST OF, BUT ARE NOT NECESSARILY LIMITED TO THE FOLLOWING: CONCRETE, ASPHALT, TREES, BRUSH, STUMPS, ROOTS, OR OTHER MISCELLANEOUS DEBRIS OR TRASH.
  - MASS GRADE THE SITE IN ACCORDANCE WITH THE PLANS.
  - INSTALL HYDROSEED AS SHOWN ON THE PLAN WITHIN 5 DAYS OF COMPLETION OF MASS GRADING OR WHENEVER DISTURBED AREAS WILL REMAIN UNCHANGED FOR 30 DAYS OR GREATER. MINIMUM 3"-4" TOPSOIL WILL BE USED WHERE VEGETATION IS REQUIRED.
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S:\PROJECTS\2023\2023-02-02-2024 105 SITE IMPROVEMENT PROJECT\SOW CONSTRUCTION-PAVING7-TRANS SERVICE BUILDING (C-3.5)ESC GRADE-202002-TRANS SERVICE BUILDING.dwg

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#### SEQUENCE OF CONSTRUCTION:

START DAY	END DAY	DESCRIPTION
1	2	INSTALL TEMPORARY SOIL EROSION CONTROL MEASURES, SILT FENCES, INLET PROTECTION, ETC. AS NECESSARY.
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- LAWN RESTORATION AREA

REFER TO THE TROY SOIL EROSION AND SEDIMENTATION CONTROL DETAILS SHEET FOR ALL DEVICE DETAILS.

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#### GRADING LEGEND:

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- PROPOSED SPOT ELEVATION: TYPICALLY TOP OF PAVEMENT IN PAVED AREAS, GUTTER GRADE IN CURB LINES.
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#### ABBREVIATIONS

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REFER TO GRADING NOTES ON SHEET C-4.0.

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#### SOIL EROSION MAINTENANCE SCHEDULE AND NOTES:

- THE SOIL EROSION CONTROLS WILL BE MAINTAINED WEEKLY AND AFTER EVERY STORM EVENT BY:  
ROB CARSON  
TROY SCHOOL DISTRICT  
1140 RANKIN  
TROY, OKLAHOMA COUNTY, MICHIGAN  
2048-293-4067
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#### SOIL EROSION AND SEDIMENTATION CONTROL SEQUENCE OF CONSTRUCTION

- SEE CITY OF TROY SOIL EROSION AND SEDIMENTATION CONTROL DETAILS SHEET FOR ALL SOIL EROSION CONTROL RELATED DETAILS.
- PLACE SILT FENCE & INSTALL INLET FILTERS ON EXISTING STORM SEWER STRUCTURES, ACCORDING TO PLANS.
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#### EROSION CONTROL QUANTITIES:

TREE PROTECTION FENCING	83 LF
SILT FENCE	674 LF
R.Y.C.B. INLET FILTER	2 EA.
LOW POINT INLET FILTER	3 EA.
LAWN RESTORATION AREA	606 SY

**PEA GROUP**

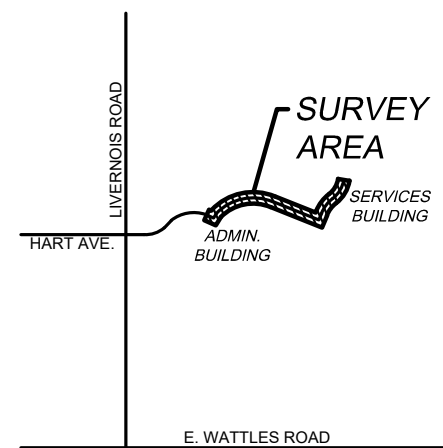
t: 844.813.2949  
www.peagroup.com



0 10 20 40  
SCALE: 1" = 20'



**CAUTION!!**  
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.



#### CLIENT

**TROY SCHOOLS**  
1140 RANKIN DRIVE  
TROY, MI 48065

#### PROJECT TITLE

**SERVICES BUILDING**  
4420 LIVERNOIS ROAD  
CITY OF TROY, OKLAHOMA COUNTY, MICHIGAN

#### REVISIONS

ORIGINAL ISSUE DATE:  
OCTOBER 31, 2023

#### DRAWING TITLE

**GRADING AND SESC PLAN**

PEA JOB NO. 2023-0262

P.M. RR

DN. RR

DES. RM

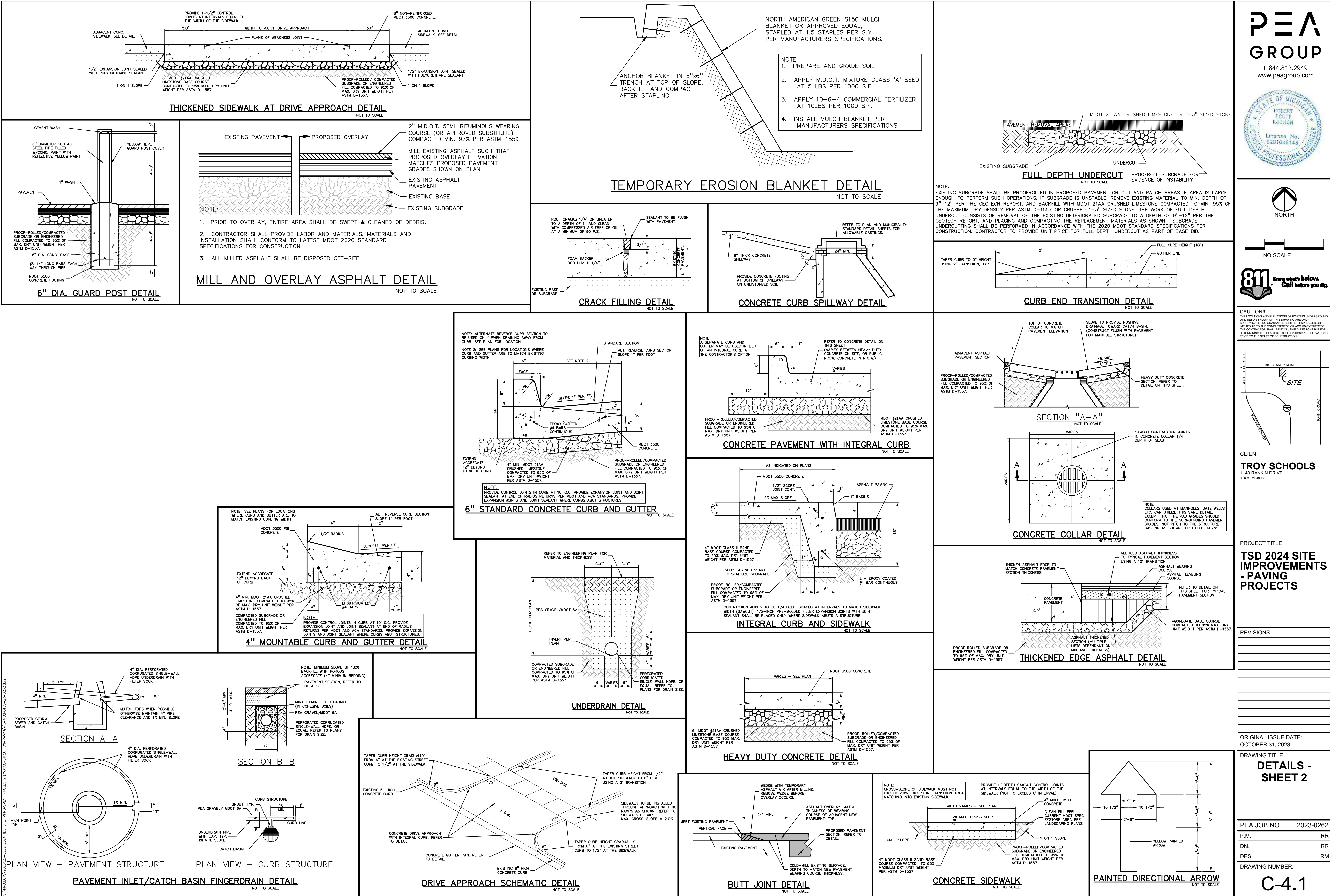
DRAWING NUMBER:

**C-3.5**











1. The following items are intended to be a guide to the contractor in evaluating Soil Erosion control requirements for the project. Specific Soil Erosion control devices and locations may be detailed on the plans. The contractor should also note that Soil Erosion and Sedimentation controls are included in the project unless specified otherwise on the plans or in the specifications.

2. All erosion and Sediment control work shall conform to the permit requirements and the standards and specifications of the City of Troy.
3. Daily inspections shall be made by the contractor for effectiveness of Soil Erosion and Sedimentation control measures and any necessary repairs shall be performed without delay.
4. Erosion and any sedimentation from work on this site shall be contained on the site and not allowed to collect on any off-site areas or in waterways.
5. Waterways include natural or man-made open ditches, streams, storm drains, lakes and ponds.
6. Contractor shall apply temporary soil erosion and sedimentation control measures when required or as directed. Contractor shall remove temporary measures as soon as permanent stabilization of slopes, ditches, and other earth changes has been accomplished.
7. Staging the work will be done by the contractor as indicated on the Soil Erosion plans and as required to ensure progressive stabilization of disturbed earth.
8. The contractor will establish soil erosion control measures in the early stages of construction. Sediment control measures will be applied as a perimeter defense against any transporting of silt off the site.
9. Engineer and owner certification must be included on the plans.
10. Separate sheets showing soil erosion and sedimentation control plans must be provided.
11. The following guidelines are to be implemented:


- a. **Check Dams:**
  - i. Stone size must be increased with increased slope and velocity.
  - ii. Side slope of the dam should be 2:1 or flatter.
  - iii. Straw bales are not to be used for check dams.
  - iv. Add stones as needed to maintain design height and cross section.
  - v. An accumulation of sediment shall be removed and stockpiled in a stabilized area to prevent the material from eroding back into the drainage course.
- b. **Vegetative Buffer Zones:**
  - i. Vegetation must be maintained in a vigorous condition.
  - ii. Reshape and reseed areas where concentrated flow occurs or vegetation fails.
  - iii. To be used for sheet flows only.
  - iv. Not to be used as a roadway.
- c. **Silt Fence:**
  - i. Must be installed along the contour line.
  - ii. Is not to be used in areas of concentrated flow.
  - iii. Must be trenched in at least 6 inches and backfilled.
  - iv. Multiple rows are to be used up a slope.
  - v. Accumulated sediment must be periodically removed.
  - vi. Where necessary, a support fence shall be used to support the geotextile filter fabric.
- d. To be removed after site is permanently stabilized.
- e. **Inlet Sediment Trap:**
  - i. The sediment deposition area and nonwoven geotextile filter fabric should be cleaned of all accumulated sediment after each storm.
  - ii. After all contributing areas are stabilized, the filter fabric will be removed, sediment deposition area filled, and a sod inlet filter placed over the disrupted lawn area.
  - iii. The filter material used to backfill parking lot drainage holes will be peastone. The side excavation for the placement of this material will not be deeper than the invert of the drainage holes.
- f. **Inlet Filters After Paving or Grading:**
  - i. Inlet filters will remain in place until all denuded areas contributing to them are stabilized with vegetation.
  - ii. Periodic inspection and maintenance will be provided to insure that filters are functioning properly.
- g. **Sod Inlet Filter:**
  - i. Sod inlet filters will only be used to handle light concentrations of sediment. Recommended for use after final grading is complete and during the establishment of a vegetative cover.
  - ii. Basin inlet filters may be wrapped in a non-woven geotextile filter fabric for additional filtration.
  - iii. Periodic inspection and maintenance must be provided to insure efficient operation.

A circular professional engineer seal for the State of Michigan. The outer ring contains the text "STATE OF MICHIGAN" on the left and "PROFESSIONAL ENGINEER" on the right, separated by two stars. The inner circle contains the text "WILLIAM J. HUOTARI" at the top, "ENGINEER" in the middle, and "NO. 43231" at the bottom.

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CONTRACT NO. XX-XX  
PROJECT NO. XX.XXX.X

a.	Type of soil being disrupted:	
	Derived from:	Soil Survey      Soil Borings      Other
b.	Present the chronological sequence and expected time of year for each major phase of earth disruption.	
	Site Clearing	DATE
	Soil Erosion Control	
	Mass Balancing	
	Underground Utilities	
	Paving	
	Restoration / Stabilization	
c.	Indicate the measures proposed to prevent sediment from leaving the site:	

a. Type of "Offsite" drainage outlet(s) available for this site:

County Drain Lake/Pond River/Stream Enclosed Drain Detention Basin (with outlet) Wetland Overland Flow	Name of Drain: Name of Lake/Pond: Name of River/Stream: Name of Enclosed Drain: Retention Basin (no outlet) Open Ditch
--	---

b. Distance to nearest lake, stream, pond, open drain, or wetland:

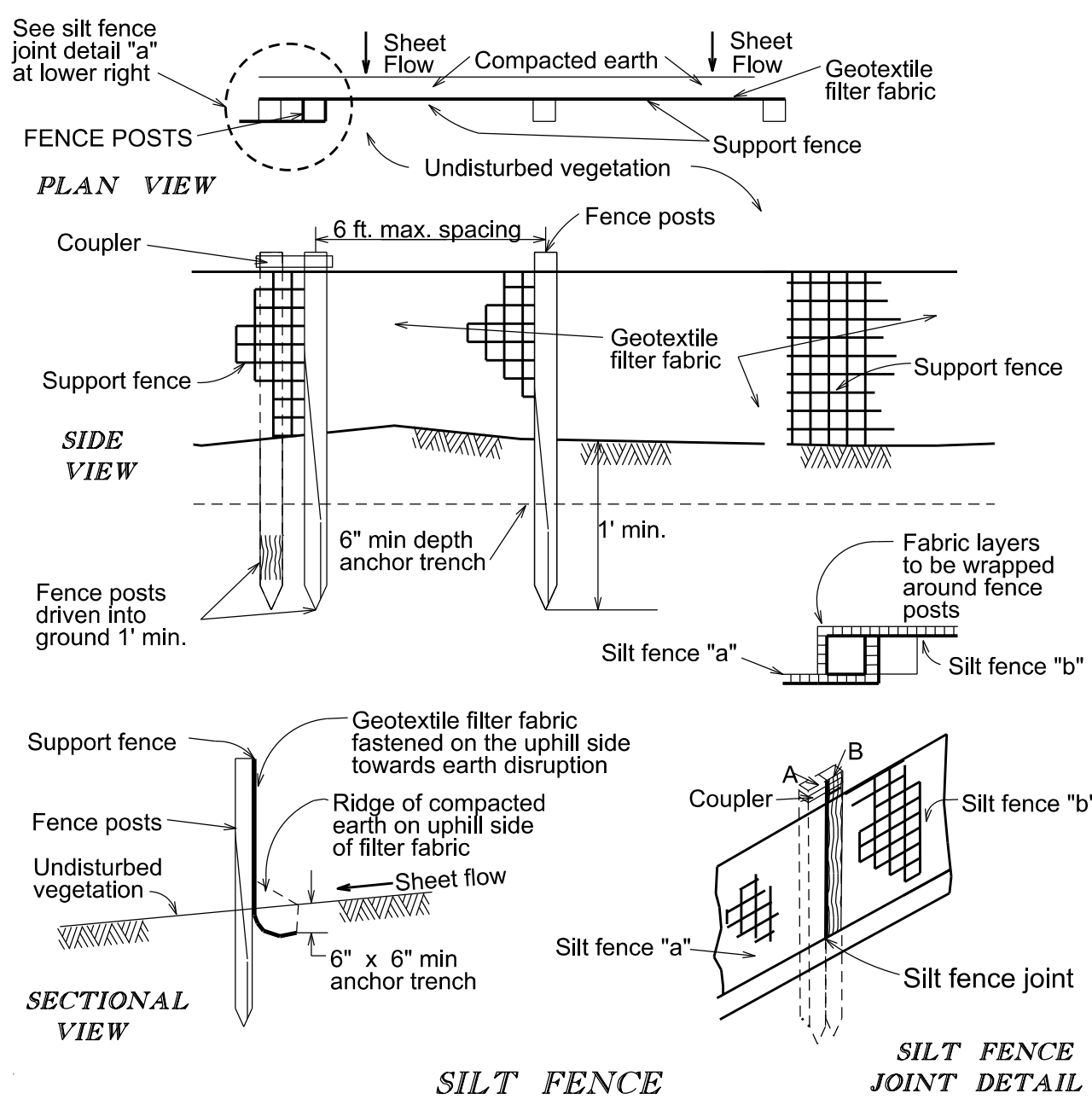
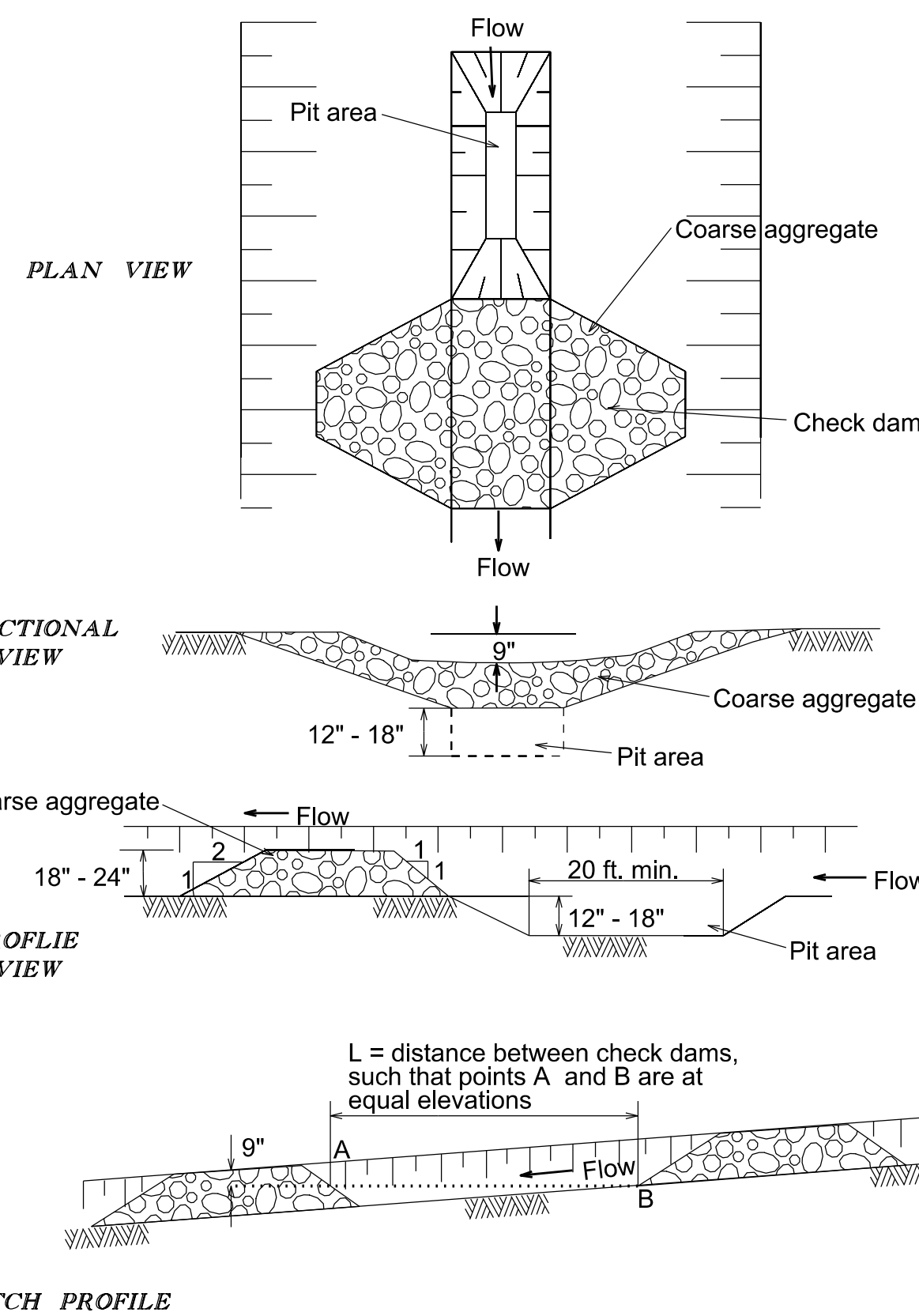
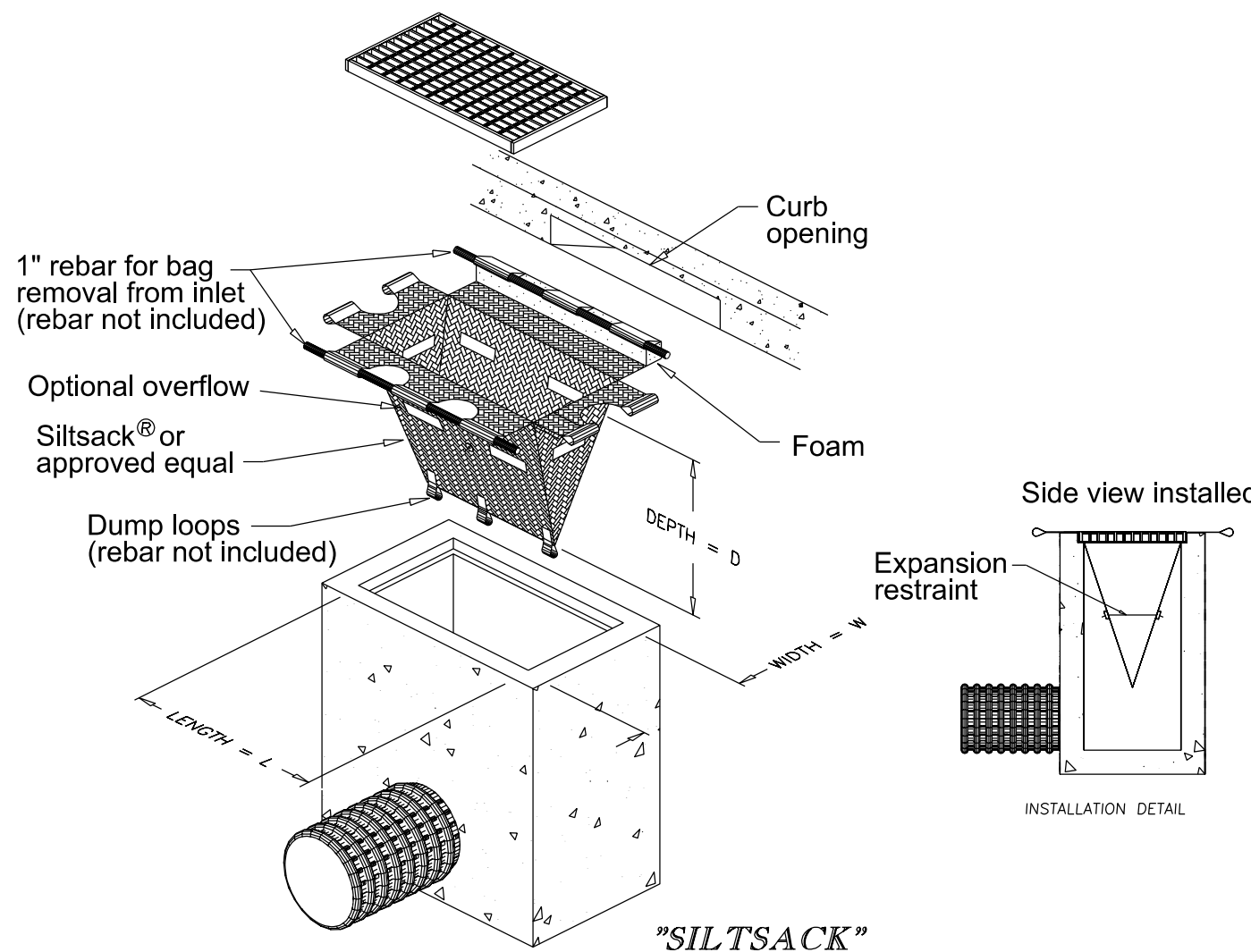
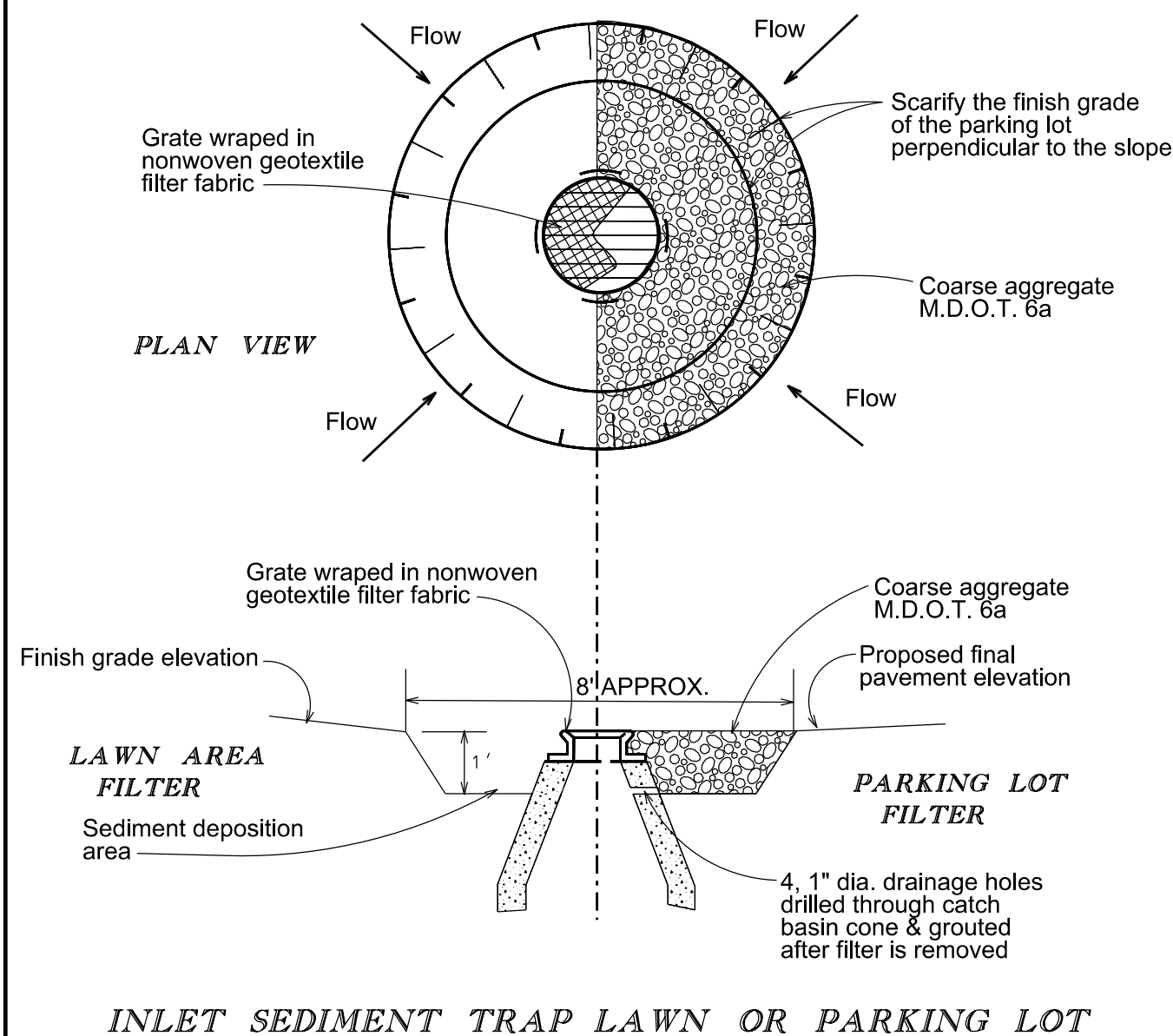
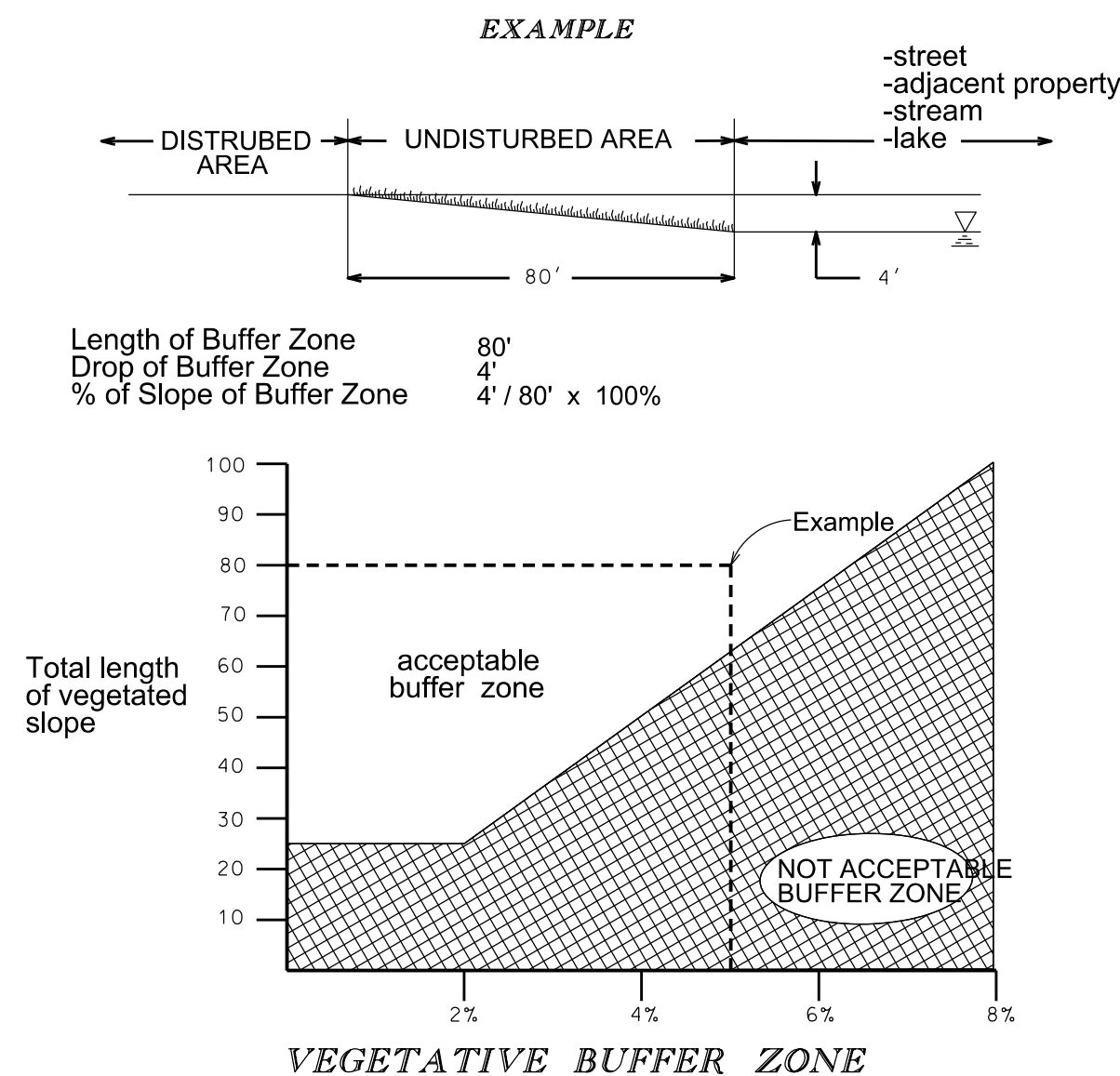
c. Does the project include any work or disruption with a flood plain (Yes or No)?

d. Does the project include work within the cross-section of a lake/stream (Yes or No)?

e. Is a MDEQ Permit required (Yes or No)? If Yes, what is the MDEQ Permit Number (if known):

f. If MDEQ Permit is required and application has not been submitted, what is the expected date of submittal?

The graph listed below is used to determine the adequacy of an existing vegetative buffer zone for use as a sediment filter. This graph is only applicable if the vegetation is a dense well-grown stand of ground cover, at least 4" in height. An area covered with bushes and trees without a good ground cover is not acceptable.



**Definition** Sod inlet filter are pads of sod placed around a storm drain inlet or catch basin.

**Purpose** Sod inlet filters are installed to slow the flow of water into an inlet or catch basin and to filter out appreciable amounts of sediment in the process.

**Where applicable** Sod inlet filters should only be used to handle light concentrations of sediment. They are best used after final grading is completed and during the establishment of a vegetative cover.

The diagram is an isometric view showing a circular storm drain inlet in the center. It is surrounded by a rectangular area of sod, indicated by horizontal hatching. The sod is laid in strips. Arrows indicate the flow of water: one arrow points towards the inlet from the top left, another points away from the inlet towards the bottom right, and a third points from the right towards the inlet. Dimensions are shown: '20 ft. min.' for the length of the sod area and '20 ft. min.' for the width of the sod area. A note states: 'NOTE: MINIMUM SIZE SHALL BE 20 FT. X 20 FT.' The text 'ISOMETRIC VIEW' is at the bottom left, and 'SOD INLET FILTER' is at the bottom center.

Flow

20 ft. min.

NOTE: MINIMUM SIZE SHALL BE 20 FT. X 20 FT.

Sod

20 ft. min.

Flow

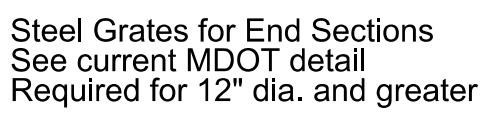
Flow

Sod

ISOMETRIC VIEW

*SOD INLET FILTER*





## SOILS AND AGGREGATES

### PART 1 GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Subsoil materials.
2. Topsoil materials.
3. Coarse aggregate materials.
4. Fine aggregate materials.

B. Related Sections:

1. Section 31 22 13 - Rough Grading.
2. Section 31 23 17 - Trenching.
3. Section 31 23 23 - Fill.
4. Section 32 91 19 - Landscape Grading.
5. Section 33 41 00 - Storm Utility Drainage Piping.

#### 1.2 REFERENCES

A. ASTM International:

1. ASTM D136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
3. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
4. ASTM D2974 - Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.
5. ASTM D7928 - Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis.
6. ASTM C4972 - Test Method for PH of Soils.
7. MTM 109 - Michigan Test Method for Sieve Analysis of Fine, Dense Graded, Open Graded and Coarse Aggregates in the Field.

### 1.3 SUBMITTALS

- A. Samples: Submit 2, 20lb samples of each type of material to be tested, to the testing agency.
- B. Materials Source: Submit name of imported materials supplier(s).
- C. Manufacturer's Certificate: The Contractor shall submit to the Owner, two copies of material certificates signed by the Material Producer and Contractor. Certificates shall state that each material item meets specified requirements.
- D. Gradation Reports: The Contractor shall submit to the Owner, two copies of the gradations for each of the required aggregate mixtures. Mix designs shall be within allowable tolerances as specified for the particular section.

### 1.4 QUALITY ASSURANCE

- A. Furnish each aggregate material from single source throughout the Work.
- B. Perform Work in accordance with local governing agency standards.
- C. Testing and Inspection: The Owner will engage a testing agency to sample and test materials proposed for use in the Work.

## PART 2 PRODUCTS

### 2.1 SUBSOIL MATERIALS

- A. Subsoil Type S1:
  - 1. Excavated and re-used material, imported borrow and select or local borrow.
  - 2. Graded.
  - 3. Free of lumps larger than 3 inches, rocks larger than 2 inches, organic material, and debris.

### 2.2 TOPSOIL MATERIALS

- A. Topsoil Type S2:
  - 1. Fertile, friable, natural topsoil of loamy character, obtained from well drained arable site.
  - 2. Reasonably free of clay, lumps, coarse sands, plants, roots, rocks larger than 1/2 inch, subsoil, debris, large weeds, and foreign matter.
  - 3. Acidity range pH of 5.0 to 7.5.
  - 4. Containing minimum of 10 percent organic matter.

## 2.3 SOIL MATERIALS

- A. General: Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations.
- B. Satisfactory Soil Materials: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.
- C. Unsatisfactory Soil Materials: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.
- D. Backfill and Fill Materials: Satisfactory soil materials as recommended by a geotechnical engineer.

## 2.4 AGGREGATE MATERIALS

- A. Crushed Stone Fill, Type A1: Dense-graded crushed aggregate shall meet the requirements of Section 902 of the latest Michigan Department of Transportation Standard Specification for Construction and shall consist of 21AA Crushed Limestone.
- B. Granular Fill, Type A2: Granular material shall consist of natural sand, stone screenings, gravel or a blend of natural sand, gravel and stone screenings. It shall be composed of rough surfaced and angular grains of quartz or other hard durable rock and meet the requirements of Section 902 of the latest Michigan Department of Transportation Standard Specification for Construction and shall consist of Class II granular material.
- C. Open-Graded Drainage Course Aggregate Materials (OGDC), Type A3: for use in Temporary Construction Access Drives, Drainage Course under Pavement Aggregate Base Courses and other miscellaneous uses shall consist of crushed stone or crushed gravel free from organic matter or other deleterious substances with material sized between 1" and 3" in diameter, with less than 6% fine material (#200 sieve). Such materials are usually referred to as "1x3" or "OGDC".
- D. Crushed Aggregate Surface Course (CASC), Type A4: shall meet the requirements of Section 306 of the latest Michigan Department of Transportation Standard Specification for Construction and shall consist of 23A Crushed Aggregate.

## 2.5 SOURCE QUALITY CONTROL

- A. Testing and Analysis of Subsoil Material: Perform in accordance with ASTM D1557.
- B. Testing and Analysis of Topsoil Material: Perform in accordance with ASTM D2974 and ASTM D4972.
- C. When tests indicate materials do not meet specified requirements, change material and retest.
- D. Provide materials from same source throughout the Work.

## PART 3 EXECUTION

### 3.1 EXCAVATION

- A. Excavate subsoil and aggregates from areas designated. Strip topsoil to full depth of topsoil in designated areas.
- B. Stockpile excavated material meeting requirements for subsoil materials, topsoil materials and aggregates.
- C. Remove excess excavated subsoil and topsoil not intended for reuse, from the site.
- D. Remove excavated materials not meeting requirements for subsoil materials, topsoil materials and aggregates from the site.

### 3.2 EXAMINATION

- A. The Owner's 3<sup>rd</sup> party testing company shall verify compacted substrate is dry and ready to support paving and imposed loads.
- B. The Owner's 3<sup>rd</sup> party testing company shall verify substrate has been inspected, gradients and elevations are correct.

### 3.3 PREPARATION

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place fill on soft, muddy, or frozen surfaces.

### 3.4 AGGREGATE TRANSPORTING AND PLACEMENT

- A. The aggregate shall be transported from the crushing plant to the point of use in hauling vehicles which are covered. Deliveries shall be scheduled so that spreading and compaction of all aggregate delivered that day can be completed during daylight hours, unless adequate artificial lighting is provided, or stockpile locations are provided. Hauling over freshly placed material shall not be permitted until the material has been compacted as specified.
- B. Upon arrival, the aggregate shall be spread to a thickness not to exceed 6 inches by an approved grading method. It shall be struck off in a uniform layer of such depth that, when the Work is completed, it shall have the required thickness and conform to the grade and contour indicated.
- C. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the aggregate may be spread, raked, leveled and compacted by using hand tools.
- D. After spreading, the aggregate shall be thoroughly and uniformly compacted by approved compaction equipment. The speed of the compaction equipment shall at all times be sufficiently slow enough to avoid displacement of the aggregate. Any displacement occurring as a result of reversing direction of the compaction equipment or from any other cause shall be corrected at once. Rolling shall continue until all roller marks are eliminated, the surface is of uniform texture and true to grade and cross-section and the required field-density is obtained.

- E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

### 3.5 MINIMUM QUALITY REQUIREMENTS

- A. The Owner shall hire a 3<sup>rd</sup> party testing company to test in-place aggregate surface, base course and subbase materials for compliance with the requirements for density and thickness per the latest version of ASTM and MDOT Standard Specifications for Construction.
- B. Maximum dry density shall be determined per ASTM D1557 modified proctor.
- C. In-place compacted minimum thickness is as shown in the cross-sectional details on the Plans. Any thickness less than shown on the plans is not acceptable.

### 3.6 TOLERANCES

- A. Maximum Variation from Flat Surface: 1/2 inch measured with 10-foot straight edge.
- B. Maximum Variation from Thickness: No less than shown on the Plans.
- C. Maximum Variation from Elevation: 1/2 inch.

### 3.7 FIELD QUALITY CONTROL

- A. The Owner shall hire a 3<sup>rd</sup> party testing company to complete all field quality control testing per the latest version of ASTM and MDOT Standard Specifications for Construction.
- B. Quality Control During Aggregate Placement: Perform the following sampling and testing of aggregate mixtures for quality control during operations. Record the locations where samples are taken to correlate with subsequent testing.
- C. Test uncompacted aggregate for gradation distribution per ASTM D136 or MTM 109. Test for compaction per ASTM D1557 modified proctor.
- D. Perform three tests for each day's aggregate placement, unless otherwise specified or directed.
- E. Test in-place, compacted aggregate for density and thickness. Perform five tests for each day's aggregate placement unless otherwise specified or directed.
- F. Additional testing may be required if any of the previous tests indicate insufficient values. If two successive tests indicate insufficient values, contact the Owner for a course of action.
- G. Aggregate materials not complying with specified requirements shall be removed and replaced with new compliant aggregate.
- H. Upon completion of the construction Work and after spoils and debris have been removed, re-grade any areas disturbed by the operations.

### 3.8 STOCKPILING

- A. Stockpile materials on site at locations designated by Owner.
- B. Stockpile in sufficient quantities to meet project schedule and requirements.

- C. Separate different materials with dividers or stockpile individually to prevent mixing.
- D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- E. Surround stockpile with silt fence or erosion eels.
- F. Stockpile unsuitable materials on impervious material and cover to prevent erosion and leaching, until disposed of.

### 3.9 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

**\*\*END OF SECTION\*\***



SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Protecting existing vegetation to remain.
  - 2. Removing existing vegetation.
  - 3. Clearing and grubbing.
  - 4. Stripping and stockpiling topsoil.
  - 5. Removing above and below-grade site improvements.
  - 6. Temporary erosion and sedimentation control.

1.3 DEFINITIONS

- A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow.
- D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.
- E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.
- F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PRE-INSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at Project site.

1.5 MATERIAL OWNERSHIP

- A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.6 INFORMATIONAL SUBMITTALS

- A. Existing Conditions: The Contractor shall have the option to submit documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
  - 1. Use sufficiently detailed photographs or video recordings.
  - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.
- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.7 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.
  - 3. All activities shall be appropriately scheduled and communicated to the Owner prior to commencement of construction operations.
- B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.
  - 1. Do not proceed with work on adjoining property until directed by Owner.
- C. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises at location directed by the Owner.
- D. Utility Locator Service: Three full working days before construction begins, call the Miss Dig system at 1-800-482-7171 or 811. Private onsite utility locations must be completed prior cutting or excavation activity.
- E. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.
- F. Tree and Plant Protection Zones: Protect according to requirements in Section 015639 "Temporary Tree and Plant Protection."
- G. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 310516 "Soils and Aggregates".
  - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction unless otherwise indicated to be removed.
- B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to plan requirements.
- C. Protect existing site improvements to remain from damage during construction.
  - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil bearing water runoff or airborne dust to adjacent properties and walkways, according to Soil Erosion and Sedimentation Control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion and sedimentation control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

- A. Protect trees and plants remaining on-site according to according to plan requirements.
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations according to plan requirements.

3.4 EXISTING UTILITIES

- A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed.
  - 1. Owner will arrange to shut off indicated utilities when requested by Contractor.
- B. Locate, identify, and disconnect utilities indicated to be abandoned in place.
- C. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Owner not less than 3 days in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Owner's written permission.
- D. Excavate for and remove underground utilities indicated to be removed.

3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
  2. Grind down stumps and remove roots larger than 3 inches in diameter, obstructions, and debris to a depth of 24 inches below exposed subgrade.
  3. Use only hand methods or air spade for grubbing within protection zones.
  4. Chip removed tree branches and dispose of off-site.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches and compact each layer to a density equal to adjacent original ground.

### 3.6 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to required depth in a manner to prevent intermingling with underlying subsoil or other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
1. Limit height of topsoil stockpiles to 72 inches.
  2. Do not stockpile topsoil within protection zones.
  3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.
  4. Stockpile surplus topsoil to allow for re-spreading deeper topsoil.

### 3.7 SITE IMPROVEMENTS

- A. Remove existing above and below grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically. If possible, adjust line of demolition to the nearest joint.
  2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

### 3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

- C. Burning of waste materials is not permitted on Owner's property.

**\*\*END OF SECTION\*\***

ROUGH GRADING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating subsoil.
2. Cutting, grading, filling, rough contouring, and compacting site for site structures, building pads, and pavements.

B. Related Sections:

1. Section 31 05 16 – Soils and Aggregates.
2. Section 31 10 00 - Site Clearing: Excavating topsoil.
3. Section 31 23 16 - Excavation: General area excavation
4. Section 31 23 17 - Trenching: Trenching and backfilling for utilities.
5. Section 31 23 23 - Fill: General area backfilling.

1.2 REFERENCES

A. ASTM International:

1. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
2. ASTM D6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

A. Materials Source: Submit name of imported materials suppliers.

B. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.5 QUALITY ASSURANCE

A. The services of a full-time Soils Engineer and Soils Laboratory may be retained by the Owner to observe earthwork operations, analyze soil materials and perform applicable laboratory and field tests.

- B. The Contractor shall arrange and pay for any other test or required inspections necessary to meet the requirements set forth in these Construction Documents.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Topsoil: Type S2 as specified in Section 31 05 16.
- B. Subsoil Fill: Type S1 as specified in Section 31 05 16.
- C. Crushed Stone Fill: Type A1 as specified in Section 31 05 16.
- D. Granular Fill: Type A2 as specified in Section 31 05 16.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify survey bench mark and intended elevations for the Work are as indicated on Drawings.
- C. Locate and protect survey control and reference points. Promptly notify Engineer of discrepancies discovered.
- D. Control datum for survey is that shown on Drawings.
- E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- F. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.

### 3.2 PREPARATION

- A. Call Local Utility Line Information service, MISS DIG at 1-800-482-7171 or 811, not less than three working days before performing Work. Private utility location is required.
  - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum.
- C. Notify utility company prior to removing or relocating utilities.
- D. Protect utilities indicated to remain from damage.
- E. Protect plant life, lawns, and other features remaining as portion of final landscaping.

- F. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

### 3.3 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas to be further excavated, re-landscaped, or regraded.
- B. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.
- C. Remove excess subsoil not intended for reuse, from site.
- D. Benching Slopes: Horizontally bench existing slopes greater than 1: 4 to key placed fill material to slope to provide firm bearing.
- E. Stability: Replace damaged or displaced subsoil as specified for fill.

### 3.4 FILLING

- A. Fill areas to contours and elevations with unfrozen materials.
- B. Place material in continuous layers as follows:

<u>Compaction Method</u>	<u>Maximum Loose Lift Thickness</u>
Hand-operated vibratory plate or light roller in confined areas	4 inches
Hand-operated vibratory roller weighing at least 1,000 pounds	6 inches
Vibratory roller drum roller, minimum dynamic force, 2,000 pounds	9 inches
Vibratory drum roller, minimum dynamic force, 30,000 pounds	12 inches
Sheeps-foot roller	8 inches

- C. Maintain optimum moisture content of fill materials to attain required compaction density.
- D. Make grade changes gradually. Blend slope into level areas.
- E. Repair or replace items indicated to remain damaged by excavation or filling.

### 3.5 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.

### 3.6 FIELD QUALITY CONTROL

- A. The Owner shall hire a 3<sup>rd</sup> party testing company to complete all field quality control testing per the latest version of ASTM and MDOT Standard Specifications for Construction.



- B. Perform laboratory material tests in accordance with ASTM D1557.
- C. Perform in place compaction tests in accordance with the following:
  - 1. Density and Moisture Tests: ASTM D-6938.
- D. When tests indicate Work does not meet specified requirements, remove work, replace and retest.
- E. Frequency of Tests: Provide one density test for every lift.

### 3.7 SCHEDULES

- A. Fill in the upper 12 inches under pavement and sidewalks:
  - 1. Compact uniformly to minimum 95 percent of maximum density per ASTM D-1557.
- B. Fill below 12 inches under pavement and sidewalks:
  - 1. Compact uniformly to minimum 92 percent of maximum density per ASTM D-1557.
- C. Fill in landscape areas:
  - 1. Compact uniformly to minimum 88 percent of maximum density per ASTM D-1557.

**\*\*END OF SECTION\*\***

## EXCAVATION

### PART 1 GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Soil densification.
2. Excavating for paving, roads, and parking areas.
3. Excavating for slabs-on-grade.
4. Excavating for site structures.
5. Excavating for landscaping.

B. Related Sections:

1. Section 31 05 16 – Soils and Aggregates.
2. Section 31 22 13 - Rough Grading: Topsoil and subsoil removal from site surface.
3. Section 31 23 17 - Trenching: Excavating for utility trenches.
4. Section 31 23 23 - Fill.
5. Section 33 41 00 – Storm Utility Drainage Piping.

#### 1.2 REFERENCES

- A. Local utility standards when working within 24 inches of utility lines.

#### 1.3 SUBMITTALS

- A. Shop Drawings: None required.

#### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with local governing agency standards.

### PART 2 PRODUCTS

Not Used.

### PART 3 EXECUTION

#### 3.1 PREPARATION

- A. Call Local Utility Line Information service and Miss Dig at 1-800-482-7171 or 811, not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.
2. Private locating required?
  - B. Identify required lines, levels, contours, and datum.
  - C. Notify utility company prior to the removal and relocation of utilities.
  - D. Protect utilities indicated to remain from damage.
  - E. Protect plant life, lawns, and other features remaining as portion of final landscaping.
  - F. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs indicated to remain from excavating equipment and vehicular traffic.
- 3.

### 3.2 EXCAVATION

- A. Underpin adjacent structures which may be damaged by excavation work.
- B. Excavate subsoil to accommodate slabs-on-grade, paving and site structures.
- C. The removal of existing soil to get to the final subgrade elevation shall not be considered subgrade undercutting. It is part of this section for excavation to balance the site and establish the elevations for the placement of the proposed pavement elevations. Subgrade undercutting is excavation and removal below proposed top of subgrade elevation, or the elevation new work will be constructed on.
- D. Slope banks with machine to angle of repose or less until shored.
- E. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- F. Trim excavation. Remove loose matter.
- G. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by volume. Remove larger material as specified in Section 31 23 23.
- H. Notify Owner/Engineer immediately of unexpected subsurface conditions.
- I. Correct over-excavated areas with crushed stone fill Type A1 specified in Section 31 05 16 or as directed by the Geotechnical Engineer.
- J. Remove excess and unsuitable material from site.
- K. Stockpile subsoil to be re-used on-site in area designated by Owner on site to height not exceeding 6feet and protect from erosion.
- L. Repair or replace items indicated to remain damaged by excavation.

3.3 FIELD QUALITY CONTROL

- A. Request inspection of excavation and controlled fill operations in accordance with applicable code and local governing agency requirements at least 48 hours ahead of scheduled work or per agency requirements.
- B. Request visual inspection of bearing surfaces by inspection agency before installing subsequent work at least 48 hours ahead of scheduled work or per agency requirements.

3.4 PROTECTION

- A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.
- B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- C. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

**\*\*END OF SECTION\*\***

## TRENCHING

### PART 1 GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Excavating trenches for utilities from 5 feet outside building to utility service.
2. Compacted fill from top of utility bedding to subgrade elevations.
3. Backfilling and compaction.

B. Related Sections:

1. Section 31 05 16 – Soils and Aggregates.
2. Section 31 22 13 - Rough Grading: Topsoil and subsoil removal from site surface.
3. Section 31 23 16 - Excavation: General building excavation.
4. Section 31 23 23 - Fill: General backfilling.
5. Section 32 91 19 - Landscape Grading: Filling of topsoil over backfilled trenches to finish grade elevation.
6. Section 33 41 00 - Storm Utility Drainage Piping

#### 1.2 REFERENCES

A. ASTM International:

1. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
2. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

#### 1.3 DEFINITIONS

- A. Utility: Any buried pipe, duct, conduit, or cable.

#### 1.4 SUBMITTALS

- A. Product Data: Submit data for geotextile fabric indicating fabric and construction.
- B. Materials Source: Submit name of imported fill materials suppliers.
- C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with local governing agency standards.

1.6 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.7 COORDINATION

- A. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Subsoil Fill: Type S1 as specified in Section 31 05 16.
- B. Crushed Stone Fill: Type A1 as specified in Section 31 05 16.
- C. Granular Fill: Type A2 as specified in Section 31 05 16.

2.2 ACCESSORIES

- A. Geotextile Fabric: Non-biodegradable, non-woven.
  - 1. Tencate Mirafi; Model 140N Filter Fabric or approved equal.

PART 3 EXECUTION

3.1 LINES AND GRADES

- A. Lay pipes to lines and grades indicated on Drawings.
  - 1. Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.
- B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.2 PREPARATION

- A. Call Local Utility Line Information service, Miss Dig, at 1-800-482-7171 or 811, not less than three working days before performing Work.
  - 1. Request underground utilities to be located and marked within and surrounding construction areas.
  - 2. Private utility location is required.
- B. Identify required lines, levels, contours, and datum locations.
- C. Protect plant life, lawns, and other features remaining as portion of final landscaping.

- D. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs indicated to remain from excavating equipment and vehicular traffic.
- E. Maintain and protect above and below grade utilities indicated to remain.

### 3.3 TRENCHING

- A. Excavate subsoil required for utilities to utility service.
- B. Remove lumped subsoil, boulders, and rock up of 1/6 cubic yard, measured by volume.
- C. Perform excavation within 24 inches of existing utility service or in accordance with utility's requirements.
- D. Do not advance open trench more than 200 feet ahead of installed pipe.
- E. Cut trenches to width indicated on Drawings. Remove water or materials that interfere with Work.
- F. Excavate bottom of trenches maximum 12 inches wider than outside diameter of pipe.
- G. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and pipe.
- H. Do not interfere with 45 degree bearing splay of foundations.
- I. When Project conditions permit, slope side walls of excavation starting 2 feet above top of pipe. When side walls cannot be sloped, provide a trench box or sheeting and shoring to protect excavation as specified in this section.
- J. Cut out soft areas of subgrade not capable of compaction in place. Backfill with bedding material and compact to density equal to or greater than requirements for subsequent backfill material.
- K. Trim excavation. Remove loose matter.
- L. Correct over-excavated areas with compacted backfill as specified for authorized excavation.
- M. Remove excess subsoil not intended for reuse, from site.
- N. Stockpile subsoil for reuse in area designated by the Owner on site to depth not exceeding 6 feet and protect from erosion.

### 3.4 SHEETING AND SHORING

- A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.
- B. Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.
- C. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.

- D. Repair damage to new Work and existing improvements from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

### 3.5 BACKFILLING

- A. Backfill trenches to contours and elevations with unfrozen fill materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
- C. Place material in continuous layers as follows:
  - 1. Common Fill: Maximum 4 inches compacted depth for hand compaction and 8 to 12 inches for roller compaction.
  - 2. Granular Fill: Maximum 4 inches compacted depth for hand compaction and 8 to 12 inches for roller compaction.
- D. Employ placement method that does not disturb or damage foundation perimeter drainage and utilities in trench.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.
- F. Do not leave more than 50 feet of trench open at end of working day.
- G. Protect open trench to prevent danger to Owner and the public.

### 3.6 TOLERANCES

- A. Top Surface of Backfilling: Plus or minus 1 inch from required elevations.

### 3.7 FIELD QUALITY CONTROL

- A. The Owner shall hire a 3rd party testing company to complete all field quality control testing per the latest version of ASTM and MDOT Standard Specifications for Construction.
- B. Perform laboratory material tests in accordance with ASTM D1557.
- C. Perform in place compaction tests in accordance with the following:
  - 1. Density Tests: ASTM D6938.
  - 2. Moisture Tests: ASTM D6938.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.

### 3.8 PROTECTION OF FINISHED WORK

- A. Reshape and re-compact fills subjected to vehicular traffic during construction.

**\*\*END OF SECTION\*\***



FILL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Backfilling site structures to subgrade elevations.
2. Fill under slabs-on-grade.
3. Fill under paving.
4. Fill for over-excavation.

B. Related Sections:

1. Section 31 05 16 – Soils and Aggregates.
2. Section 31 22 13 - Rough Grading: Site filling.
3. Section 31 23 16 - Excavation.
4. Section 31 23 17 - Trenching: Backfilling of utility trenches.
5. Section 32 91 19 - Landscape Grading.
6. Section 33 41 00 - Storm Utility Drainage Piping.

1.2 REFERENCES

A. ASTM International:

1. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
2. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: None required.
- C. Materials Source: Submit name of imported fill materials suppliers.
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with local governing agency standards.

## PART 2 PRODUCTS

### 2.1 FILL MATERIALS

- A. Common Fill: Type S1 as specified in Section 31 05 16.
- B. Crushed Stone Fill: Type A1 as specified in Section 31 05 16.
- C. Granular Fill: Type A2 as specified in Section 31 05 16.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Administrative Requirements: Coordination and project conditions.

### 3.2 PREPARATION

- A. Compact subgrade to density requirements for subsequent backfill materials. The removal of existing soil to get to the final subgrade elevation shall not be considered subgrade undercutting. It is part of excavation per Section 31 23 16 to balance the site and establish the elevations for the placement of the proposed pavement elevations.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with structural or granular fill as directed by testing agency and compact to density equal to or greater than requirements for subsequent fill material.
- C. Scarify subgrade surface to a minimum depth of 8 inches.
- D. Proof roll to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

### 3.3 BACKFILLING

- A. Backfill areas to contours and elevations with unfrozen materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Place material in continuous layers as follows:

<u>Compaction Method</u>	<u>Maximum Loose Lift Thickness</u>
Hand-operated vibratory plate or light roller in confined areas	4 inches
Hand-operated vibratory roller weighing at least 1,000 pounds	6 inches
Vibratory roller drum roller, minimum dynamic force, 2,000 pounds	9 inches
Vibratory drum roller, minimum dynamic force, 30,000 pounds	12 inches

Sheeps-foot roller

8 inches

- D. Employ placement method that does not disturb or damage other new work or existing improvements.
- E. Maintain optimum moisture content of backfill materials to attain required compaction density.
- F. Make gradual grade changes. Blend slope into level areas.
- G. Remove surplus backfill materials from site.
- H. Leave fill material stockpile areas free of excess fill materials.

### 3.4 TOLERANCES

- A. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.
- B. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

### 3.5 FIELD QUALITY CONTROL

- A. The Owner shall hire a 3rd party testing company to test in-place aggregate surface, base course and subbase materials for compliance with the requirements for density and thickness per the latest version of ASTM and MDOT Standard Specifications for Construction.
- B. Perform laboratory material tests in accordance with ASTM D1557.
- C. Perform in place compaction tests in accordance with the following:
  - 1. Density Tests: ASTM D6938.
  - 2. Moisture Tests: ASTM D6938.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- E. Proof roll compacted fill surfaces under slabs-on-grade and paving.

### 3.6 PROTECTION OF FINISHED WORK

- A. Reshape and re-compact fills subjected to vehicular traffic

**\*\*END OF SECTION\*\***

## EROSION CONTROLS

### PART 1 GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Check Dams.
2. Inlet Filters.
3. Silt Fencing.
4. Rip-Rap.

B. Related Sections:

1. Section 31 05 16 – Soils and Aggregates.
2. Section 31 10 00 - Site Clearing.
3. Section 31 23 16 - Excavation.
4. Section 31 23 23 - Fill.
5. Section 32 91 19 - Landscape Grading.
6. Section 32 92 19 - Seeding.

#### 1.2 REFERENCES

A. Troy School District Stormwater Management – Illicit Discharge Regulatory Policy

1. A copy of this policy will be part of the bid package or is available upon request.

B. Troy School District Stormwater Management – Post -Construction Policy & Procedure

1. A copy of this policy will be part of the bid package or is available upon request.

C. ASTM International:

1. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).

#### 1.3 SUBMITTALS

A. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

#### 1.4 QUALITY ASSURANCE

A. Perform Work in accordance with local governing agency standards.

## 1.5 ENVIRONMENTAL REQUIREMENTS

- A. Do not place grout when air temperature is below freezing.

## PART 2 PRODUCTS

### 2.1 ROCK MATERIALS

- A. Rock: Sound, tough, durable fractured rock, free from decompressed stones or other defects impairing its durability. Broken concrete or rounded stones are not acceptable and material shall be to the sizes indicated in the plans

### 2.2 PLANTING MATERIALS

- A. Seeding and Soil Supplements: as specified in Section 32 92 19.
- B. Mulch: as specified in Section 32 92 19.
- C. Erosion Control Blankets: as specified in Section 32 92 19

### 2.3 ACCESSORIES

- A. Inlet Filter Fabric: Geotextile fabric with minimum flow rate of 100 gal/min./sft meeting local governing agency requirements.
- B. Inlet Filter Bag: Silt Sack by ACF Environmental or approved equal.
- C. Silt Fencing: Geotextile filter fabric with minimum flow rate of 10 gal/min./sft, Amoco ProPex 2130 or approved equal.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify compacted subgrade is acceptable and ready to support devices and imposed loads.

### 3.2 SITE STABILIZATION

- A. Incorporate erosion control devices indicated on the Drawings into the Project at the earliest practicable time.
- B. Construct, stabilize and activate erosion controls before site disturbance within tributary areas of those controls.
- C. Stockpile and waste pile heights shall not exceed 6 feet. Slope stockpile sides at 2H:1V or flatter.
- D. Stabilize any disturbed area of affected erosion control devices on which activity has ceased and which will remain exposed for more than 20 days.

1. During non-germinating periods, apply mulch per the supplier's recommended rates.
2. Stabilize disturbed areas which are not at finished grade and which will be disturbed within one year in accordance with Section 32 92 19 at 50 percent of permanent application rate with no topsoil.
3. Stabilize disturbed areas which are either at finished grade or will not be disturbed within one year in accordance with Section 32 92 19 permanent seeding specifications.

E. Stabilize stockpiles within 24 hours after the pile has been put in place.

### 3.3 FIELD QUALITY CONTROL

- A. Inspect erosion control devices on a weekly basis and after each runoff event per the school district's stormwater management policies. Make necessary repairs to ensure erosion and sediment controls are in good working order.
- B. Compaction Testing: In accordance with ASTM D1557.
- C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

### 3.4 CLEANING

- A. When sediment accumulation in sedimentation structures has reached a point one-third depth of sediment structure or device, remove and dispose of sediment.
- B. Do not damage structure or device during cleaning operations. Repair or replace any damages structures or devices.
- C. Do not permit sediment to erode into construction or site areas or natural waterways.
- D. Clean channels when depth of sediment reaches approximately one-half channel depth.

**\*\*END OF SECTION\*\***

ASPHALT PAVING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Asphalt materials.
2. Aggregate materials.
3. Aggregate subbase.
4. Asphalt paving base course, binder course, and wearing course.
5. Asphalt paving overlay for existing paving.

B. Related Sections:

1. Section 31 22 13 - Rough Grading: Preparation of site for paving [and base].
2. Section 31 23 23 - Fill: Compacted subbase for paving.
3. Section 31 05 16 – Soils and Aggregates: Product requirements for aggregate for placement by this section.
4. Section 32 13 13 – Concrete Paving
5. Section 32 17 23 - Pavement Markings: Painted pavement markings, lines, and legends.
6. Section 33 05 13 - Manholes and Structures

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO M140 - Standard Specification for Emulsified Asphalt.
2. AASHTO M324 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.

B. Asphalt Institute:

1. AI MS-19 - Basic Asphalt Emulsion Manual.

C. ASTM International:

1. ASTM D977 - Standard Specification for Emulsified Asphalt.
2. ASTM D979 - Standard Practice for Sampling Bituminous Paving Mixtures.

3. ASTM D1188 - Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples.
4. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
5. ASTM D1559 – Test Method for Resistance of Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.
6. ASTM D2172 - Standard Test Methods for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures.
7. ASTM D2726 - Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.
8. ASTM D2950 - Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods.
9. ASTM D3381 - Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction.
10. ASTM D3549 - Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens.
11. ASTM D3910 - Standard Practices for Design, Testing, and Construction of Slurry Seal.
12. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.

### 1.3 SUBMITTALS

#### A. Product Data:

1. Submit product information for asphalt and aggregate materials per plans.
2. Submit mix design with laboratory test results supporting design per plans.
3. All testing and material data must be dated within the previous two months of the date of the submittal.

#### B. Manufacturer's Certificate: Certify that materials specified in this section meet or exceed the specified requirements.

#### C. The paving contractor shall execute the Guarantee for Bituminous Pavement form located at the end of this section per the requirements set forth on the form.

### 1.4 QUALITY ASSURANCE

#### A. Mixing Plant: Certified by State of Michigan.

#### B. Obtain materials from same source throughout.

#### C. Perform Work in accordance with Michigan Department of Transportation (MDOT) standards.



## 1.5 QUALIFICATIONS

- A. Installer: Company specializing in performing work of this section with minimum of five (5) years documented experience.

## 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Apply bituminous tack coats only when temperature has not been below 35 degrees F for 12 hours immediately prior to application. Construct asphalt surface course only when atmospheric temperature is above 40 degrees F and base is dry. Asphalt binder and base courses may be laid when the atmospheric temperature is above 35 degrees F and rising.

## PART 2 PRODUCTS

### 2.1 ASPHALT MATERIALS

- A. Asphalt Cement: Shall comply with the requirements of ASTM D3381 for viscosity graded asphalt cement AC-10 (85-100 penetration grade) and meet the requirements of Section 501 of the Michigan Department of Transportation Standard Specifications for Construction (latest edition) for PG64-28.
- B. Tack Coat: Shall be emulsified asphalt meeting the requirements of ASTM D977, AASHTO M140 and the Asphalt Institute for type SS-1h.
- C. Reclaimed Asphalt Pavement (RAP): Processed material obtained by milling or full depth removal of existing asphalt paving.

### 2.2 AGGREGATE MATERIALS

- A. Coarse Aggregate: Shall consist of crushed stone, crushed gravel, a mixture of uncrushed gravel with either crushed stone or crushed gravel, or other inert material having similar characteristics. It shall be composed of clean, tough, durable fragments free from an excess of flat or elongated pieces and shall be free of organic matter and deleterious substances and meet the requirements of Section 902 of the Michigan Department of Transportation Standard Specifications for Construction (latest edition).
- B. Fine Aggregate: Shall be well graded from coarse to fine and consist of natural sand, stone screenings or a blend of natural sand and stone screenings. It shall be composed of rough surfaced and angular grains of quartz or other hard durable rock and meet the requirements of Section 902 of the Michigan Department of Transportation Standard Specifications for Construction (latest edition).
- C. Mineral Filler: Shall be limestone dust, dolomite dust, slag or hydrated lime meeting the requirements of Section 902 of the Michigan Department of Transportation Standard Specifications for Construction (latest edition).

### 2.3 MIXES

- A. Use dry material to avoid foaming. Mix uniformly.
- B. Asphalt Paving Mixtures: Designed in accordance with Section 501 the Michigan Department of Transportation Standard Specifications for Construction (latest edition).

1. Asphalt Cement: PG 64-28 per plans
2. Leveling Course: MDOT 4EML or 4EMH per plans
3. Wearing Course: MDOT 5EML or 4EMH per plans

## 2.4 SOURCE QUALITY CONTROL

- A. Submit proposed mix design of each class of mix for review prior to beginning of Work.
- B. Test samples in accordance with ASTM D979, D2172 or D6307 and D6925.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify utilities indicated under paving are installed with excavations and trenches backfilled and compacted.
- C. Verify compacted subgrade, aggregate base course and subbase is dry and ready to support paving and imposed loads.
- D. Verify gradients and elevations of base are correct.
- E. Verify existing concrete curb lines and elevations are correct.
- F. Verify all manhole, catch basin and inlet grates and frames (and any other type of casting within the area to be paved) are installed in correct position and at correct elevation.

### 3.2 BASE COURSE

- A. Aggregate Base Course to be installed per Section 31 05 16.

### 3.3 EXISTING WORK

- A. Saw cut existing paving as indicated on the Drawings.
- B. Clean existing paving to remove foreign material, excess joint sealant and crack filler from paving surface.
- C. Repair surface defects in existing paving to provide uniform surface to receive new paving.
- D. Protect new and existing works adjacent to the paving area to prevent damage.

### 3.4 BOND COAT

- A. Apply bond coat to contact surfaces of previously constructed surfaces abutting or projecting into the area to be paved with new asphalt.
  1. New Asphalt Surfaces: 0.02-0.05 gal/sq yd residual rate.

2. Existing Asphalt Surfaces: 0.004-0.07 gal/sq yd residual rate.
  3. Milled Asphalt Surfaces: 0.04 – 0.08 gal/sq yd residual rate.
  4. Portland Cement Concrete Surfaces: 0.03 – 0.05 gal/sq yd residual rate.
- B. Apply bond coat to contact surfaces of curbs, gutters and sidewalks etc. as required. Protect surfaces from overspray Bond coat shall be applied uniformly without streaks and/or bare spots.
- C. Coat surfaces of manholes, catch basin and any other casting frames with oil to prevent bond with asphalt paving. Do not tack coat these surfaces.

### 3.5 SINGLE COURSE ASPHALT PAVING

- A. Install Work in accordance with Section 502 of the Michigan Department of Transportation Standard Specifications for Construction (latest edition).
- B. Place asphalt within 24 hours of applying bond coat.
- C. Place asphalt wearing course to the thickness as indicated on Drawings.
- D. Compact paving by rolling to specified density (Ninety-two (92) to Ninety-seven (97) percent of the recorded laboratory specimen density per ASTM D2041). Do not displace or extrude paving from position. Hand compact in areas inaccessible to rolling equipment.
- E. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

### 3.6 DOUBLE COURSE ASPHALT PAVING

- A. Place asphalt binder course within 24 hours of applying bond coat to existing vertical surfaces abutting proposed pavement.
- B. Place binder course to the thickness as indicated on Drawings.
- C. Clean and dry binder surface and apply bond coat before placing wearing course.
- D. Place wearing course to the thickness as indicated on Drawings.
- E. Compact each course by rolling to specified density (Ninety-two (92) to Ninety-seven (97) percent of the recorded laboratory specimen density per ASTM D2041) . Do not displace or extrude paving from position. Hand compact in areas inaccessible to rolling equipment.
- F. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

### 3.7 ASPHALT PAVING OVERLAY

- A. Apply tack coat to existing paving milled surface at rate recommended of 0.04 – 0.08 gal/sq yd residue rate.
- B. Place wearing course to the thickness as indicated on Drawings.

- C. Compact overlay by rolling to specified density (Ninety-two (92) to Ninety-seven (97) percent of the recorded laboratory specimen density per ASTM D2041) . Do not displace or extrude paving from position. Hand compact in areas inaccessible to rolling equipment.
- D. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

### 3.8 CONSTRUCTION TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch as measured with 10-foot straight edge.
- B. Scheduled Compacted Thickness: No less than specified on the Drawings.
- C. Variation from Indicated Elevation: Within 1/4 inch.

### 3.9 FIELD QUALITY CONTROL

- A. The Owner shall hire a 3rd party testing company to test compliance with the requirements for density and thickness per the latest version of ASTM and MDOT Standard Specifications for Construction.
- B. Record the locations where samples are taken to correlate with subsequent testing.
- C. Sample asphalt paving in accordance with ASTM D979.
- D. Asphalt Paving Mix Temperature: Measure and record temperature at time of placement.
- E. Asphalt Paving Thickness: Owner's 3<sup>rd</sup> party testing company will verify loose thickness during placement.
- F. Asphalt Paving Density: ASTM D2950 nuclear method; perform minimum of three tests and one test per 5,000 sft for each day of paving unless otherwise directed or specified by the Owner. In-place Density shall be 92 – 97% of ASTM D2041 maximum density shall be based on either the value in the JMF or the daily testing value by the plant, if available.
- G. Additional testing may be required if any of the previous tests indicate insufficient values. If two successive tests indicate insufficient values, contact the Owner for a course of action.
- H. Asphalt concrete materials not complying with specified requirements shall be repaired or removed and replaced with new paving.

### 3.10 PROTECTION OF FINISHED WORK

- A. Immediately after placement, protect paving from mechanical injury for at least 6 hours or until surface temperature is less than 140 degrees F.

**\*\*END OF SECTION\*\***

**DATE:**

**CONTRACTOR:**

**STREET ADDRESS:**

**CITY, STATE, ZIP:**

**AGENT:**

**GUARANTEE FOR BITUMINOUS PAVEMENT**

We hereby guarantee that the Asphalt Pavement which we have installed at for \_\_\_\_\_ has been done in strict accordance with the Drawings and Specifications. We will repair or replace, or agree to have repaired or replaced, all Work which may prove to be defective in workmanship or materials. We will repair or replace, or agree to have repaired or replaced, any adjacent Work which required repair or replacement because of our defective Work. We guarantee the Work for two years from the date of acceptance by the Owner

Failure to comply with the above paragraph within 10 days after receipt of written notice from the Owner, or failure to Work with diligence authorizes the Owner to proceed with repair of the defective Work. We shall pay the costs and charges for the repairs along with interest at the maximum rate permitted by law upon demand. If we fail to fulfill the preceding obligation, and if the Owner brings an action to enforce this guarantee, we agree to pay the Owner's reasonable attorney fees incurred.

**CONTRACTOR'S SIGNATURE**

- (a) The Paving Contractor shall execute the Guarantee Form as shown above.
- (b) All Manufacturer's Warranties for materials shall be filled out, dated, signed and submitted to Owner.

CONCRETE PAVING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete paving for:
  - a. Concrete sidewalks
  - b. Concrete curbs and gutters
  - c. Concrete parking areas and roads

B. Related Sections:

1. Section 32 17 23 - Pavement markings
2. Section 31 22 13 - Rough Grading
3. Section 31 23 23 - Fill
4. Section 32 05 16 – Soils and Aggregates
5. Section 32 12 16 - Asphalt Paving
6. Section 32 91 19 - Landscape Grading
7. Section 33 05 13 - Manholes and Structures

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO M213 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

B. American Concrete Institute:

1. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
2. ACI 305R - Hot Weather Concreting.
3. ACI 306R - Cold Weather Concreting.
4. ACI 315 - Manual of Standard Practice for Detailing Reinforced Concrete Structures.

C. ASTM International:

1. ASTM A184 - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.

2. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
3. ASTM A497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
4. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
5. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
6. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
7. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
8. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
9. ASTM C150 - Standard Specification for Portland Cement.
10. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
11. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
12. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
13. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
14. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
15. ASTM C979 - Standard Specification for Pigments for Integrally Colored Concrete.
16. ASTM C994 – Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
17. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
18. ASTM D994 – Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).

### 1.3 SUBMITTALS

#### A. Submittal of Ready-Mixed Concrete Information

1. Statement of Purchase for Ready-Mixed Concrete: Prior to actual delivery of concrete, submit, to the Owner, the Statement of Purchase, giving the dry weights of cement and saturated surface dry weights of fine and coarse aggregates and quantities, type and name of admixtures (if any) and of water per cu. yd., that will be used in the manufacture of the concrete. The Contractor shall also furnish evidence satisfactory to the Owner that the materials to be used and proportions selected will produce concrete of the quality specified. Whatever strengths are obtained, the quality of cement used

shall not be less than the minimum specified. The information must follow the current MDOT Review Checklist (Form 2000).

2. Reports: Submit four copies of reports, to the Engineer/Owner, for ready-mix concrete slump, air content, unit weight, yield and strength tests as specified in Section 15 and 17 of ASTM C94.
  3. Ready-Mixed Concrete Delivery Tickets: Submit one copy of each delivery ticket to the Owner and Contractor in accordance with Section 16 of ASTM C94.
  4. Submit manufacturers complete technical data sheet for colored admixtures and curing compounds for any colored concrete pavement and sidewalk areas. Include color charts for initial selection of color by Owner.
- B. The paving contractor shall execute the Guarantee for Concrete Pavement, Guarantee for Concrete Curb, and Guarantee for Concrete Sidewalk forms located at the end of this section per the requirements set forth on the forms.
- C. Design Data:
1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
    - a. Hot and cold weather concrete work.
  2. Identify mix ingredients and proportions, including admixtures.
  3. Identify chloride content of admixtures and whether or not chloride was added during manufacture.

#### 1.4 QUALITY ASSURANCE

- A. Testing and Inspection Service: The Owner will engage a testing agency to sample and test concrete materials proposed for use in the Work, perform tests and calculations for concrete mixtures and perform testing during paving operations.
- B. Submit to the Owner, materials certificates signed by Material Producer and Contractor per the plans. Certificates shall state that each material item meets specified requirements.
- C. Submit to the Owner, job-mix formulas for each required cement-aggregate mixture per the plans. Mix designs shall be within allowable tolerances as specified for the particular application. The job-mix formula must follow the current MDOT Review Checklist (Form 2000).
- D. All testing/material data must be dated within the previous two months of the date of the submittal.
- E. Obtain cementitious materials from same source throughout.
- F. Perform Work in accordance with local governing agency standards.



## 1.5 QUALIFICATIONS

- A. Manufacturer: All ready-mixed concrete suppliers must be Michigan Department of Transportation certified and approved by the Engineer/Owner. Concrete shall be manufactured and delivered to the job Site by a ready-mixed concrete manufacturer thoroughly experienced in ready-mixed concrete. If requested by the Owner, submit a written description of proposed ready-mixed concrete Manufacturer, giving qualifications of Personnel, location of batching plant, list of Projects similar in scope to specified Work, and other information as may be requested by the Owner.
- B. Installer: All concrete installers must be approved by the Owner. If requested by the Owner, submit a written description of proposed ready-mixed concrete Installer, giving qualifications of Personnel, list of Projects similar in scope to specified Work, and other information as may be requested by the Owner.

## 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Construct concrete surface course only when ground temperature is above 35-degrees F and base is dry. Base course must be laid when temperature is above 35-degrees F and rising.

## 1.7 TRAFFIC CONTROL

- A. Maintain vehicle and pedestrian traffic during paving and repair operations in such a manner as to not disrupt normal business activities of adjacent enterprises.
- B. Protect newly placed concrete from traffic.

## PART 2 PRODUCTS

### 2.1 FORM MATERIALS

- A. Wood, steel or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects. Use flexible spring steel forms or laminated boards to form radius bends as required.
- B. When forms are used and the pavement radius is less than 200 feet, the curved alignment shall be provided for by either standard steel forms equipped with flexible liners or by flexible forms. The forms shall be of the full depth of the section. Curb and gutter forms shall be so constructed as to permit the inside of the form to be securely fastened to the outside forms.

### 2.2 JOINT MATERIALS

- A. Asphalt Expansion Joint Filler: Per Section 914 of the Michigan Department of Transportation Specification (latest edition).
- B. Hot Poured Joint Sealer: Per Section 914 of the Michigan Department of Transportation Specification (latest edition).
- C. Cold Applied Joint Sealer: Per Section 914 of the Michigan Department of Transportation Specification (latest edition).

- D. Expansion papers shall be of the pre-molded non-extruding, asphalt impregnated type, not less than 1/2-inch thick. The length shall be equal to the width of the slab and the depth equal to the thickness of the slab plus 1-inch.

## 2.3 REINFORCING

- A. Deformed Reinforcing Bars: Steel: ASTM A615, 60 ksi yield grade, deformed billet-steel bars, epoxy coated finish.
- B. Deformed Bar Mats: ASTM A184; fabricated from ASTM A615; 60 ksi yield strength, steel bars, epoxy coated finish.
- C. Welded Deformed Wire Fabric: ASTM A497; in flat sheets; epoxy coated finish.
- D. Welded Plain Wire Fabric: ASTM A185; in flat sheets; epoxy coated finish.
- E. Dowels: ASTM A615; 60ksi yield strength, plain steel bars; cut to length indicated on Drawings, square ends with burrs removed; epoxy coated finish.
- F. Tie Wire: Black, Minimum 16-gauge annealed steel type, epoxy coated.
- G. Epoxy Coating Patching Material: Type as recommended by coating manufacturer.
- H. Supports for Reinforcements: Bar supports conforming to "Bar Support Specifications" contained in the ACI "Manual of Standard Practice". Provide chairs, spacers and other devices suitable for proper spacing, supporting and fastening reinforcing bars.
- I. Shop fabricated reinforcing bars to conform to the shapes and dimensions shown on the reviewed Shop Drawings and in accordance with ACI "Manual of Standard Practice".

## 2.4 CONCRETE MATERIALS

- A. Cement: All cement used in pavement construction shall be Portland Cement per Section 901 of the Michigan Department of Transportation Specification (latest edition) or as approved by the Engineer/Owner.
- B. Fine and Coarse Aggregates:
  - 1. The fine aggregate shall meet all requirements of Section 902 of the Michigan Department of Transportation Specification (latest editions) for 2NS-Natural Sand
  - 2. The coarse aggregate shall meet all requirements of Section 902 of the Michigan Department of Transportation Specification (latest edition) for No. 6A Coarse Aggregate.
- C. Air Entrainment: Air-entraining admixture shall be in accordance with ASTM C260.
- D. Chemical Admixture: ASTM C494.
- E. Concrete must be ready-mixed concrete.

2.5 ACCESSORIES

- A. Curing Compound: The curing compound ASTM C309, Type II, Class B, or approved equal. It shall not allow a moisture loss of more than 0.055 gr./sq. cm. when applied at 200 sft./gallon.

2.6 CONCRETE MIX

A. Production of Ready-Mixed Concrete:

1. Ready-mixed concrete shall be batched, mixed and transported in accordance with ASTM C94, and comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete," except as otherwise specified herein.
2. Ready-mixed concrete shall be mixed and delivered to the point of discharge at the job by means of a ready-mix concrete truck.
3. No water from the truck water system or elsewhere shall be added after the initial introduction of the mixing water for the batch. Under no circumstances shall the approved maximum water content be exceeded nor shall the slump exceed the maximum specified.
4. Discharge of the concrete shall be completed within 1-1/2 hours or before the drum has revolved 300 revolutions, whichever comes first, after the introduction of the mixing water to the cement and aggregates or the introduction of the cement to the aggregates.
5. In hot weather (air temperature 80-degrees F. and above) or under conditions contributing to quick stiffening of the concrete, the time shall be reduced to one hour.
6. Concrete delivered in cold weather (air temperature 45-degrees F. and lower) shall have a temperature not less than 60-degrees F. at the point of discharge at job, and in compliance with ACI 306 R "Cold Weather Concreting". Concrete placing will not be permitted when the air temperature is 35-degrees F. or lower.
7. Concrete delivered under hot weather conditions contributing to quick stiffening of concrete, or in air temperature of 80-degrees F. and over, shall have a temperature between 60- and 80-degrees F. at the point of discharge at job, and in accordance with ACI 305 R "Hot Weather Concreting."

B. Provide concrete to the following criteria:

1. Per Table 1004-1: Concrete Mixtures of the Michigan Department of Transportation Specification (latest edition).

C. Use calcium chloride only when approved by the Engineer in writing.

2.7 CLEANING OF THE MIXER OR TRUCK

- A. In no case shall the mixer or truck be flushed out onto the street pavement, in a catch basin or sewer manhole, or in any public right-of-way. The contractor will be responsible for clean-up of all washout areas at no additional expense to the Owner.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify utilities indicated under paving are installed with excavations and trenches backfilled and compacted.
- C. Verify compacted subgrade is dry and ready to support paving and imposed loads.
  - 1. Proof roll subbase with a (25-ton minimum weight) rubber-tired roller, loaded front-end loader or loaded dump truck in a minimum of two perpendicular passes to identify soft spots.
  - 2. Remove soft subbase and replace with compacted fill as specified in Section 31 23 23.
- D. Verify gradients and elevations of base are correct.
- E. Verify all manhole, catch basin and inlet grates and frames (and any other type of casting within the area to be paved) are installed in correct position and at correct elevation.

3.2 BASE COURSE

- A. Aggregate Base Course shall be installed per Section 32 05 16.

3.3 PREPARATION

- A. Moisten substrate to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manholes, catch basins and inlets (and any other type of casting within the area to be paved) with oil to prevent bond with concrete paving.

3.4 LINE AND GRADE

- A. The contractor will hire a Registered Land Surveyor to establish the line and grade from the Construction Plans.

3.5 PROPERTY MARKERS

- A. All property stakes, irons, monuments, etc. shall be protected and shall not be moved without the written permission of the Property Owner.

3.6 FORMING

- A. Compact and cut-to-grade subgrade under forms so that forms when set will be uniformly supported for the entire length. Securely stake and brace or tie forms to prevent leakage of mortar. Bracing with piles of earth will not be permitted.
- B. Coat surfaces of forms to be in contact with concrete with light clear paraffin oil or parting compound which will not stain the concrete.
- C. Before start of concrete placing, formwork shall be complete and approved by the Geotechnical Engineer.

- D. Hardened concrete, debris and foreign material shall be removed from interior of forms.

### 3.7 REINFORCING

- A. Provide reinforcement for concrete pavement as shown on the Drawings. Reinforcement shall be kept clean and free from objectionable rust. Bends or kinks in reinforcing bars shall be corrected before placing. All reinforcement shall be accurately located in forms and securely held in place, before and during concrete placing, by supports adequate to prevent displacement during the course of construction.

### 3.8 PLACING CONCRETE

- A. Concrete shall be handled from the point of delivery and to concrete conveying equipment, and to the location of final deposit by methods which will prevent segregation and loss of concrete mix materials and in a manner, which will assure that the required quality of concrete is maintained.
- B. Equipment for Conveying Concrete:
  - 1. Runways for wheeled concrete conveying equipment shall be provided for the ready-mix concrete delivery point to the locations of final deposit.
  - 2. The interior surfaces of concrete conveying equipment shall be maintained free of hardened concrete, debris, water, snow, ice and other deleterious materials.
- C. When the temperature of the surrounding air is expected to be below 40-degrees F. during concrete placing or within 24-hours thereafter, the temperature of the plastic concrete, as placed, shall be no lower than 60-degrees F. The temperature of the concrete as placed shall not be so high as to cause difficulty from loss of slump, flash set or cold joints, and should not exceed 90-degrees F. When the temperature of the concrete exceeds 80-degrees F., precautionary measures approved by the Engineer shall be put into effect. When the temperature of steel forms is greater than 120-degrees F., the steel surfaces shall be sprayed with water just prior to placing the concrete.
- D. Concrete shall be deposited continuously. Concrete which has partly hardened or has been contaminated by foreign materials shall not be placed; such concrete shall be removed from the Site and disposed of in a location approved by the Owner or Governing Agency.
- E. Pavement may be constructed either by use of forms or by a mechanical paver, provided the required finish, and cross-section, as shown on Drawings, are obtained. Concrete shall be placed to provide one course monolithic structure without the use of mortar topping or sand-cement drier. Concrete shall be spaded or vibrated sufficiently to ensure satisfactory consolidation.
- F. The concrete surface shall be struck off to a plane surface with a straightedge. After the surface has been floated to an even surface, the contraction joint shall be cut and all slab edges rounded with a 1/2-inch radius edging tool that will finish to a width of 2-inches. After the concrete has slightly set, a broom shall be brushed lightly across the surface at right angles to forms so as to impart the required finish per Section 3.13.

### 3.9 JOINTS FOR CONCRETE PAVEMENT

- A. Per Section 902 of the Michigan Department of Transportation Specification (latest edition) and as listed in the Plans.

- B. Provide contraction joints in concrete pavement at the end of each day's pour, unless the pour ends at an expansion joint; in line with all contraction joints and end-of-pour joints of abutting concrete placements, maximum intervals listed in the Plans..
- C. Form contraction joints by sawing a 1/4" wide cut perpendicular to the surface and at right angles to the edge of pavement, to a depth of at least 1/4 the slab thickness with a minimum depth of 3 inches.
- D. Longitudinal joints shall be placed parallel to edge of pavement and located at 1/3 points or as listed in the Plans. Depth and width are specified in paragraph 3.9B above.
- E. Provide expansion joints in concrete pavement at tangent points or radius returns at intersections as listed in the Plans.
- F. Provide expansion joints between concrete pavement and adjacent rigid structures not specified herein before.
- G. Fill expansion joints with expansion joint filler strips, 1-inch thick unless otherwise shown on the Drawings. The strap shall extend the full depth of the concrete complying with AASHTO M-213, Type III.
- H. Where the expansion joint will not be sealed, install joint filler strips with top flush with concrete finish elevation.
- I. All contraction joints in concrete pavement sections shall be sealed with either hot-poured joint sealer or cold-applied joint sealer as listed in the Plans
- J. Prior to applying joint sealer, remove wood strips. Clean joint groove of foreign matter and loose particles, and dry surface.
- K. Slightly underfill joint groove with joint sealer to prevent extrusion of the sealer. Remove excess joint sealer material as soon after sealing as possible.
- L. Subsequent to joint sealing, protect sealed areas from contact with injurious substances or damage from construction traffic or operations until project completion.

### 3.10 JOINTS FOR CONCRETE SIDEWALK

- A. Contraction joints shall be placed at right angles to the edge of the sidewalk and perpendicular to the surface and at a depth of at least 1/4 the slab thickness with a minimum depth of 1-1/4 inches.
- B. Where along a curve, joints must be perpendicular to the curve with a minimum length of 1 foot before intersecting another joint(s) in any direction. No joints are allowed to be cut at an angle other than 90° at the curb line.
- C. Contraction joints shall be spaced as listed in n the Plans.
- D. The concrete surface shall be struck off to a plane surface with a straightedge. After the surface has been floated to an even surface, the contraction joint shall be cut and all slab edges rounded with a 1/2-inch radius edging tool that will finish to a width of 2-inches.
- E. After the concrete has set, a broom shall be brushed lightly across the surface at right angles to forms so as to impart the required finish per Section 3.13.

F. Expansion joints shall be placed at the following locations:

1. At the back of the curb and front edge of the sidewalks adjacent to each driveway.
2. At any place where a sidewalk abuts a building or fixed structure.
3. At any other locations listed in the Plans.

### 3.11 JOINTS FOR CONCRETE CURB AND GUTTER

- A. Provide contraction joints in concrete curb and gutter at the end of each day's pour, unless the pour ends at an expansion joint, in line with all contraction joints and end-of-pour joints of the abutting concrete placements, at 40-foot maximum intervals and elsewhere as listed in the Plans.
- B. Form contraction joints by steel templates  $\frac{1}{4}$ -inch in thickness, shaped to conform to the required cross-section of the curb. Leave templates in place until the concrete has set sufficiently to hold its shape.
- C. Provide expansion joints in concrete curb and gutter at tangent points of curb returns, at intersections and in straight runs at uniform intervals not exceeding 400-feet on centers.
- D. Provide expansion joints with expansion joint filler strips, 1-inch thick, unless otherwise shown on the Drawings. The strips shall extend the full depth of the concrete complying with AASHTO M-213, Type III.
- E. After the concrete has set, a broom shall be brushed lightly across the surface at right angles to forms so as to impart the required finish per Section 3.13.
- F. Install joint filler strips at the proper depth below the finished concrete construction with a slightly tapered, dressed-and-oiled wood strip temporarily secured to the top of the filler strip to form a groove not less than  $\frac{1}{4}$ -inch in depth.
- G. All contraction joints in concrete curb sections shall be sealed with either hot-poured joint sealer or cold-applied joint sealer.
- H. Prior to applying joint sealer, remove wood strips. Clean joint groove of foreign matter and loose particles and dry surface.
- I. Slightly underfill joint groove with joint sealer to prevent extrusion of the sealer. Remove excess joint sealer materials as soon after sealing as possible.
- J. Subsequent to joint sealing, protect sealed areas from contact with injurious substances or damage from construction traffic or operations until project completion.
- K. Joints in curbing should align with joints in adjacent concrete paved sidewalk or site concrete.

### 3.12 FINISHING

- A. Paving: Light broom.
- B. Sidewalk Paving: Light broom, radius to 1 inch radius, and trowel joint edges.
- C. Curbs and Gutters: Light broom.

- D. Direction of Texturing: Transverse to paving direction.
- E. Place curing compound on exposed concrete surfaces immediately after finishing.

### 3.13 CURING AND WEATHER PROTECTION

- A. Freshly placed concrete shall be protected as required to maintain the temperature of the concrete at not less than 50-degrees F nor more than 80-degrees F and in a moist condition continuously for a period of time necessary for the concrete to cure per Section 3.14B and 3.14C. Changes in temperature of the concrete during curing shall be as uniform as possible and shall not exceed 5-degrees F in any one hour, or 50-degrees F in any 24 hour period.
- B. Cold Weather Protection: When the temperature of the atmosphere is 40-degrees F and below, the concrete shall be protected by heating, insulation covering, housing or combination thereof as required to maintain the temperature of the concrete at or above 50-degrees F and in a moist condition continuously for the concrete curing period. Cold weather protection shall meet the requirements of ACI 306R "Cold Weather Concreting".
- C. Hot Weather Protection: When the temperature of the atmosphere is 90-degrees F and above, or during other climatic conditions which will cause too rapid drying of the concrete, the concrete shall be protected by windbreaks, shading, fog spraying light-colored moisture-retaining covering, or a combination thereof as required to maintain the temperature of the concrete below 80-degrees F and in a moist condition continuously for the concrete curing period. Hot weather protection shall meet the requirements of ACI 305R "Hot Weather Concreting".

### 3.14 IDENTIFICATIONS

- A. Prior to the application of the curing compound, the Contractor shall clearly and neatly mark the pavement with the Contractor's name and year of construction. This identification shall be stamped in the concrete at both ends of a length of pavement construction, at intersection locations of the pavement constructed, at both ends of a length of curb constructed and once in the middle, at both ends of a length of sidewalk constructed and at one spot in a driveway approach.

### 3.15 REMOVAL OF FORMS AND CLEAN UP

- A. All forms, rails and stakes shall be removed within 24-hours after placing the pavement, sidewalk or curbs.
- B. After completion of concrete curing in an area, remove all weather protection materials and rubbish and debris resulting from the specified Work, sweep concrete curbs clean and seal joints as specified in Sections 3.9 through 3.11.

### 3.16 ERECTION TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/8 inch in 10 ft.
- B. Variation from Indicated Elevation: Maximum 1/4 inch.
- C. Maximum Variation from True Position: 1/4 inch.
- D. Scheduled Thickness: No less than specified on the Drawings.



3.17 FIELD QUALITY CONTROL

- A. The Owner shall hire a 3rd party testing company to test in-place materials for compliance with the latest version of ASTM and MDOT Standard Specifications for Construction.
- B. Perform field inspection and testing in accordance with ASTM C94 and local governing agency standards.
- C. Inspect reinforcing placement for size, spacing, location, support.
- D. Quality Control During Paving Operations:
  - 1. Sampling Procedures: ASTM C172.
  - 2. Cylinder Molding and Curing Procedures: ASTM C31, cylinder specimens.
  - 3. Sample concrete and make three cylinders for each day of paving unless otherwise specified by the Owner. Record the locations where the samples are taken to correlate with subsequent testing.
  - 4. Test one cured concrete cylinder from each sample set per ASTM C39 at 7-day and 28-day periods and report the type of failure and compressive strength at failure. Note the third cylinder is to be stored for future use.
  - 5. Test slump in-field per ASTM C143 for each sample.
  - 6. Test mix for air-entrainment per ASTM C231 for each sample.
- E. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.
- F. Additional testing may be required if any of the previous tests indicate insufficient values. If two successive tests indicate insufficient values, contact the Owner for a course of action.
- G. Concrete materials not complying with the specified requirements shall be repaired or removed and replaced with new paving.

3.18 PROTECTION

- A. Immediately after placement, protect paving from premature drying, excessive hot or cold temperatures, and mechanical injury. Refer to section 3.14 for additional detail.
- B. Do not permit vehicular traffic over paving for a minimum of 14 days after finishing.

**\*\*END OF SECTION\*\***

PAVEMENT MARKINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Traffic lines and markings
2. Legends
3. Paint

B. Related Sections:

1. Section 32 12 16 - Asphalt Paving
2. Section 32 13 13 - Concrete Paving

1.2 PERFORMANCE REQUIREMENTS

- A. Paint Adhesion: Adhere to road surface forming smooth continuous film one minute after application.
- B. Paint Drying: Tack free by touch so as not to require coning or other traffic control devices to prevent transfer by vehicle tires within two minutes after application.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit paint formulation for each type of paint.
- C. Manufacturer's Installation Instructions: Submit instructions for application temperatures, eradication requirements, application rate, line thickness, and any other data on proper installation.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with local governing agency standards.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Invert containers several days prior to use when paint has been stored more than 2 months. Minimize exposure to air when transferring paint. Seal drums and tanks when not in use.

## 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer
- C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
- D. Do not apply paint when temperatures are expected to fall below 40 degrees F for 24 hours after application.
- E. Volatile Organic Content (VOC). Do not exceed State or Environmental Protection Agency maximum VOC on traffic paint.

## PART 2 PRODUCTS

### 2.1 PAINTED PAVEMENT MARKINGS

- A. Furnish materials in accordance with local governing agency standards.
- B. Color:
  - 1. Traffic lane striping shall be white or yellow reflectorized as shown on the Plans.
  - 2. Traffic marking, curb faces and light pole bases shall be yellow reflectorized as shown on the Plans.
  - 3. Parking lot striping shall be yellow unless otherwise noted.
  - 4. Handicap stall striping meeting current ADA guidelines shall be blue unless noted otherwise.

### 2.2 EQUIPMENT

- A. Continuous Longitudinal Line Application Machine: Use application equipment with following capabilities.
  - 1. Dual nozzle paint gun to simultaneously apply parallel lines of indicated width in solid or broken patterns or various combinations of those patterns.

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2. Pressurized bead-gun to automatically dispense glass beads onto painted surface, at required application rate.
3. Measuring device to automatically and continuously measure length of each line placed, to nearest foot.
4. Device to heat paint as necessary for fast dry applications.

B. Machine Calibration:

1. Paint Line Measuring Device: Calibrate automatic line length gauges to maintain tolerance of plus or minus 25 feet per mile.
2. Cycle Length/Paint Line Length Timer: Calibrate cycle length to maintain tolerance of plus or minus 6 inches per 40 feet; calibrate paint line length to maintain tolerance to plus or minus 3 inches per 10 feet.
3. Paint Guns: Calibrate to simultaneously apply paint binder at uniform rates as specified with an allowable tolerance of plus or minus 1 mil.

C. Other Equipment:

1. For application of crosswalks, intersections, stop lines, legends and other miscellaneous items by walk behind stripers, hand spray or stencil trucks, apply with equipment meeting requirements of this section. Do not use hand brushes or rollers.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Do not apply paint to pavement surfaces until it has cured for 28 days, unless approved by Owner.

3.2 PREPARATION

A. Maintenance and Protection of Traffic:

1. Prevent interference with marking operations and to prevent traffic on newly applied markings before markings dry.
2. Maintain access to existing businesses, and other properties requiring access.

B. Surface Preparation.

1. Clean and dry paved surface prior to painting.

SECTION 321723  
PAVEMENT  
MARKINGS

2. Blow or sweep surface free of dirt, debris, oil, grease or gasoline or other material that would adversely affect paint bonding with pavement.
3. Pavement surface shall be protected during any paint transfer operations to contain spillage and splatter.

3.3 APPLICATION

- A. Agitate paint for 1-15 minutes prior to application to ensure even distribution of paint pigment.
- B. Dispense paint per manufacturer's recommendations to a wet-film thickness of 15 mils, except dispense edge markings to wet-film thickness of 12 mils.
- C. Apply markings to indicated dimensions at indicated locations.
- D. Prevent splattering and over spray when applying markings.
- E. Unless material is track free at end of paint application, use traffic cones to protect markings from traffic until track free. When vehicle crosses a marking and tracks it or when splattering or over spray occurs, eradicate affected marking and resultant tracking and apply new markings.
- F. Collect and legally dispose of residues from painting operations.
- G. Install Work in accordance with local governing agency standards.

3.4 APPLICATION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Wet Film Thickness: 1 mil.
- C. Maximum Variation from Wet Paint Line Width: Plus or minus 1/8 inch.
- D. Maintain cycle length for skip lines at tolerance of plus or minus 6 inches per 40 feet and line length of plus or minus 3 inches per 10 feet.
- E. Maximum Variation from Specified Application Temperature: Plus or minus 5 degrees F

### 3.5 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect for incorrect location, line length, insufficient thickness, line width, coverage, retention, uncured or discolored material, and insufficient bonding.
- C. Repair lines and markings, which after application and curing do not meet following criteria:
  - 1. Incorrect Location: Remove and replace incorrectly placed patterns.
  - 2. Insufficient Thickness, Line Width, Paint Coverage, Glass Bead Coverage or Retention: Prepare defective material by acceptably grinding or blast cleaning to remove substantial amount of beads and to roughen marking surface. Remove loose particles and debris. Apply new markings on cleaned surface in accordance with this Section.
  - 3. Uncured or Discolored Material, Insufficient Bonding: Remove defective markings in accordance with this Section and clean pavement surface one foot beyond affected area. Apply new markings on cleaned surface in accordance with this Section.
- D. When eradication of existing paint lines is necessary, eradicate by shot blast or water blast method. Do not gouge or groove pavement more than 1/16 inch during removal. Limit area of removal to area of marking plus 1 inch on all sides. Prevent damage to transverse and longitudinal joint sealers, and repair any damage according to requirements in Section 32 13 13 or Section 32 12 16.
- E. Maintain daily log showing work completed, results of above inspections or tests, pavement and air temperatures, relative humidity, presence of any moisture on pavement, and any material or equipment problems. Make legible entries in log in ink, sign and submit to owner by end of each work day. Enter environmental data into log prior to starting work each day and at two additional times during day.

### 3.6 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Protect painted pavement markings from vehicular and pedestrian traffic until paint is dry and track free. Follow manufacturer's recommendations or use minimum of 30 minutes. Consider barrier cones as satisfactory protection for materials requiring more than 2 minutes dry time.

**\*\*END OF SECTION\*\***

## SOIL PREPARATION

### PART 1 GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Preparation of subsoil.
2. Soil testing.
3. Placing topsoil.

B. Related Sections:

4. Section 31 22 13 - Rough Grading: Rough grading of site.
5. Section 31 23 17 - Trenching: Rough grading over cut.
6. Section 32 91 19 - Landscape Grading: Preparation of subsoil and placement of topsoil in preparation for the Work of this section.
7. Section 32 92 19 - Seeding

#### 1.2 REFERENCES

A. ASTM International:

1. ASTM D2607 – Classification of Peats, Mosses, Humus, and Related Products

#### 1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with local governing agency standards regarding materials, methods of work, and disposal of excess and waste materials.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Topsoil: As specified in Section 310516 Type S2. Frozen or muddy topsoil is not acceptable.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify prepared soil base is ready to receive the Work of this section.

- C. Locate and identify existing underground and overhead services and utilities within contract limit work areas. (Call private utility locating service and Miss Dig: 1-800-482-7171 or 811).
- D. Provide adequate means to protect utilities and services designated to remain.
- E. Repair utilities damaged during site work operations at Subcontractor's expense.
- F. When uncharted or incorrectly charted underground piping or other utilities and services are encountered during site work operations, notify the applicable utility company and Engineer immediately to obtain procedure directions. Cooperate with applicable utility company in maintaining active services in operation.
- G. Locate, protect and maintain bench marks, monuments, control points and project engineering reference points. Re-establish disturbed or destroyed items at Subcontractor's expense.
- H. Perform landscape work operations and the removal of debris and materials to ensure minimum interference with streets, walks, and other adjacent facilities.
- I. Protect existing trees scheduled to remain against injury or damage including cutting, breaking or skinning of roots, trunks or branches, smothering by stockpiled construction materials, excavated materials or vehicular traffic within branch spread.

### 3.2 DISPOSAL OF WASTE MATERIALS

- A. Stockpile, haul from site and legally dispose of waste materials and debris. Accumulation is not permitted.
- B. Maintain disposal routes, clear, clean and free of debris.
- C. On site burning of combustible cleared materials is not permitted.
- D. Upon completion of landscape preparation work, clean areas within contract limits, remove tools and equipment. Site to be clear, clean, and free of materials and debris and suitable for site work operations
- E. Materials, items and equipment not scheduled for reinstallation or salvaged for the General Contractor are the property of the Landscape Contractor. Remove cleared materials from the site as the work progresses. Storage and sale of Landscape contractors salvage items on site is not permitted.

**\*\*END OF SECTION\*\***



LANDSCAPE GRADING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Final grade topsoil for finish landscaping.

B. Related Sections:

2. Section 31 22 13 - Rough Grading: Site contouring.
3. Section 31 23 17 - Trenching: Backfilling trenches.
4. Section 31 23 23 - Fill: Backfilling at building areas.
5. Section 32 05 16 - Soils and Aggregates.
6. Section 32 92 19 - Seeding.

1.2 SUBMITTALS

A. Materials Source: Submit name of imported materials source.

B. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.3 QUALITY ASSURANCE

A. Furnish each topsoil material from single source throughout the Work.

B. Perform Work in accordance with local governing agency standards.

PART 2 PRODUCTS

2.1 MATERIAL

A. Topsoil: Fill Type S2 as specified in Section 32 05 16.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify substrate base has been contoured and compacted.

3.2 PREPARATION

- A. Protect landscaping and other features remaining as final Work.
- B. Protect existing structures, fences, sidewalks, utilities, paving, and curbs.

3.3 SUBSTRATE PREPARATION

- A. Eliminate uneven areas and low spots.
- B. Remove debris, roots, branches, stones, in excess of 1 inch in size. Remove contaminated subsoil.
- C. Scarify surface to depth of 4 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.4 PLACING TOPSOIL

- A. Prior to placing topsoil Contractor must call for an inspection by the Owner/Engineer to verify that the grading is within tolerance for installing the proper depth of topsoil.
- B. Place topsoil in areas where seeding is required to compacted depth of 3 inches. Place topsoil during dry weather.
- C. Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.
- D. Remove roots, weeds, rocks, and foreign material while spreading.
- E. Lightly compact placed topsoil.
- F. Remove surplus subsoil and topsoil from site.

3.5 TOLERANCES

- A. Top of Topsoil: Plus or minus 1/2 inch.

3.6 PROTECTION OF INSTALLED WORK

- A. Prohibit construction traffic over topsoil.

**\*\*END OF SECTION\*\***

## SEEDING

### PART 1 GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Seeding.
2. Hydroseeding.
3. Mulching.

B. Related Sections:

1. Section 31 22 13 - Rough Grading: Rough grading of site.
2. Section 31 23 17 - Trenching: Rough grading over cut.
3. Section 32 05 16 - Soils and Aggregates.
4. Section 32 91 13 - Soil Preparation
5. Section 32 91 19 - Landscape Grading: Preparation of subsoil and placement of topsoil in preparation for the Work of this section.

#### 1.2 DEFINITIONS

- A. Weeds: Vegetative species other than specified species to be established in given area.

#### 1.3 SUBMITTALS

- A. Product Data: Submit data for seed mix, fertilizer, mulch, and other accessories.
- B. Submit seed vendor's certification for required grass seed mixture, indicating percentage by weight, and percentage of purity, germination, and weed seed for each grass species.
- C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Include maintenance instructions, cutting method and maximum grass height and types, application frequency, and recommended coverage of fertilizer.

#### 1.5 QUALITY ASSURANCE

- A. Provide seed mixture in original unopened containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging. Store in manner to prevent wetting and deterioration.

- B. Perform Work in accordance with local governing agency standards.

## 1.6 QUALIFICATIONS

- A. Seed Supplier: Company specializing in manufacturing Products specified in this section with minimum three years' experience.
- B. Installer: Company specializing in performing work of this section with minimum 3 years' experience.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

## PART 2 PRODUCTS

### 2.1 SEED MIXTURE

- A. Lawn seeded areas: Fresh, clean and new crop seed mixture. Mixed by approved methods.
- B. Seed mixture composed of the following varieties, mixed to the specified proportions by weight and tested to minimum percentages of purity and germination.
- C. Detention Basin Embankment Seed Mixture as indicated below:

<b>SEED TYPE</b>	<b>OUNCES/ACRE</b>
<b>Permanent Grasses/Sedges/Rushes:</b>	
River Bulrush	1.00
Crested Oval Sedge	0.50
Bottlebrush Sedge	3.00
Brown Fox Sedge	2.00
Virginia Wild Rye	24.00
Fowl Manna Grass	1.00
Common Rush	1.00
Rice Cut Grass	1.00
Switch Grass	2.00
Great Bulrush	3.00
Dark Green Rush	2.00
Wool Grass	1.00
<b>Temporary Cover:</b>	
Common Oat	512.00
<b>Forbs/Shrubs</b>	
Common Water Plantain	2.50
Swamp Milkweed	2.00
Bidens Species	2.00
Common Boneset	1.00
Sneezeweed	2.00
Blue Flag	4.00

Common Water Horehound	0.50
Monkey Flower	1.00
Ditch Stonecrop	0.50
Pinkweed Species	2.00
Sweet Black-Eyed Susan	1.00
Brown-Eyed Susan	1.50
Common Arrowhead	1.00
Wild Senna	2.00
Panicled Aster	0.50
New England Aster	0.50
Purple Meadow Rue	2.00

*No noxious weed seeds permitted*

*Basis of design is Cardno Stormwater Mix. Install per manufacturer's recommended application rates.*

D. Irrigated Seed Mixture for grass areas proportioned by volume as indicated below:

<b>SEED TYPE</b>	<b>PROPORTION</b>	<b>PURITY</b>	<b>GERMINATION</b>
Penn Lawn Fescue	30%	95%	80%
Kentucky Bluegrass	50%	90%	75%
Annual Ryegrass	20%	95%	80%

*No noxious weed seeds permitted.*

*(Fertilizer for irrigated lawn 12-12-12)*

E. Non-irrigated Seed Mixture for grass areas proportioned by volume as indicated below:

<b>SEED TYPE</b>	<b>PROPORTION</b>	<b>PURITY</b>	<b>GERMINATION</b>
Penn Lawn Fescue	60%	90%	85%
Kentucky 28# common Bluegrass	20%	90%	90%
Pennfine Perennial Rye	20%	90%	90%

*No noxious weed seeds permitted.*

*(Fertilizer for non-irrigated lawn 10-10-10)*

## 2.2 EROSION CONTROL BLANKETS

- A. The use of erosion control blankets will not be allowed on sloped earth/embankments flatter than 6H:1V.
- B. For sloped earth/embankments between 3H:1V and 6H:1V the following erosion control blankets shall be used.
  - 1. AEC Curlex Netfree
  - 2. Engineer and owner approved equal
- C. If the specified erosion control blanket will not work properly due to site conditions, as agreed to by the Owner and Engineer, and/or greater than a 3V:1H sloped earth/embankment, then the following erosion control blankets shall be used.
  - 1. AEC Premier Straw FibreNet SN MSMC s75bn
  - 2. AEC Premier Straw FibreNet DN MSMC s150bn
  - 3. Engineer and owner approved equal
- D. If erosion control blankets with netting are approved for use, then the Contractor must remove the blankets once there is 80% uniform growth established for the entire area. If the Contractor refuses to remove the netting 14 days after initial notification, then the Owner will remove the netting at Contractor's expense in the form of a deduct change order/credit to the contract. Final payment will not be issued to the Contractor until the netting has been removed to the satisfaction of the Owner.

## 2.3 ACCESSORIES

- A. Water: Free of substance harmful to seed growth. Hoses or other methods to transpiration furnished by Sub Contractor.

## 2.4 SOURCE QUALITY CONTROL

- A. Testing is not required when recent tests and certificates are available for imported topsoil. Submit these test results to testing laboratory. Indicate, by test results, information necessary to determine suitability.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify prepared soil base is ready to receive the Work of this section.
- C. Work notification: Notify Owner or General Contractor's representative at least seven (7) working days prior to start of seeding operation.
- D. Protect existing utilities, paving, and other facilities from damage caused by seeding operations.

- E. Perform seeding work only after planting and other work affecting ground surface has been completed.
- F. Provide hose and lawn watering equipment as required.

### 3.2 SURFACE PREPARATION

- A. After lawn areas have been prepared, take no heavy objects over them except lawn rollers.
- B. After preparation of lawn areas and with topsoil in semi-dry condition, roll lawn planting areas in two directions at approximately right angles with water ballast roller weighing 100 to 300 lbs according to soil type.
- C. Rake or scarify and cut or fill irregularities that develop as required until area is true and uniform, free from lumps, depressions, and irregularities.
- D. Restore prepared areas to specified condition if eroded, settled or otherwise disturbed after fine grading and prior to seeding.

### 3.3 HYDROSEEDING

- A. Hydro-seeding: The application of grass seed and a wood cellulose fiber mulch tinted green shall be accomplished in one operation by use of an approved spraying machine.
- B. Mix seed, fertilizer, and wood cellulose fiber in required amount of water to produce homogenous slurry. Add wood cellulose fiber after seed, water, and fertilizer have been thoroughly mixed and apply at the rate of 200 pounds per acre dry weight.
- C. For hydro-seeding, wood cellulose fiber shall be used. Silva-Fiber Mulch by Weyerhaeuer Company, Tacoma WA (800-443-9179) or approved equal.
- D. Hydraulically spray material on ground to form a uniform cover impregnated with grass seed.
- E. Immediately following application of slurry mix, make separate application of wood cellulose mulch at the rate of 1,000 pounds, dry weight, per acre.
- F. Apply cover so that rainfall or applied water will percolate to underlying soil.

### 3.4 ESTABLISH LAWN

- A. Establish dense lawn of permanent grasses, free from lumps and depressions. Any area failing to show uniform germination to be reseeded; continue until dense lawn established.
- B. Damage to seeded area resulting from erosion to be repaired by Subcontractor.
- C. In event Subcontractor does not establish dense lawn during first germination period, return to project to re-fertilize and reseed to establish dense lawn.
- D. Should the seeded lawn become largely weeds after germination, Subcontractor is responsible to kill the weeds and reseed the proposed lawn areas to produce a dense turf, as specified.

3.5 CLEANING

- A. Perform cleaning during installation of the work and upon completion of the work to the approval of the Owner. Remove from site all excess materials, debris, and equipment. Repair damage resulting from seeding operations.

**\*\*END OF SECTION\*\***



MANHOLES AND STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Monolithic concrete manhole section with masonry transition to cover frame, covers, anchorage, and accessories.
2. Modular precast concrete manhole section with tongue-and-groove joints [with masonry transition to cover frame,] covers, anchorage, and accessories.
3. Monolithic FRP manhole section with transition to cover frame, covers, anchorage, and accessories.
4. Masonry manhole section with masonry transition to cover frame, covers, anchorage, and accessories.
5. Outlet Control Structures for detention areas.
6. Bedding and cover materials.

B. Related Sections:

1. Section 31 05 16 - Aggregates for Earthwork: Aggregate for backfill in trenches.
2. Section 31 23 16 - Excavation: Excavating for manholes.
3. Section 31 23 23 - Fill: Backfilling after manhole installation.

1.2 REFERENCES

A. American Concrete Institute:

1. ACI 318 - Building Code Requirements for Structural Concrete.
2. ACI 530/530.1 - Building Code Requirements for Masonry Structures and Specifications for Masonry Structures.

B. ASTM International:

1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM C55 - Standard Specification for Concrete Brick.
4. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made from Clay or Shale).

5. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
6. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
7. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
8. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.
9. ASTM D3753 - Standard Specification for Glass-Fiber-Reinforced Polyester Manholes and Wet wells.
10. ASTM A760/A760M-15 - Standard Specification for Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains

### 1.3 DESIGN REQUIREMENTS

- A. Equivalent strength: Based on structural design of reinforced concrete as outlined in ACI 318.
- B. Design of Lifting Devices for Precast Components: In accordance with ASTM C913.
- C. Design of Joints for Precast Components: In accordance with ASTM C913; maximum leakage of 0.025 gallons per hour per foot of joint at 3 feet of head.

### 1.4 SUBMITTALS

- A. Shop Drawings: Indicate manhole locations, elevations, piping with sizes and elevations of penetrations.
- B. Product Data: Submit manhole cover and frame construction, features, configuration, dimensions.

### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with local governing agency standards.

### 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum of three years experience.

### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Comply with precast concrete manufacturer's instructions for unloading, storing and moving precast manholes.
- B. Store precast concrete manholes to prevent damage to Owner's property or other public or private property. Repair property damaged from materials storage.
- C. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers shown on Drawings to indicate its intended use.

## PART 2 PRODUCTS

### 2.1 MANHOLES

- A. Manhole Sections: Reinforced precast concrete in accordance with ASTM C478 with gaskets in accordance with ASTM C923.
- B. Mortar and Grout: Mortar for finishing and sealing shall be Class "C". Honeycombing less than 2 inches deep shall be repaired using Class "D" mortar.
- C. Brick Transition Reinforcement: Formed steel 8 gage wire with galvanized finish.

### 2.2 OUTLET CONTROL STRUCTURES

- A. Structure shall be material and size as indicated on Drawings.
- B. Casting shall be material and size as indicated on Drawings.
- C. Base shall be material and size as indicated on Drawings.
- D. Bedding and backfill shall be material and sizes as indicated on Drawings.

### 2.3 FRAMES AND COVERS

- A. Manufacturers:
  - 1. EJ or approved equal.
- B. Product Description: ASTM A48, Class 30B Heavy-Duty Cast-iron construction, machined flat bearing surface, removable lid, closed or open as indicated on Drawings; sealing gasket; cover molded with identifying name and logo as required by local governing agency.

### 2.4 COMPONENTS

- A. Manhole Steps: M.A. Industries P.S.I. Polypropylene or approved equal.
- B. Base Pad: Cast-in-place concrete 3,000 psi at 28 days, leveled top surface.

### 2.5 CONFIGURATION

- A. Manhole Section Construction: Concentric with eccentric cone top section.
- B. Shape: Cylindrical.
- C. Clear Inside Dimensions: 48-inch diameter or as indicated on Drawings.
- D. Design Depth: As indicated on Drawings.
- E. Clear Lid Opening: 24-inch minimum diameter or as indicated on Drawings.
- F. Pipe Entry: Provide openings as indicated on Drawings.
- G. Steps: 16 inches on center vertically, set into manhole wall. As indicated on Drawings.

2.6 BEDDING AND COVER MATERIALS

- A. Bedding: Fill Type A1 as specified in Section 31 05 16 and as indicated on Drawings.
- B. Cover: Fill Type A2, as specified in Section 31 05 16 and as indicated on Drawings.

2.7 FINISHING - STEEL

- A. Galvanizing: ASTM A123, hot dip galvanized after fabrication.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify items provided by other sections of Work are properly sized and located.
- C. Verify built-in items are in proper location, and ready for roughing into Work.
- D. Verify correct size of manhole excavation.

3.2 PREPARATION

- A. Coordinate placement of inlet and outlet pipe required by other sections.
- B. Do not install structures where site conditions induce loads exceeding structural capacity of structures.
- C. Inspect precast concrete structures immediately prior to placement in excavation to verify structures are internally clean and free from damage. Remove and replace damaged units.

3.3 INSTALLATION

- A. Excavation and Backfill:
  - 1. Excavate for manholes in accordance with Section 31 23 16 in location and to depth shown. Provide clearance around sidewalls of structure for construction operations.
  - 2. When groundwater is encountered, prevent accumulation of water in excavations. Place manholes in dry trench.
  - 3. Where possibility exists of watertight structure becoming buoyant in flooded excavation, anchor structure to avoid flotation.
- B. Place base pad, trowel top surface level.
- C. Place manhole sections plumb and level, trim to correct elevations, anchor to base pad.
- D. Backfill excavations for manholes in accordance with Section 31 23 16 and 31 23 23.
- E. Form and place manhole cylinder plumb and level, to correct dimensions and elevations.

- F. Cut and fit for pipe.
- G. Grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour to form continuous drainage channel as indicated on Drawings.
- H. Set cover frames and covers level without tipping, to correct elevations.
- I. Coordinate with other sections of Work to provide correct size, shape, and location.

### 3.4 PRECAST CONCRETE MANHOLE INSTALLATION

- A. Lift precast components at lifting points designated by manufacturer.
- B. When lowering manholes into excavations and joining pipe to units, take precautions to ensure interior of pipeline and structure remains clean.
- C. Set precast structures bearing firmly and fully on crushed stone bedding, compacted in accordance with provisions of Section 31 23 16, Section 31 23 23 or on other support system shown on Drawings.
- D. Assemble multi-section structures by lowering each section into excavation. Lower, set level, and firmly position base section before placing additional sections.
- E. Remove foreign materials from joint surfaces and verify sealing materials are placed properly. Maintain alignment between sections by using guide devices affixed to lower section.
- F. Joint sealing materials may be installed on site or at manufacturer's plant.
- G. Verify manholes installed satisfy required alignment and grade.
- H. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe. Fill annular space with mortar.
- I. Cut pipe to finish flush with interior of structure.
- J. Shape inverts through manhole as shown on Drawings.

### 3.5 CAST-IN-PLACE CONCRETE MANHOLE INSTALLATION

- A. Prepare crushed stone bedding or other support system shown on Drawings, to receive base slab as specified for precast structures.
- B. Erect and brace forms against movement.
- C. Install reinforcing steel as indicated on Drawings.
- D. Place and cure concrete.

### 3.6 FRAME AND COVER INSTALLATION

- A. Set frames using mortar and masonry. Install radially laid concrete brick with 1/4-inch-thick vertical joints at inside perimeter. Lay concrete brick in full bed of mortar and completely fill joints. Where more than one course of concrete brick is required, stagger vertical joints.

- B. Set frame and cover 2 inches above finished grade for manholes with covers located within unpaved areas to allow area to be graded away from cover beginning 1 inch below top surface of frame.

### 3.7 FIELD QUALITY CONTROL

- A. Test concrete manhole and structure sections in accordance with ASTM C497.
- B. Vertical Adjustment of Existing Manholes:
  - 1. Where required, adjust top elevation of existing manholes to finished grades shown on Drawings.
  - 2. Reset existing frames, grates and covers, carefully removed, cleaned of mortar fragments, to required elevation in accordance with requirements specified for installation of castings.
  - 3. Remove concrete without damaging existing vertical reinforcing bars when removal of existing concrete wall is required. Clean vertical bars of concrete and bend into new concrete top slab or splice to required vertical reinforcement, as indicated Drawings.
  - 4. Clean and apply sand-cement bonding compound on existing concrete surfaces to receive cast-in-place concrete.

**\*\*END OF SECTION\*\***

## STORM UTILITY DRAINAGE PIPING

### PART 1 GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Storm drainage piping.
2. Accessories.
3. Catch basins.
4. Bedding and cover materials.

B. Related Sections:

1. Section 31 05 16 – Soils and Aggregates: Aggregate for backfill in trenches.
2. Section 31 23 16 - Excavation: Product and execution requirements for excavation and backfill required by this section.
3. Section 31 23 17 - Trenching: Execution requirements for trenching required by this section.
4. Section 31 23 23 - Fill: Requirements for backfill to be placed by this section.
5. Section 33 05 13 - Manholes and Structures.
6. Section 33 46 00 - Subdrainage: Termination of catch basin subdrain system for connection to Work of this Section.

#### 1.2 REFERENCES

A. ASTM International:

1. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
2. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
4. ASTM D1785 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe
5. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

6. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
7. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
8. ASTM D3212 Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
9. ASTM D3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
10. ASTM A760/A760M-15 - Standard Specification for Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains

### 1.3 SUBMITTALS

- A. Product Data: Submit data indicating pipe and pipe accessories.
- B. Manufacturer's Installation Instructions: Submit special procedures required to install Products specified.
- C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

### 1.4 CLOSEOUT SUBMITTALS

- A. Project Record Documents:
  1. Accurately record actual as-built locations of pipe runs, connections, catch basins, cleanouts, and invert elevations.
  2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with local governing agency standards.

### 1.6 COORDINATION

- A. Coordinate the Work with termination of storm sewer connection outside building, trenching, and connection to private or municipal sewer utility service.

## PART 2 PRODUCTS

### 2.1 STORM DRAINAGE PIPING

- A. Reinforced Concrete Pipe: ASTM C76, Class IV unless indicated otherwise on Drawings.
  1. Fittings: Reinforced concrete.
  2. Joints: ASTM C443, rubber compression gasket.



- B. Corrugated Metal Pipe: A760/A760M-15 material, fittings and joints as indicated on Drawings.
- C. Plastic Pipe: ASTM D1785, SCH 26, Poly (Vinyl Chloride) (PVC) material; bell and spigot style rubber ring sealed gasket joint.
  - 1. Fittings: PVC.
  - 2. Joints: ASTM D3212, elastomeric gaskets.

## 2.2 CATCH BASINS

- A. Catch Basin Lid and Frame Manufacturers:
  - 1. EJ or approved equal.
- B. Catch Basin Lid and Frame:
  - 1. Construction: Cast iron or ductile iron construction as indicated on Drawings.
- C. Shaft Construction and Cone Top Section: Reinforced precast concrete pipe sections, lipped male/female joints, nominal shaft diameter as indicated on Drawings, conforming to City of Troy Standard Details and Specifications.
- D. Base Pad: Pre-cast or cast-in-place concrete of type specified on Drawings.

## 2.3 CLEANOUTS

- A. Cleanout Lid and Frame Manufacturers:
  - 1. EJ or approved equal.

## 2.4 BEDDING AND COVER MATERIALS

- A. Bedding: Fill Type A1 as specified in Section 31 05 16.
- B. Cover: Fill Type A2, as specified in Section 31 05 16.
- C. Soil Backfill from Above Pipe to Finish Grade: Soil Type A2, as specified in Section 31 05 16.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify trench cut and excavation is ready to receive work and excavations, dimensions, and elevations are as indicated on drawings.

### 3.2 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with fine aggregate.

- B. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.
- C. Contractor shall hire a Registered Land Surveyor to establish lines and grades for storm sewer installation.

### 3.3 BEDDING

- A. Excavate pipe trench in accordance with Section 31 23 17 for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.
- B. Place bedding material at trench bottom, level materials in continuous layers not exceeding 6 inches compacted depth, each layer. Place compacted bedding material to elevation of paving subgrade as indicated on Drawings.
- C. Maintain optimum moisture content of bedding material to attain required compaction density.

### 3.4 INSTALLATION - PIPE

- A. Install pipe, fittings, and accessories in accordance with ASTM D2321, ASTM C12 or manufacturer's published instructions, and state or local requirements. Seal joints watertight. Pipe shall be +/- 0.10' of the elevation shown on Drawings.
- B. Install pipe on minimum 6-inch bedding, ½" to 1 ½" crushed angular graded stone compacted to 95% maximum dry unit weight per ASTM D1557.
- C. Lay pipe to slope gradients indicated on Drawings.
- D. Install aggregate at sides and over top of pipe. Provide top cover to minimum compacted thickness equal to paving subgrade elevation indicated on Drawings.
- E. Refer to Section 31 23 23 for backfilling and compacting requirements. Do not displace or damage pipe when compacting.
- F. Refer to Section 33 05 13 for manhole requirements.
- G. Connect to private or municipal storm sewer system, manholes, catch basins, and inlets as indicated on Drawings.
- H. Install site storm drainage system piping to 5 feet of building. Coordinate with other trades/contractors to ensure depth and location are adequate for connection.
- I. Install Work in accordance with local government standards.

### 3.5 INSTALLATION - CATCH BASINS

- A. Form bottom of excavation clean and smooth to elevation indicated on Drawings.
- B. Form and place cast-in-place concrete base pad, with provision for storm sewer to be placed at required elevations.
- C. Level top surface of base pad; sleeve concrete shaft sections to receive storm sewer pipe sections.

- D. Establish elevations and pipe inverts for inlets and outlets as indicated on Drawings.
- E. Mount grate and frame level, in grout, secured to top section to elevation indicated.
- F. Connect to catch basin subdrainage system piping. Refer to Section 33 46 00.
- G. Install Work in accordance with local government standards.

### 3.6 FIELD QUALITY CONTROL

- A. The Owner shall hire a 3<sup>rd</sup> party testing company to test in-place materials for compliance with the requirements for density and thickness per the latest version of ASTM and MDOT Standard Specifications for Construction.
- B. Request inspection prior to and immediately after placing aggregate cover over pipe.
- C. Compaction Testing: In accordance with ASTM D1557.
- D. When tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Frequency of Compaction Tests: One test for each 50 lineal feet of trench.
- F. Infiltration Test: Test in accordance with applicable local Public Works Department Standard Specifications and requirements.
- G. Deflection Test: Test in accordance with applicable local Public Works Department Standard Specifications and requirements.
- H. Pressure Test: Test in accordance with applicable local Public Works Department Standard Specifications and requirements.

### 3.7 PROTECTION OF FINISHED WORK

- A. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.
  - 1. Take care not to damage or displace installed pipe and joints during construction of pipe supports, backfilling, testing, and other operations.
  - 2. Repair or replace pipe that is damaged or displaced from construction operations.

**\*\*END OF SECTION\*\***

## SUBDRAINAGE

### PART 1 GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Catch basin finger drain system.
2. Pavement underdrain system

B. Related Sections:

1. Section 31 05 16 – Soils and Aggregates.
2. Section 31 23 23 – Fill.
3. Section 33 41 00 - Storm Utility Drainage Piping: Connection to catch basin.

#### 1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO M252 – Standard Specification for Corrugated Polyethylene Drainage Pipe.

#### 1.3 SUBMITTALS

- A. Shop Drawings: Indicate dimensions, layout of piping, high and low points of pipe inverts.
- B. Product Data: Submit data on pipe drainage products and pipe accessories.

#### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with local governing agency standards.

### PART 2 PRODUCTS

#### 2.1 PIPE MATERIALS

- A. Furnish materials in accordance with local governing agency standards.
- B. HDPE corrugated polyethylene pipe: AASHTO M-252 Type CP; perforated, flexible type, with required fittings per Plans.

#### 2.2 AGGREGATE AND BEDDING

- A. Filter Aggregate and Bedding Materials: Drainage aggregate as specified in Section 31 05 16.

## 2.3 ACCESSORIES

- A. Pipe Coupling: Pre-fabricated coupling with soil tight gasketed joint.
- B. Filter Fabric: Water pervious type, polyester; with filter pipe sock, or approved equal.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify excavated base is ready to receive work and excavations, dimensions, and elevations are as indicated on Drawings.

### 3.2 PREPARATION

- A. Hand trim excavations to required elevations.
- B. Remove large stones or other hard matter which could damage drainage piping or impede consistent backfilling or compaction.

### 3.3 INSTALLATION

- A. Place drainage pipe on aggregate pipe bedding.
- B. Lay pipe to slope gradients noted on Drawings; with maximum variation from indicated slope of 1/8 inch in 10 feet.
- C. Place pipe with perforations facing down.
- D. Install pipe couplings as needed.
- E. Install Drainage aggregate at sides, over joint covers and top of pipe.
- F. Place filter fabric over leveled top surface of aggregate cover prior to subsequent backfilling operations.
- G. Place trench backfill aggregate in maximum 6-inch lifts, consolidating each lift.
- H. Refer to Section 31 23 23 for compaction requirements. Do not displace or damage pipe when compacting.

### 3.4 FIELD QUALITY CONTROL

- A. The Owner shall hire a 3rd party testing company to test in-place materials for compliance with the requirements for density and thickness per the latest version of ASTM and MDOT Standard Specifications for Construction.
- B. Request inspection prior to and immediately after placing aggregate cover over pipe.
- C. When inspections indicate work does not meet specified requirements, remove work, replace and retest.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect pipe and aggregate cover from damage or displacement until backfilling operation begins.

**\*\*END OF SECTION\*\***