2025 Hot Mixed Asphalt Bid Letting
County Wide
Letting Date – February 10, 2025, 10:00 am
Addendum #1

Contractor: _____

Address: _____

_____

Sign & Print: _____

Date: _____

Phone & Fax: _____

Email: _____

Bid Letting TCRC Total _____

from bid tab. Estimated Tons 59,790

Bid Letting MDOT M-24 Phase #2 Total _____

from bid tab. Estimated Tons 3,200

Bid Letting MDOT M-24 Phase #3 Total _____

from bid tab. Estimated Tons 2,780

Bid Letting MDOT M-24 Phase #4 Total _____

from bid tab. Estimated Tons 2,320

Primary Roads (27,115 tons) Local Roads (32,675 tons)
In the following townships: Almer, Akron, Arbela, Columbia, Denmark, Elkland, Ellington, Gilford, Fairgrove, Fremont, Indianfields, Juniata, Kingston, Millington, Novesta, Vassar, Watertown, & Wells.

COMPLETION DATE: Seasonal Limitations per the MDOT 2020 Standard Specifications for Construction except as modify here. All paving must be complete by October 15, 2025. Signed Insurance, Agreement, and ROW Permit and bid tab shall be enclosed.

Addendum 1 (All changes made are designated in red)

- Adds MDOT M-24 Phase 2 Bid Tab and Project Log
- Adds MDOT M-24 Phase 3 Bid Tab and Project Log
- Adds MDOT M-24 Phase 4 Bid Tab and Project Log
- Adds MDOT Standard Project Documentation
- Change in 2025 TCRC Bid Letting Attachment Changes TCRC Bid Item 16 from “165# Bit Mix” to “165# Bit Mix (2 Lifts)“
- Change in 2025 TCRC Bid Letting Attachment adds total at bottom of page 7

Bids are to be submitted on the Road Commission forms in a plainly marked, sealed envelope. No faxed or emailed bids accepted. Plans and specifications are available online at www.tuscolaroad.org. Please contact Brent Dankert, Tuscola County Highway Engineer at 989-233-7472 or highwayengineer@tuscolaroad.org with any questions. Any addenda must be noted and initialed.

If you are interested in bidding and have downloaded plans from the website, please email highwayengineer@tuscolaroad.org to be added to the plan holders list to make sure you receive addendums.

The Contractor has examined the proposal, permits, plans, and the location of the work described here in and is fully informed as to the nature of the work and the conditions relating to its performance. Proposals will be received from contractors having a current (Cb) prequalification with the Michigan Department of Transportation. All work will be done in accordance with the requirements of Section 501 of 2020 MDOT Standard Specifications for Construction and as modified herein.

General:
This work shall be at various locations throughout Tuscola County or state highways under the maintenance jurisdiction of the Tuscola County Road Commission. This work shall include all necessary labor, equipment, and material to place HMA to the depth specified, and compacting the material to achieve the required density for a complete installation. Quantities shown are estimates and are subject to increase or decrease by the Engineer. Changes in quantities will not change unit prices as bid. Some projects are to be constructed in coordination with work by other Contractors, or Tuscola County Road Commission Crews. The contractor awarded these projects will cooperate by scheduling their work with the other crew(s) accordingly.

Projects may be added or deleted as mutually agreed upon by the Road Commission and the Contractor. All local road projects listed are subject to the approval and award of the project at the township level.

Schedule:
- 14 days advance notice shall given by contractor prior to paving. The advance notification allows for advance construction signs to be installed and any prep work such as cutting and spraying shoulders, to be completed by the Tuscola County Road Commission. This advance notification is crucial as the Tuscola County Road Commission will not complete the prep work until notification is given.
- All work shall be completed Monday through Friday with Engineer's approval needed for Saturday work, and Board of Road Commissioner's approval needed for Sunday work.
- Late April 2025 Preconstruction meeting with contractor. The Engineer will determine the day, time and place for the preconstruction meeting.

- Biweekly Progress Meetings. The Contractor must attend biweekly progress meetings with the Engineer. The Engineer will determine the day, time, and place for the progress meetings. All work needs to be coordinated with the HMA Crush and Shape, Chip Seal Contractor, Grading Contractor, and Tuscola County Road Commission Crews and approved by the Engineer.
- May 1st, 2025 Weekly a list will be provided to the contractor as Townships authorize local road projects.
- May 23th, 2025 Bid Items 005 Leix, 006 Saginaw, and 025 Walton shall be Completed
- June 1st, 2025 Complete List of Paving Projects to contractor
- June 30th, 2025 Interlayers Scheduled to be completed. HMA surface must be applied within 10 days of the acceptance of the interlayer.
- The HMA surface must be applied within 10 days of the acceptance of crush and shape surface.
- October 15th, 2025 Completion Date. All work shall be completed within the Seasonal Limitations as specified by the 2020 MDOT Standard Specifications for Construction unless otherwise approved by the Engineer**.**
- **It is expected that once a date is scheduled by the contractor to pave a project that project will be paved within 14 days. If the project is not paved within 14 days liquidated damages may be assessed at a rate of $100.00 per day per project at the discretion of the Engineer.**

Construction:
The Contractor shall follow the construction methods as described in Section 501.03 of the 2020 MDOT Standard Specifications for Construction except as modified herein:

1. **Hot Mix Asphalt (HMA)**
   a. **Leveling** - Where directed by the Engineer to correct irregularities in the existing road surface, a leveling layer of bituminous mixture shall be placed with the paver and rolled. Corrections requiring additional bituminous mixture shall be rolled far enough ahead of paving operations to permit proper compaction. Materials placed as a leveling layer shall be paid for as the ___# Bit Mix Scratch Course.
   b. **Main Line Paving** – Where directed by the Engineer to main line pave over existing or crush, shape, & compacted road surface, a layer of bituminous mixture shall be placed with the paver and rolled. Materials placed as main line paving shall be paid for as ___# Bit Mix.

c. **Wedging** - Where directed by the Engineer to correct sporadic irregularities in the existing road surface. Wedging shall be considered included in the pay item for main line paving but may require a separate application to achieve proper compaction.
d. **Base Patching** - This work involves removing the existing loose bituminous road material to the existing gravel base, and replacing it with new bituminous material, 1.5" minimum. The method by which the existing bit material is to be removed and replaced will be up to the Contractor but will require prior approval by the Engineer. The base patch shall be noted and included in the pay item as indicated.

2. **HMA Approach** – When specified will be placed as a separate application from main line paving on a crossroad or drive requiring more than the 3' typical widening done with main line paving. If the pay item HMA Approach is not included, but the contractor chooses to pave approaches and driveways separate from mainline, all cost for work will be included in ___# Bit Mix item.
3. **HMA Curb** – When encountered contractor shall verify direction of flow and verify that after placement and compact the water is channelized and flows in the correct direction.
4. **Non-Motorized Pathway** – Where designated the non-motorized pathway shall be paved in the same pass as the mainline and at the same slope as mainline paving. Material placed shall be paid for as **Non-Motorized Pathway.**
5. **Compaction** - The Nuclear Gauge Method for testing compaction will be used on Primary roads. The Number of Rollers Method chart below shall apply, for local road paving. The Engineer may decide to verify density on local roads with the Nuclear Gauge Method.

Number of Rollers Required Based on Placement Rate:

Average Laydown Rate, Square Yards Per Hour	Number of Rollers Required	
	Compaction Rollers	Finish Rollers
Less than 600		
601 – 1200	1	1*
	1	1
1201 – 2400	2	1
2401 – 3600	3	1
3601 and more	4	1

*The Compaction roller may be used as the finish roller also.

An approved self-propelled pneumatic-tired roller shall be provided and used as directed while placing Bit Mix for leveling or wedging.

6. **Butt Joints** - Shall be constructed at railroad crossings, bridge decks, and at locations specified. Remove the existing surface to the thickness of the proposed overlay, for the full width of the joint. Uniformly taper the removal to the original surface over a minimum of

35 feet, (1" per 35'), or as agreed to with the Engineer. Once the Butt Joints are cut, bump signs shall be installed and a bag joint shall be installed and maintained by the Contractor until it is paved over. Butt Joint shall not be cut more than 7 days prior to paving. Butt Joints will be paid for by the Each as noted on the bid.

7. **Safety Edge** – Shall be installed on all reconstruct projects, (crush and shape and new pavement projects). Safety Edge shall be constructed in accordance with MDOT Standard Detail R-110.
8. **Pavement Removal** - Shall be completed according to Section 204.04B of the 2020 MDOT Standard Specifications for Construction.
9. **Cold Milling Full Width and Approach** - Shall be completed in accordance with Michigan Department of Transportation 2020 Standard Specifications for Construction Section S01 and all other applicable sections. Depth of Cold Milling shall be 1.5 inches or as noted on the bid. For locations where the depth of Cold Milling is 3.0 inches the Contractor shall pave back a minimum of 1.5 inches by end of day. Once paving is done, bump signs & uneven lane signs shall be installed. A bag joint shall also be installed and maintained by the contractor until all paving is complete. Cold Milling Full Width and Approach shall be paid for by the square yard as noted on the bid.
10. **Equipment** - The paver shall be equipped with an automatically controlled and activated screed and strike-off assembly.
11. **Temporary Pavement Marking Tape** - Shall be required on Michigan Department of Transportation projects and all Primary Road projects only. Temporary pavement marking tape shall be Type NR unless specified by the Engineer. No additional payment will be made for the tape; payment for temporary pavement marking tape shall be included in other items of work.
12. **Gravel Driveway Approaches** - Asphalt fillets at gravel driveways on overlay projects shall be completed with mainline paving. 23A Shoulder Gravel shall be applied to each gravel approach from the fillet out 5' to taper new grade to existing driveway. All driveways shall not exceed 10% running slope. If the driveway exceeds 10% the gravel shall be extended past the 5' point until the running slope is less than 10%. Material, equipment, and labor used to complete this work will not be paid for separately but will be considered included in line item 23A Gravel Shoulder.
13. **Hard Surfaced Driveways** – Driveway approaches for existing asphalt or concrete drives shall be feathered with hot mix asphalt to meet existing grade within 5' of the edge of pavement. All hard surface driveway overlays shall not exceed 10% running slope. If the driveway overlay exceeds 10% the asphalt shall be extended past the 5' point until the running slope is less than 10%. Material, equipment, and labor used to complete this work will not be paid for separately but will be considered in other items of work.
14. **Limestone Driveways** – Limestone material will be placed by the Tuscola County Road Commission or locations may be marked to gap prior to the Contractor's shouldering operation. Care shall be taken to avoid placing shoulder material in these driveways.
15. **Bond Coat** – Shall be applied at a uniform rate of application between 0.05 to 0.15 gallons per square yard. A bond coat shall be applied between multiple lifts of asphalt. Bond Coat will not be paid for separately but included in the cost of other bid items.

Materials:
All materials must meet the 2020 MDOT Standard Specification for Construction except as modified herein:

1. **Bituminous Materials** – Bituminous Mixture shall be 4EL. See Below for more details.
2. **Bond Coat** – Shall be SS-1h or low tracking bond coat and shall meet the requirement of MDOT SSFC 2020 Section 501 and 904.
3. **Asphalt Cement** – Shall be PG 58-28 in accordance with 2020 MDOT SSFC Section 501 and 904.
4. **Bituminous Mixture 4EL** – Shall meet the gradation as specified in 2020 MDOT SSFC Section 902 Table 902-5 and Physical Requirements specified in 2020 MDOT SSFC Section 902 Table 902-6. Asphalt cement content of the mix shall be from 5.7% to 6.5% in the surface course as directed by the Engineer. If/When Reclaimed Asphalt Pavement (RAP) is used a maximum of 27% RAP binder by weight of the total binder in the mixture shall apply. Reference Special Provision 20SP-501F-01 for Recycled Hot Mix Asphalt Mixture on Local Agency Projects. The mix design shall be approved by the Engineer prior to the placement of the mixture.
5. **Bit Scratch Course** – The item Bit Scratch Course shall be placed at the pounds specified on the project list as leveling. The mix be the same as the top course, or as approved by the Engineer.
6. **Testing of Asphalt Materials –** All materials must be tested and approved in accordance with the MDOT Specifications before they enter the construction of the projects. The mix designs must be submitted and approved by the Engineer prior to placing any asphalt. Acceptance of asphalt material will be based on MDOT Special Provision 20SP-501I-01 Acceptance of HMA Mixture on Local Agency Projects, except as herein noted. Air voids shall be 3.0% for leveling and top course. The Engineer will perform Quality Assurance sampling and testing a minimum of two tests per day of production for each mix type. A failing test will result in additional testing with possible penalties. The Engineer will measure density with a Nuclear Density Gauge using the Gmm from the JMF for the density control target on all Primary Road Projects. Local Road Projects will use the Number of Rollers Method, unless requested otherwise by the Engineer. The Engineer may at their discretion verify the roller pattern as established by the contractor utilizing the Nuclear Density Gauge. The Contractor shall submit Quality Control test results for each day of paving to the Engineer. **Lack of test reports may delay payment.** A new mix design must be approved prior to changes in the aggregate used. The Road Commission reserves the right to test randomly as necessary.
7. **Shoulders** – All crushed gravel or limestone material shall meet the 23A gradation and compacted in accordance with the 2020 MDOT Standard Specifications for Construction. The shoulder width of new roads shall be 3’ minimum unless varied by the Engineer to fit field conditions. For overlay projects, existing shoulder width shall be matched, with a maximum width of 3’. Any concerns for loss of material due to existing narrow shoulder width shall be brought to the attention of the Engineer, as soon as possible. All shoulder

material shall be bid by the ton furnished, hauled and placed**. Please Note: Shoulders on asphalt projects shall be placed within 7 days after asphalt is laid unless extended by approval of Engineer. A penalty of $500/day per project may be charged if the Contractor does not comply.**

8. **Testing of 23A Shoulder Material** – The contractor will furnish one gradation test on each source (new stockpile) of shoulder material to be used, prior to placing and one gradation test for every 10,000 tons of shoulder material to be used. A copy of the test results shall be forwarded to the Engineer. The Road Commission reserves the right to test the shoulder material randomly as necessary.
9. **Monument Box Rings** – The Contractor shall supply monument box rings to adjust all existing monument boxes within the proposed pavement surface to the proper height providing a smooth ride, whether noted on the bid or not.

Traffic Control:
The Road Commission will install "Road Work Ahead" signs on each project. Traffic must be maintained to local traffic during construction. Primary Road work will be performed via a single lane closure. Local Road work will be performed via temporary road closure.

1. Lane Closure – The contractor shall maintain traffic as per the Tuscola County Road Commission Maintaining Traffic Special Provision attached.

2. Temporary Road Closure – Will be allowed if approved by the Engineer on a site-specific basis. Type III barricades or arrow boards will be required at each end of the project along with a traffic regulator for re-routing traffic. Prior to commencing work, Contractor shall contact Central Dispatch, (989) 673-8338, and School District if in session to inform of Road Closure & Road Opening.

3. Warning Signs – The contractor will be responsible for supplying, installing, and maintaining any signs necessary to protect the motoring public from situations that have occurred due to unfinished work, i.e. Uneven Lanes Sign W8-11, Bump Sign W8-1, Low Shoulder W8-9. Such signs shall be installed in such a manner to NOT obscure visibility of existing regulatory and warning signs.

4. Traffic Regulators – Traffic regulators shall be equipped with High-visibility Class 2 or Class 3 safety apparel, Stop/Slow or Stop/Stop Sign Paddles, and a two-way radio system and a standby backup system if traffic regulators are not visible to each other. Ensure persons designated to regulate traffic receive training, no more than 12 months before traffic regulating operations, on property traffic regulating procedures. Ensure this training consists of at least viewing "Safely Regulating Traffic in Michigan" and reading the current MDOT handbook, Traffic Regulators Instruction Manual. Maintain documentation on persons trained and dates trained and provide to the Engineer upon request.

Measurement and Payment:
The completed work will be paid for at the contract unit price for the following contract pay item and includes all material, equipment, and labor to complete these items.

Pay Item	Pay Unit
____# Bit Scratch Course	Ton
____#Bit Mix	Ton
Non-Motorized Pathway	Ton
23A Shoulder Gravel	Ton
23A Limestone Shoulder Gravel	Ton
Monument Ring	Each
Cold Milling ___ Inch Depth Full Width	Syds
Cold Milling ___Inch Depth Approach	Syds
HMA Approach	Ton
HMA Curb Overlay	Feet
Butt Joint	Each

Contract items shall be invoiced by location. Measurement will be made by the unit specified above. Proper material tickets shall be provided with the invoice documenting quantity used of each material.

All invoices **MUST** include the TCRC job number and project location.

It is understood by all parties involved that the construction of some projects in this bid letting are conditional on the Road Commission receiving the necessary agreements from the Townships. Payment will be made as funds become available.

Warranty:
The Contractor hereby warrants his work and material for one year from date of placement. The Road Commission may choose to hold up to 10% of the project bid cost until the warranty expires.

Liability:
The Contractor shall at all times exercise extreme care and shall assume all liability for any damages resulting from his operations and shall hold the Tuscola County Road Commission harmless from any such claims or damages.

The contractor must obtain a Tuscola County Right of Way Permit before any work can begin.

The successful bidder must also furnish certificates or policies giving satisfactory evidence of insurance coverage to the minimum extent of $500,000.00 property damage and $1,000,000.00 personal liability to insure adequate payment for any damage caused by his operations.

The contractor shall, prior to the start of work, file with the Tuscola County Road Commission a certificate of Workmen's Compensation Insurance. The attached certificate of insurance is required for the successful bidder or bidders.

NON-COMPLIANCE WITH PROJECT SPECIFICATION PROVISIONS:
Any variation from the specifications of the project herein without written approval from the Tuscola County Road Commission and/or its authorized representative may result in, at the discretion of the Road Commission, the voiding and/or canceling of the acceptance of any bid and/or contract, resulting from this project.

The Board reserves the right to accept or reject any or all proposals and to re-advertise or to accept the proposal, which in their opinion, is in the best interest of Tuscola County.

Attachments:

1. Title IV and VI Compliance
2. 2025 HMA Bid Tab
3. 2025 HMA Bid Maps
4. MDOT M-24 Phase 2 Bid Tab and Project Log
5. MDOT M-24 Phase 3 Bid Tab and Project Log
6. MDOT M-24 Phase 4 Bid Tab and Project Log
7. Agreement
8. Tuscola County Right of Way Permit
9. TCRC Standard Detail for Driveway and Butt Joint
10. Tuscola County Road Commission Maintaining Traffic
11. Maintaining Traffic Typical – M0150A
12. Safety Edge Standard Detail R-110
13. Special Provision 20SP-501A-01 – Sampling Asphalt Binder on Local Agency Project
14. Special Provision 20SP-501F-01 – Recycled Hot Mix Asphalt Mixture on Local Agency Projects
15. Special Provision 20SP-501I-01 – Acceptance of Hot Mix Asphalt Mixture on Local Agency Projects
16. MDOT Standard Project Documentation M-24 Phase 2, 3, 4

TUSCOLA COUNTY ROAD COMMISSION
TITLE IV COMPLIANCE
APPENDIX A

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. Compliance with Regulations: The contractor shall comply with the Regulations relative to non-discrimination in Federally-assisted programs of the Department of Transportation, Title 49, code of Federal Regulations, Part 21 as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
2. Non-discrimination: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment.
3. The contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulation, including employment practices when the contractor covers a program set forth in Appendix B of the Regulations.
4. Solicitations for Subcontracts, Including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to non-discrimination on the grounds of race, color, or national origin.
5. Information and Reports: The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities us may be determined by the Tuscola County Road Commission to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses this information, the contractor shall so certify to the State high· way department, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
6. Sanctions for Non-compliance: In the event of the contractor's non-compliance with the non-discrimination provisions of this contract, the Tuscola County Road Commission Shall Impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to:
    a) Withholding of payments to the contractor under the contract until the contractor complies, and/or
    b) Cancellation, termination, or suspension of the contract, in whole or in part.
7. Incorporation of Provisions: The contractor shall Include the provisions of paragraphs (l) through (6) in every subcontract, including procurement of materials and leases of equipment, unless exempt by the Regulations, or directives Issues pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Tuscola County Road Commission may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event u contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Tuscola County Road Commission to enter into such litigation to protect the interests of the County, and, in addition, the contractor may request the State highway department to enter into such litigation to protect the interests of the State and/or the United States to enter into such litigation to protect the interests of the United States.

"The TUSCOLA COUNTY ROAD COMMISSION, in accordance with Title VI of the Civil Rights Act of 1964, 78-252, 42 U.S.C. 2000d-222d-4, the Civil Rights Act of 1987, P.L. 100-259, and Title 49, Code of Federal Regulations, Department of Transportation, subtitle A, Office of the Secretary, Part 21, Non- discrimination in federally assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, Disadvantaged Business Enterprise firms will be afforded full oppo1iunity to submit bids in response to this invitation and will not be discriminated against on the grounds of Race, Color, Sex, Age, National Origin, or Handicap in consideration for an award. For additional compliance information, please see Appendix A."

2025 TCRC Hot Mix Asphalt Bid Letting

Monday, February 10th @ 10:00 a.m.

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
1	**Primary**	**Deckerville**	**Plain to Kingston**	**4.13**	**22**

Qty	Unit	Item	Unit Price	Total Price
3,000	Tons	110# Bit Scratch Mix		$ -
105	Tons	HMA Approach		$ -
2,800	Tons	23A Cr. Gravel		$ -
160	Syds	Approach Cold Milling		$ -
10	Each	Butt Joint		$ -
7	Each	Monument Box		$ -
			Total:	$ -

*Coordinate w/ TCRC Crews for Culvert Installation

**Approach Cold Milling 2" Depth 8' Wide (from Deford Store to TCRC Drive)

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
2	**Primary**	**Colling Rd**	**Dickerson to BCF**	**3.03**	**22**

Qty	Unit	Item	Unit Price	Total Price
3,600	Tons	165# Bit Mix		$ -
50	Tons	HMA Approach		$ -
1,950	Tons	23A Cr. Gravel		$ -
4	Each	Butt Joint		$ -
5	Each	Monument Box		$ -
			Total:	$ -

*Coordinate w/ TCRC Crews for Culvert Installation

**Wedging as requested

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
3	**Primary**	**Unionville**	**Gilford to M-24**	**1.67**	**22**

Qty	Unit	Item	Unit Price	Total Price
4,000	Tons	165# Bit Mix (2 Lifts)		$ -
40	Tons	HMA Approach		$ -
1,100	Each	23A Cr. Gravel		$ -
			Total:	$ -

*Coordinate w/ Crush & Shape Contractor

**Safety Edge to be installed as per MDOT Standard Plan R-110-B

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
4	**Primary**	**Millington**	**Reese to Bray**	**1.69**	**22**

Qty	Unit	Item	Unit Price	Total Price
4,100	Tons	165# Bit Mix (2 Lifts)		$ -
40	Tons	HMA Approach		$ -
1,150	Each	23A Cr. Gravel		$ -
			Total:	$ -

*Coordinate w/ Crush & Shape Contractor

**Safety Edge to be installed as per MDOT Standard Plan R-110-B

2025 TCRC Hot Mix Asphalt Bid Letting

Monday, February 10th @ 10:00 a.m.

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
5	**Primary**	**Leix**	**Saginaw to Blackmore**	**2.05**	**22**

Qty	Unit	Item	Unit Price	Total Price
4,800	Tons	165# Bit Mix (2 Lifts)		$ -
40	Tons	HMA Approach		$ -
1,400	Each	23A Cr. Gravel		$ -
			Total:	$ -

*Coordinate w/ Crush & Shape Contractor

**Safety Edge to be installed as per MDOT Standard Plan R-110-B

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
6	**Primary**	**Saginaw**	**Chambers to Conrad**	**2.08**	**36**

Qty	Unit	Item	Unit Price	Total Price
4,850	Tons	165# Bit Mix (2 Lifts)		$ -
2,450	Tons	Non-Motorized Pathway		$ -
40	Tons	HMA Approach		$ -
1,300	Tons	23A Cr. Gravel		$ -
			Total:	$ -

*Coordinate w/ Cold Milling Contractor

**HMA Approach 1.5" Depth

***Sweeping & Clean up for Cold Milling to be included HMA Cost

****4 Days of Cold Milling (1 lane mile & non-motorized pathway per day)

*****Safety Edge to be installed as per MDOT Standard Plan R-110-B

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
7	**1-Akron**	**Forest**	**Gotham to Kindler**	**0.63**	**22**

Qty	Unit	Item	Unit Price	Total Price
750	Tons	180# Bit Mix		$ -
400	Tons	23A Cr. Gravel		$ -
2	Each	Butt Joint		$ -
			Total:	$ -

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
8	**1-Akron**	**Ringle**	**Loomis to Gotham**	**1.01**	**21**

Qty	Unit	Item	Unit Price	Total Price
2,200	Tons	165# Bit Mix (2 Lifts)		$ -
650	Tons	23A Cr. Gravel		$ -
1	Each	Butt Joint		$ -
550	Syds	Cold Milling		$ -
			Total:	$ -

*Wedging as requested

**Bridge #10532- Cold Milling 1.5" Depth Full Width + step down to 3" and taper out to 0"

2025 TCRC Hot Mix Asphalt Bid Letting

Monday, February 10th @ 10:00 a.m.

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
9	**1-Akron**	**Sheridan**	**Hoppe to Ackerman**	**0.99**	**21**

Qty	Unit	Item	Unit Price	Total Price
1,100	Tons	180# Bit Mix		$ -
30	Tons	HMA Approach		$ -
650	Tons	23A Cr. Gravel		$ -
1	Each	Butt Joint		$ -
2	Each	Monument Box		$ -
*Wedging as requested			Total:	$ -

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
10	**1-Akron**	**Sheridan**	**Ackerman to M-25**	**0.99**	**21**

Qty	Unit	Item	Unit Price	Total Price
1,100	Tons	180# Bit Mix		$ -
650	Tons	23A Cr. Gravel		$ -
1	Each	Butt Joint		$ -
*Wedging as requested			Total:	$ -

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
11	**1-Akron**	**Wildner**	**Forest to County Line**	**0.44**	**22**

Qty	Unit	Item	Unit Price	Total Price
550	Tons	180# Bit Mix		$ -
300	Tons	23A Cr. Gravel		$ -
4	Each	Butt Joint		$ -
*Wedging as requested			Total:	$ -

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
12	**3-Arbela**	**Swaffer**	**Buell to Belsay**	**1.05**	**22**

Qty	Unit	Item	Unit Price	Total Price
1,700	Tons	220# Bit Mix		$ -
750	Tons	23A Cr. Gravel		$ -
2	Each	Butt Joint		$ -
*Wedging as requested			Total:	$ -

**Safety Edge to be installed as per MDOT Standard Plan R-110-B

2025 TCRC Hot Mix Asphalt Bid Letting

Monday, February 10th @ 10:00 a.m.

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
13	**4-Columbia**	**Hoppe**	**Remington to Colwood**	**1.00**	**22**

Qty	Unit	Item	Unit Price	Total Price
2,400	Tons	165# Bit Mix (2 Lifts)		$ -
650	Tons	23A Cr. Gravel		$ -
			Total:	$ -

*Coordinate w/ Crush & Shape Contractor

**Safety Edge to be installed as per MDOT Standard Plan R-110-B

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
14	**4-Columbia**	**Hoppe**	**Ashmore to Remington**	**1.00**	**22**

Qty	Unit	Item	Unit Price	Total Price
2,400	Tons	165# Bit Mix (2 Lifts)		$ -
30	Tons	HMA Approach		$ -
650	Tons	23A Cr. Gravel		$ -
100	Syds	Cold Milling		$ -
			Total:	$ -

*Bridge #10560- Cold Milling 3.0" Depth Full Width

**Coordinate w/ Crush & Shape Contractor

***Safety Edge to be installed as per MDOT Standard Plan R-110-B

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
15	**6-Denmark**	**Bradford**	**M-46 to Wilder**	**1.00**	**22**

Qty	Unit	Item	Unit Price	Total Price
2,400	Tons	165# Bit Mix (2 Lifts)		$ -
30	Tons	HMA Approach		$ -
700	Tons	23A Cr. Gravel		$ -
			Total:	$ -

*Coordinate w/ Crush & Shape Contractor

**Safety Edge to be installed as per MDOT Standard Plan R-110-B

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
16	**7-Elkland**	**Schwegler**	**M-81 to Milligan**	**1.00**	**20**

Qty	Unit	Item	Unit Price	Total Price
2,200	Tons	165# Bit Mix (2 Lifts)		$ -
15	Tons	HMA Approach		$ -
700	Tons	23A Cr. Gravel		$ -
			Total:	$ -

*Coordinate w/ Crush & Shape Contractor

**Safety Edge to be installed as per MDOT Standard Plan R-110-B

2025 TCRC Hot Mix Asphalt Bid Letting

Monday, February 10th @ 10:00 a.m.

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
17	**8-Ellington**	**Akron**	**Cedar Run to Dodge**	**1.00**	**22**

Qty	Unit	Item	Unit Price	Total Price
1,100	Tons	165# Bit Mix		$ -
700	Tons	23A Cr. Gravel		$ -
2	Each	Butt Joint		$ -
*Coordinate w/ Chip & Seal Contractor			Total:	$ -

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
18	**12-Gilford**	**Quanicassee**	**Darbee to Dutcher**	**0.99**	**20**

Qty	Unit	Item	Unit Price	Total Price
2,400	Tons	165# Bit Mix (2 Lifts)		$ -
30	Tons	HMA Approach		$ -
700	Tons	23A Limestone		$ -
*New Construction - Coordinate w/ Grading Contractor			Total:	$ -

**Safety Edge to be installed as per MDOT Standard Plan R-110-B

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
19	**13-Indianfields**	**Unionville**	**End of Pave to Gilford**	**0.50**	**22**

Qty	Unit	Item	Unit Price	Total Price
600	Tons	180# Bit Mix		$ -
400	Tons	23A Cr. Gravel		$ -
1	Each	Butt Joint		$ -
			Total:	$ -

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
20	**13-Indianfields**	**Purdy**	**Van Geisen to Gilford**	**0.95**	**20-23**

Qty	Unit	Item	Unit Price	Total Price
1,200	Tons	180# Bit Mix		$ -
600	Tons	23A Cr. Gravel		$ -
150	Feet	HMA Curb Overlay		$ -
2	Each	Butt Joint		$ -
*Coordinate w/ Chip & Seal Contractor			Total:	$ -

2025 TCRC Hot Mix Asphalt Bid Letting

Monday, February 10th @ 10:00 a.m.

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
21	**14-Juniata**	**Fairway Dr.**	**Kirk West to Dead End**	**0.27**	**22**

Qty	Unit	Item	Unit Price	Total Price
350	Tons	180# Bit Mix		$ -
200	Tons	23A Limestone		$ -
1	Each	Butt Joint		$ -
			Total:	$ -

*Coordinate w/ Chip & Seal Contractor

**1' 23A Limestone Shoulders

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
22	**14-Juniata**	**Sheridan Rd.**	**Wilder to Ball**	**1.02**	**22**

Qty	Unit	Item	Unit Price	Total Price
2,400	Tons	165# Bit Mix (2 Lifts)		$ -
700	Tons	23A Cr. Gravel		$ -
			Total:	$ -

*Coordinate w/ Crush & Shape Contractor

**Safety Edge to be installed as per MDOT Standard Plan R-110-B

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
23	**15-Kingston**	**Wilmot Streets**	**Bond, Hawkins, McComb, & Montague**	**0.81**	**21**

Qty	Unit	Item	Unit Price	Total Price
1,300	Tons	220# Bit Mix		$ -
50	Tons	HMA Approach		$ -
350	Tons	23A Limestone		$ -
2	Each	Butt Joint		$ -
			Total:	$ -

*HMA Approach for Driveways

**1' 23A Limestone Shoulders

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
24	**17-Millington**	**Irish Rd.**	**Birch Run to Barnes**	**1.01**	**22**

Qty	Unit	Item	Unit Price	Total Price
1,200	Tons	180# Bit Mix		$ -
650	Tons	23A Cr. Gravel		$ -
2	Each	Butt Joint		$ -
1	Each	Monument Box		$ -
			Total:	$ -

*Coordinate w/ Chip & Seal Contractor

**Coordinate w/ Construction Project on Irish

2025 TCRC Hot Mix Asphalt Bid Letting

Monday, February 10th @ 10:00 a.m.

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
25	**20-Vassar**	**Waltan**	**Caine to Oak**	**1.00**	**22**

Qty	Unit	Item	Unit Price	Total Price
1,600	Tons	220# Bit Mix		$ -
30	Tons	HMA Approach		$ -
650	Tons	23A Cr. Gravel		$ -
			Total:	$ -

*Coordinate w/ Crush & Shape Contractor

**Safety Edge to be installed as per MDOT Standard Plan R-110-B

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
26	**21-Watertown**	**Barnes**	**Fostoria to Willits**	**1.01**	**21**

Qty	Unit	Item	Unit Price	Total Price
1,200	Tons	180# Bit Mix		$ -
650	Tons	23A Cr. Gravel		$ -
1	Each	Butt Joint		$ -
			Total:	$ -

*Coordinate w/ Chip & Seal Contractor

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
27	**22-Wells**	**Lee Hill**	**M-46 to Rossman**	**1.01**	**21**

Qty	Unit	Item	Unit Price	Total Price
1,200	Tons	180# Bit Mix		$ -
10	Tons	HMA Approach		$ -
750	Tons	23A Cr. Gravel		$ -
4	Each	Butt Joint		$ -
			Total:	$ -

*Coordinate w/ Chip & Seal Contractor

Bid Number	Township	Road Name	Location	Length (Mi.)	Width (Ft)
28	**22-Wells**	**Riley**	**East Dayton to Murray**	**1.06**	**21**

Qty	Unit	Item	Unit Price	Total Price
1,100	Tons	180# Bit Mix		$ -
700	Tons	23A Cr. Gravel		$ -
2	Each	Butt Joint		$ -
550	Syds	Cold Milling		$ -
			Total:	$ -

*Wedging as requested

**Bridge #10662- Cold Milling 1.5" Depth Full Width

***Coordinate w/ Chip & Seal Contractor

Total TCRC HMA Bid 1 thru 28	$ -

M-24 Mill & Resurfacing Project Phase 2

Projectwide Pay Items	Quantity	Unit		Unit Cost	Total
Mobilization, Max	1	LSUM			$ -
M-24 HMA Resurfacing Pay Items	**Quantity**	**Unit**		**Unit Cost**	**Total**
Cold Milling HMA Surface	35,200	Syd			$ -
HMA, 5EML	3,200	Ton			$ -
Centerline Corrugations, Milled, HMA	10,560	Ft			$ -
Shoulder, Cl II, Modified	880	Ton			$ -
Permanent Pavement Markings Pay Items	**Quantity**	**Unit**		**Unit Cost**	**Total**
Pavt Mrkg, Waterborne, 6 inch, White	21,542	Ft			$ -
Pavt Mrkg, Waterborne, 6 inch, Yellow	15,433	Ft			$ -
Pavt Mrkg, Waterborne, 2nd Application, 6 inch, White	21,542	Ft			$ -
Pavt Mrkg, Waterborne, 2nd Application, 6 inch, Yellow	15,433	Ft			$ -
Recessing Pavt Mrkg, Longit	36,975	Ft			$ -
Witness, Log, $1,250.00	1,250	Dlr			$ -
Maintenance of Traffic Pay Items	**Quantity**	**Unit**		**Unit Cost**	**Total**
Minor Traf Devices	1	LSUM			$ -
Channelizing Device, 42 inch, Fluorescent, Furn	250	Ea			$ -
Channelizing Device, 42 inch, Fluorescent, Oper	250	Ea			$ -
Automated Flagger Assistance Device	2	Ea			$ -
Sign, Type B, Temp, Prismatic, Furn	400	Sft			$ -
Sign, Type B, Temp, Prismatic, Oper	400	Sft			$ -
Traf Regulator Control	1	LSUM			$ -
Pavt Mrkg, Wet Reflective, Type R, Tape, 6 inch, Yellow, Temp	845	Ft			$ -
Rumble Strip, Temp, Portable, Furn	12	Ea			$ -
Rumble Strip, Temp, Portable, Oper	12	Ea			$ -
		Grand Total:		$	-

MICHIGAN DEPARTMENT OF TRANSPORTATION

MDOT M-24 Phase 2

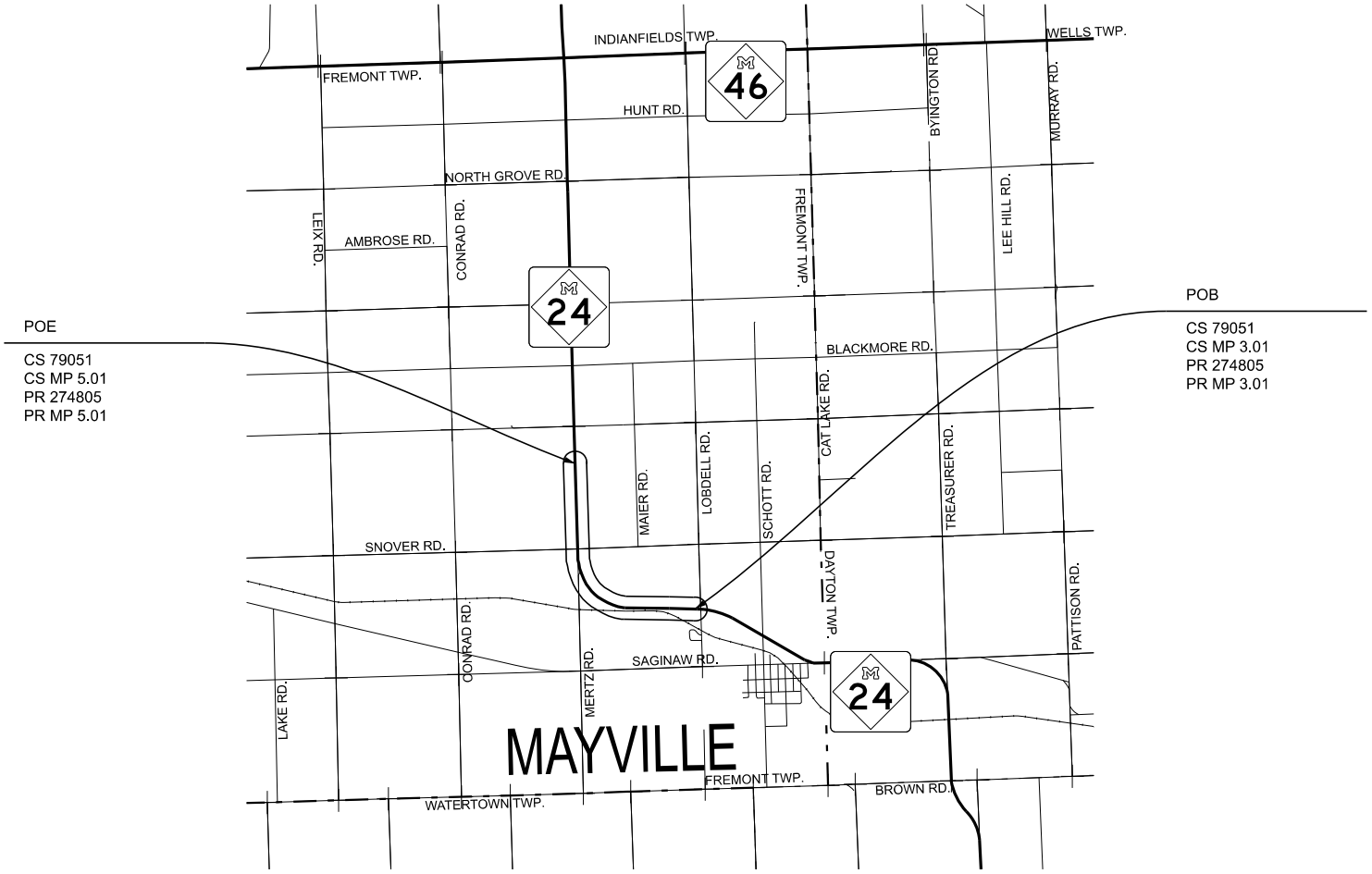
ROUTE: M-24
FREMONT TOWNSHIP
TUSCOLA COUNTY

COUNTY KEY

SECTION	CONTROL SEC	JOB NO.	FED AID PROJ
01	79051	TWA	NO

TRAFFIC DATA

ROAD	YEAR	ADT	DHV	COMM	SPEED DATA DESIGN	POSTED	LIMITS
M-24	2023	4,192	371	6%	60	55	POB TO POE



THE IMPROVEMENTS COVERED BY THESE PLANS SHALL BE DONE IN ACCORDANCE WITH THE MICHIGAN DEPARTMENT OF TRANSPORTATION 2020 STANDARD SPECIFICATIONS FOR CONSTRUCTION. PHYSICAL ROAD NUMBER (PR#) & MILEPOST (MP) DATA ARE FROM MICHIGAN GEOGRAPHIC FRAMEWORK VERSION # 24.

BRADLEY C. WIEFERICH, P.E. - DIRECTOR

MILES: 2.00

CONTRACT FOR:
2.00 MI OF HOT MIX ASPHALT COLD MILLING AND RESURFACING, SHOULDER GRAVEL AND PAVEMENT MARKINGS ON M-24 FROM LOBDELL ROAD TO 4,200 FT SOUTH OF BLACKMORE ROAD IN FREMONT TOWNSHIP, TUSCOLA CO

MDOT Michigan Department of Transportation	NO SCALE	DESIGN UNIT: TERVO	TSC: HURON	DATE: 1/15/2025	
		CS: 79051	TITLE SHEET	DRAWING	SHEET
		JN: TWA	M-24	M-24 TITLE 01	SECT01
FILE: M-24_TITLE.DGN			LOBDELL RD TO BLACKMORE RD		

LOG OF PROJECT

LOCATION

The project is located on M-24 from 675 feet west of Lobdell Road to 4,200 feet south of Blackmore Road in Tuscola County.

Route	M-24
CS	79051
From CS MP	3.01
To CS MP	5.01
PR	274805
From PR MP	3.01
To PR MP	5.01
Length (mi)	2.00

DESCRIPTION OF WORK.

The following items apply throughout the project:

Project Wide Pay Items	Quantity	Unit
Mobilization, Max	1.00	LSUM

Mill and Resurface M-24 per the typical sections. Place Shoulder, Cl II Modified as directed by the Engineer. Install centerline corrugations per R-112-J in areas with a posted speed of 55 mph.

M-24 HMA Overlay Pay Items	Quantity	Unit
Cold Milling HMA Surface	35,200	Syd
HMA, 5EML	3,200	Ton
Centerling Corrugations, Milled, HMA	10,560	Ft
Shoulder, Cl II, Modified	880	Ton

Apply pavement markings where existing pavement markings have been removed due to construction operations. Document existing markings prior to construction operations, paid for as Witness, Log, $1,250.00.

Permanent Pavement Markings Pay Items	Quantity	Unit
Pavt Mrkg, Waterborne, 6 inch, White	21,542	Ft
Pavt Mrkg, Waterborne, 6 inch, Yellow	15,433	Ft
Pavt Mrkg, Waterborne, 2nd Application, 6 inch, White	21,542	Ft
Pavt Mrkg, Waterborne, 2nd Application, 6 inch, Yellow	15,433	Ft

Recessing Pavt Mrkg, Longit	36,975	Ft
Witness, Log, $1,250.00	1250	Dlr

Maintain traffic per the special provision for maintaining traffic.

Maintenance of Traffic Pay Items	Quantity	Unit
Minor Traf Devices	1.00	LSUM
Channelizing Device, 42 inch, Fluorescent, Furn	250	Ea
Channelizing Device, 42 inch, Fluorescent, Oper	250	Ea
Automated Flagger Assistance Device	2	Ea
Sign, Type B, Temp, Prismatic, Furn	400	Sft
Sign, Type B, Temp, Prismatic, Oper	400	Sft
Traf Regulator Control	1.00	LSUM
Pavt Mrkg, Wet Reflective, Type R, Tape, 6 inch, Yellow, Temp	845	Ft
Rumble Strip, Temp, Portable, Furn	12	Ea
Rumble Strip, Temp, Portable, Oper	12	Ea

GENERAL NOTES

MISS DIG/UNDERGROUND UTILITY NOTIFICATION

For the protection of underground utilities and in conformance with MCL 460.171 et seq, the Contractor shall contact MISS DIG System, Inc. by phone at 811 or 800-482-7171 or via the web at either locate.missdig.org for single address or rte.missdig.org, a minimum of 3 work days prior to excavating, excluding weekends and holidays.

MONUMENT BOXES

All government corners on this project shall be protected during construction.

STATIONING

Stationing on this project was taken from old plans and pavement stenciled stationing and is not necessarily accurate.

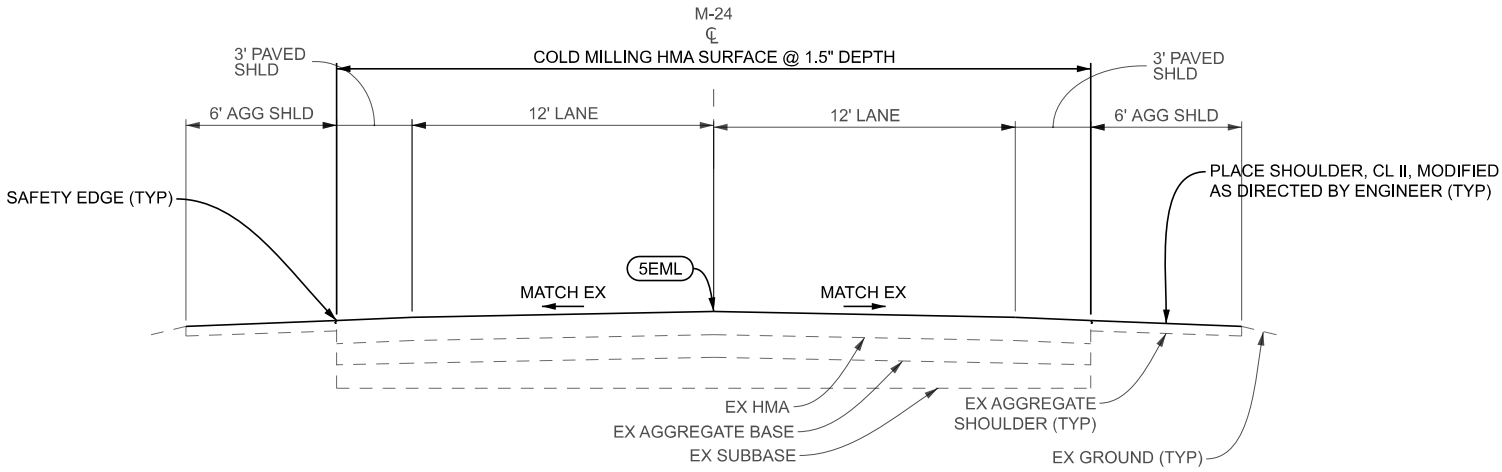
OLD ROAD PLANS

The following old road plans were referred to in the design of this project:
JN 132145 2018 Chip Seal
JN 80684 2006 M-24 Two Course

In addition, other old road plans that predate this project may be available. These plans may be reviewed in the Transportation Service Center (TSC) during normal working hours.

PUBLIC UTILITIES

There are no anticipated utility conflicts within the scope of this project. For utility company contacts during construction, please contact John DeLang, MDOT Huron TSC at delangj1@michigan.gov or (810) 347-9250.



PROPOSED NORMAL SECTION

SECTION APPLIES TO:
CS 79051
POB MP 3.01 to POE MP 5.01

HMA APPLICATION ESTIMATE

IDENT NO.	ITEM	RATE LBS PER SYD	PERFORMANCE GRADE	REMARKS
5EML	HMA, 5EML	165	PG 64-28	AWI = 260
	* BOND COAT	0.05-0.15 GAL		

* FOR INFORMATION ONLY

MDOT Michigan Department of Transportation	NO SCALE	DESIGN UNIT: TERVO	TSC: HURON	DATE: 1/15/2025
		CS: 79051	TYPICAL CROSS SECTIONS	DRAWING: SHEET
		JN: TWA	M-24	M-24 TYP 01 SECT01
FILE: M-24_TYPICAL				

M-24 Mill & Resurfacing Project Phase 3

Projectwide Pay Items	Quantity	Unit		Unit Cost	Total
Mobilization, Max	1	LSUM			$ -
M-24 HMA Resurfacing Pay Items	**Quantity**	**Unit**		**Unit Cost**	**Total**
Cold Milling HMA Surface	30,630	Syd			$ -
HMA, 5EML	2,780	Ton			$ -
Centerline Corrugations, Milled, HMA	9,188	Ft			$ -
Shoulder, Cl II, Modified	770	Ton			$ -
Permanent Pavement Markings Pay Items	**Quantity**	**Unit**		**Unit Cost**	**Total**
Pavt Mrkg, Waterborne, 6 inch, White	18,376	Ft			$ -
Pavt Mrkg, Waterborne, 6 inch, Yellow	2,297	Ft			$ -
Pavt Mrkg, Waterborne, 2nd Application, 6 inch, White	18,376	Ft			$ -
Pavt Mrkg, Waterborne, 2nd Application, 6 inch, Yellow	2,297	Ft			$ -
Recessing Pavt Mrkg, Longit	20,673	Ft			$ -
Witness, Log, $1,250.00	1,250	Dlr			$ -
Maintenance of Traffic Pay Items	**Quantity**	**Unit**		**Unit Cost**	**Total**
Minor Traf Devices	1	LSUM			$ -
Channelizing Device, 42 inch, Fluorescent, Furn	250	Ea			$ -
Channelizing Device, 42 inch, Fluorescent, Oper	250	Ea			$ -
Automated Flagger Assistance Device	2	Ea			$ -
Sign, Type B, Temp, Prismatic, Furn	400	Sft			$ -
Sign, Type B, Temp, Prismatic, Oper	400	Sft			$ -
Traf Regulator Control	1	LSUM			$ -
Pavt Mrkg, Wet Reflective, Type R, Tape, 6 inch, Yellow, Temp	735	Ft			$ -
Rumble Strip, Temp, Portable, Furn	12	Ea			$ -
Rumble Strip, Temp, Portable, Oper	12	Ea			$ -
		Grand Total:		$	-

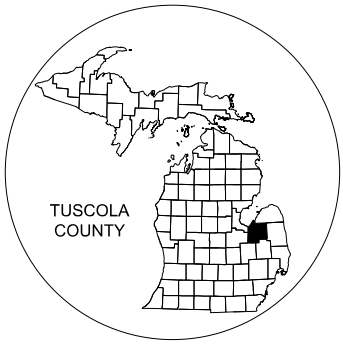
MICHIGAN DEPARTMENT OF TRANSPORTATION

MDOT M-24 Phase 3

ROUTE: M-24

FREMONT TOWNSHIP
TUSCOLA COUNTY

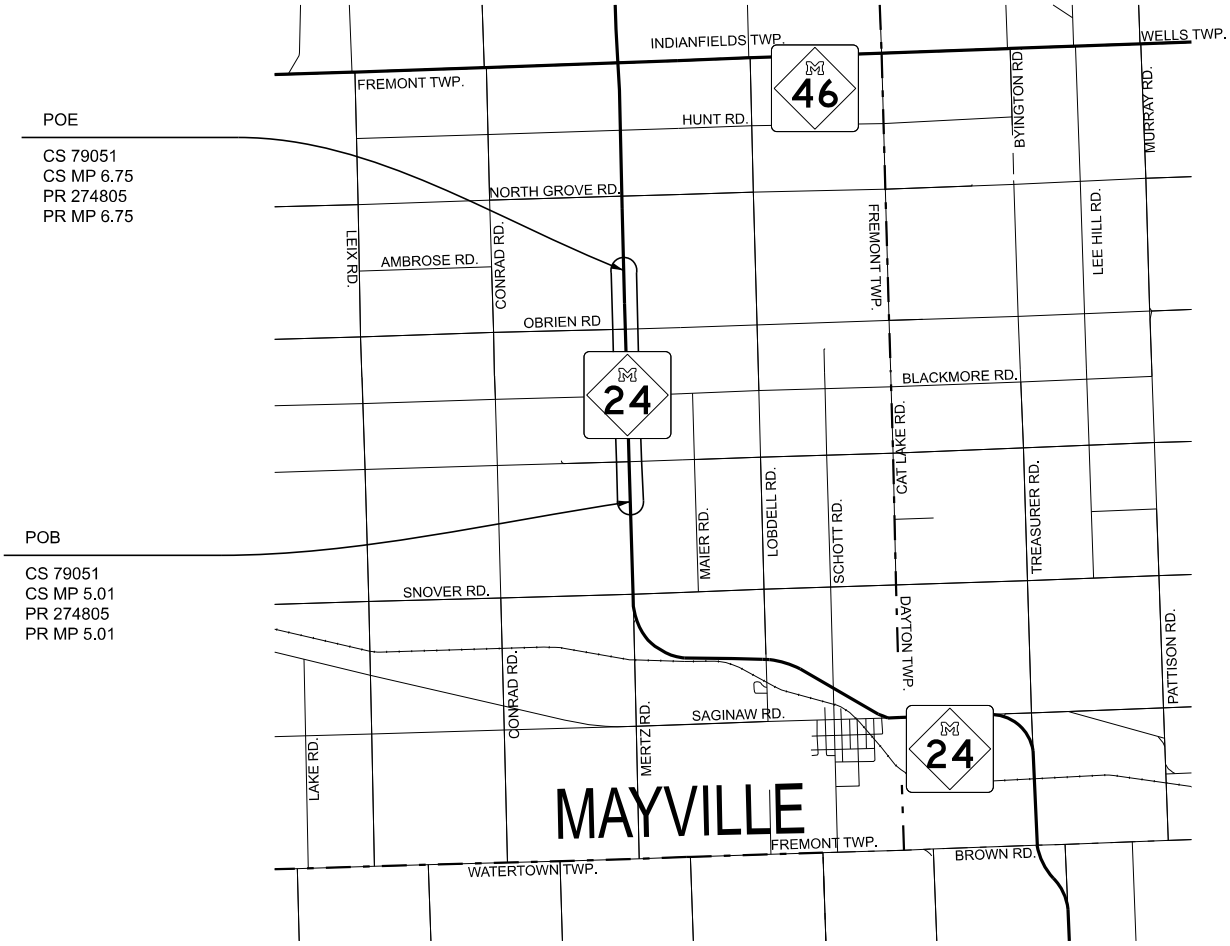
SECTION	CONTROL SEC	JOB NO.	FED AID PROJ
01	79051	TWA	NO



COUNTY KEY

TRAFFIC DATA

ROAD	YEAR	ADT	DHV	COMM	SPEED DATA DESIGN	POSTED	LIMITS
M-24	2023	4,368	381	6%	60	55	POB TO POE



THE IMPROVEMENTS COVERED BY THESE PLANS SHALL BE DONE IN ACCORDANCE WITH THE MICHIGAN DEPARTMENT OF TRANSPORTATION 2020 STANDARD SPECIFICATIONS FOR CONSTRUCTION. PHYSICAL ROAD NUMBER (PR#) & MILEPOST (MP) DATA ARE FROM MICHIGAN GEOGRAPHIC FRAMEWORK VERSION # 24.

BRADLEY C. WIEFERICH, P.E. - DIRECTOR

MILES: 1.74

CONTRACT FOR:
1.74 MI OF HOT MIX ASPHALT COLD MILLING AND RESURFACING, SHOULDER GRAVEL AND PAVEMENT MARKINGS ON M-24 FROM 4,200 FT SOUTH OF BLACKMORE ROAD TO 2,350 FT NORTH OF OBRIEN RD IN FREMONT TOWNSHIP, TUSCOLA CO

MDOT Michigan Department of Transportation	NO SCALE	DESIGN UNIT: TERVO	TSC: HURON	DATE: 1/15/2025
		CS: 79051	TITLE SHEET	DRAWING: SHEET
		JN: TWA	M-24	M-24 TITLE 01 / SECT01
FILE: M-24_TITLE.DGN			BLACKMORE RD TO OBRIEN RD	

LOG OF PROJECT

LOCATION

The project is located on M-24 from 4,200 feet south of Blackmore Road to 2,350 North of Obrien Road in Tuscola County.

Route	M-24
CS	79051
From CS MP	5.01
To CS MP	6.75
PR	274805
From PR MP	5.01
To PR MP	6.75
Length (mi)	1.74

DESCRIPTION OF WORK.

The following items apply throughout the project:

Project Wide Pay Items	Quantity	Unit
Mobilization, Max	1.00	LSUM

Mill and Resurface M-24 per the typical sections. Place Shoulder, Cl II Modified as directed by the Engineer. Install centerline corrugations per R-112-J in areas with a posted speed of 55 mph.

M-24 HMA Overlay Pay Items	Quantity	Unit
Cold Milling HMA Surface	30,630	Syd
HMA, 5EML	2,780	Ton
Centerling Corrugations, Milled, HMA	9,188	Ft
Shoulder, Cl II, Modified	770	Ton

Apply pavement markings where existing pavement markings have been removed due to construction operations. Document existing markings prior to construction operations, paid for as Witness, Log, $1,250.00.

Permanent Pavement Markings Pay Items	Quantity	Unit
Pavt Mrkg, Waterborne, 6 inch, White	18,376	Ft
Pavt Mrkg, Waterborne, 6 inch, Yellow	2,297	Ft
Pavt Mrkg, Waterborne, 2nd Application, 6 inch, White	18,376	Ft
Pavt Mrkg, Waterborne, 2nd Application, 6 inch, Yellow	2,297	Ft

Recessing Pavt Mrkg, Longit	20,673	Ft
Witness, Log, $1,250.00	1,250	Dlr

Maintain traffic per the special provision for maintaining traffic.

Maintenance of Traffic Pay Items	Quantity	Unit
Minor Traf Devices	1.00	LSUM
Channelizing Device, 42 inch, Fluorescent, Furn	250	Ea
Channelizing Device, 42 inch, Fluorescent, Oper	250	Ea
Automated Flagger Assistance Device	2	Ea
Sign, Type B, Temp, Prismatic, Furn	400	Sft
Sign, Type B, Temp, Prismatic, Oper	400	Sft
Traf Regulator Control	1.00	LSUM
Pavt Mrkg, Wet Reflective, Type R, Tape, 6 inch, Yellow, Temp	735	Ft
Rumble Strip, Temp, Portable, Furn	12	Ea
Rumble Strip, Temp, Portable, Oper	12	Ea

GENERAL NOTES

MISS DIG/UNDERGROUND UTILITY NOTIFICATION

For the protection of underground utilities and in conformance with MCL 460.171 et seq, the Contractor shall contact MISS DIG System, Inc. by phone at 811 or 800-482-7171 or via the web at either locate.missdig.org for single address or rte.missdig.org, a minimum of 3 work days prior to excavating, excluding weekends and holidays.

MONUMENT BOXES

All government corners on this project shall be protected during construction.

STATIONING

Stationing on this project was taken from old plans and pavement stenciled stationing and is not necessarily accurate.

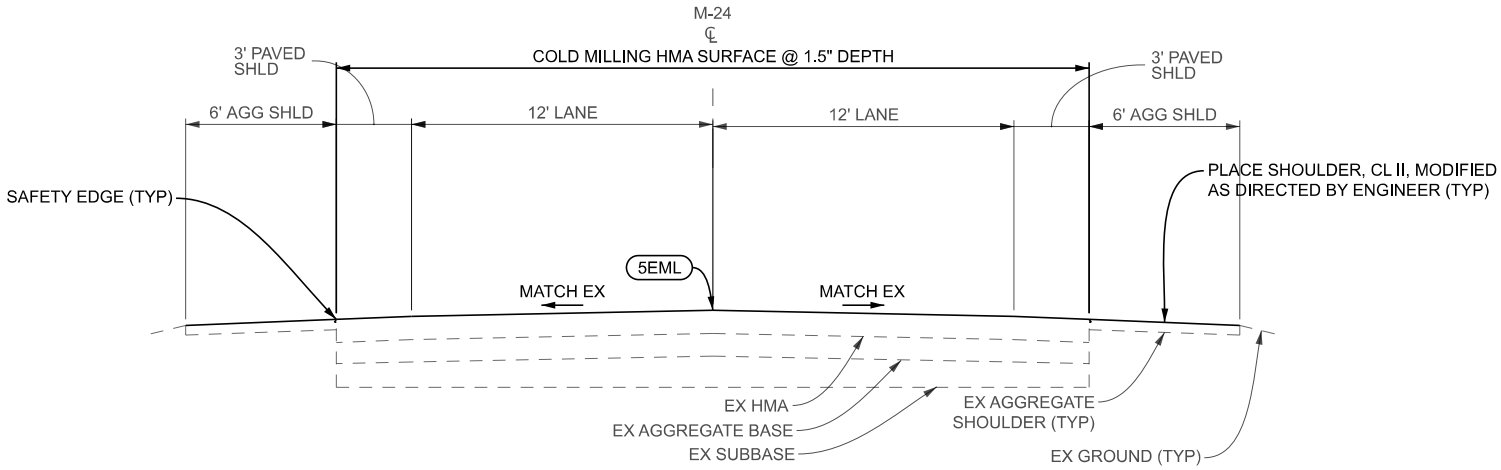
OLD ROAD PLANS

The following old road plans were referred to in the design of this project:
JN 132145 2018 Chip Seal
JN 80684 2006 M-24 Two Course

In addition, other old road plans that predate this project may be available. These plans may be reviewed in the Transportation Service Center (TSC) during normal working hours.

PUBLIC UTILITIES

There are no anticipated utility conflicts within the scope of this project. For utility company contacts during construction, please contact John DeLang, MDOT Huron TSC at delangj1@michigan.gov or (810) 347-9250.



PROPOSED NORMAL SECTION

SECTION APPLIES TO:
CS 79051
POB MP 5.01 to POE MP 6.75

HMA APPLICATION ESTIMATE

IDENT NO.	ITEM	RATE LBS PER SYD	PERFORMANCE GRADE	REMARKS
5EML	HMA, 5EML	165	PG 64-28	AWI = 260
	* BOND COAT	0.05-0.15 GAL		

* FOR INFORMATION ONLY

MDOT Michigan Department of Transportation	NO SCALE	DESIGN UNIT: TERVO	TSC: HURON	DATE: 1/15/2025
		CS: 79051	TYPICAL CROSS SECTIONS	DRAWING / SHEET
		JN: TWA	M-24	M-24 TYP 01 / SECT01
FILE: M-24_TYPICAL				

M-24 Mill & Resurfacing Project Phase 4

Projectwide Pay Items	Quantity	Unit		Unit Cost	Total
Mobilization, Max	1	LSUM			$ -
M-24 HMA Resurfacing Pay Items	**Quantity**	**Unit**		**Unit Cost**	**Total**
Cold Milling HMA Surface	25,510	Syd			$ -
HMA, 5EML	2,320	Ton			$ -
Centerline Corrugations, Milled, HMA	7,651	Ft			$ -
Shoulder, Cl II, Modified	590	Ton			$ -
Permanent Pavement Markings Pay Items	**Quantity**	**Unit**		**Unit Cost**	**Total**
Pavt Mrkg, Waterborne, 6 inch, White	15,300	Ft			$ -
Pavt Mrkg, Waterborne, 6 inch, Yellow	1,913	Ft			$ -
Pavt Mrkg, Waterborne, 2nd Application, 6 inch, White	15,300	Ft			$ -
Pavt Mrkg, Waterborne, 2nd Application, 6 inch, Yellow	1,913	Ft			$ -
Recessing Pavt Mrkg, Longit	17,213	Ft			$ -
Witness, Log, $1,250.00	1,250	Dlr			$ -
Maintenance of Traffic Pay Items	**Quantity**	**Unit**		**Unit Cost**	**Total**
Minor Traf Devices	1	LSUM			$ -
Channelizing Device, 42 inch, Fluorescent, Furn	125	Ea			$ -
Channelizing Device, 42 inch, Fluorescent, Oper	125	Ea			$ -
Automated Flagger Assistance Device	2	Ea			$ -
Sign, Type B, Temp, Prismatic, Furn	400	Sft			$ -
Sign, Type B, Temp, Prismatic, Oper	400	Sft			$ -
Traf Regulator Control	1	LSUM			$ -
Pavt Mrkg, Wet Reflective, Type R, Tape, 6 inch, Yellow, Temp	612	Ft			$ -
Rumble Strip, Temp, Portable, Furn	12	Ea			$ -
Rumble Strip, Temp, Portable, Oper	12	Ea			$ -
		Grand Total:		$	-

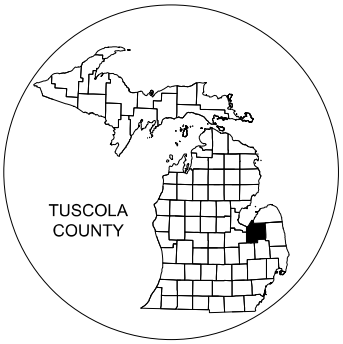
MICHIGAN DEPARTMENT OF TRANSPORTATION

ROUTE: M-24

MDOT M-24 Phase 4

FREMONT TOWNSHIP
TUSCOLA COUNTY

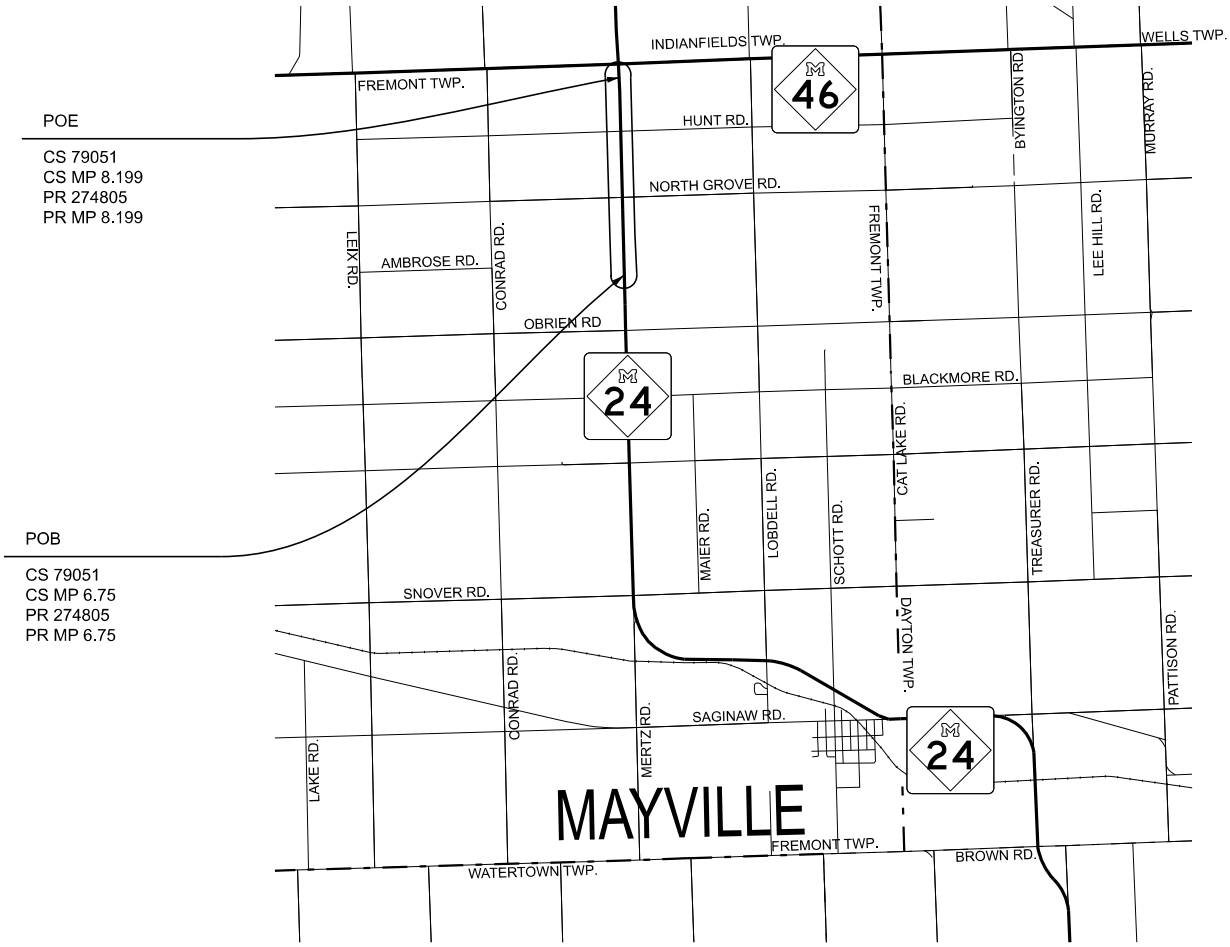
SECTION	CONTROL SEC	JOB NO.	FED AID PROJ
01	79051	TWA	NO



COUNTY KEY

TRAFFIC DATA

ROAD	YEAR	ADT	DHV	COMM	SPEED DATA DESIGN	POSTED	LIMITS
M-24	2023	4,368	381	6%	60	55	POB TO POE



THE IMPROVEMENTS COVERED BY THESE PLANS SHALL BE DONE IN ACCORDANCE WITH THE MICHIGAN DEPARTMENT OF TRANSPORTATION 2020 STANDARD SPECIFICATIONS FOR CONSTRUCTION. PHYSICAL ROAD NUMBER (PR#) & MILEPOST (MP) DATA ARE FROM MICHIGAN GEOGRAPHIC FRAMEWORK VERSION # 24.

MILES: 1.45

CONTRACT FOR:
1.45 MI OF HOT MIX ASPHALT COLD MILLING AND RESURFACING, SHOULDER GRAVEL AND PAVEMENT MARKINGS ON M-24 FROM 2,350 FT NORTH OF OBRIEN RD TO 625 FT SOUTH OF M-46 IN FREMONT TOWNSHIP, TUSCOLA CO

BRADLEY C. WIEFERICH, P.E. - DIRECTOR

MDOT Michigan Department of Transportation	NO SCALE	DESIGN UNIT: TERVO	TSC: HURON	DATE: 1/15/2025
		CS: 79051	TITLE SHEET	DRAWING: SHEET
		JN: TWA	M-24	M-24 TITLE 01 / SECT01
FILE: M-24_TITLE.DGN			OBRIEN RD TO M-46	

LOG OF PROJECT

LOCATION

The project is located on M-24 from 2,350 ft North of Obrien Road to 625 ft south of the centerline of M-46 in Tuscola County.

Route	M-24
CS	79051
From CS MP	6.75
To CS MP	8.199
PR	274805
From PR MP	6.75
To PR MP	8.199
Length (mi)	1.449

DESCRIPTION OF WORK.

The following items apply throughout the project:

Project Wide Pay Items	Quantity	Unit
Mobilization, Max	1.00	LSUM

Mill and Resurface M-24 per the typical sections. Place Shoulder, Cl II Modified as directed by the Engineer. Install centerline corrugations per R-112-J in areas with a posted speed of 55 mph.

M-24 HMA Overlay Pay Items	Quantity	Unit
Cold Milling HMA Surface	25,510	Syd
HMA, 5EML	2,320	Ton
Centerline Corrugations, Milled, HMA	7,651	Ft
Shoulder, Cl II, Modified	590	Ton

Apply pavement markings where existing pavement markings have been removed due to construction operations. Document existing markings prior to construction operations, paid for as Witness, Log, $1,250.00.

Permanent Pavement Markings Pay Items	Quantity	Unit
Pavt Mrkg, Waterborne, 6 inch, White	15,300	Ft
Pavt Mrkg, Waterborne, 6 inch, Yellow	1,913	Ft
Pavt Mrkg, Waterborne, 2nd Application, 6 inch, White	15,300	Ft
Pavt Mrkg, Waterborne, 2nd Application, 6 inch, Yellow	1,913	Ft

Recessing Pavt Mrkg, Longit	17,213	Ft
Witness, Log, $1,250.00	1,250	Dlr

Maintain traffic per the special provision for maintaining traffic.

Maintenance of Traffic Pay Items	Quantity	Unit
Minor Traf Devices	1.00	LSUM
Channelizing Device, 42 inch, Fluorescent, Furn	125	Ea
Channelizing Device, 42 inch, Fluorescent, Oper	125	Ea
Automated Flagger Assistance Device	2	Ea
Sign, Type B, Temp, Prismatic, Furn	400	Sft
Sign, Type B, Temp, Prismatic, Oper	400	Sft
Traf Regulator Control	1.00	LSUM
Pavt Mrkg, Wet Reflective, Type R, Tape, 6 inch, Yellow, Temp	612	Ft
Rumble Strip, Temp, Portable, Furn	12	Ea
Rumble Strip, Temp, Portable, Oper	12	Ea

GENERAL NOTES

MISS DIG/UNDERGROUND UTILITY NOTIFICATION

For the protection of underground utilities and in conformance with MCL 460.171 et seq, the Contractor shall contact MISS DIG System, Inc. by phone at 811 or 800-482-7171 or via the web at either locate.missdig.org for single address or rte.missdig.org, a minimum of 3 work days prior to excavating, excluding weekends and holidays.

MONUMENT BOXES

All government corners on this project shall be protected during construction.

STATIONING

Stationing on this project was taken from old plans and pavement stenciled stationing and is not necessarily accurate.

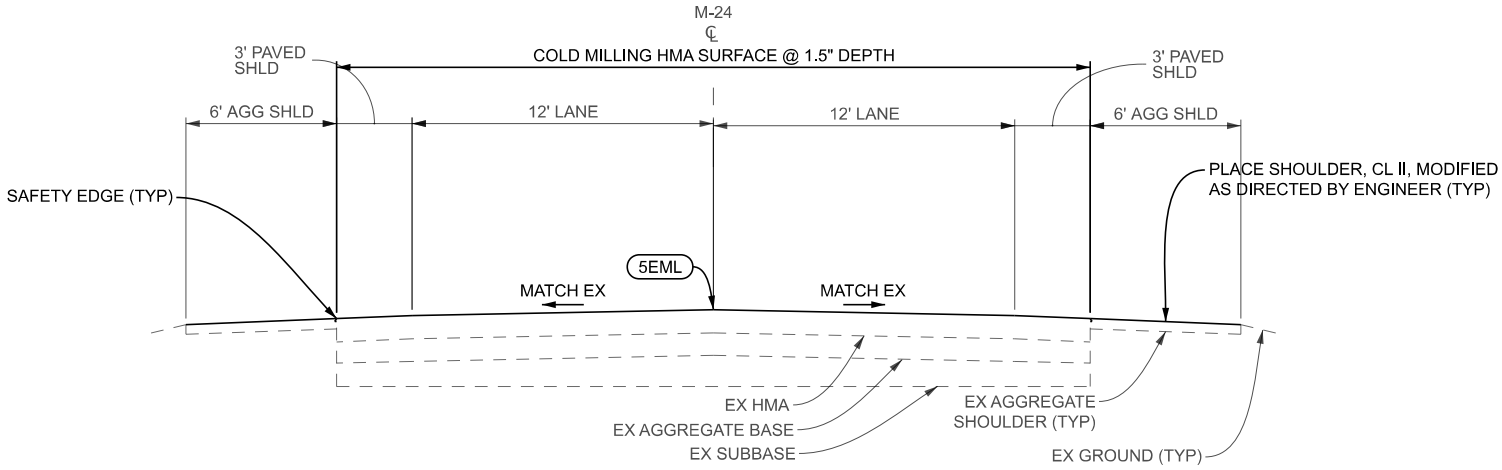
OLD ROAD PLANS

The following old road plans were referred to in the design of this project:
JN 132145 2018 Chip Seal
JN 80684 2006 M-24 Two Course

In addition, other old road plans that predate this project may be available. These plans may be reviewed in the Transportation Service Center (TSC) during normal working hours.

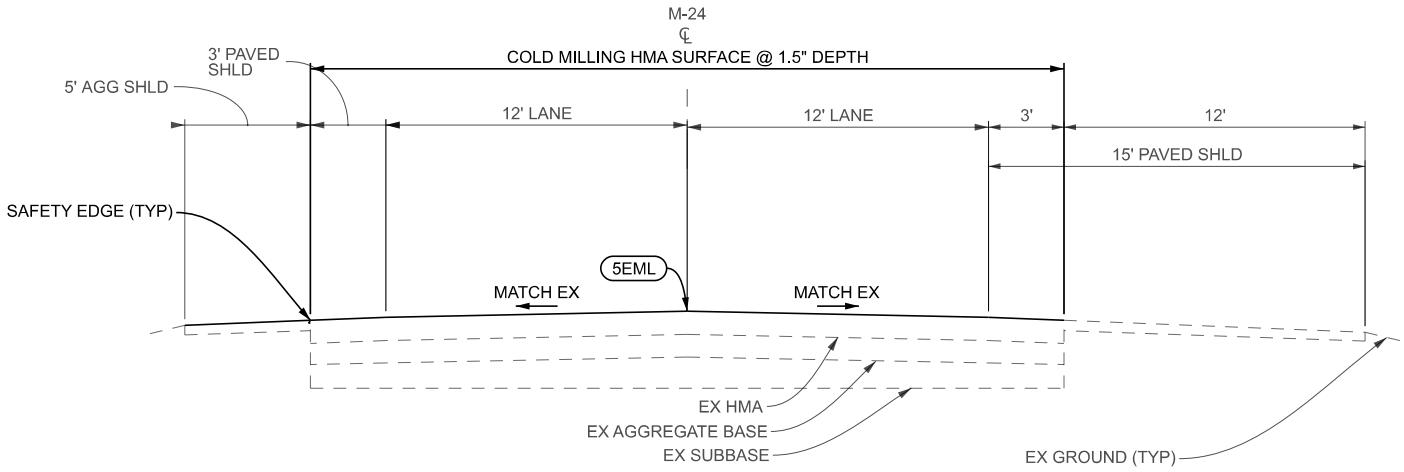
PUBLIC UTILITIES

There are no anticipated utility conflicts within the scope of this project. For utility company contacts during construction, please contact John DeLang, MDOT Huron TSC at delangj1@michigan.gov or (810) 347-9250.



PROPOSED NORMAL SECTION

SECTION APPLIES TO:
CS 79051
POB MP 6.75 TO MP 8.09



PROPOSED NORMAL SECTION

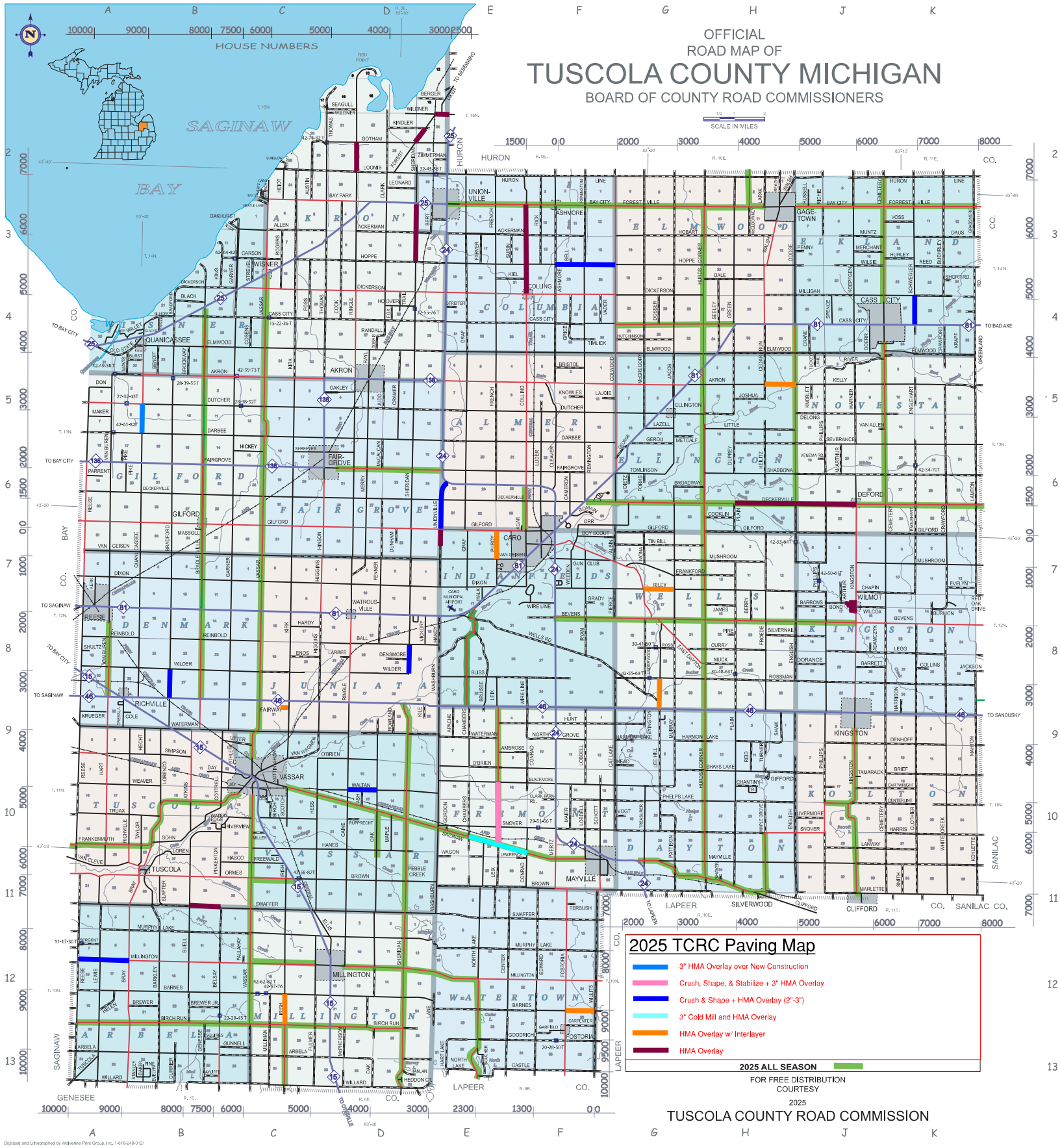
SECTION APPLIES TO:
CS 79051
MP 8.09 TO POE MP 8.199

HMA APPLICATION ESTIMATE

IDENT NO.	ITEM	RATE LBS PER SYD	PERFORMANCE GRADE	REMARKS
5EML	HMA, 5EML	165	PG 64-28	AWI = 260
	* BOND COAT	0.05-0.15 GAL		

* FOR INFORMATION ONLY

MDOT Michigan Department of Transportation	NO SCALE	DESIGN UNIT: TERVO	TSC: HURON	DATE: 1/15/2025
		CS: 79051	TYPICAL CROSS SECTIONS	DRAWING: M-24 TYP 01 / SHEET: SECT01
		JN: TWA	M-24	
FILE: M-24_TYPICAL				



Digitized and Lithographed by Wolverine Print Group, Inc. 1-616-248-0121

AGREEMENT

TUSCOLA COUNTY ROAD COMMISSION – 1733 S. MERTZ ROAD, CARO, MI 48723

This agreement made this _____day of_____, 20_____
by and between the Board of Tuscola County Road Commissioners and _____
_____.

1. _____hereby agrees to undertake the following work in the status of an independent contractor performing the following job:
   _____
   _____
   _____.

2. Said contractor, _____, shall at all times exercise extreme care and shall assume any and all liability for property damage or bodily injury resulting from the above operation by this employees, agents, assigns, sub-contractors and anyone else acting under his control or direction; and will indemnify, hold harmless and defend the Tuscola County Road Commission, its Commissioners or employees from any and all claims for property damage or bodily injury arising out of this Agreement.

3. Said contractor, _____, while engaged in said job shall maintain and furnish certificates of insurance, naming the Tuscola County Road Commission and Commissioners as an additional insured under the policy, with policy limits of $500,000/$1,000,000 for property damage and bodily injury, and shall furnish the Tuscola County Road Commission copies of said certificates of insurance prior to commencing any work on said project.
   Additionally, said contractor, _____, shall furnish prior to start of said job with the Board of Tuscola County Road Commissioners, a policy of insurance certifying he carries and has in effect worker's compensation insurance on all those required to be covered under Michigan law.

4. The address of the Board of Tuscola County Road Commissioners is 1733 S, Mertz Rd., Caro, MI 48723.

Witnessed:

_____ _____
Board of Tuscola County Road Commissioners

_____ _____
Contractor

Contractor bid will not be accepted unless the enclosed Agreement is Signed and Returned with you bid.

TUSCOLA COUNTY ROAD COMMISSION

Right - of - Way Permit Worksheet

Permit Fees & Proof of Insurance are required prior to review of the permit application

Date: _____

Applicant/Property Owner:

Name: _____

Address: _____

_____

Phone: _____

Email: _____

Signature: _____

Contractor:

Name: _____

Adddress: _____

_____

Phone: _____

Email: _____

Signature: _____

Project Locations:

Address: _____

Road: _____

Between: _____

And: _____

Township: _____ Section: _____

Project Description:

_____

_____

_____

_____

_____

Type of Work:

Driveway: *Commercial ☐ Residential/Farm ☐

Special Use: Utility ☐ Yard Enclosure ☐

Road Crossing: Bore ☐ Open Cut ☐

Misc.: ☐ _____

Material: *(If Known)*

**Pipe/Culvert Material: _____

Pipe/Culvert Diameter: _____

Pipe/Culvert Length: _____

***Backfill Material: _____

Reviewer's Recommendations:

_____

_____

_____

_____

Additonal Permit Standards & Policies apply, availible upon Request

Reviewer's Signature: _____

****Plastic, Concrete, or CMP (CMP may be purchased thru TCRC if placed in R-O-W)***

Flagged: _____

*****A Copy of the Certified Mechanical Analysis & the Density Report are required for material placed under roadway***

SPECIAL PROVISION FOR
MAINTAINING TRAFFIC

TUSCOLA COUNTY ROAD COMMISSION – 1733 S. MERTZ ROAD, CARO, MI 48723

GENERAL

Traffic shall be maintained in accordance with Sections 812 and 922 of the 2020 Michigan Department of Transportation (MDOT) Standard Specifications for Construction, including any Supplemental Specifications, and as herein specified.

CONSTRUCTION INFLUENCE AREA

The construction influence area (CIA) shall consist of the width of the project right-of-way from 3,500 feet before the project P.O.B. to 3,500 feet beyond the project P.O.E. and 500 feet in all directions along all crossroads.

TRAFFIC CONTROL DEVICES

All traffic control devices and their usage shall conform to the Michigan Manual on Uniform Traffic Control Devices (MMUTCD), 2011 edition as amended, and as herein specified.

Sign covers shall be placed over existing regulatory, warning and construction signs that are not applicable during construction.

Signing for a lane closure shall be according to attached MDOT Maintaining Traffic Typical Figure M0150a. The use of the speed limit signs, R 2-1, will be as needed.

Sheeting shall conform to section 922.02B of the 2020 Standard Specifications for Construction. Engineer grade reflective sheeting must meet the requirements for ASTM D 4956 Type I engineer grade sheeting.

TRAFFIC RESTRICTIONS

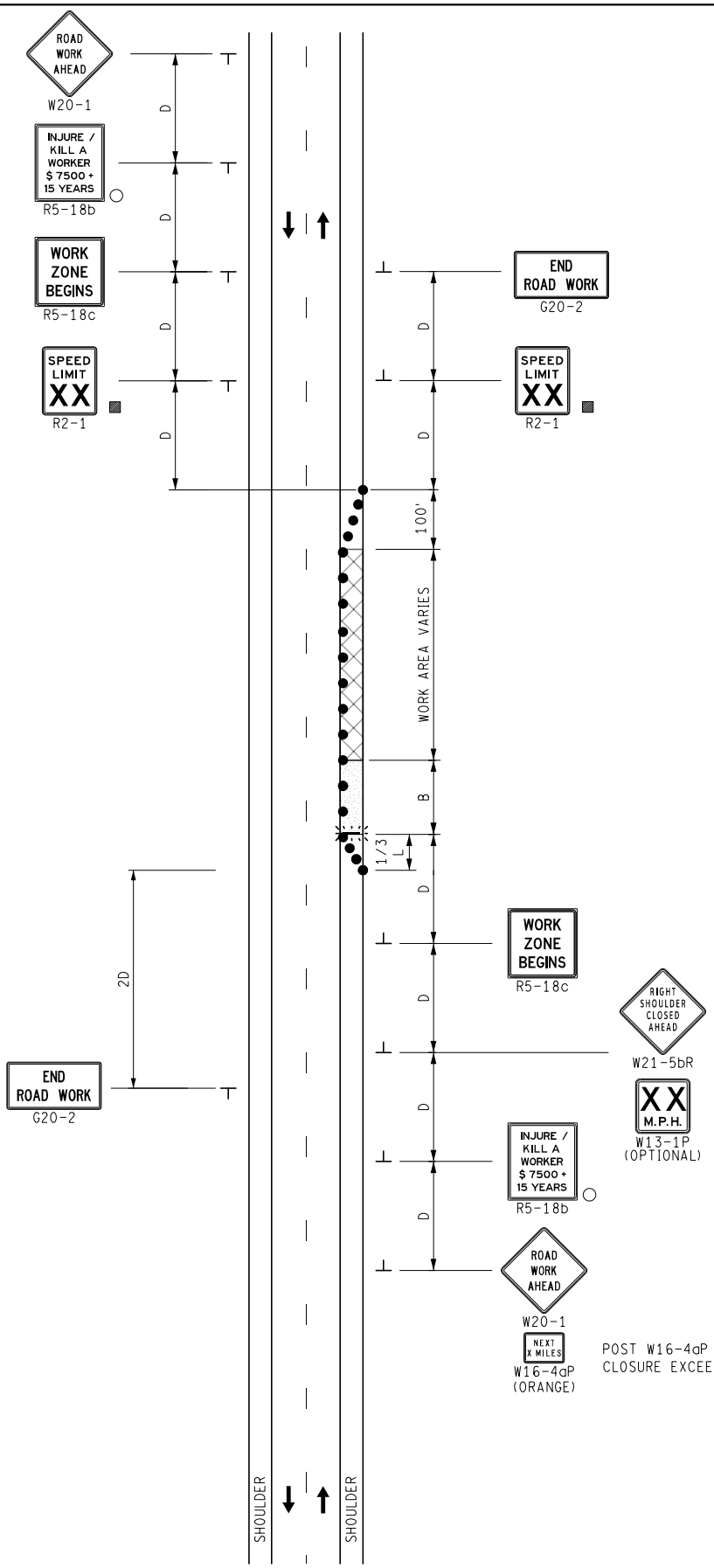
Work shall be conducted during daylight hours only. No work shall be conducted on Sundays unless approved by the Engineer.

The maximum distance between the traffic regulators shall be no more than 2 miles in length. All sequences of more than 2 miles in length will require written permission from the Engineer before proceeding.

PAYMENT

Payment for Maintaining Traffic shall be included in other Bid unit prices. There will be no separate payment for Maintaining Traffic.

Approved by Board 1/27/05 rev.1/17/07 rev.12/22/11 rev. 117/13



KEY

- CHANNELIZING DEVICES
- LIGHTED ARROW PANEL (CAUTION MODE)
- TRAFFIC FLOW
- REFLECTS EXISTING SPEED LIMIT
- PLACE SIGN AS INDICATED IN NOTE S2

STANDARD NOTES

(SEE 102-GEN-NOTES)

GENERAL: G1, G2, G3, G4
SIGNING: S1, S2, S3, S5
DEVICES: TCD1, TCD2, TCD6, TCD7

POST W16-4aP WHEN SHOULDER CLOSURE EXCEEDS 1 MILE IN LENGTH

MDOT Michigan Department of Transportation	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL	SHOULDER CLOSURE ON A 2-LANE, UNDIVIDED ROADWAY	DATE: MAY 2021
		NO: 122-NFW-SHL-(R)		SHEET: 1 OF 1
FILE: 122-NFW-SHL-(R).dgn				

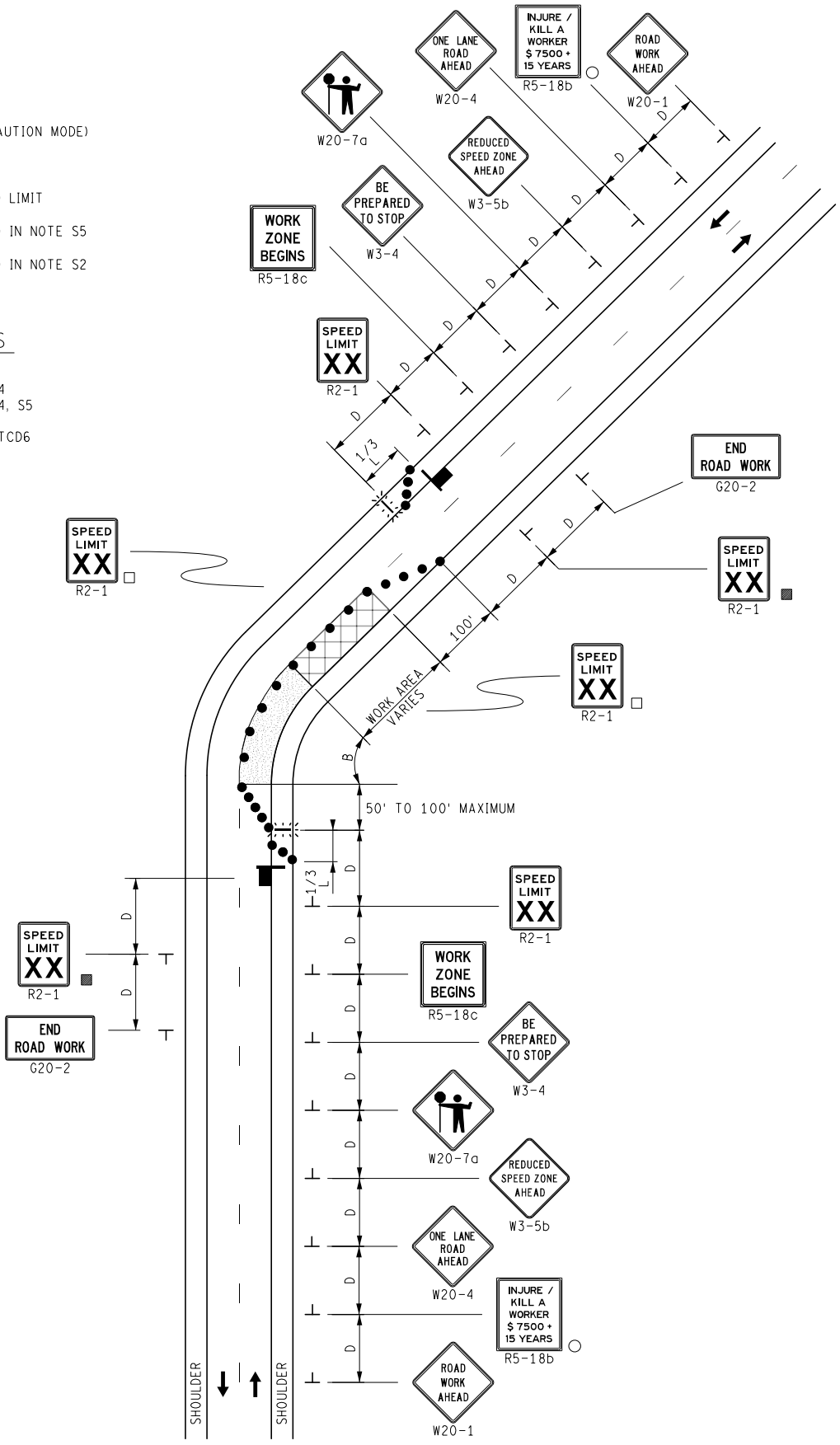
KEY

- TRAFFIC REGULATOR
- CHANNELIZING DEVICES
- LIGHTED ARROW PANEL (CAUTION MODE)
- TRAFFIC FLOW
- REFLECTS EXISTING SPEED LIMIT
- PLACE SIGN AS INDICATED IN NOTE S5
- PLACE SIGN AS INDICATED IN NOTE S2

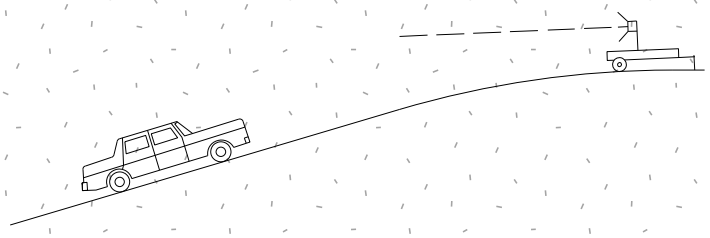
STANDARD NOTES

(SEE GEN-NOTES)

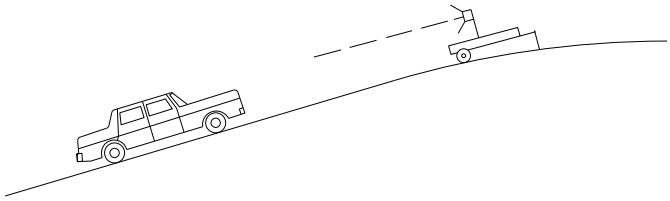
GENERAL: G1, G2, G3, G4
SIGNING: S1, S2, S3, S4, S5
TRAF REG: TR1, TR2
DEVICES: TCD1, TCD2, TCD6



MDOT Michigan Department of Transportation	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL NO: 110-TR-NFW-2L	LANE CLOSURE UTILIZING TRAFFIC REGULATORS ON A 2-LANE UNDIVIDED ROADWAY	DATE: MAY 2021 SHEET: 1 OF 1
FILE: 110-TR-NFW-2L.dgn				

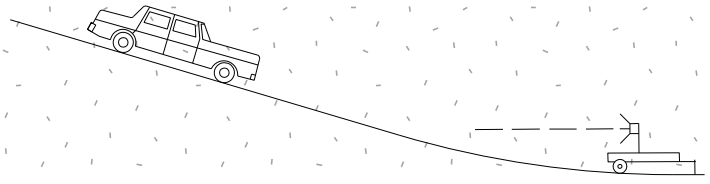


INCORRECT USAGE

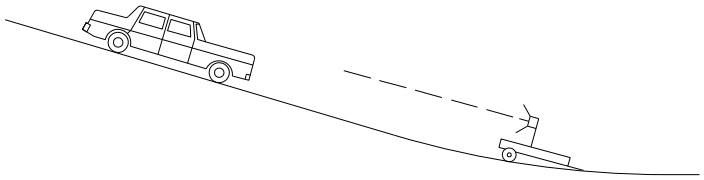


CORRECT USAGE

PLACEMENT ON A CREST VERTICAL CURVE

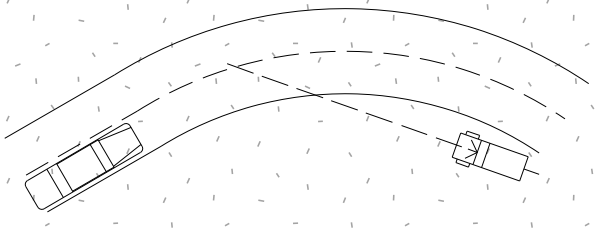


INCORRECT USAGE

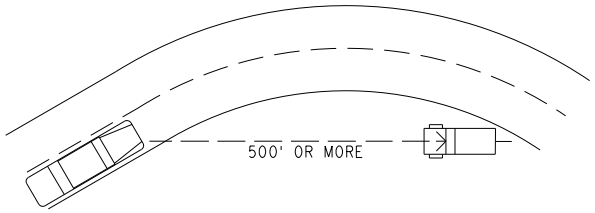


CORRECT USAGE

PLACEMENT ON A SAG VERTICAL CURVE



INCORRECT USAGE



CORRECT USAGE

NOT TO SCALE

PLACEMENT ON A HORIZONTAL CURVE

NOTE:

ENSURE THE ARROW REMAINS CLEARLY LEGIBLE AT DISTANCES FROM 2,500 FEET TO 200 FEET, FROM ALL TRAFFIC LANES AND ROADWAY ENTRANCES. DO NOT PLACE THE LIGHTED ARROW ON A HORIZONTAL OR VERTICAL CURVE THAT MIGHT INTERFERE WITH THIS LEGIBILITY REQUIREMENT.

MDOT Michigan Department of Transportation	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL NO: 104-GEN-AB	**USE OF ARROW BOARD ON HILL OR CURVE AND WORK ZONE LAYOUT**	DATE: MAY 2021 SHEET: 1 OF 1
FILE: 104-GEN-AB.dgn				

THE FOLLOWING NOTES APPLY IF CALLED FOR ON THE TRAFFIC TYPICAL

GENERAL NOTES

G1: SEE GEN-SPACING-CHARTS FOR COMMON VALUES INCLUDING:
D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
L = MINIMUM LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER
ROLL AHEAD DISTANCE

G2: DISTANCE BETWEEN SIGNS, "D", THE VALUES FOR WHICH ARE SHOWN IN TYPICAL GEN-KEY ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

G3: ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING MUST MEET NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 350 (NCHRP 350) TEST LEVEL 3, OR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH) TL-3 AS WELL AS THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

G4: DO NOT STORE EQUIPMENT, MATERIALS OR PERFORM WORK IN ESTABLISHED BUFFER AREAS.

G5: ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR TRAFFIC PATTERNS FOR WORK LESS THAN THREE DAYS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

SIGN NOTES

S1: ALL NON-APPLICABLE SIGNING WITHIN THE CIA MUST BE MODIFIED TO FIT CONDITIONS, COVERED, OR REMOVED. FOR GUIDANCE SEE THE WORK ZONE SAFETY AND MOBILITY MANUAL, SECTIONS 6.01.09 AND 6.01.10.

S2: R5-18b SIGNS ARE ONLY REQUIRED ON FREEWAY PROJECTS WITH A DURATION OF 15 DAYS OR LONGER OR NON-FREEWAY PROJECTS WITH A DURATION OF 90 DAYS OR LONGER. TO APPLY THIS TYPICAL WITHOUT R5-18b SIGNS, REMOVE THE SIGNS AND CONSOLIDATE THE SEQUENCE AS APPROPRIATE.

S3: R5-18c IS ONLY REQUIRED IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. OMIT THIS SIGN IN SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE.

S4: ADDITIONAL SIGNING AND/OR ELONGATED SIGNING SEQUENCES SHOULD BE USED WHEN TRAFFIC VOLUMES ARE SIGNIFICANT ENOUGH TO CREATE BACKUPS BEYOND THE W20-5 SIGNS.

S5: PLACE ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE WORK ZONE SPEED AFTER EACH MAJOR CROSSROAD THAT INTERSECTS THE WORK ZONE, OR AFTER EACH ENTRANCE RAMP THAT COMES ONTO THE FREEWAY WHERE THE REDUCED SPEED IS IN EFFECT. PLACE ADDITIONAL SPEED LIMIT SIGNS AT INTERVALS ALONG THE ROADWAY SUCH THAT NO SPEED LIMIT SIGNS ARE MORE THAN 2 MILES APART. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, PLACE ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED BEYOND THE LIMITS OF THE WORK AREA AS INDICATED. IF PERMANENT SIGNS DISPLAYING THE CORRECT SPEED LIMIT ARE POSTED, OMIT ALL W3-5b AND R2-1 SIGNS AND REDUCE SPACING ACCORDINGLY.

S6: FABRICATE SPECIAL SIGNS IN ACCORDANCE WITH CURRENT SIGNING DESIGN STANDARDS.

S7: PLACE ADDITIONAL R8-3 SIGNS AT A MAXIMUM 500' SPACING THROUGHOUT THE WORK ZONE.

S8: WHEN SPEED LIMIT SIGNS CANNOT BE PLACED SIDE BY SIDE AS SHOWN, PLACE THEM "D" DISTANCE APART.

S9: STOP SIGNS NOT REQUIRED IF SIGNALS ARE ON 4-WAY FLASHING RED. STOP AHEAD SIGNS ARE NOT REQUIRED IF THERE IS ADEQUATE VISIBILITY OF THE STOP SIGN OR IF SIGNALS ARE BEING USED TO CONTROL TRAFFIC.

S10: PLACE REDUCED SPEED ZONE AHEAD SIGN (W3-5b) HERE WHEN USING A SPEED REDUCTION IN THIS DIRECTION.

S11: THE NUMBER OF W1-6 SHIFT SIGNS TO PLACE FOR A SHIFT IS AS FOLLOWS:
SHIFTS 4FT OR LESS, PLACE ONE W1-6(R)(L)
SHIFTS 5FT TO 12FT, PLACE TWO W1-6(R)(L)
SHIFTS MORE THAN 12FT, PLACE THREE OR MORE W1-6(R)(L) SIGNS DEPENDING UPON LENGTH OF SHIFT AND AS PER THE ENGINEER.

S12: PLACE R2-1 SIGNS AS DETAILED IN NOTE S5 WHEN THERE IS A SPEED REDUCTION IN THIS DIRECTION

TRAFFIC REGULATOR NOTES

TR1: TRAFFIC REGULATORS MUST FOLLOW ALL THE REQUIREMENTS IN THE STANDARD SPECIFICATIONS, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS, THE CURRENT VERSIONS OF THE TRAFFIC REGULATOR'S INSTRUCTION MANUAL AND THE VIDEO "HOW TO SAFELY REGULATE TRAFFIC IN MICHIGAN". THE MAXIMUM DISTANCE BETWEEN THE TRAFFIC REGULATORS IS DETERMINED BY THE ROADWAY ADT, GEOMETRICS, AND AS DIRECTED BY THE ENGINEER.

TR2: PROVIDE APPROPRIATE BALLOON LIGHTING TO SUFFICIENTLY ILLUMINATE TRAFFIC REGULATOR'S STATIONS WHEN TRAFFIC REGULATING IS ALLOWED DURING THE HOURS OF DARKNESS.

TEMPORARY TRAFFIC CONTROL DEVICE NOTES

TCD1: THE MAXIMUM DISTANCE IN FEET BETWEEN CHANNELIZING DEVICES IN A TAPER SHOULD NOT EXCEED 1.0 TIMES THE WORK ZONE SPEED LIMIT IN MPH FOR ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT LESS THAN 45 MPH AND SHOULD NOT EXCEED 50 FEET ON ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT OF 45 MPH OR GREATER. THE SPACING FOR 42 INCH CHANNELIZING DEVICE TAPERS ARE NOT TO EXCEED 25 FEET AT NIGHT.

TCD2: THE MAXIMUM DISTANCE IN FEET BETWEEN CHANNELIZING DEVICES IN A TANGENT SHOULD NOT EXCEED TWICE THE WORK ZONE SPEED LIMIT IN MPH FOR ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT LESS THAN 45 MPH AND SHOULD NOT EXCEED 100 FEET ON ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT OF 45 MPH OR GREATER. THE SPACING FOR 42 INCH CHANNELIZING DEVICE TANGENTS ARE NOT TO EXCEED 50 FEET AT NIGHT.

TCD3: TYPE III BARRICADES MUST BE LIGHTED FOR OVERNIGHT CLOSURES.

TCD4: WHEN THE HAUL ROAD IS NOT IN USE, PLACE LIGHTED TYPE III BARRICADES WITH "ROAD CLOSED" EXTENDING COMPLETELY ACROSS THE HAUL ROAD.

TCD5: USE OBJECT MARKER SIGNS IN LIEU OF THE TYPE B HIGH INTENSITY LIGHT SHOWN IN THE STANDARD PLAN FOR TEMPORARY CONCRETE BARRIER (R-53, AND R-126) WHEN USED WITH A TEMPORARY SIGNAL SYSTEM. THE OBJECT MARKERS MUST BE A MINIMUM OF 12 INCHES IN WIDTH AND 36 INCHES IN HEIGHT AND HAVE ORANGE AND WHITE RETROREFLECTIVE SHEETING. THE RETROREFLECTIVE SHEETING MUST HAVE ALTERNATING DIAGONAL ORANGE AND WHITE STRIPES SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION VEHICULAR TRAFFIC IS TO PASS.

TCD6: PLACE LIGHTED ARROW PANELS AS CLOSE TO THE BEGINNING OF TAPERS AS PRACTICAL, BUT NOT IN A MANNER THAT WILL OBSCURE OR CONFUSE APPROACHING MOTORISTS WHEN PHYSICAL LIMITATIONS RESTRICT PLACEMENT. IN CURBED SECTIONS, IF ARROW BOARD CANNOT BE PLACED BEHIND CURB, PLACE ARROW BOARD IN THE CLOSED LANE AS CLOSE TO THE BEGINNING OF TAPER AS POSSIBLE.

TCD7: ADDITIONAL TYPE III BARRICADES MAY BE REQUIRED TO COMPLETELY CLOSE OFF ROAD FROM EDGE OF PAVEMENT TO EDGE OF PAVEMENT.

TCD8: WHERE THE SHIFTED SECTION IS SHORTER THAN 600 FEET, A DOUBLE REVERSE CURVE SIGN (W24-1) CAN BE USED INSTEAD OF THE FIRST REVERSE CURVE SIGN, AND THE SECOND REVERSE CURVE SIGN CAN BE OMITTED.

TCD9: RUMBLE STRIPS ARE TO BE PLACED AS SPECIFIED IN THE CONTRACT. IF NOT SPECIFIED IN THE CONTRACT, PLACE RUMBLE STRIPS AS SHOWN, AND IN ACCORDANCE WITH THE RUMBLE STRIP MANUFACTURER'S RECOMMENDATIONS. AN ARRAY OF RUMBLE STRIPS CONTAINS THREE RUMBLE STRIPS. PLACE THE RUMBLE STRIPS IN THE ARRAY AT A CONSISTENT DISTANCE, BETWEEN 10' AND 20' APART.

TCD10: SEE THE WORK ZONE SAFETY AND MOBILITY MANUAL, PORTABLE CHANGEABLE MESSAGE SIGN GUIDELINES FOR RECCOMENDED AND CORRECT PCMS MESSAGING. STAGGER PCMS THAT ARE ON OPPOSING SIDES OF THE ROAD 1000 FEET FROM EACH OTHER.

RAMP NOTES

RMP1: WHEN CONDITIONS ALLOW, E5-1 SIGNS MUST BE REMOVED OR COVERED AND CHANELIZING DEVICES MUST BE POSITIONED TO ENABLE RAMP TRAFFIC TO DIVERGE IN A FREE MANNER

RMP2: STOP AND YIELD CONDITIONS SHOULD BE AVOIDED WHENEVER PRACTICAL. WHEN CONDITIONS WARRANT, R1-1 SIGNS MAY BE USED IN PLACE OF R1-2 SIGNS. WHEN R-1 SIGNS ARE USED, W3-1 SIGNS MUST BE USED IN PLACE OF W3-2 SIGNS. CONSIDERATION SHOULD BE GIVEN TO CLOSING THE RAMP TO COMPLETE WORK TO ALLOW AN ADEQUATE MERGE DISTANCE. WORK SHOULD BE EXPEDITED TO AVOID THE STOP AND/OR YIELD CONDITIONS.

THE FOLLOWING NOTES APPLY IF CALLED FOR ON THE TRAFFIC TYPICAL

SIGNAL NOTES

SIG1: EXISTING SIGNAL MUST BE EITHER 4-WAY FLASHING RED, BAGGED, OR TURNED OFF.

SIG2: SIGNAL IS IN OPERATION.

SIG3: DELINEATE THE WORK ZONE AREA WITH 28 INCH CONES FOR DAYTIME WORK, OR 42 INCH CHANNELIZING DEVICES FOR NIGHTTIME WORK.

SIG4: THE CONTRACTOR MUST HAVE A DESIGNATED SPOTTER IF THE AERIAL BUCKET TRUCK IS LOCATED OVER ACTIVE TRAVEL LANES.

SIG5: THE LOWEST POINT OF THE BUCKET MAY NOT TRAVEL BELOW 14 FOOT VERTICAL CLEARANCE. THE CONTRACTOR MUST UTILIZE AN ALTERNATE SET UP, OR PLACE THE INTERSECTION IN A 4 WAY STOP IF THE 14 FOOT VERTICAL CLEARANCE IS COMPROMIZED. USE TRAFFIC REGULATORS TO CONTROL TRAFFIC THROUGH THE INTERSECTION WHEN TRAFFIC IS PLACED IN A 4 WAY STOP.

SIG6: DELINEATE THE TRUCK WITH CHANNELIZING DEVICES. THE POSITION OF THE TRUCK MAY BE MOVED TO FACILITATE WORK.

MAINTENANCE AND SURVEYING NOTES

MS1: WHENEVER STOPPING SIGHT DISTANCE EXISTS TO THE REAR, THE SHADOW VEHICLES SHOULD MAINTAIN THE RECOMENDED DISTANCE FROM THE WORK AREA AND PROCEEED AT THE SAME SPEED. THE SHADOW VEHICLE SHOULD SLOW DOWN AND TRAVEL AT A FARTHER DISTANCE TO PROVIDE ADEQUATE SIGHT DISTANCE IN ADVANCE OF VERTICAL OR HORIZONTAL CURVES.

MS2: WORKERS OUTSIDE OF VEHICLES SHOULD WORK WITHIN 150' OF WORK VEHICLES WITH AN ACTIVATED BEACON, BETWEEN THE "BEGIN WORK CONVOY" SIGN AND THE "END WORK CONVOY" SIGN, OR BETWEEN THE "WORK ZONE BEGINS" AND "END ROAD WORK" SIGN.

MS3: WORK OR SHADOW VEHICLES WITH OR WITHOUT A TMA MAY BE USED TO SEPARATE THE WORK SPACE FROM TRAFFIC. IF USED, THE VEHICLES SHOULD BE PARKED ACCORDING TO THE ROLL AHEAD DISTANCE TABLES.

MS4: WORK AND SHADOW VEHICLES SHALL BE APPROPRIATELY EQUIPPED WITH AN ACTIVATED AMBER BEACON.

MS5: WHEN WORKERS ARE OUTSIDE THEIR VEHICLES IN AN EXISTING LANE WHILE A MOBILE OPERATION IS OCCURRING DURING THE NIGHTTIME HOURS, CHANNELIZING DEVICES TO DELINEATE OPEN OR CLOSED LANES AT 50 FT SPACING MUST BE USED. AN EXAMPLE OF AN OPERATION (BUT NOT LIMITED TO) IS THE LAYOUT OF CONCRETE PATCHES.

MS6: W21-6 AND W20-1 SIGNS MAY BE SUBSTITUTED AS DETERMINED BY THE TYPE OF WORK TAKING PLACE AS PER THE ENGINEER.

DISTANCE BETWEEN TRAFFIC SIGNS, "D"

"D" DISTANCES	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)										
	25	30	35	40	45	50	55	60	65	70	75
D (FEET)	250	300	350	400	450	500	550	600	650	700	750

GUIDELINES FOR LENGTH OF LONGITUDINAL BUFFER SPACE, "B"

"B" LENGTHS	SPEED,* MPH (PRIOR TO WORK AREA)											
	20	25	30	35	40	45	50	55	60	65	70	75
B (FEET)	33	50	83	132	181	230	279	329	411	476	542	625

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

MINIMUM MERGING TAPER LENGTH, "L" (FEET)

OFFSET (FEET)	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)										
	25	30	35	40	45	50	55	60	65	70	75
1	11	15	21	27	45	50	55	60	65	70	75
2	21	30	41	54	90	100	110	120	130	140	150
3	32	45	62	80	135	150	165	180	195	210	225
4	42	60	82	107	180	200	220	240	260	280	300
5	53	75	103	134	225	250	275	300	325	350	375
6	63	90	123	160	270	300	330	360	390	420	450
7	73	105	143	187	315	350	385	420	455	490	525
8	84	120	164	214	360	400	440	480	520	560	600
9	94	135	184	240	405	450	495	540	585	630	675
10	105	150	205	267	450	500	550	600	650	700	750
11	115	165	225	294	495	550	605	660	715	770	825
12	125	180	245	320	540	600	660	720	780	840	900
13	136	195	266	347	585	650	715	780	845	910	975
14	146	210	286	374	630	700	770	840	910	980	1050
15	157	225	307	400	675	750	825	900	975	1050	1125

NOT TO SCALE

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

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

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

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

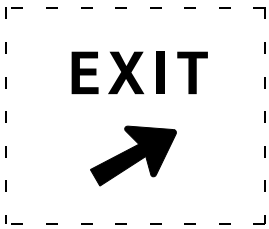
TYPES OF TAPERS	TAPER LENGTH
UPSTREAM TAPERS	
MERGING TAPER	L - MINIMUM
SHIFTING TAPER	1/2 L - MINIMUM
SHOULDER TAPER	1/3 L - MINIMUM
2 TO 1 LANE ROAD TAPER	100' - MAXIMUM
DOWNSTREAM TAPERS	
(USE IS RECOMMENDED)	100' (PER LANE)

MAXIMUM SPACING FOR CHANNELIZING DEVICES

WORK ZONE SPEED LIMIT	DRUM AND 42" DEVICE SPACING (FT)		NIGHTTIME 42" DEVICE SPACING (FT)	
	TAPER	TANGENT	TAPER	TANGENT
< 45 MPH	1 x SPEED LIMIT	2 x SPEED LIMIT	25 FEET	50 FEET
≥ 45 MPH	50 FEET	100 FEET	25 FEET	50 FEET

SIGN OUTLINE KEY

DASHED OUTLINES INDICATE A SIGN THAT EXISTS ON SITE, AND NEEDS TO BE COVERED.



SOLID OUTLINES INDICATE A SIGN THAT IS TO BE PLACED ON THE PROJECT

NOT TO SCALE

GUIDELINES FOR ROLL-AHEAD DISTANCES FOR TMA VEHICLES - TEST LEVEL 2

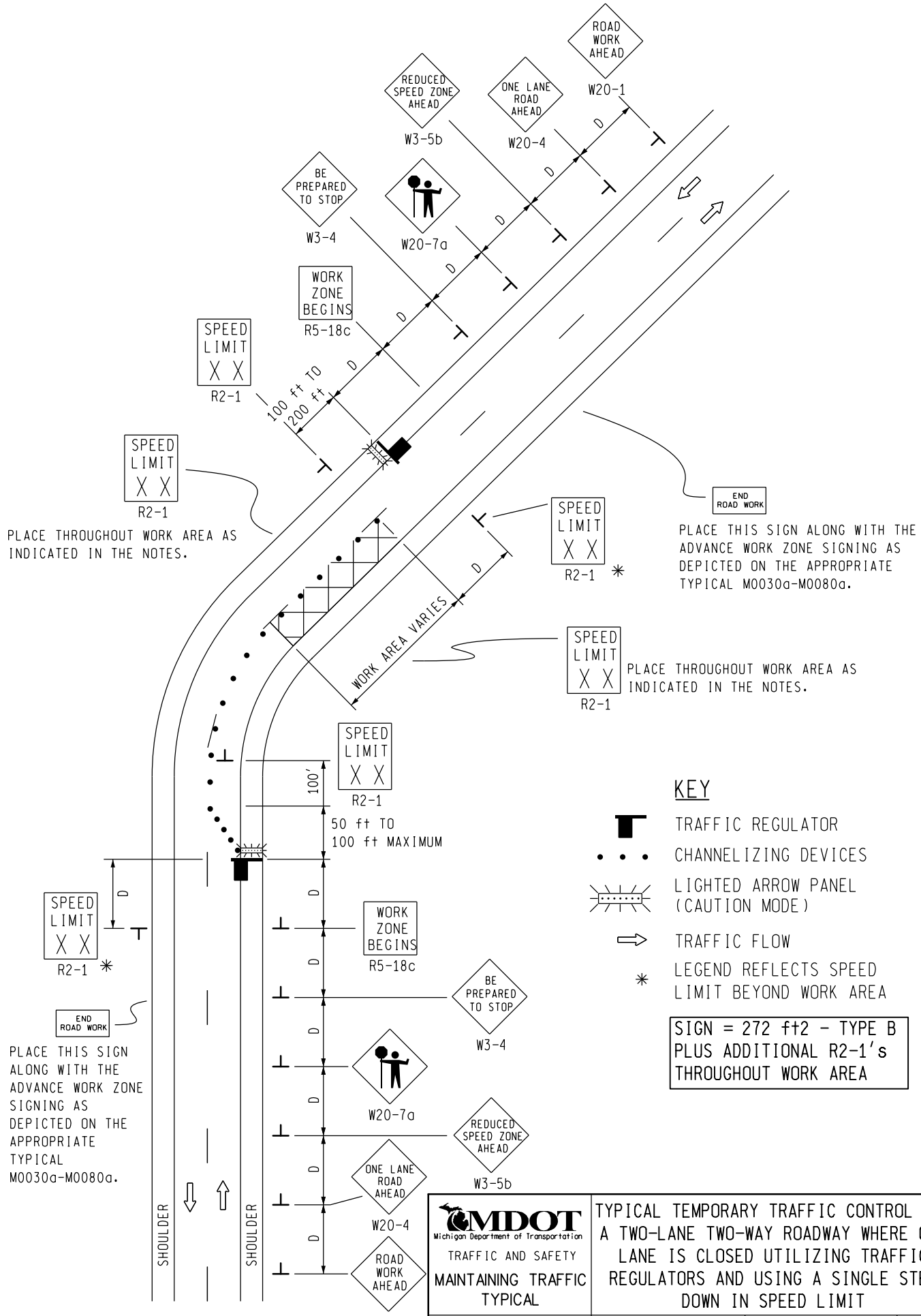
WEIGHT OF TMA VEHICLE	PREVAILING SPEED (POSTED SPEED PRIOR TO WORK ZONE)	ROLL-AHEAD DISTANCE* (DISTANCE FROM FRONT OF TMA VEHICLE TO WORK AREA)
5.5 TONS (STATIONARY)	40 MPH OR LESS	25 FT

* ROLL-AHEAD DISTANCES ARE CALCULATED USING A 4,410 POUND IMPACT VEHICLE WEIGHT.

GUIDELINES FOR ROLL-AHEAD DISTANCES FOR TMA VEHICLES - TEST LEVEL 3

WEIGHT OF TMA VEHICLE	PREVAILING SPEED (POSTED SPEED PRIOR TO WORK ZONE)	ROLL-AHEAD DISTANCE* (DISTANCE FROM FRONT OF TMA VEHICLE TO WORK AREA)
5 TONS (MOBILE)	45 MPH	100 FT
	50-55 MPH	150 FT
	60-75 MPH	175 FT
12 TONS (STATIONARY)	45 MPH	25 FT
	50-55 MPH	25 FT
	60-75 MPH	50 FT

* ROLL-AHEAD DISTANCES ARE CALCULATED USING A 10,000 POUND IMPACT VEHICLE WEIGHT.



MDOT Michigan Department of Transportation

TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A TWO-LANE TWO-WAY ROADWAY WHERE ONE LANE IS CLOSED UTILIZING TRAFFIC REGULATORS AND USING A SINGLE STEP DOWN IN SPEED LIMIT

DRAWN BY: CON:AE:djf	OCTOBER 2011	M0150a	SHEET 1 OF 2
CHECKED BY: BMM:CRB	PLAN DATE:		
FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0150a.dgn REV. 10/04/2011			

NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

16A. ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED SHALL BE PLACED AFTER EACH MAJOR CROSSROAD THAT INTERSECTS THE WORK AREA WHERE THE REDUCED SPEED IS IN EFFECT, AND AT INTERVALS ALONG THE ROADWAY SUCH THAT NO SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED ARE MORE THAN TWO MILES APART.

16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.

16E. WHEN EXISTING SPEED LIMITS ARE REDUCED MORE THAN 10 MPH, THE SPEED LIMIT SHALL BE STEPPED DOWN IN NO MORE THAN 10 MPH INCREMENTS.

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

SIGN SIZES

DIAMOND WARNING	- 48" x 48"
RECTANGULAR REGULATORY	- 48" x 60"
R5-18c REGULATORY	- 48" x 48"

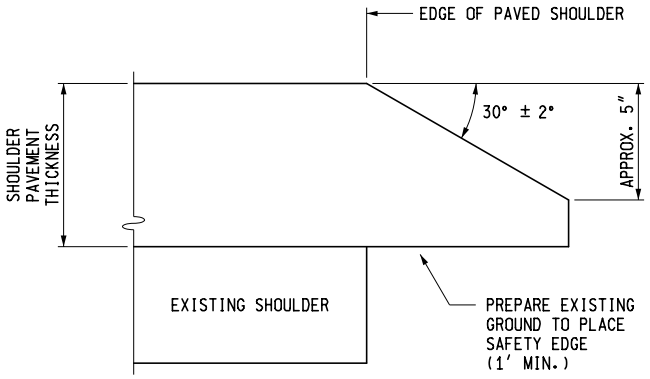
NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A TWO-LANE TWO-WAY ROADWAY WHERE ONE LANE IS CLOSED UTILIZING TRAFFIC REGULATORS AND USING A SINGLE STEP DOWN IN SPEED LIMIT

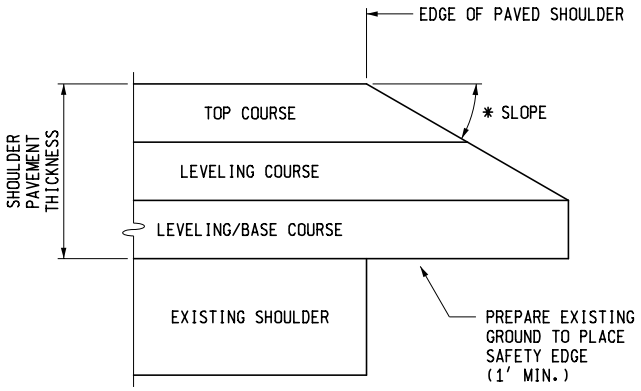
DRAWN BY: CON:AE:djf	OCTOBER 2011	M0150a	SHEET 2 OF 2
CHECKED BY: BMM:CRB	PLAN DATE:		

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0150a.dgn REV. 10/04/2011

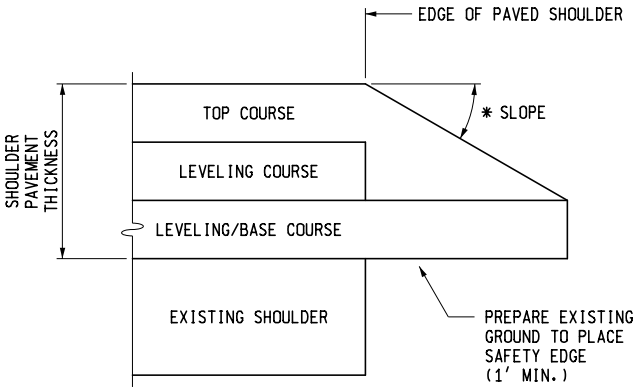


SAFETY EDGE FOR CONCRETE PAVEMENT

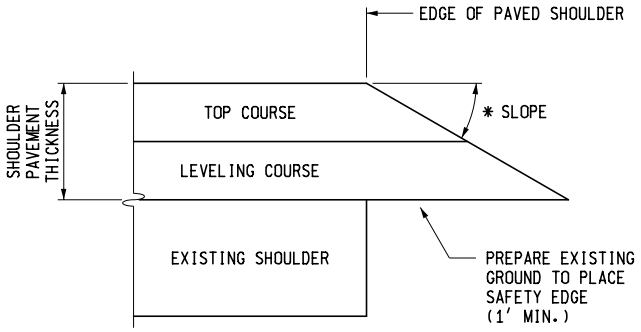
OVERLAY



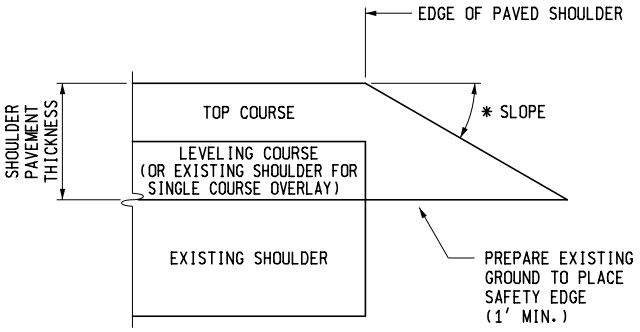
CONFIGURATION 1 FOR
PAVEMENT THICKNESS GREATER THAN 5"



CONFIGURATION 2 FOR
PAVEMENT THICKNESS GREATER THAN 5"



CONFIGURATION 1 FOR
PAVEMENT THICKNESS 5" OR LESS



CONFIGURATION 2 FOR
PAVEMENT THICKNESS 5" OR LESS

* THE RANGE FOR SLOPE IS:
29° MINIMUM
30° DESIREABLE
40° MAXIMUM

SAFETY EDGE FOR HMA PAVEMENT

OVERLAY

MDOT Michigan Department of Transportation

PREPARED BY DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Paul C. Ajegba

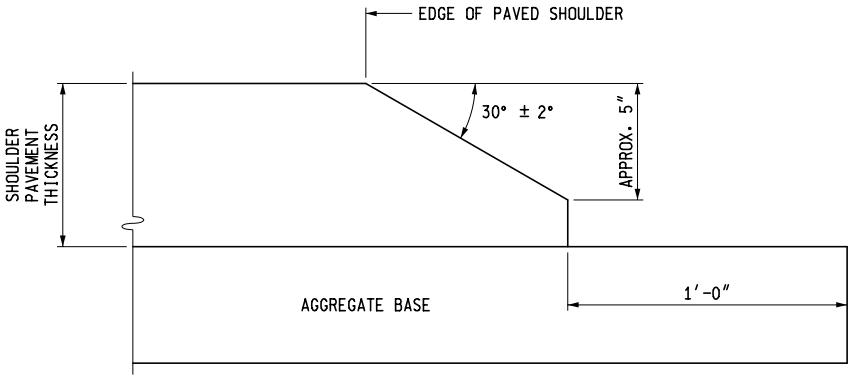
APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

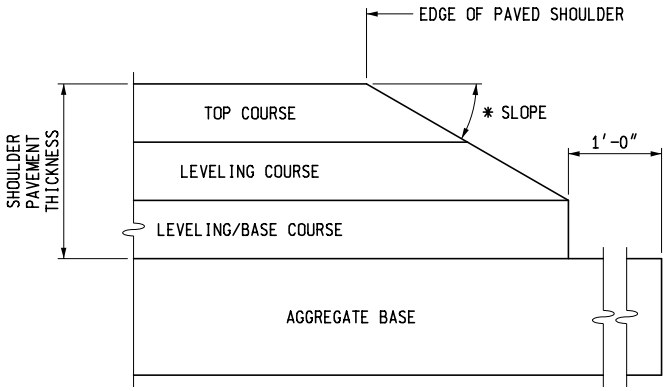
PAVEMENT SAFETY EDGE

F.H.W.A. APPROVAL	6-14-2021 PLAN DATE	R-110-B	SHEET 1 OF 3

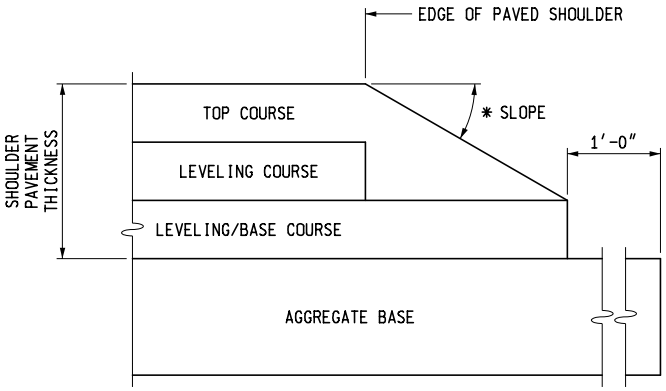


SAFETY EDGE FOR CONCRETE PAVEMENT

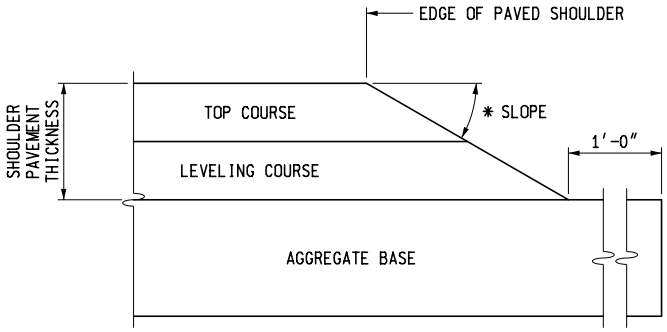
NEW CONSTRUCTION / RECONSTRUCTION



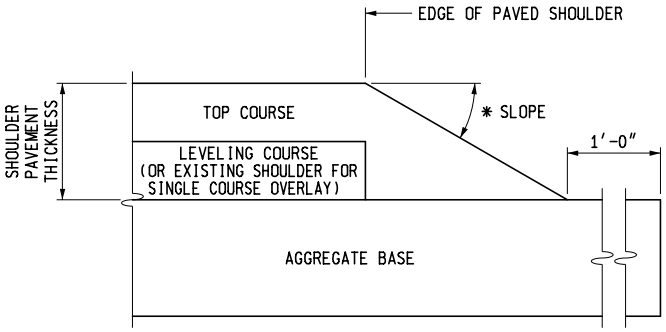
CONFIGURATION 1 FOR
PAVEMENT THICKNESS GREATER THAN 5″



CONFIGURATION 2 FOR
PAVEMENT THICKNESS GREATER THAN 5″



CONFIGURATION 1 FOR
PAVEMENT THICKNESS 5″ OR LESS



CONFIGURATION 2 FOR
PAVEMENT THICKNESS 5″ OR LESS

* THE RANGE FOR SLOPE IS:
29° MINIMUM
30° DESIREABLE
40° MAXIMUM

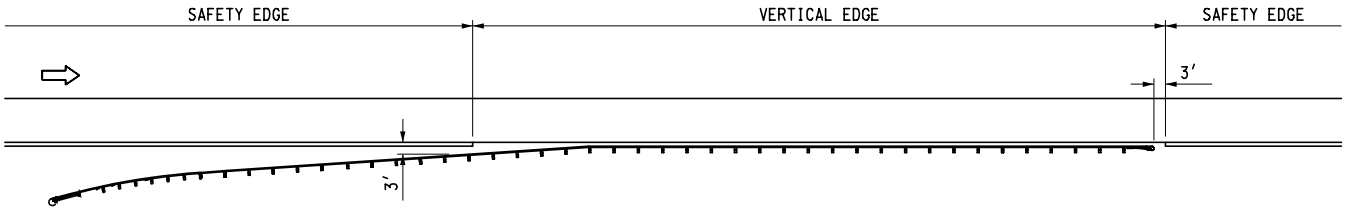
SAFETY EDGE FOR HMA PAVEMENT

NEW CONSTRUCTION / RECONSTRUCTION

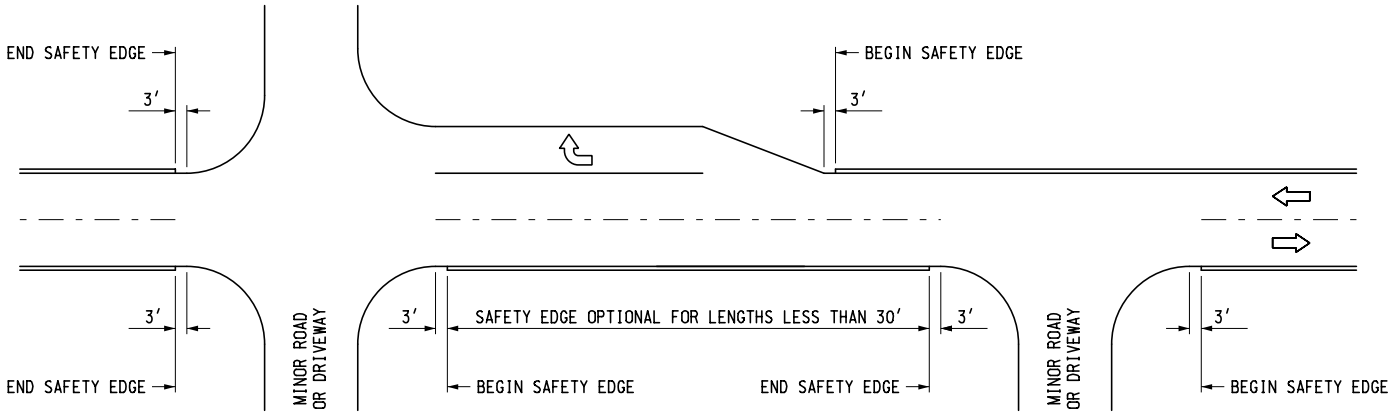
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

PAVEMENT SAFETY EDGE

F.H.W.A. APPROVAL	6-14-2021 PLAN DATE	R-110-B	SHEET 2 OF 3



SAFETY EDGE TREATMENT AT GUARDRAIL



SAFETY EDGE TREATMENT AT INTERSECTIONS AND DRIVEWAYS

NOTES:

WHEN CALLED FOR, SAFETY EDGE ON FREEWAY OUTSIDE SHOULDERS WILL END PRIOR TO RAMP SHOULDER TRANSITIONS AND CONTINUE WHERE FULL MAINLINE SHOULDER RESUMES.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

PAVEMENT SAFETY EDGE

F.H.W.A. APPROVAL	6-14-2021 PLAN DATE	R-110-B	SHEET 3 OF 3

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
SAMPLING ASPHALT BINDER ON LOCAL AGENCY PROJECTS

CFS:TRC 1 of 1 APPR:JWB:KPK:02-19-20
FHWA:APPR:02-19-20

a. Description. This work consists of the Contractor taking samples of the asphalt binder and delivering the samples to the Engineer prior to incorporation into the hot mix asphalt mixture.

b. Materials. For informational purposes, original samples of asphalt binder will be taken by the Contractor and delivered to the Engineer prior to incorporation into the mixture. The frequency of sampling will be determined by the Engineer.

The Contractor must certify in writing that the materials used in the HMA mixture are from the same source as the materials used in developing the HMA mixture design and the bond coat is from an approved supplier as stated in the *Material Quality Assurance Procedures Manual*.

c. Construction. None specified.

d. Measurement and Payment. The cost of obtaining and delivering the samples to the Engineer will be included in the hot mix asphalt (HMA) pay items in the contract.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
RECYCLED HOT MIX ASPHALT MIXTURE ON LOCAL AGENCY PROJECTS

CFS:KPK 1 of 2 APPR:JWB:CJB:02-26-20
FHWA:APPR:03-02-20

Add the following subsection to subsection 501.02.A.2 of the Standard Specifications for Construction.

c. **Reclaimed Asphalt Pavement (RAP) and Binder Grade Selection**. The method for determining the binder grade in HMA mixtures incorporating RAP is divided into three categories designated Tier 1, Tier 2 and Tier 3. Each tier has a range of percentages that represent the contribution of the RAP binder toward the total binder, by weight. The tiers identified below apply to HMA mixtures with the following exception: Superpave mixture types EML, EML High Stress, EMH, EMH High Stress, and EH, EH High Stress used as leveling or top course must be limited to a maximum of 27 percent RAP binder by weight of the total binder in the mixture.

Recycled materials may be used as a substitute for a portion of the new materials required to produce HMA mixtures in accordance with contract.

- **Tier 1 (0% to 17% RAP binder by weight of the total binder in the mixture).** No binder grade adjustment is made to compensate for the stiffness of the asphalt binder in RAP.

- **Tier 2 (18% to 27% RAP binder by weight of the total binder in the mixture).** For all mixtures no binder grade change will occur in Tier 2 for all shoulder and temporary road mixtures.

  Ensure the required asphalt binder grade is at least one grade lower for the low temperature than the design binder grade required for the specified project mixture type. Lowering the high temperature of the binder one grade is optional. For example, if the design binder grade for the mixture type is PG 58-22, the required grade for the binder in the HMA mixture containing RAP would be a PG 52-28 or a PG 58-28.

  For Marshall Mixes, no binder grade change will be required when Average Daily Traffic (ADT) is above 7000 or Commercial Average Daily Traffic (CADT) is above 700. No binder grade change will occur for EL mixtures used as leveling or top course.

  The asphalt binder grade can also be selected using a blending chart for high and low temperatures. Supply the blending chart and the RAP test data used in determining the binder selection according to *AASHTO M323*.

- **Tier 3 (≥ 28% RAP binder by weight of the total binder in the mixture).** The binder grade for the asphalt binder is selected using a blending chart for high and low temperatures per *AASHTO M323*. Supply the blending chart and the RAP test data

used in determining the binder selection.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
ACCEPTANCE OF HOT MIX ASPHALT MIXTURE ON LOCAL AGENCY PROJECTS

CFS:KPK 1 of 7 APPR:CJB:JWB:02-26-20
FHWA:APPR:03-13-20

a. Description. This special provision provides sampling and testing requirements for local agency projects using the roller method and the nuclear density gauge testing. Provide the hot mix asphalt (HMA) mixture in accordance with the requirements of the standard specifications, except where modified herein.

b. Materials. Provide aggregates, mineral filler (if required), and asphalt binder to produce a mixture proportioned within the master gradation limits shown in the contract, and meeting the uniformity tolerance limits in Table 1.

Table 1: Uniformity Tolerance Limits for HMA Mixtures

Parameter			Top and Leveling Course		Base Course	
Number	Description		Range 1 (a)	Range 2	Range 1 (a)	Range 2
1	% Binder Content		-0.30 to +0.40	±0.50	-0.30 to +0.40	±0.50
2	% Passing	# 8 and Larger Sieves	±5.0	±8.0	±7.0	±9.0
		# 30 Sieve	±4.0	±6.0	±6.0	±9.0
		# 200 Sieve	±1.0	±2.0	±2.0	±3.0
3	Crushed Particle Content (b)		Below 10%	Below 15%	Below 10%	Below 15%

a. This range allows for normal mixture and testing variations. The mixture must be proportioned to test as closely as possible to the Job-Mix-Formula (JMF).
b. Deviation from JMF.

Parameter number 2 as shown in Table 1 is aggregate gradation. Each sieve will be evaluated on one of the three gradation tolerance categories. If more than one sieve is exceeding Range 1 or Range 2 tolerances, only the one with the largest exceedance will be counted as the gradation parameter.

The master gradation should be maintained throughout production; however, price adjustments will be based on Table 1. Aggregates which are to be used in plant-mixed HMA mixtures must not contain topsoil, clay, or loam.

c. Construction. Submit a Mix Design and a JMF to the Engineer. Do not begin production and placement of the HMA until receipt of the Engineer's approval of the JMF. Maintain the binder content, aggregate gradation, and the crushed particle content of the HMA mixture within the Range 1 uniformity tolerance limits in Table 1. For mixtures meeting the definition of top or leveling course, field regress air void content to 3.5 percent with liquid asphalt cement unless specified otherwise on HMA application estimate. For mixtures meeting the definition of base course, field regress air void content to 3.0 percent with liquid asphalt cement unless specified

otherwise on HMA application estimate.

Ensure all persons performing Quality Control (QC) and Quality Assurance (QA) HMA field sampling are "Local Agency HMA Sampling Qualified" samplers. At the pre-production or preconstruction meeting, the Engineer will determine the method of sampling to be used. Ensure all sampling is done in accordance with *MTM 313 (Sampling HMA Paving Mixtures)* or *MTM 324 (Sampling HMA Paving Mixtures Behind the Paver)*. Samples are to be taken from separate hauling loads.

For production/mainline type paving, obtain a minimum of two samples, each being 20,000 grams, each day of production, for each mix type. The Engineer will sample and maintain possession of the sample. Sampling from the paver hopper is prohibited. Each sample will be divided into two 10,000 gram parts with one part being for initial testing and the other part being held for possible dispute resolution testing. Obtain a minimum of three samples for each mix type regardless of the number of days of production.

Obtain samples that are representative of the day's paving. Sample collection is to be spaced throughout the planned tonnage. One sample will be obtained in the first half of the tonnage and the second sample will be obtained in the second half of the tonnage. If planned paving is reduced or suspended, when paving resumes, the remaining sampling must be representative of the original intended sampling timing.

Ensure all persons performing testing are Bit Level One certified or Bit QA/QC Technician certified.

Ensure daily test samples are obtained, except, if the first test results show that the HMA mixture is in specification, the Engineer has the option of not testing additional samples from that day.

At the pre-production or preconstruction meeting, the Engineer and Contractor will collectively determine the test method for measuring asphalt content (AC) using *MTM 319 (Determination of Asphalt Content from Asphalt Paving Mixtures by the Ignition Method)* or *MTM 325 (Quantitative Extraction of Bitumen from HMA Paving Mixtures)*. Back calculation will not be allowed for determining asphalt content.

Ensure all labs performing local agency acceptance testing are qualified labs per the *HMA Production Manual and the Michigan Quality Assurance Procedures Manual,* and participate in the MDOT round robin process, or they must be *AASHTO Materials Reference Laboratory* (AMRL) accredited for *AASHTO T30* or *T27*, and *AASHTO T164* or *T308*. Ensure on non-National Highway System (NHS) routes, Contractor labs are made available, and may be used, but they must be qualified labs as previously stated. Contractor labs may not be used on NHS routes. Material acceptance testing will be completed by the Engineer within 14 calendar days, except holidays and Sundays, for projects with less than 5,000 tons (plan quantity) of HMA and within 7 calendars days, except holidays and Sundays, for projects with 5,000 tons (plan quantity) or more of HMA, after the Engineer has obtained the samples. QA test results will be provided to the Contractor after the Engineer receives the QC test results. Failure on the part of the Engineer or the laboratory to provide QA test results within the specified time frame does not relieve the Contractor of their responsibility to provide an asphalt mix within specifications.

The correlation procedure for ignition oven will be established as follows. Asphalt binder content based on ignition method from MTM 319. Gradation (*ASTM D5444*) and Crushed particle content *(MTM 117)* based on aggregate from *MTM 319*. The incineration temperature will be established

at the pre-production meeting. The Contractor will provide a laboratory mixture sample to the acceptance laboratory to establish the correction factor for each mix. Ensure this sample is provided to the Engineer a minimum of 14 calendar days prior to production.

For production/mainline type paving, the mixture may be accepted by visual inspection up to a quantity of 500 tons per mixture type, per project (not per day). For non-production type paving defined as driveways, approaches, and patching, visual inspection may be allowed regardless of the tonnage.

The mixture will be considered out-of-specification, as determined by the acceptance tests, if for any one mixture, two consecutive tests per parameter, (for Parameter 2, two consecutive aggregate gradations on one sieve) are outside Range 1 or Range 2 tolerance limits. If a parameter is outside of Range 1 tolerance limits and the second consecutive test shows that the parameter is outside of Range 2, then it will be considered to be a Range 1 out-of-specification. Consecutive refers to the production order and not necessarily the testing order. Out-of-specification mixtures are subject to a price adjustment per the Measurement and Payment section of this special provision.

Contractor operations will be suspended when the mixture is determined to be out-of-specification, but contract time will continue to run. The Engineer may issue a Notice of Non-Compliance with Contract Requirements (Form 1165), if the Contractor has not suspended operations and taken corrective action. Submit a revised JMF or proposed alterations to the plant and/or materials to achieve the JMF to the Engineer. Effects on the Aggregate Wear Index (AWI) and mix design properties will be taken into consideration. Production and placement cannot resume until receipt of the Engineer's approval to proceed.

Pavement in-place density will be measured using one of two approved methods. The method used for measuring in-place density will be agreed upon at a pre-production or preconstruction meeting.

Pavement in-place density tests will be completed by the Engineer during paving operations and prior to traffic staging changes. Pavement in-place density acceptance testing will be completed by the Engineer prior to paving of subsequent lifts and being open to traffic.

Option 1 - Direct Density Method

Use of a nuclear density gauge requires measuring the pavement density using the Gmm from the JMF for the density control target. The required in-place density of the HMA mixture must be 92.0 to 98.0 percent of the density control target. Nuclear density testing and frequency will be in accordance with the *MDOT Density Testing and Inspection Manual*.

Option 2 - Roller Method

The Engineer may use the Roller Method with a nuclear or non-nuclear density gauge to document achieving optimal density as discussed below.

Use of the density gauge requires establishing a rolling pattern that will achieve the required in-place density. The Engineer will measure pavement density with a density gauge using the Gmm from the JMF for the density control target.

Use of the Roller Method requires developing and establishing density frequency curves, and

meeting the requirements of Table 2. A density frequency curve is defined as the measurement and documentation of each pass of the finished roller until the in-place density results indicate a decrease in value. The previous recording will be deemed the optimal density. The Contractor is responsible for establishing and documenting an initial or QC rolling pattern that achieves the optimal in-place density. When the density frequency curve is used, the Engineer will run and document the density frequency curve for each half day of production to determine the number of passes to achieve the maximum density. Table 5, located at the end of this special provision, can be used as an aid in developing the density frequency curve. The Engineer will perform density tests using an approved nuclear or non-nuclear gauge per the manufacturer's recommended procedures.

Table 2: Minimum Number of Rollers Recommended Based on Placement Rate

Average Laydown Rate, Square Yards per Hour	Number of Rollers Required (a)	
	Compaction	Finish
Less than 600	1	1 (b)
601 - 1200	1	1
1201 - 2400	2	1
2401 - 3600	3	1
3601 and More	4	1

a. Number of rollers may increase based on density frequency curve.
b. The compaction roller may be used as the finish roller also.

After placement, roll the HMA mixture as soon after placement as the roller is able to bear without undue displacement or cracking. Start rolling longitudinally at the sides of the lanes and proceed toward the center of the pavement, overlapping on successive trips by at least half the width of the drum. Ensure each required roller is 8 tons minimum in weight unless otherwise approved by the Engineer.

Ensure the initial breakdown roller is capable of vibratory compaction and is a maximum of 500 feet behind the paving operations. The maximum allowable speed of each roller is 3 miles per hour (mph) or 4.5 feet per second. Ensure all compaction rollers complete a minimum of two complete rolling cycles prior to the mat temperature cooling to 180 degrees Fahrenheit (F). Continue finish rolling until all roller marks are eliminated and no further compaction is possible. The Engineer will verify and document that the roller pattern has been adhered to. The Engineer can stop production when the roller pattern is not adhered to.

d. Measurement and Payment. The completed work, as described, will be measured and paid for using applicable pay items as described in subsection 501.04 of the Standard Specifications for Construction, or the contract, except as modified below.

Base Price. Price established by the Department to be used in calculating incentives and adjustments to pay items and shown in the contract.

If acceptance tests, as described in section c. of this special provision, show that a Table 1 mixture parameter exceeds the Range 1, but not the Range 2, tolerance limits, that mixture parameter will be subject to a 10 percent penalty. The 10 percent penalty will be assessed based on the acceptance tests only unless the Contractor requests that the 10,000 gram sample part retained for possible dispute resolution testing be tested. The Contractor has 4 calendar days from receipt

of the acceptance test results to notify the Engineer, in writing, that dispute resolution testing is requested. The Contractors QC test results for the corresponding QA test results must result in an overall payment greater than QA test results otherwise the QA tests will not be allowed to be disputed. The Engineer has 4 calendar days to send the dispute resolution sample to the lab once dispute resolution testing is requested. The dispute resolution sample will be sent to an independent lab selected by the Local Agency, and the resultant dispute test results will be used to determine the penalty per parameter, if any. Ensure the independent lab is a MDOT QA/QC qualified lab or an AMRL HMA qualified lab. The independent lab must not have conflicts of interest with the Contractor or Local Agency. If the dispute testing results show that the mixture parameter is out-of-specification, the Contractor will pay for the cost of the dispute resolution testing and the contract base price for the material will be adjusted, based on all test result parameters from the dispute tests, as shown in Table 3 and Table 4. If the dispute test results do not confirm the mixture parameter is out-of-specification, then the Local Agency will pay for the cost of the dispute resolution testing and no price adjustment is required.

If acceptance tests, as described in section c. of this special provision, show that a Table 1 mixture parameter exceeds the Range 2 tolerance limits, the 10,000 gram sample part retained for possible dispute resolution testing will be sent, within 4 calendar days, to the MDOT Central Laboratory for further testing. The MDOT Central Laboratory's test results will be used to determine the penalty per mixture parameter, if any. If the MDOT Central Laboratory's results do not confirm the mixture parameter is out-of-specification, then no price adjustment is required. If the MDOT Central Laboratory's results show that the mixture is out-of-specification and the Engineer approves leaving the out-of-specification mixture in place, the contract base price for the material will be adjusted, based on all parameters, as shown in Table 3 and Table 4.

In the case that the Contractor disputes the results of the test of the second sample obtained for a particular day of production, the test turn-around time frames given would apply to the second test and there would be no time frame on the first test.

The laboratory (MDOT Central Laboratory or independent lab) will complete all Dispute Resolution testing and return test results to the Engineer, who will provide them to the Contractor, within 13 calendar days upon receiving the Dispute Resolution samples.

In all cases, when penalties are assessed, the penalty applies to each parameter, up to two parameters, that is out of specification.

Table 3: Penalty Per Parameter

Mixture Parameter out-of-Specification per Acceptance Tests	Mixture Parameter out-of-Specification per Dispute Resolution Test Lab	Price Adjustment per Parameter
No	N/A	None
Yes	No	None
	Yes	Outside Range 1 but not Range 2: decrease by 10%
		Outside Range 2: decrease by 25%

The quantity of material receiving a price adjustment is defined as the material produced from the time the first out-of-specification sample was taken until the time the sample leading to the first in-specification test was taken.

Each parameter of Table 1 is evaluated with the total price adjustment applied to the contract base price based on a sum of the two parameter penalties resulting in the highest total price adjustment as per Table 4. For example, if three parameters are out-of-specification, with two parameters outside Range 1 of Table 1 tolerance limits, but within Range 2 of Table 1 limits and one parameter outside of Range 2 of Table 1 tolerance limits and the Engineer approves leaving the mixture in place, the total price adjustment for that quantity of material is 35 percent.

Table 4: Calculating Total Price Adjustment

Cost Adjustment as a Sum of the Two Highest Parameter Penalties		
Number of Parameters Out-of-Specification	Range(s) Outside of Tolerance Limits of Table 1 per Parameter	Total Price Adjustment
One	Range 1	10%
	Range 2	25%
Two	Range 1 and Range 1	20%
	Range 1 and Range 2	35%
	Range 2 and Range 2	50%
Three	Range 1, Range 1 and Range 1	20%
	Range 1, Range 1 and Range 2	35%
	Range 1, Range 2 and Range 2	50%
	Range 2, Range 2 and Range 2	50%

PROGRESS CLAUSE: Submit a Progress Schedule. The Engineer for this project is as follows:

Craig C. Innis, P.E.
MDOT Huron TSC
(989) 233-4778
InnisC@michigan.gov

After award, start work on the date approved by the Engineer, which must be no earlier than **10 days after award.** In no case may any work be commenced prior to award by the Department.

The entire project must be completed by the final completion date of **September 19th, 2025**.

The Contractor is responsible to provide sufficient resources and adjust work schedules to complete work within the contract time.

Failure by the Contractor to meet interim completion, open to traffic, and/or final completion dates will result in the assessment of liquidated damages in accordance with subsection 108.10.C.1 of the Standard Specifications for Construction. Liquidated damages will be assessed separately and simultaneously for failure to meet interim completion, open to traffic, and/or final completion dates. Liquidated damages will continue to be assessed for each calendar day that the work associated with the interim completion, open to traffic, and/or final completion dates remains incomplete, even if these days extend into or beyond seasonal suspension, unless approved otherwise by the Engineer.

Unless specific pay items are provided in the contract any extra costs incurred by the Contractor due to cold-weather protection and winter grading will not be paid for separately but will be included in the payment of other pay items in the contract.

After award and prior to the start of work, the Contractor must attend a preconstruction meeting with the Engineer. The Engineer will determine the day, time and place for the preconstruction meeting. The meeting will be conducted after project award and may be rescheduled if there are delays in the award of the project. The named subcontractor(s) for, Designated and/or Specialty Items, as shown in the proposal, is(are) recommended to be at the preconstruction meeting if such items materially affect the work schedule.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
MAINTAINING TRAFFIC

a. Description. This special provision consists of requirements and restrictions to maintain traffic on M-24 in Fremont Township, Tuscola County.

b. General. Maintain traffic throughout the project in accordance with the standard specifications, typicals, and supplemental specifications in the contract and as described on the plans for this project.

c. Construction Influence Area (CIA). The CIA includes the right-of-way of the following roadways, within the approximate limits described below:

1. On M-24 from approximately 3,250 ft north of Obrien Rd to 675 ft south of M-46.

2. In addition, the CIA includes the right-of-way of any designated detour route or alternate route, intersecting roads and ramps adjacent to the work zone for a distance of approximately 1/4 mile in advance of the work zone or as far as the construction or detour signing extends. The roads include but are not limited to M-24, M-46, Obrien Rd, North Grove Rd and Hunt Rd.

d. Traffic Restrictions. Maintain traffic in accordance with the Maintaining Traffic Typicals contained herein, except as noted below. Changes or adjustments to the Maintaining Traffic Typicals may be necessary to fit field conditions, subject to approval of the Engineer or as determined by the Engineer.

1. Utilize the following Maintaining Traffic Typicals:

   A. 100-GEN-KEY

   B. 101-GEN-SPACING-CHARTS

   C. 103-GEN-NOTES

   D. 116-AFAD-NFW-2L-RUM

   E. WZD-125-E

2. Do not deliver material, or close lanes during the holiday periods as defined in Table 1.

Table 1: 2025 Holiday Periods

Holiday	Start Date and Time	End Date and Time
Memorial Day	3:00 PM Thursday, May 22, 2025	6:00 AM Tuesday, May 27, 2025
Independence Day	3:00 PM Wednesday, July 2, 2025	6:00 AM Tuesday, July 8, 2025
Labor Day	3:00 PM Thursday, August 28, 2025	6:00 AM Tuesday, September 2, 2025

3. Do not deliver material, or close lanes during the Special Events as defined in Table 2.

Table 2: 2025 Special Events

Local Event	Start Dates and Time	End Date and Time
Mayville Sunflower Festival	6:00 AM 7/17/2025	8:00 PM 7/20/2025

4. Perform work and lane closures within the allowable time frames as shown in Table 3 unless otherwise approved by the Engineer. Traffic switch operations on freeways may take place within the allowable times listed below in the traffic restriction tables and/or as otherwise approved by the Engineer. Additional lane closures and shifts may be implemented during maintaining traffic stage and traffic switch operations with prior Engineer approval.

5. Traffic switch operations are exempt from lane rental assessments or liquidated damage assessments for 8 hours for each traffic switch. Perform traffic switch operations within the allowable "traffic restriction tables" as shown below.

A. A traffic switch is defined as a change in the existing (original or staged) traffic configuration which requires multiple (more than one) lane lines and/or edge lines to be relocated in a new location and the old lines to be removed either between construction stages, or maintenance of traffic stages.

Table 3: M-24 Traffic Restrictions

Closure Type	Start Time	End Time	M	Tu	W	Th	F	Sa	Su
Shoulder Closures	00:00	24:00	∞	∞	∞	∞	∞	∞	∞
Single Lane Closures	☼	▼	∞	∞	∞	∞	∞	∞	0

☼ = half hour before sunrise as defined by the National Oceanic and Atmospheric Administration (NOAA)
▼ = half hour after sunset as defined by NOAA
∞ = Closure is allowed, and the frequency is not limited during the project timeframe
= The number of times closures can take place during the project timeframe.

6. Maintain a minimum of one lane of traffic in each direction at all times on M-24. (And all intersecting roads and ramps, except where detoured.)

7. No more than 1 closure is allowed in each direction of travel at the same time.

A. The maximum closure length is 2 miles unless otherwise approved by the Engineer.

8. When a lane is closed, place channelizing devices at cross streets and major drives to form a radius that clearly defines the approaches to the through and turning traffic.

9. Maintain access to all driveways as directed by the Engineer unless prior agreements are made with the respective property owners.

e. Traffic General.

1. For any lane open to traffic, provide a minimum lane width of 11 feet with 2 feet of shy distance on both sides unless identified otherwise on plans.

2. Do not close lanes or utilize traffic regulation sequences where work can be accomplished with a shoulder closure. Do not occupy any part of the active traffic lane with personnel or equipment when utilizing a shoulder closure. Place lane closures and traffic regulation operations only in areas as show on the plans unless otherwise directed by the Engineer.

3. Prior to shifting traffic onto shoulders or opening any lanes/shoulders and/or ramps, remove, by sweeping all accumulated debris that has collected within the shoulder and/or within the closed lane/shoulder.

4. A speed reduction will be used. Set the work zone speed limit on M-24 to 45 miles per hour (mph).

5. Remove all temporary traffic control devices from MDOT right-of-way during any shut down periods unless needed for directly maintaining or channelizing traffic. No additional payment will be made for removal and/or redeployment of these devices except for in the case of an approved extension of time.

6. Cover or remove construction signing that refers to work zone speed when work at a location is planned to be inactive for a period greater than 2 days or as directed by the Engineer.

7. Once work is initiated that includes any lane restrictions, that work must be continued daily until completed. A lack of work activity for more than 3 days will require the removal of lane closures at no expense to the Department.

f. Traffic Regulator Control.

1. Maintain two-way traffic at all times on (route/segment) using traffic regulator control with Automated Flagger Assistance Devices (AFADs). A traffic regulator sequence is allowed to cover a maximum closure length of 2 miles. Place the AFAD, signs and channelizing taper for the traffic regulator operation at locations approved by the Engineer for adequate visibility by oncoming traffic.

2. Do not utilize more than 1 traffic regulator operation(s) at one time on M-24.

3. Crossroads should remain open to traffic at all times. Use intermediate traffic regulators at each intersection approach and commercial driveways within the closure limits,

as directed by the Engineer. Use traffic regulator control as directed by the Engineer for cross street traffic while paving through intersections.

4. Follow the Michigan Traffic Regulator's Instruction Manual for operations at signalized intersections. Contact the MDOT region electrician or applicable maintaining agency prior to work on traffic signals. Only the MDOT region electrician or applicable maintaining agency may make changes to the traffic signal controllers.

g. Stage Construction. Maintain traffic in accordance with the restrictions listed in section d. Traffic Restrictions and the sequence of operations contained herein. Use of an alternate traffic control plan is subject to review and approval by the Engineer.

1. Stage 1.

A. Mill and resurface M-24 and place permanent pavement markings.

B. Utilize traffic regulators and MOT typical 116-AFAD-NFW-2L-RUM.

h. Hot Mix Asphalt (HMA) Work.

1. Resurface all HMA milled areas the same day as the HMA cold milling operation.

2. No traffic is allowed on the HMA milled surface, unless directed by the Engineer.

3. Provide transverse and longitudinal HMA tapers at all grade changes greater than X inches caused by cold milling and overlay. Place W8-1 ("BUMP") signs in advance of transverse HMA tapers. Place W8-11 ("UNEVEN LANES") signs in advance of longitudinal HMA tapers. Place W8-9 ("LOW SHOULDER") signs in advance of and every mile within the shoulder drop off.

i. Traffic Control Devices. Ensure all traffic control devices are in accordance with the *MMUTCD* and must meet the "acceptable" criteria as defined in the *ATSSA* publication entitled "*Quality Guidelines for Temporary Traffic Control Devices and Features*" at the time of initial deployment and after each major stage change.

1. During non-working periods, place applicable advance signs and channelizing devices at specific locations, as directed by the Engineer, at no additional cost to the Department.

2. Notify the Engineer 24 hours in advance of when traffic control devices are being delivered to the project site, to allow for initial inspection of devices to take place.

3. Remove from the project site all traffic control devices (including detour signing) no longer needed for a particular operation and equipment for construction within 14 calendar days of reopening the shoulder/lane/roadway.

4. Channelizing Devices.

A. Ensure all devices have sufficient ballast to prevent moving or tipping. If moving or tipping occurs, place additional ballast, as directed by the Engineer, at no additional cost to the Department. No more than two ballasts are allowed on each channelizing device.

B. Do not use caution tape on channelizing devices for traffic control and/or pedestrian traffic control on this project.

5. Temporary Signs.

A. Additional W20-1 (ROAD WORK AHEAD) signs are included in the quantities to be placed on all intersecting or adjacent roads where construction activities may be encountered.

j. Temporary Pavement Markings.

1. Remove conflicting pavement markings, pavement markings in taper/transition areas and other markings as directed by the Engineer, for operations occupying a location longer than 3 days. Durable markings in these areas should be covered rather than be removed.

2. Quantities for temporary tape to be placed during paving operations are based on the MDOT PAVE 900 Series standard plans.

3. When Type R or NR tape is used, ensure that all temporary pavement markings adhere to the pavement surface until permanent markings are installed.

4. Replace all existing pavement markings that are removed for traffic control or obliterated during construction.

k. Measurement and Payment. Payment will be in accordance with the standard specifications unless otherwise specified. No additional payment will be made for the following activities:

1. Transporting traffic control items from site to site.

2. Providing sufficient vehicles and staff to make changes as-needed on site during work.

3. Providing sufficient vehicles and staff to remove closures from the roadway.

Michigan Department
of Transportation
0561 (12/15)

MDOT LANE CLOSURE NOTIFICATION/REQUEST FORM

(FOR SHIFTS, LANE, SHOULDER, STRUCTURE AND RAMP CLOSURES)

TSC: ______________________________ DATE: ______________________________
COUNTY: ______________________________ REQUEST #: ______________________________
JOB #: ______________________________ REQUESTOR NAME: ______________________________
PRIME CONTRACTOR: ______________________________ 24 HR CONTACT: ______________________________

ROUTE	DIRECTION	LOCATION OF CLOSURE (Cross St. to Cross St., M.P. to M.P., Exit name and Number)	WORK DESCRIPTION	DETOUR Y/N	EXISTING # LANES	CLOSURE TYPE (Place "X" in the boxes that apply)								DURATION OF CLOSURE and TYPE (Place "X" in the boxes that apply)					RESTRICTIONS		
						LEFT SHLDR	LANE NUMBER 1	2	3	4	RIGHT SHLDR	RAMPS ENTRANCE	EXIT		DATE MM/DD	TIME	DAILY/ RECURRING	MOVING	HEIGHT	WEIGHT	WIDTH
														CLOSE							
														OPEN							
														CLOSE							
														OPEN							
														CLOSE							
														OPEN							
														CLOSE							
														OPEN							
														CLOSE							
														OPEN							
														CLOSE							
														OPEN							
														CLOSE							
														OPEN							

DETOUR ROUTE	
SUMMARY	

Please submit for approval before 2 p.m. each Monday of the week a minimum of five (5) business days prior to the start of requested closures, by email to the Project Engineer for processing.

NOTE: SEMTOC shall be called in 'Real Time' when lane closures are beginning and when lane closures are removed in addtion to providing advance notification on this Lane Closure Form. This includes shoulder closures and moving operations. Please notify SEMTOC and refer to the Main Job Number associated with the project.

Clear Form

DISTANCE BETWEEN TRAFFIC SIGNS, "D"

"D" DISTANCES	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)										
	25	30	35	40	45	50	55	60	65	70	75
D (FEET)	250	300	350	400	450	500	550	600	650	700	750

GUIDELINES FOR LENGTH OF LONGITUDINAL BUFFER SPACE, "B"

"B" LENGTHS	SPEED,* MPH (PRIOR TO WORK AREA)											
	20	25	30	35	40	45	50	55	60	65	70	75
B (FEET)	33	50	83	132	181	230	279	329	411	476	542	625

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

MINIMUM MERGING TAPER LENGTH, "L" (FEET)

OFFSET (FEET)	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)										
	25	30	35	40	45	50	55	60	65	70	75
1	11	15	21	27	45	50	55	60	65	70	75
2	21	30	41	54	90	100	110	120	130	140	150
3	32	45	62	80	135	150	165	180	195	210	225
4	42	60	82	107	180	200	220	240	260	280	300
5	53	75	103	134	225	250	275	300	325	350	375
6	63	90	123	160	270	300	330	360	390	420	450
7	73	105	143	187	315	350	385	420	455	490	525
8	84	120	164	214	360	400	440	480	520	560	600
9	94	135	184	240	405	450	495	540	585	630	675
10	105	150	205	267	450	500	550	600	650	700	750
11	115	165	225	294	495	550	605	660	715	770	825
12	125	180	245	320	540	600	660	720	780	840	900
13	136	195	266	347	585	650	715	780	845	910	975
14	146	210	286	374	630	700	770	840	910	980	1050
15	157	225	307	400	675	750	825	900	975	1050	1125

NOT TO SCALE

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

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

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

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

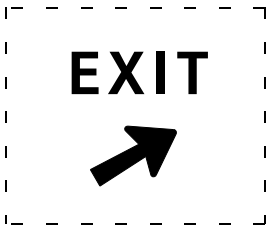
TYPES OF TAPERS	TAPER LENGTH
UPSTREAM TAPERS	
MERGING TAPER	L - MINIMUM
SHIFTING TAPER	1/2 L - MINIMUM
SHOULDER TAPER	1/3 L - MINIMUM
2 TO 1 LANE ROAD TAPER	100' - MAXIMUM
DOWNSTREAM TAPERS	
(USE IS RECOMMENDED)	100' (PER LANE)

MAXIMUM SPACING FOR CHANNELIZING DEVICES

WORK ZONE SPEED LIMIT	DRUM AND 42" DEVICE SPACING (FT)		NIGHTTIME 42" DEVICE SPACING (FT)	
	TAPER	TANGENT	TAPER	TANGENT
< 45 MPH	1 x SPEED LIMIT	2 x SPEED LIMIT	25 FEET	50 FEET
≥ 45 MPH	50 FEET	100 FEET	25 FEET	50 FEET

SIGN OUTLINE KEY

DASHED OUTLINES INDICATE A SIGN THAT EXISTS ON SITE, AND NEEDS TO BE COVERED.



SOLID OUTLINES INDICATE A SIGN THAT IS TO BE PLACED ON THE PROJECT

NOT TO SCALE

GUIDELINES FOR ROLL-AHEAD DISTANCES FOR TMA VEHICLES - TEST LEVEL 2

WEIGHT OF TMA VEHICLE	PREVAILING SPEED (POSTED SPEED PRIOR TO WORK ZONE)	ROLL-AHEAD DISTANCE* (DISTANCE FROM FRONT OF TMA VEHICLE TO WORK AREA)
5.5 TONS (STATIONARY)	40 MPH OR LESS	25 FT

* ROLL-AHEAD DISTANCES ARE CALCULATED USING A 4,410 POUND IMPACT VEHICLE WEIGHT.

GUIDELINES FOR ROLL-AHEAD DISTANCES FOR TMA VEHICLES - TEST LEVEL 3

WEIGHT OF TMA VEHICLE	PREVAILING SPEED (POSTED SPEED PRIOR TO WORK ZONE)	ROLL-AHEAD DISTANCE* (DISTANCE FROM FRONT OF TMA VEHICLE TO WORK AREA)
5 TONS (MOBILE)	45 MPH	100 FT
	50-55 MPH	150 FT
	60-75 MPH	175 FT
12 TONS (STATIONARY)	45 MPH	25 FT
	50-55 MPH	25 FT
	60-75 MPH	50 FT

* ROLL-AHEAD DISTANCES ARE CALCULATED USING A 10,000 POUND IMPACT VEHICLE WEIGHT.

THE FOLLOWING NOTES APPLY IF CALLED FOR ON THE TRAFFIC TYPICAL

GENERAL NOTES

G1: SEE GEN-SPACING-CHARTS FOR COMMON VALUES INCLUDING:
D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
L = MINIMUM LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER
ROLL AHEAD DISTANCE

G2: DISTANCE BETWEEN SIGNS, "D", THE VALUES FOR WHICH ARE SHOWN IN TYPICAL GEN-KEY ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

G3: ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING MUST MEET NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 350 (NCHRP 350) TEST LEVEL 3, OR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH) TL-3 AS WELL AS THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

G4: DO NOT STORE EQUIPMENT, MATERIALS OR PERFORM WORK IN ESTABLISHED BUFFER AREAS.

G5: ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR TRAFFIC PATTERNS FOR WORK LESS THAN THREE DAYS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

SIGN NOTES

S1: ALL NON-APPLICABLE SIGNING WITHIN THE CIA MUST BE MODIFIED TO FIT CONDITIONS, COVERED, OR REMOVED. FOR GUIDANCE SEE THE WORK ZONE SAFETY AND MOBILITY MANUAL, SECTIONS 6.01.09 AND 6.01.10.

S2: R5-18b SIGNS ARE ONLY REQUIRED ON FREEWAY PROJECTS WITH A DURATION OF 15 DAYS OR LONGER OR NON-FREEWAY PROJECTS WITH A DURATION OF 90 DAYS OR LONGER. TO APPLY THIS TYPICAL WITHOUT R5-18b SIGNS, REMOVE THE SIGNS AND CONSOLIDATE THE SEQUENCE AS APPROPRIATE.

S3: R5-18c IS ONLY REQUIRED IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. OMIT THIS SIGN IN SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE.

S4: ADDITIONAL SIGNING AND/OR ELONGATED SIGNING SEQUENCES SHOULD BE USED WHEN TRAFFIC VOLUMES ARE SIGNIFICANT ENOUGH TO CREATE BACKUPS BEYOND THE W20-5 SIGNS.

S5: PLACE ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE WORK ZONE SPEED AFTER EACH MAJOR CROSSROAD THAT INTERSECTS THE WORK ZONE, OR AFTER EACH ENTRANCE RAMP THAT COMES ONTO THE FREEWAY WHERE THE REDUCED SPEED IS IN EFFECT. PLACE ADDITIONAL SPEED LIMIT SIGNS AT INTERVALS ALONG THE ROADWAY SUCH THAT NO SPEED LIMIT SIGNS ARE MORE THAN 2 MILES APART. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, PLACE ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED BEYOND THE LIMITS OF THE WORK AREA AS INDICATED. IF PERMANENT SIGNS DISPLAYING THE CORRECT SPEED LIMIT ARE POSTED, OMIT ALL W3-5b AND R2-1 SIGNS AND REDUCE SPACING ACCORDINGLY.

S6: FABRICATE SPECIAL SIGNS IN ACCORDANCE WITH CURRENT SIGNING DESIGN STANDARDS.

S7: PLACE ADDITIONAL R8-3 SIGNS AT A MAXIMUM 500' SPACING THROUGHOUT THE WORK ZONE.

S8: WHEN SPEED LIMIT SIGNS CANNOT BE PLACED SIDE BY SIDE AS SHOWN, PLACE THEM "D" DISTANCE APART.

S9: STOP SIGNS NOT REQUIRED IF SIGNALS ARE ON 4-WAY FLASHING RED. STOP AHEAD SIGNS ARE NOT REQUIRED IF THERE IS ADEQUATE VISIBILITY OF THE STOP SIGN OR IF SIGNALS ARE BEING USED TO CONTROL TRAFFIC.

S10: PLACE REDUCED SPEED ZONE AHEAD SIGN (W3-5b) HERE WHEN USING A SPEED REDUCTION IN THIS DIRECTION.

S11: THE NUMBER OF W1-6 SHIFT SIGNS TO PLACE FOR A SHIFT IS AS FOLLOWS:
SHIFTS 4FT OR LESS, PLACE ONE W1-6(R)(L)
SHIFTS 5FT TO 12FT, PLACE TWO W1-6(R)(L)
SHIFTS MORE THAN 12FT, PLACE THREE OR MORE W1-6(R)(L) SIGNS DEPENDING UPON LENGTH OF SHIFT AND AS PER THE ENGINEER.

S12: PLACE R2-1 SIGNS AS DETAILED IN NOTE S5 WHEN THERE IS A SPEED REDUCTION IN THIS DIRECTION

TRAFFIC REGULATOR NOTES

TR1: TRAFFIC REGULATORS MUST FOLLOW ALL THE REQUIREMENTS IN THE STANDARD SPECIFICATIONS, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS, THE CURRENT VERSIONS OF THE TRAFFIC REGULATOR'S INSTRUCTION MANUAL AND THE VIDEO "HOW TO SAFELY REGULATE TRAFFIC IN MICHIGAN". THE MAXIMUM DISTANCE BETWEEN THE TRAFFIC REGULATORS IS DETERMINED BY THE ROADWAY ADT, GEOMETRICS, AND AS DIRECTED BY THE ENGINEER.

TR2: PROVIDE APPROPRIATE BALLOON LIGHTING TO SUFFICIENTLY ILLUMINATE TRAFFIC REGULATOR'S STATIONS WHEN TRAFFIC REGULATING IS ALLOWED DURING THE HOURS OF DARKNESS.

TR3: PROVIDE EITHER A STOP/SLOW AFAD OR A RED/YELLOW LENS AFAD, MEETING THE REQUIREMENTS OF THE MMUTCD

TEMPORARY TRAFFIC CONTROL DEVICE NOTES

TCD1: THE MAXIMUM DISTANCE IN FEET BETWEEN CHANNELIZING DEVICES IN A TAPER SHOULD NOT EXCEED 1.0 TIMES THE WORK ZONE SPEED LIMIT IN MPH FOR ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT LESS THAN 45 MPH AND SHOULD NOT EXCEED 50 FEET ON ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT OF 45 MPH OR GREATER. THE SPACING FOR 42 INCH CHANNELIZING DEVICE TAPERS ARE NOT TO EXCEED 25 FEET AT NIGHT.

TCD2: THE MAXIMUM DISTANCE IN FEET BETWEEN CHANNELIZING DEVICES IN A TANGENT SHOULD NOT EXCEED TWICE THE WORK ZONE SPEED LIMIT IN MPH FOR ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT LESS THAN 45 MPH AND SHOULD NOT EXCEED 100 FEET ON ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT OF 45 MPH OR GREATER. THE SPACING FOR 42 INCH CHANNELIZING DEVICE TANGENTS ARE NOT TO EXCEED 50 FEET AT NIGHT.

TCD3: TYPE III BARRICADES MUST BE LIGHTED FOR OVERNIGHT CLOSURES.

TCD4: WHEN THE HAUL ROAD IS NOT IN USE, PLACE LIGHTED TYPE III BARRICADES WITH "ROAD CLOSED" EXTENDING COMPLETELY ACROSS THE HAUL ROAD.

TCD5: USE OBJECT MARKER SIGNS IN LIEU OF THE TYPE B HIGH INTENSITY LIGHT SHOWN IN THE STANDARD PLAN FOR TEMPORARY CONCRETE BARRIER (R-53, AND R-126) WHEN USED WITH A TEMPORARY SIGNAL SYSTEM. THE OBJECT MARKERS MUST BE A MINIMUM OF 12 INCHES IN WIDTH AND 36 INCHES IN HEIGHT AND HAVE ORANGE AND WHITE RETROREFLECTIVE SHEETING. THE RETROREFLECTIVE SHEETING MUST HAVE ALTERNATING DIAGONAL ORANGE AND WHITE STRIPES SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION VEHICULAR TRAFFIC IS TO PASS.

TCD6: PLACE LIGHTED ARROW PANELS AS CLOSE TO THE BEGINNING OF TAPERS AS PRACTICAL, BUT NOT IN A MANNER THAT WILL OBSCURE OR CONFUSE APPROACHING MOTORISTS WHEN PHYSICAL LIMITATIONS RESTRICT PLACEMENT. IN CURBED SECTIONS, IF ARROW BOARD CANNOT BE PLACED BEHIND CURB, PLACE ARROW BOARD IN THE CLOSED LANE AS CLOSE TO THE BEGINNING OF TAPER AS POSSIBLE.

TCD7: ADDITIONAL TYPE III BARRICADES MAY BE REQUIRED TO COMPLETELY CLOSE OFF ROAD FROM EDGE OF PAVEMENT TO EDGE OF PAVEMENT.

TCD8: WHERE THE SHIFTED SECTION IS SHORTER THAN 600 FEET, A DOUBLE REVERSE CURVE SIGN (W24-1) CAN BE USED INSTEAD OF THE FIRST REVERSE CURVE SIGN, AND THE SECOND REVERSE CURVE SIGN CAN BE OMITTED.

TCD9: RUMBLE STRIPS ARE TO BE PLACED AS SPECIFIED IN THE CONTRACT. IF NOT SPECIFIED IN THE CONTRACT, PLACE RUMBLE STRIPS AS SHOWN, AND IN ACCORDANCE WITH THE RUMBLE STRIP MANUFACTURER'S RECOMMENDATIONS. AN ARRAY OF RUMBLE STRIPS CONTAINS THREE RUMBLE STRIPS. PLACE THE RUMBLE STRIPS IN THE ARRAY AT A CONSISTENT DISTANCE, BETWEEN 10' AND 20' APART.

TCD10: SEE THE WORK ZONE SAFETY AND MOBILITY MANUAL, PORTABLE CHANGEABLE MESSAGE SIGN GUIDELINES FOR RECCOMENDED AND CORRECT PCMS MESSAGING. STAGGER PCMS THAT ARE ON OPPOSING SIDES OF THE ROAD 1000 FEET FROM EACH OTHER.

RAMP NOTES

RMP1: WHEN CONDITIONS ALLOW, E5-1 SIGNS MUST BE REMOVED OR COVERED AND CHANELIZING DEVICES MUST BE POSITIONED TO ENABLE RAMP TRAFFIC TO DIVERGE IN A FREE MANNER

RMP2: STOP AND YIELD CONDITIONS SHOULD BE AVOIDED WHENEVER PRACTICAL. WHEN CONDITIONS WARRANT, R1-1 SIGNS MAY BE USED IN PLACE OF R1-2 SIGNS. WHEN R-1 SIGNS ARE USED, W3-1 SIGNS MUST BE USED IN PLACE OF W3-2 SIGNS. CONSIDERATION SHOULD BE GIVEN TO CLOSING THE RAMP TO COMPLETE WORK TO ALLOW AN ADEQUATE MERGE DISTANCE. WORK SHOULD BE EXPEDITED TO AVOID THE STOP AND/OR YIELD CONDITIONS.

MDOT Michigan Department of Transportation	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL	TRAFFIC TYPICALS NOTE SHEET	DATE: MAY 2022
		NO: 102-GEN-NOTES		SHEET: 1 OF 2
FILE: 102-GEN-NOTES.dgn				

THE FOLLOWING NOTES APPLY IF CALLED FOR ON THE TRAFFIC TYPICAL

SIGNAL NOTES

SIG1: EXISTING SIGNAL MUST BE EITHER 4-WAY FLASHING RED, BAGGED, OR TURNED OFF.

SIG2: SIGNAL IS IN OPERATION.

SIG3: DELINEATE THE WORK ZONE AREA WITH 28 INCH CONES FOR DAYTIME WORK, OR 42 INCH CHANNELIZING DEVICES FOR NIGHTTIME WORK.

SIG4: THE CONTRACTOR MUST HAVE A DESIGNATED SPOTTER IF THE AERIAL BUCKET TRUCK IS LOCATED OVER ACTIVE TRAVEL LANES.

SIG5: THE LOWEST POINT OF THE BUCKET MAY NOT TRAVEL BELOW 14 FOOT VERTICAL CLEARANCE. THE CONTRACTOR MUST UTILIZE AN ALTERNATE SET UP, OR PLACE THE INTERSECTION IN A 4 WAY STOP IF THE 14 FOOT VERTICAL CLEARANCE IS COMPROMIZED. USE TRAFFIC REGULATORS TO CONTROL TRAFFIC THROUGH THE INTERSECTION WHEN TRAFFIC IS PLACED IN A 4 WAY STOP.

SIG6: DELINEATE THE TRUCK WITH CHANNELIZING DEVICES. THE POSITION OF THE TRUCK MAY BE MOVED TO FACILITATE WORK.

MAINTENANCE AND SURVEYING NOTES

MS1: WHENEVER STOPPING SIGHT DISTANCE EXISTS TO THE REAR, THE SHADOW VEHICLES SHOULD MAINTAIN THE RECOMENDED DISTANCE FROM THE WORK AREA AND PROCEEED AT THE SAME SPEED. THE SHADOW VEHICLE SHOULD SLOW DOWN AND TRAVEL AT A FARTHER DISTANCE TO PROVIDE ADEQUATE SIGHT DISTANCE IN ADVANCE OF VERTICAL OR HORIZONTAL CURVES.

MS2: WORKERS OUTSIDE OF VEHICLES SHOULD WORK WITHIN 150' OF WORK VEHICLES WITH AN ACTIVATED BEACON, BETWEEN THE "BEGIN WORK CONVOY" SIGN AND THE "END WORK CONVOY" SIGN, OR BETWEEN THE "WORK ZONE BEGINS" AND "END ROAD WORK" SIGN.

MS3: WORK OR SHADOW VEHICLES WITH OR WITHOUT A TMA MAY BE USED TO SEPARATE THE WORK SPACE FROM TRAFFIC. IF USED, THE VEHICLES SHOULD BE PARKED ACCORDING TO THE ROLL AHEAD DISTANCE TABLES.

MS4: WORK AND SHADOW VEHICLES SHALL BE APPROPRIATELY EQUIPPED WITH AN ACTIVATED AMBER BEACON.

MS5: WHEN WORKERS ARE OUTSIDE THEIR VEHICLES IN AN EXISTING LANE WHILE A MOBILE OPERATION IS OCCURRING DURING THE NIGHTTIME HOURS, CHANNELIZING DEVICES TO DELINEATE OPEN OR CLOSED LANES AT 50 FT SPACING MUST BE USED. AN EXAMPLE OF AN OPERATION (BUT NOT LIMITED TO) IS THE LAYOUT OF CONCRETE PATCHES.

MS6: W21-6 AND W20-1 SIGNS MAY BE SUBSTITUTED AS DETERMINED BY THE TYPE OF WORK TAKING PLACE AS PER THE ENGINEER.

SIGN NUMBER KEY

E5-1f
48" x 48"
60" x 48"

E5-2
48" x 36"

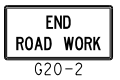
E5-2a
48" x 36"

E5-3
48" x 36"

E13-1P
VAR x 24"

E13-1aP
36" x 24"

G20-1
60" x 24"



G20-2
48" x 24"

G20-4
36" x 18"


I-6a
18" x 18"
24" x 24"
30" x 30"

M1-1
18" x 18"
24" x 24"
36" x 36"
48" x 48"

M1-1
22.5" x 18"
30" x 24"
45" x 36"
60" x 48"

M1-2
18" x 18"
24" x 24"
36" x 36"
48" x 48"

M1-2
22.5" x 18"
30" x 24"
45" x 36"
60" x 48"

M1-3
18" x 18"
24" x 24"
36" x 36"
48" x 48"

M1-3
22.5" x 18"
30" x 24"
45" x 36"
60" x 48"

M1-4
18" x 18"
24" x 24"
36" x 36"
48" x 48"

M1-4
22.5" x 18"
30" x 24"
45" x 36"
60" x 48"

M1-5
18" x 18"
24" x 24"
30" x 30"
36" x 36"

M1-5a
18" x 18"
24" x 24"

M1-6
18" x 18"
24" x 24"
36" X 36"

M1-6
22.5" x 18"
30" x 24"
45" x 36"

M3-1
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"

M3-2
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"

M3-3
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"

M3-4
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"

M4-1
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"

M4-1a
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"

M4-2
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"

M4-3
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"

M4-4
18" x 9"
24" x 12"
30" x 15"
36" x 18"

M4-5
12" X 6"
18" x 9"
24" X 12"
30" X 15"
36" X 18"

M4-6
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"

M4-7
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"

M4-7a
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"

M4-8
12" x 6"
18" x 9"
24" x 12"
30" x 15"

M4-8a
24" x 18"

M4-8b
24" x 12"

M4-9L
30" x 24"
48" x 36"
60" x 48"

M4-9R
30" x 24"
48" x 36"
60" x 48"

M4-9j
30" x 24"
48" x 36"
60" x 48"

M4-9kL
30" x 30"
48" x 42"
60" x 54"

M4-9kR
30" x 30"
48" x 42"
60" x 54"

M4-9mL
30" x 30"
48" x 42"
60" x 54"

M4-9mR
30" x 30"
48" x 42"
60" x 54"


M4-9dL
12" x 18"


M4-9dR
12" x 18"


M4-9e
12" x 18"

M4-9f
12" x 18"


M4-9gL
12" x 18"


M4-9gR
12" x 18"


M4-9h
12" x 24"

M4-9i
12" x 18"

M4-10L
48" x 18"

M4-10R
48" x 18"

M4-11a
12" X 6"
18" x 9"
24" X 12"
30" X 15"
36" X 18"


M5-1L
12" x 9"
21" x 15"
30" x 21"


M5-1R
12" x 9"
21" x 15"
30" x 21"


M5-2L
12" x 9"
21" x 15"
30" x 21"


M5-2R
12" x 9"
21" x 15"
30" x 21"


M5-3
12" x 9"
21" x 15"
30" x 21"


M6-1L
12" x 9"
18" x 12"
21" x 15"
30" x 21"


M6-1R
12" x 9"
18" x 12"
21" x 15"
30" x 21"


M6-2L
12" x 9"
18" x 12"
21" x 15"
30" x 21"


M6-2R
12" x 9"
18" x 12"
21" x 15"
30" x 21"


M6-3
12" x 9"
18" x 12"
21" x 15"
30" x 21"


M6-4
12" x 9"
18" x 12"
21" x 15"
30" x 21"


M6-5
12" x 9"
18" x 12"
21" x 15"
30" x 21"


M6-6L
12" x 9"
18" x 12"
21" x 15"
30" x 21"


M6-6R
12" x 9"
18" x 12"
21" x 15"
30" x 21"


M6-7L
12" x 9"
18" x 12"
21" x 15"
30" x 21"


M6-7R
12" x 9"
18" x 12"
21" x 15"
30" x 21"

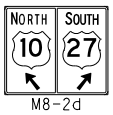
SEE MDOT SHS 13-WORK ZONE FOR SIGN DETAILS

MDOT Michigan Department of Transportation	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL NO: 103-GEN-SIGN	TRAFFIC TYPICALS SIGN SHEET	DATE: JUNE 2021 SHEET: 1 OF 5
FILE: 103-GEN-SIGN.dgn				

SIGN NUMBER KEY

M8-1gL
36" x 66"

M8-1gR
36" x 66"

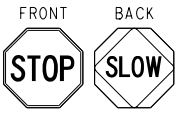


M8-2d
60" x 48"


OM-3L
12" x 36"
24" x 48"
36" x 72"


OM-3R
12" x 36"
24" x 48"
36" x 72"

R1-1
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"



R1-1a
18" x 18"
24" x 24"

R1-2
18"
24"
30"
36"
48"
60"

R1-2aP
24" x 18"
36" x 30"
48" x 36"

R2-1
18" x 24"
24" x 30"
30" x 36"
36" x 48"
48" x 60"

R2-1a
48" x 60"


R3-1
24" x 24"
30" x 30"
36" x 36"
48" x 48"


R3-2
24" x 24"
30" x 30"
36" x 36"
48" x 48"

R3-3
24" x 24"
36" x 36"
48" x 48"


R3-4
24" x 24"
30" x 30"
36" x 36"
48" x 48"

R3-5L
30" x 36"
36" x 48"

R3-5R
30" x 36"
36" x 48"

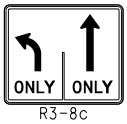
R3-5a
30" x 36"
36" x 48"


R3-6L
30" x 36"
42" x 48"

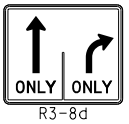

R3-6R
30" x 36"
42" x 48"

R3-7L
30" x 30"
36" x 36"

R3-7R
30" x 30"
36" x 36"



R3-8c
36" x 30"



R3-8d
36" x 30"

R4-1
12" x 18"
18" x 24"
24" x 30"
36" x 48"
48" x 60"

R4-2
12" x 18"
18" x 24"
24" x 30"
36" x 48"
48" x 60"


R4-7
12" x 18"
18" x 24"
24" x 30"
36" x 48"
48" x 60"


R4-8
18" x 24"
24" x 30"
36" x 48"
48" x 60"

R4-9
18" x 24"
24" x 30"
36" x 48"
48" x 60"

R5-1
30" x 30"
36" x 36"
48" x 48"

R5-1a
30" x 18"
36" x 24"
42" x 30"

R5-18b
48" x 60"

R5-18c
48" x 48"

R5-18d
78" x 12"

R5-18e
72" x 12"

R5-18f
48" x 60"

R5-18g
30" x 42"

R5-18h
48" x 60"

R6-1L
36" x 12"
54" x 18"

R6-1R
36" x 12"
54" x 18"

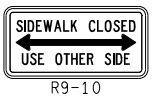
R6-2L
12" x 16"
18" x 24"
24" x 30"
36" x 48"
48" x 60"

R6-2R
12" x 16"
18" x 24"
24" x 30"
36" x 48"
48" x 60"


R8-3
12" x 12"
18" x 18"
24" x 24"
36" x 36"
48" x 48"

R9-8
36" x 18"

R9-9
24" x 12"
30" x 18"



R9-10
24" x 12"
48" x 24"

R9-11L
24" x 12"
48" x 36"

R9-11R
24" x 12"
48" x 36"

R9-11aL
24" x 12"
48" x 24"

R9-11aR
24" x 12"
48" x 24"

R10-6b
36" x 54"

R11-2
48" x 30"

R11-2a
48" x 30"

R11-2b
48" x 30"

R11-2c
60" x 30"

R11-3a
60" x 30"

R11-3b
60" x 30"

R11-4
60" x 30"

SEE MDOT SHS 13-WORK ZONE FOR SIGN DETAILS

MDOT Michigan Department of Transportation	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL	TRAFFIC TYPICALS SIGN SHEET	DATE: JUNE 2021
FILE: 103-GEN-SIGN.dgn		NO: 103-GEN-SIGN		SHEET: 2 OF 5

SIGN NUMBER KEY


W1-1L
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W1-1R
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W1-2L
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W1-2R
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W1-2bL
36" x 36"
48" x 48"


W1-2bR
36" x 36"
48" x 48"


W1-3L
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W1-3R
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W1-4L
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W1-4R
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W1-4bL
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W1-4bR
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W1-4cL
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W1-4cR
24" x 24"
30" x 30"
36" x 36"
48" x 48"


30" x 30"
36" x 36"
W24-1L 48" x 48"

W24-1cP
24" x 18"
30" x 24"


W24-1R
30" x 30"
36" x 36"
48" x 48"


W24-1aL
30" x 30"
36" x 36"
48" x 48"


W24-1aR
30" x 30"
36" x 36"
48" x 48"


W24-1bL
30" x 30"
36" x 36"
48" x 48"


W24-1bR
30" x 30"
36" x 36"
48" x 48"


W1-6L
24" x 12"
36" x 18"
48" x 24"
60" x 30"
96" x 48"

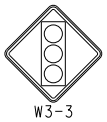

W1-6R
24" x 12"
36" x 18"
48" x 24"
60" x 30"
96" x 48"


W1-8L
12" x 18"
18" x 24"
24" x 30"
30" x 36"
36" x 48"


W1-8R
12" x 18"
18" x 24"
24" x 30"
30" x 36"
36" x 48"


W3-1
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W3-2
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W3-3
18" x 18"
30" x 30"
36" x 36"
48" x 48"

W3-4
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W3-4b
30" x 30"
36" x 36"
48" x 48"

W3-5
36" x 36"
48" x 48"

W3-5a
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W3-5b
30" x 30"
36" x 36"
48" x 48"


W4-1L
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W4-1R
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W4-2L
30" x 30"
36" x 36"
48" x 48"


W4-2R
30" x 30"
36" x 36"
48" x 48"


W4-3L
30" x 30"
36" x 36"
48" x 48"


W4-3R
30" x 30"
36" x 36"
48" x 48"


W4-5L
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W4-5R
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W4-5P
18" x 24"
24" x 30"


W4-6L
24" x 24"
30" x 30"
36" x 36"
48" x 48"


W4-6R
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W4-7L
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W4-7R
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W5-1
30" x 30"
36" x 36"
48" x 48"

W5-2
18" x 18"
30" x 30"
36" x 36"
48" x 48"

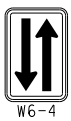
W5-3
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W5-4
30" x 30"
36" x 36"
48" x 48"


W6-1
30" x 30"
36" x 36"
48" x 48"


W6-2
30" x 30"
36" x 36"
48" x 48"


W6-3
30" x 30"
36" x 36"
48" x 48"


W6-4
12" x 18"


W7-1
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W7-1a
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W8-1
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"

SEE MDOT SHS 13-WORK ZONE FOR SIGN DETAILS

MDOT Michigan Department of Transportation	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL NO: 103-GEN-SIGN	TRAFFIC TYPICALS SIGN SHEET	DATE: JUNE 2021 SHEET: 3 OF 5
FILE: 103-GEN-SIGN.dgn				

SIGN NUMBER KEY

W8-2
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W8-3
18" x 18"
30" x 30"
36" x 36"
48" x 48"

W8-4
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W8-5
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W8-5P
24" x 18"
30" x 24"
36" x 30"

W8-7
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W8-8
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W8-9
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W8-11
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W8-12
30" x 30"
36" x 36"
48" x 48"

W8-14
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W8-15
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W8-15P
24" x 18"
30" x 24"
36" x 30"

W8-17L
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W8-17R
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W8-17P
24" x 18"
30" x 24"
36" x 30"

W8-18
24" x 24"
36" x 36"
48" x 48"

W8-23
24" x 24"
36" x 36"
48" x 48"

W8-24
30" x 30"
36" x 36"
48" x 48"

W8-25
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W8-26
36" x 36"
48" x 48"

W9-1L
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W9-1R
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W9-2L
30" x 30"
36" x 36"
48" x 48"

W9-2R
30" x 30"
36" x 36"
48" x 48"

W9-3C
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W9-3L
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W9-3R
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W9-3a
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W9-3b
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W11-10
24" x 24"
30" x 30"
36" x 36"
48" x 48"

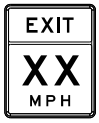
W11-10a
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W11-24
36" x 36"
48" x 48"

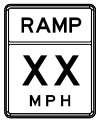
W12-1
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W12-2
18" x 18"
30" x 30"
36" x 36"
48" x 48"

W13-1P
18" x 18"
24" x 24"
30" x 30"



W13-2
24" x 30"
36" x 48"
48" x 60"



W13-3
24" x 30"
36" x 48"
48" x 60"

W13-4P
24" x 24"
36" x 36"

W13-6
24" x 42"
36" x 60"
48" x 84"

W13-6a
24" x 42"
36" x 60"
48" x 84"

W13-7
24" x 42"
36" x 60"
48" x 84"

W13-7a
24" x 42"
36" x 60"
48" x 84"

W14-3
36" x 24"
40" x 30"
48" x 36"
64" x 48"

W16-2P
18" x 12"
24" x 18"
30" x 24"

W16-4aP
18" x 12"
24" x 18"
30" x 24"
36" x 30"

W16-12P
24" x 18"

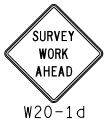
W16-13P
24" x 18"
30" x 24"

W20-1
24" x 24"
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W20-1a
24" x 24"
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W20-1b
24" x 24"
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W20-1c
24" x 24"
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W20-1d
24" x 24"
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W20-2
30" x 30"
36" x 36"
48" x 48"

W20-3
30" x 30"
36" x 36"
48" x 48"

W20-3a
30" x 30"
36" x 36"
48" x 48"

SEE MDOT SHS 13-WORK ZONE FOR SIGN DETAILS

MDOT Michigan Department of Transportation	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL NO: 103-GEN-SIGN	TRAFFIC TYPICALS SIGN SHEET	DATE: JUNE 2021 SHEET: 4 OF 5
FILE: 103-GEN-SIGN.dgn				

SIGN NUMBER KEY

W20-3b
30" x 30"
36" x 36"
48" x 48"

W20-4
30" x 30"
36" x 36"
48" x 48"

W20-4c
36" x 36"
48" x 48"

W20-5C
30" x 30"
36" x 36"
48" x 48"

W20-5L
30" x 30"
36" x 36"
48" x 48"

W20-5L1
30" x 30"
36" x 36"
48" x 48"

W20-5L2
30" x 30"
36" x 36"
48" x 48"

W20-5R
30" x 30"
36" x 36"
48" x 48"

W20-5R1
30" x 30"
36" x 36"
48" x 48"

W20-5R2
30" x 30"
36" x 36"
48" x 48"

W20-5aL2
30" x 30"
36" x 36"
48" x 48"

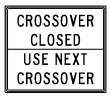
W20-5aL3
30" x 30"
36" x 36"
48" x 48"

W20-5aR2
30" x 30"
36" x 36"
48" x 48"

W20-5aR3
30" x 30"
36" x 36"
48" x 48"


W20-7a
30" x 30"
36" x 36"
48" x 48"

W20-8
24" x 18"



W20-9
54" x 48"

W20-10
48" x 24"
66" x 30"

W20-11
12" x 18"

W20-12P
VARIABLE x 12"

W20-13P
VARIABLE x 12"

W20-14L
36" x 36"
48" x 48"

W20-14R
36" x 36"
48" x 48"

W20-14aP
36" x 12"
48" x 12"

W20-14bP
36" x 12"
48" x 12"

W20-15
36" x 36"
48" x 48"

W20-15a
36" x 36"
48" x 48"

W20-15c
48" x 54"

W20-15d
48" x 54"

W20-16
36" x 36"
48" x 48"

W20-17
36" x 36"
48" x 48"

W21-1
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W21-2
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W21-2
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W21-3
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W21-4
36" x 18"

W21-5
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W21-5aL
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W21-5aR
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W21-5bL
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W21-5bR
30" x 30"
36" x 36"
48" x 48"
60" x 60"

W21-6
24" x 24"
30" x 30"
36" x 36"
48" x 48"

W21-7
30" x 30"
36" x 36"
48" x 48"

W21-8
30" x 30"
36" x 36"
48" x 48"

W22-1
30" x 30"
36" x 36"
48" x 48"

W22-2
42" x 36"

W22-3
36" x 30"
42" x 36"

W23-1
48" x 24"

W23-2
36" x 36"
48" x 48"

SEE MDOT SHS 13-WORK ZONE FOR SIGN DETAILS

MDOT Michigan Department of Transportation	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL NO: 103-GEN-SIGN	TRAFFIC TYPICALS SIGN SHEET	DATE: JUNE 2021 SHEET: 5 OF 5
FILE: 103-GEN-SIGN.dgn				

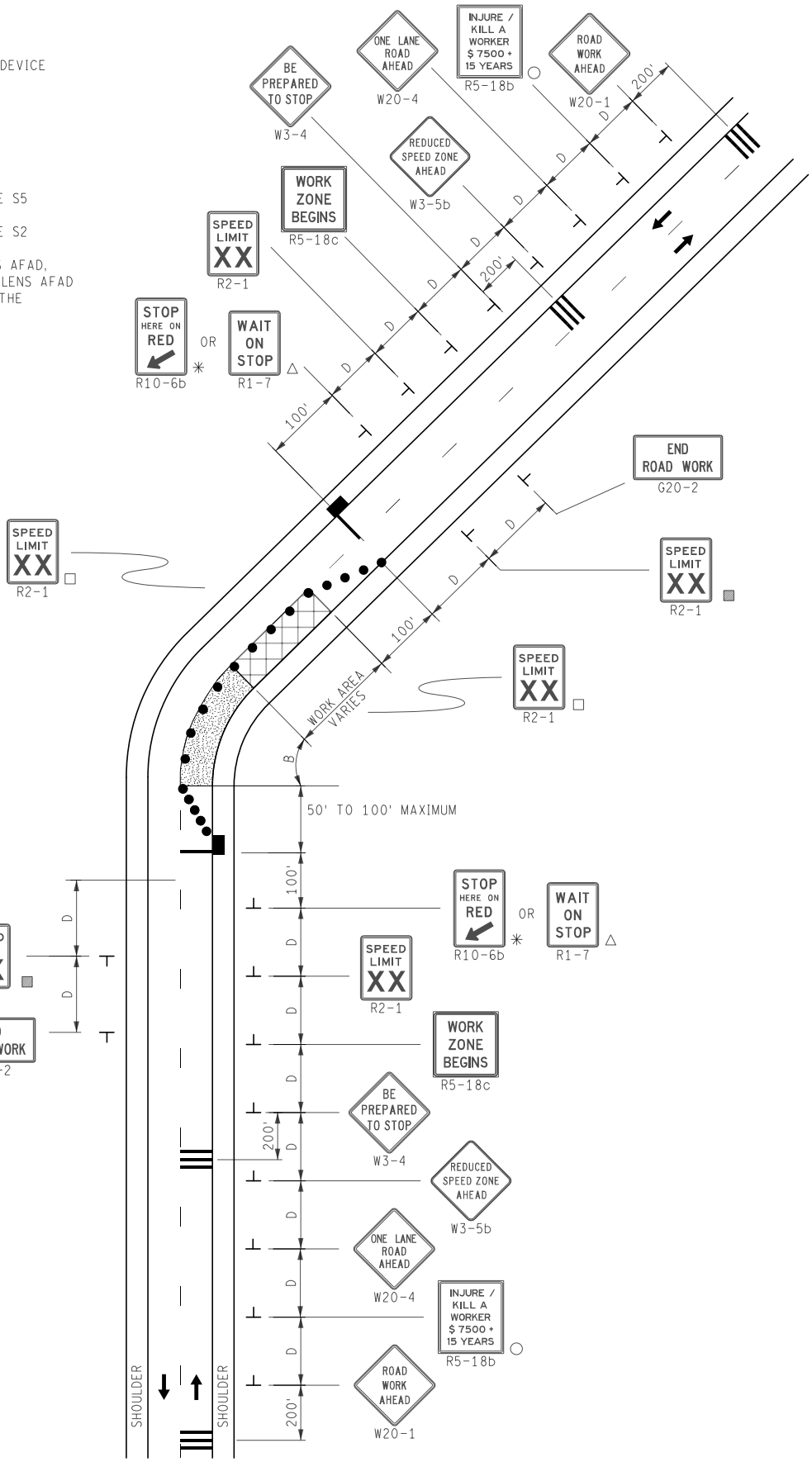
KEY

- AUTOMATED FLAGGER ASSISTANCE DEVICE
- CHANNELIZING DEVICES
- TRAFFIC FLOW
- REFLECTS EXISTING SPEED LIMIT
- □ PLACE SIGN AS INDICATED IN NOTE S5
- ○ PLACE SIGN AS INDICATED IN NOTE S2
- ✳ FOR USE WITH A RED/YELLOW LENS AFAD, ELIMINATE SIGN IF A RED/YELLOW LENS AFAD WITH A R10-6 SIGN MOUNTED TO THE DEVICE IS PROVIDED
- △ FOR USE WITH A STOP/SLOW AFAD
- RUMBLE STRIPS (SEE NOTE TCD9)

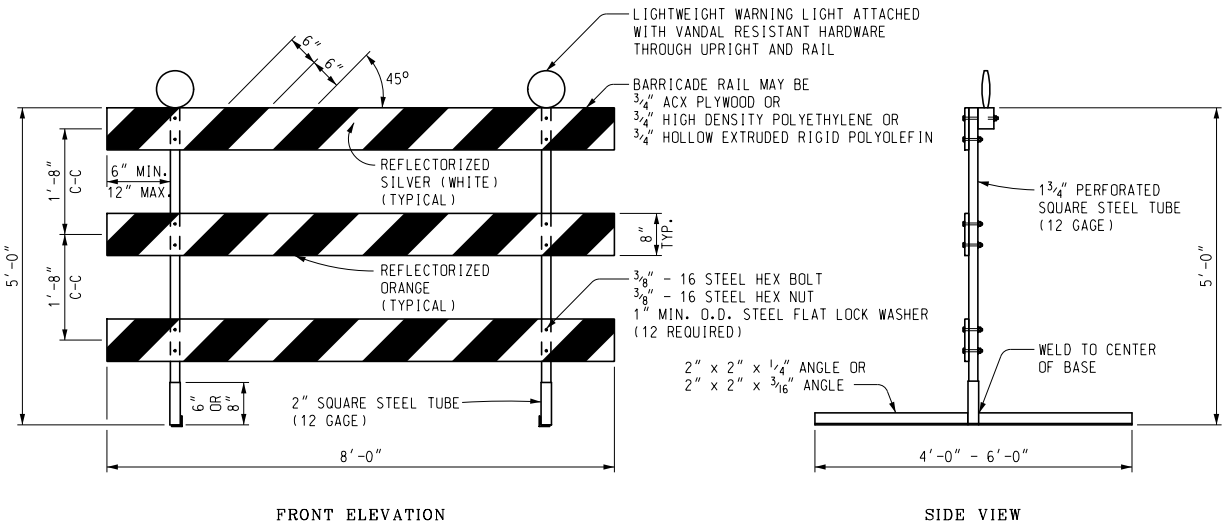
STANDARD NOTES

(SEE GEN-NOTES)

GENERAL: G1, G2, G3, G4
SIGNING: S1, S2, S3, S4, S5
TRAF REG: TR3
DEVICES: TCD1, TCD2, TCD6



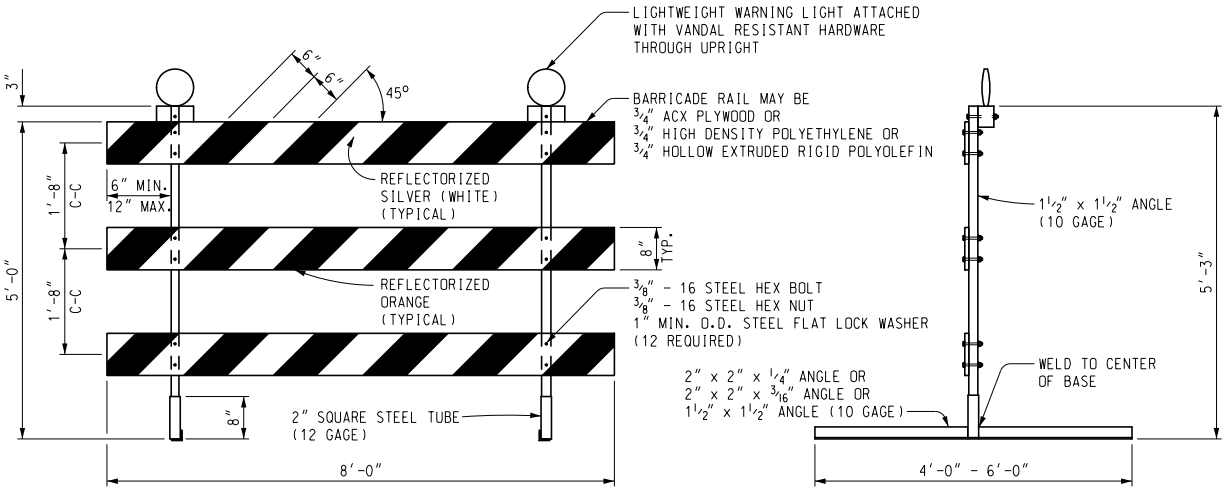
MDOT Michigan Department of Transportation	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL	LANE CLOSURE UTILIZING AN AFAD AND TEMPORARY RUMPLE STRIPS ON A 2-LANE UNDIVIDED ROADWAY	DATE: MAY 2022
FILE: 116-AFAD-NFW-2L-RUM.dgn		NO: 116-AFAD-NFW-2L-RUM		SHEET: 1 OF 1



FRONT ELEVATION

SIDE VIEW

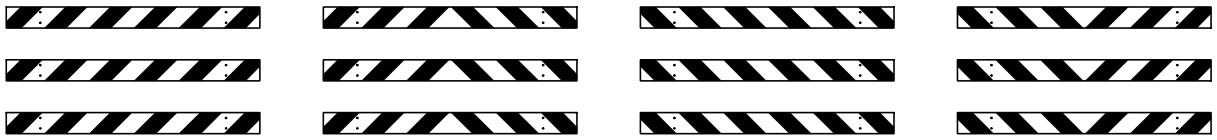
PERFORATED SQUARE STEEL TUBE OPTION



FRONT ELEVATION

SIDE VIEW

ANGLE IRON OPTION



LEFT DIRECTIONAL

BI-DIRECTIONAL

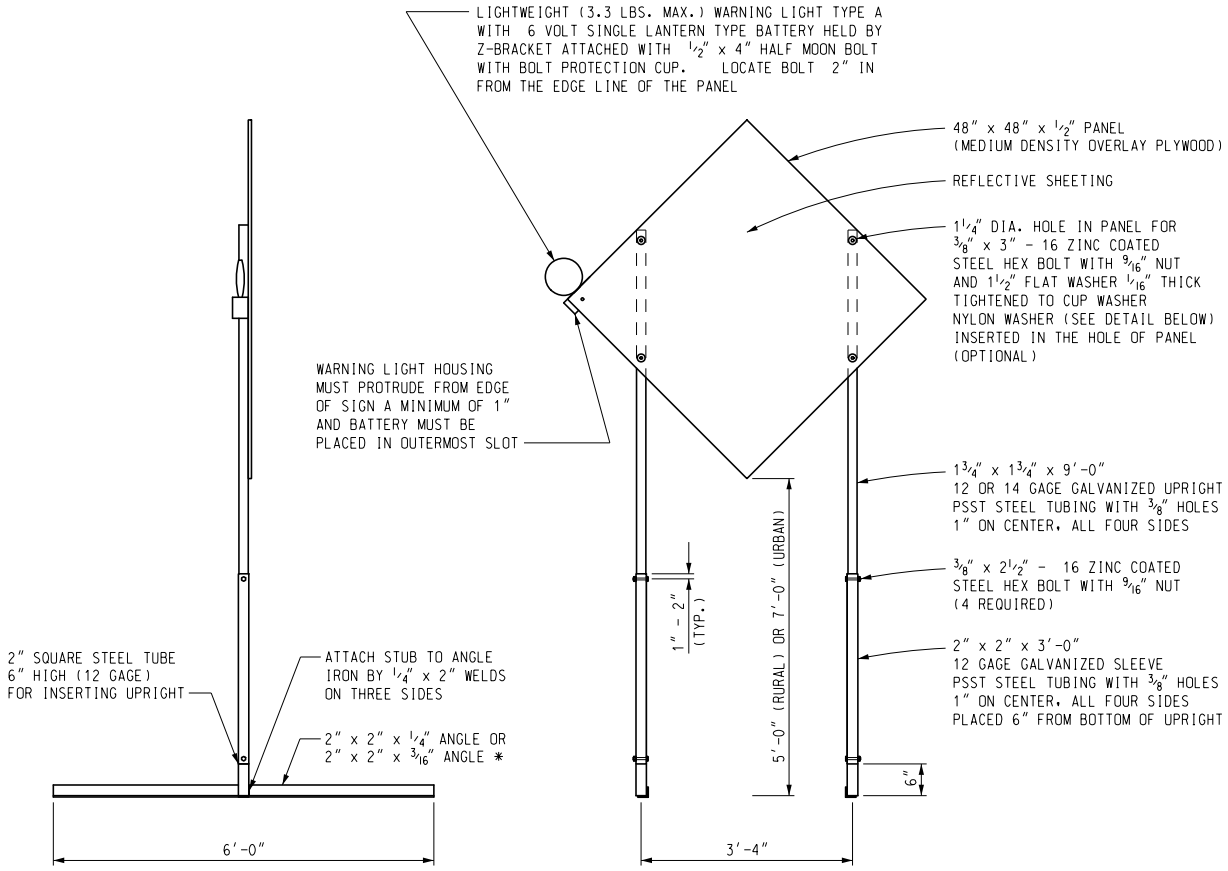
RIGHT DIRECTIONAL

CLOSURES

BARRICADE RAIL SHEETING OPTIONS
TYPE III BARRICADES

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

MDOT Michigan Department of Transportation PREPARED BY OPERATIONS FIELD SERVICES DRAWN BY: ECH CHECKED BY: MWB	DEPARTMENT DIRECTOR Paul C. Ajegba APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES APPROVED BY: (SPECIAL DETAIL) DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL FOR Temporary Traffic Control Devices			
		F.H.W.A. APPROVAL	6/16/22 PLAN DATE	WZD-125-E	SHEET 1 OF 3



SIDE VIEW

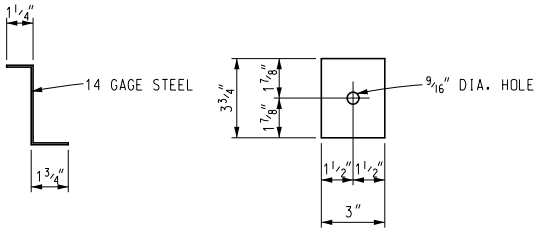
FRONT ELEVATION

TEMPORARY SIGN SUPPORT

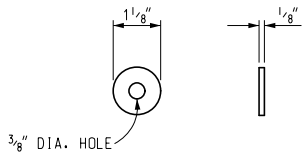
(WARNING LIGHT PLACED ON SIDE CLOSEST TO TRAFFIC)

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

UPRIGHTS SHALL NOT EXTEND ABOVE THE SIGN PANEL.



Z-BRACKET DETAIL



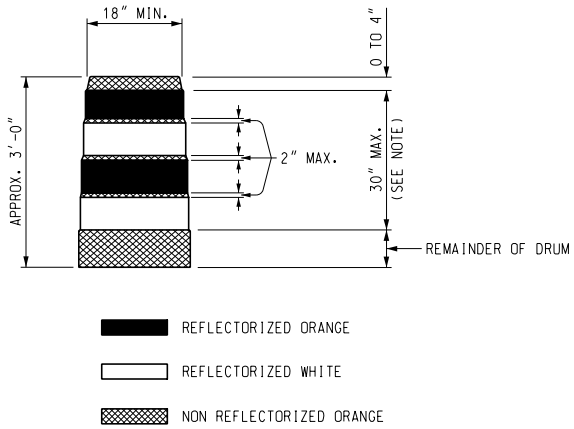
OPTIONAL NYLON WASHER

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

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL 19	SPECIAL DETAIL F.H.W.A. APPROVAL	6/16/22 PLAN DATE	WZD-125-E	SHEET 2 OF 3

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



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

PLASTIC DRUM

NOTES:

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

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

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

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

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

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL 20	(SPECIAL DETAIL) F.H.W.A. APPROVAL	6/16/22 PLAN DATE	WZD-125-E	SHEET 3 OF 3

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

MICHIGAN
DEPARTMENT OF TRANSPORTATION

COORDINATION CLAUSE
FOR OTHER CONTRACTS WITHIN THE VICINITY

The Contractor shall coordinate this work with other Contractors and MDOT Contract Agencies performing work within the Construction Influence Area (CIA) or adjoining areas to avoid conflicts in the maintenance of traffic, construction signing and the orderly progress of contract work.

The Contractor may need to coordinate their work with adjacent local agency projects and/or maintenance work.

There will be no additional compensation for any coordination required with other projects. The Contractor’s attention is directed to Section 104.08 of the Standard Specifications.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
SHOULDER, CLASS II, MODIFIED

BAY:TPA 1 of 1 APPR:JFS:DBP:08-31-21

a. Description. This work consists of furnishing aggregate and constructing a Class II shoulder in accordance with section 307 of the Standard Specifications for Construction except as modified herein.

b. Materials. Furnish aggregate only from geologically natural sources that is a quarried carbonate, with minimum 95 percent two-faced crushed material (MTM 107), meeting the physical and grading requirements for Class 23A dense-graded aggregate.

c. Construction. Complete all work in accordance with the standard specifications.

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

Pay Item	**Pay Unit**
Shld, Cl II, Modified	Ton

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
TEMPORARY PORTABLE RUMBLE STRIPS

COS:CRB 1 of 2 APPR:LLR:MRB:01-22-21
FHWA:APPR:01-28-21

a. Description. This work consists of furnishing, installing, maintaining, relocating, and removing temporary portable rumble strips.

b. Materials. Provide temporary portable rumble strips in accordance with the following:

1. Construct the rumble strip from engineered polymers designed to maintain integrity for at least the 0 degree to 180 degree Fahrenheit (F) temperature range. Ensure polymers do not degrade due to weather or traffic conditions for the duration of use. The unit is to be colored white, black, or orange. The bottom side of the rumble strip must include `a design feature that allows liquid drainage underneath without causing displacement of the unit. The leading and tail edges of the rumble strip are to be beveled, designed to allow the safe passage of motorcycles over the unit. The rumble strip must provide an auditory and tactile response to vehicle crossing events, while minimizing any displacement. The rumble strip must provide a minimum coverage of 11 feet across the lane and be a minimum of 12 inches wide. The rumble strip is not to require adhesives, nails, or any other “affixing” materials for installation.

2. The rumble strip must maintain acceptable performance when subjected to a variety of traffic conditions including roadways with normally posted speed limits up to 65 miles per hour (mph), and commercial heavy trucks.

3. Ensure the rumble strip is in an acceptable condition and is free of any defects prior to installation.

4. Use RoadQuake 2F, manufactured by Plastic Safety Systems Inc., 2444 Baldwin Rd, Cleveland, Ohio, 44104, (800)-662-6338.

c. Construction. Install the rumble strips in accordance with the manufacturer’s recommendations, and the following:

1. Ensure the pavement surface is clear of all foreign material such as gravel, sand, or other debris. Place each rumble strip on a uniform paved surface free of defects including, potholes, excessive rutting, separated transverse joints, and utility structures. Do not install rumble strips on horizontal curves or steep vertical curves.

2. Install each rumble strip perpendicular to the travel direction and ensure the strip is in complete contact with the road surface. Center the strip in the lane to maximize contact with traffic and minimize opportunities for motorists to maneuver around the rumble strips.

3. A rumble strip array consists of three rumble strips installed with spacing as described

in Table 1, plus or minus 6-inch tolerance for adjusting due to inadequacies with the roadway, unless otherwise approved by the Engineer. Place two rumble strip arrays on the mainline in each direction of approach to the work zone.

Table 1: Rumble Strip Spacing

Normally Posted Speed Limit	On Center Spacing
40 mph or Less	10 feet
45 to 55 mph	15 feet
60 to 65 mph	20 feet

4. Locate the arrays based on the following recommendations, unless field conditions prohibit or otherwise shown on the plans or as directed by the Engineer:

A. The first rumble strip array is recommended to be placed approximately 200 feet in advance of the Road Work Ahead (W20-1) sign.

B. The second rumble strip array is recommended to be placed approximately 200 feet in advance of the Traffic Regulator (W20-7a) sign.

5. Once properly installed, maintain the rumble strips as necessary throughout deployment. Re-adjustment is required if a rumble strip displaces such that: it is no longer perpendicular to the direction of travel, it is skewed by at least 6 inches, will not remain flat on the paved surface for any reason, or no longer satisfies the above conditions. Replace rumble strips with faulty connections, worn rubber, exposed metal, or torn material as directed by the Engineer.

6. Remove the temporary rumble strips from the roadway simultaneously with the rest of the temporary traffic control devices (TTCD) on the project during all inactive periods or when no longer needed as directed by the Engineer. Rumble strips are to be placed flat on the ground, and not stacked, when stored on the roadside. Once removed, rumble strips may be stored on the jobsite outside of the clear zone.

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

Pay Item **Pay Unit**

Rumble Strip, Temp, Portable, Furn .....Each
Rumble Strip, Temp, Portable, Oper.....Each

1. **Rumble Strip, Temp, Portable, Furn** will be measured by counting as a total quantity each rumble strip furnished and installed. Replacement of rumble strips damaged by vehicular traffic other than the Contractor's vehicles and equipment will be paid for as **Rumble Strip, Temp, Portable, Furn.**

2. **Rumble Strip, Temp, Portable, Oper** will be counted as a total quantity and includes operating, inspecting, maintaining, cleaning, relocating, and removing each rumble strip.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
AUTOMATED FLAGGER ASSISTANCE DEVICE

COS:SAH 1 of 3 APPR:CRB:CT:07-25-22

a. Description. This work consists of furnishing, installing, operating, maintaining, relocating, and the removal of Automated Flagger Assistance Devices (AFAD) that allows the operator to fully control the device from a safe location, outside of the lane of traffic. Use automated flagger assistance devices to control traffic in one-lane, two-way work zones. Relocate the system as required by the location of work. This system will be used to control traffic during active work only when personnel are on-site.

The Contractor is responsible for coordinating with any work in adjacent work zone projects.

b. Materials. Ensure all hardware components of this system are crashworthy in accordance with the *NCHRP 350* or *MASH*, in addition to the following requirements:

1. Provide a qualified traffic regulator as described in subsection 812.03.G.8 of the Standard Specifications for Construction with the material listed in subsections 922.11.B, 922.11.C, and 922.11.D of the Standard Specifications for Construction and an AFAD system composed of one of the following two options and as noted below:

A. Furnish an AFAD device meeting the requirements of *MMUTCD Section 6E.05 STOP/SLOW Automated Flagger Assistance Devices*.

B. Furnish an AFAD device meeting the requirements of *MMUTCD Section 6E.06 Red/Yellow Lens Automated Flagger Assistance Devices*. Furnish the required Stop Here On Red sign (R10-6 or R10-6a) as part of the device or installed on the right-hand side of the approach at the point at which drivers are expected to stop.

2. Delineate the unit with a 2-inch by 36-inch strip, or an equivalent area, of reflectorized red and white conspicuity tape to increase nighttime visibility.

3. Furnish a unit with an intrusion alarm system to alert workers when traffic has improperly entered the work zone. The alarm will sound when the operator activates the intrusion alarm using a wireless controller or when the gate arm is detached from the AFAD.

4. Furnish the AFAD system equipped with a solar power supply and a battery backup with a built-in 110 VAC battery charger. When fully charged, ensure the AFAD and wireless controlled are capable of operating for 24 hours continuously.

5. Ensure the AFAD trailer is painted highway orange.

6. Furnish a gate arm meeting the requirements of the *MMUTCD Section 6E.06* which descends to a down position across the approach lane of traffic when the STOP face or Red Lens is displayed and then ascends to an upright position when the SLOW face or Yellow

Lens is displayed. Ensure both configurations employ visible methods of determining the status of each AFAD unit from the backside of the unit. Ensure the indication is legible for a minimum distance of 300 feet from the back of the unit in daylight hours and does not produce false indications to opposing traffic.

c. Construction. Install the AFAD in accordance with the manufacturer's recommendations, the plans, and the following requirements:

1. Furnish up to 1 hour of training for applicable representatives from contractors and MDOT if required by the Engineer. The training includes, at a minimum, installation, removal, and operation of the system and must take place prior to installation if required.

2. Use AFADs in accordance with the *MMUTCD Section 6E.04 Automated Flagger Assistance Devices*.

3. Delineate the AFAD with three channelizing devices. The use of cones is allowed for daytime use only.

4. It is acceptable for one traffic regulator to operate two AFADs from a central location when the distance between the regulator and each AFAD is a maximum of 750 feet with a clear line of sight from the regulator to both AFADs.

5. Furnish a two-way handheld radio system and standby traffic regulator equipment as a backup system for traffic regulators operating the AFAD.

6. Traffic regulators operating the AFADs should stand on or behind the shoulder of the roadway. Ensure positioning allows the regulators to remain safely out of traffic areas while remaining visible to motorists.

7. Furnish AFAD controllers to each traffic regulator located at the AFAD. Ensure the control is simple in nature and consist of buttons that can be pushed while wearing gloves. Controls with electronic screens are prohibited unless approved by the Engineer.

8. Use AFADs to control mainline traffic. Any side street or intersecting location will require an intermediate traffic regulator. Intermediate traffic regulators are required to follow the guidance in subsection 812.03.G.8 of the Standard Specifications for Construction. AFADs may be used at intermediate locations at the Contractor's expense.

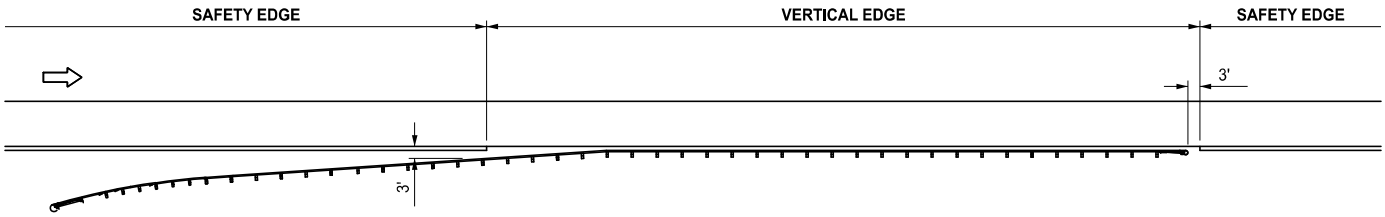
9. Remove AFADs from the roadway completely at the end of each work day and store outside of the clear zone, as determined by the Engineer, or in the Contractor's yard.

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

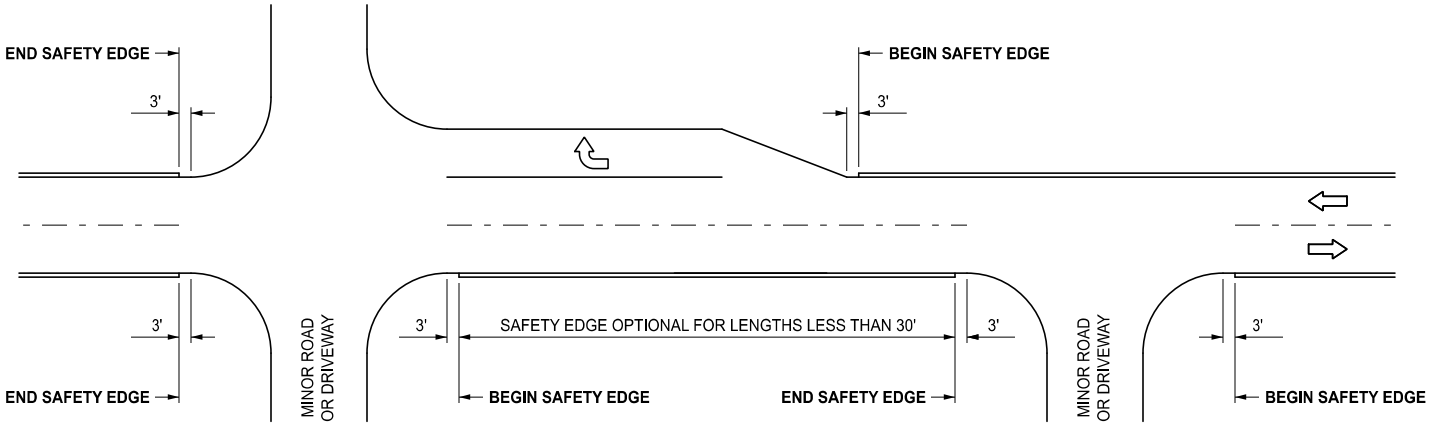
Pay Item	**Pay Unit**
Automated Flagger Assistance Device	Each

Automated Flagger Assistance Device includes installing, operating and removing one automated flagger assistance device. No additional payment will be made for relocating the device on the project. The Department will pay for the maximum number of automated flagger

assistance devices in use at one time on the project. Additional payment will not be provided for AFADs installed at intermediate locations.



SAFETY EDGE TREATMENT AT GUARDRAIL



SAFETY EDGE TREATMENT AT INTERSECTIONS AND DRIVEWAYS

NOTES:

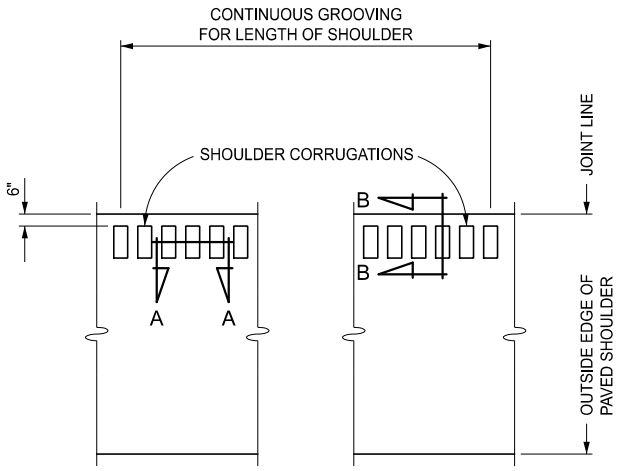
WHEN CALLED FOR, SAFETY EDGE ON FREEWAY OUTSIDE SHOULDERS WILL END PRIOR TO RAMP SHOULDER TRANSITIONS AND CONTINUE WHERE FULL MAINLINE SHOULDER RESUMES.

MDOT
Michigan Department of Transportation

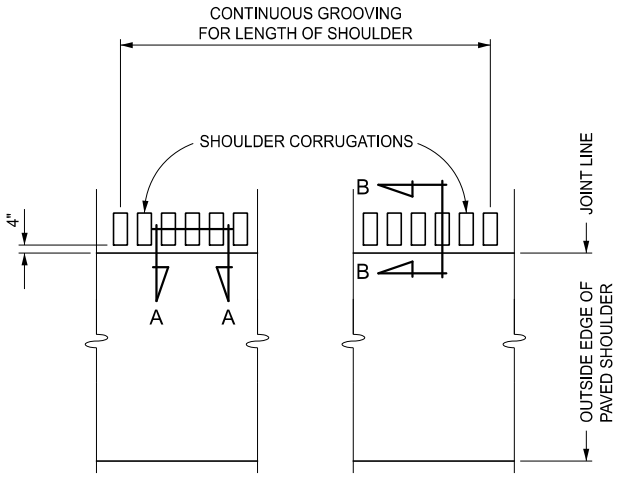
DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
PAVEMENT SAFETY EDGE

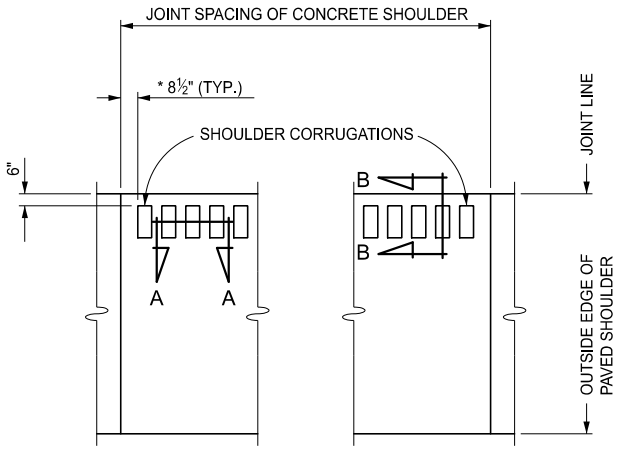
(SPECIAL DETAIL)	06/14/2021	R-110-B	SHEET
FHWA APPROVAL	PLAN DATE		3 OF 3



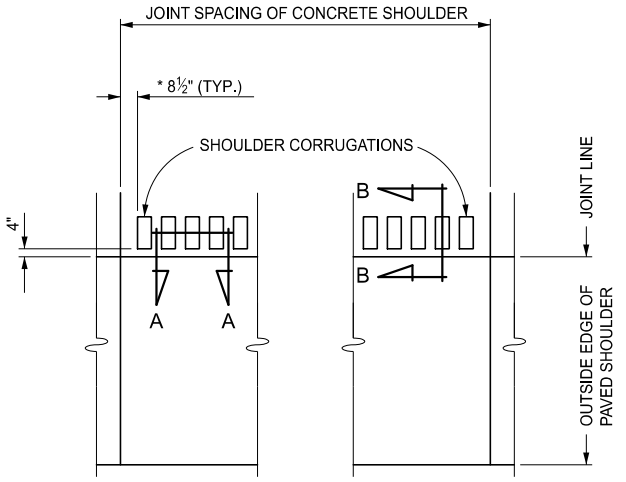
HMA SHOULDER PLAN
ADJACENT TO 12' LANE



HMA SHOULDER PLAN
ADJACENT TO 14' LANE



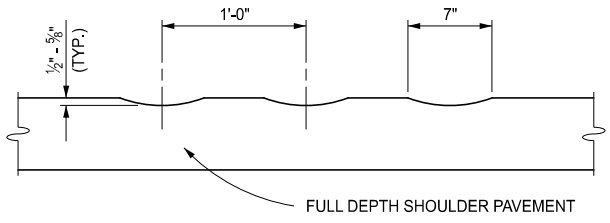
CONCRETE SHOULDER PLAN
ADJACENT TO 12' LANE



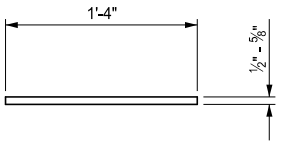
CONCRETE SHOULDER PLAN
ADJACENT TO 14' LANE

* THE DISTANCE FROM THE CORRUGATION TO THE TRANSVERSE JOINT SHALL BE AT LEAST 6" BUT LESS THAN 12".

* THE DISTANCE FROM THE CORRUGATION TO THE TRANSVERSE JOINT SHALL BE AT LEAST 6" BUT LESS THAN 12".



SECTION A - A



SECTION B - B

FREEWAY SHOULDER CORRUGATIONS

(FOR FREEWAY SHOULDERS PAVED 4 FEET OR GREATER)

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

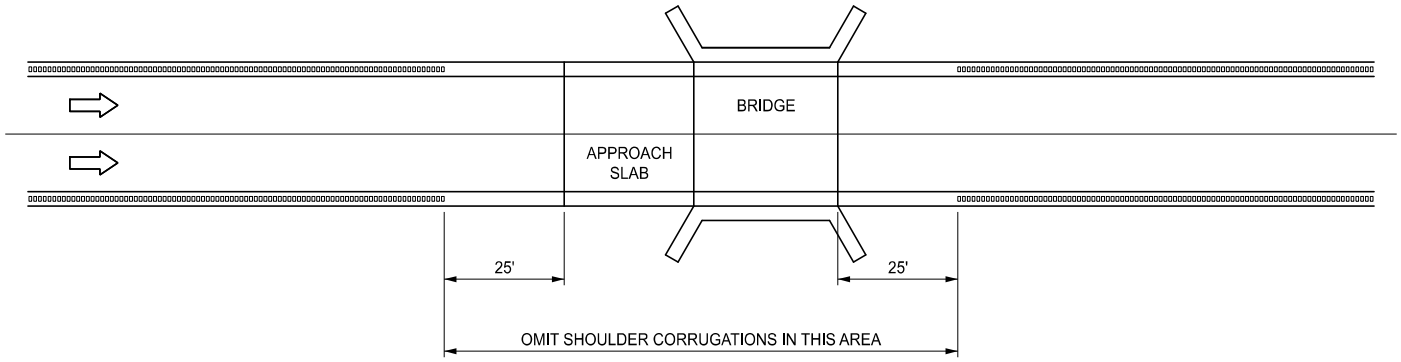
APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MDOT
Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
SHOULDER AND CENTER LINE CORRUGATIONS

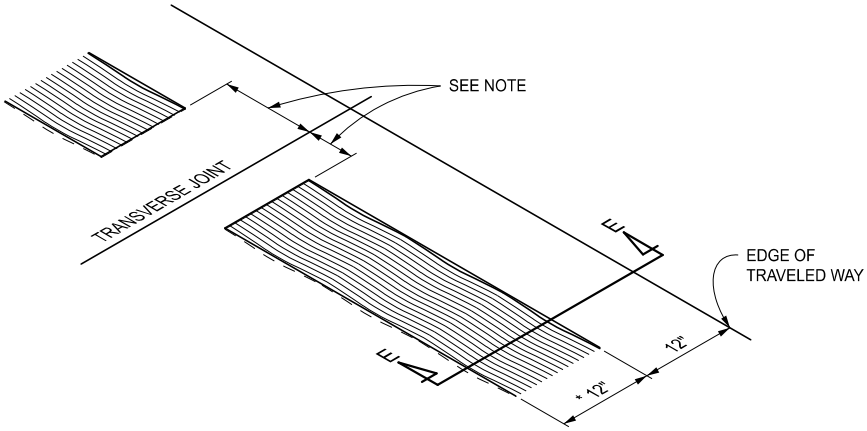
(SPECIAL DETAIL) / FHWA APPROVAL	08/02/2023 / PLAN DATE	R-112-J	SHEET 1 OF 10



SHOULDER CORRUGATIONS AT BRIDGES

FREEWAY SHOULDER CORRUGATIONS

(FOR FREEWAY SHOULDERS PAVED 4 FEET OR GREATER)

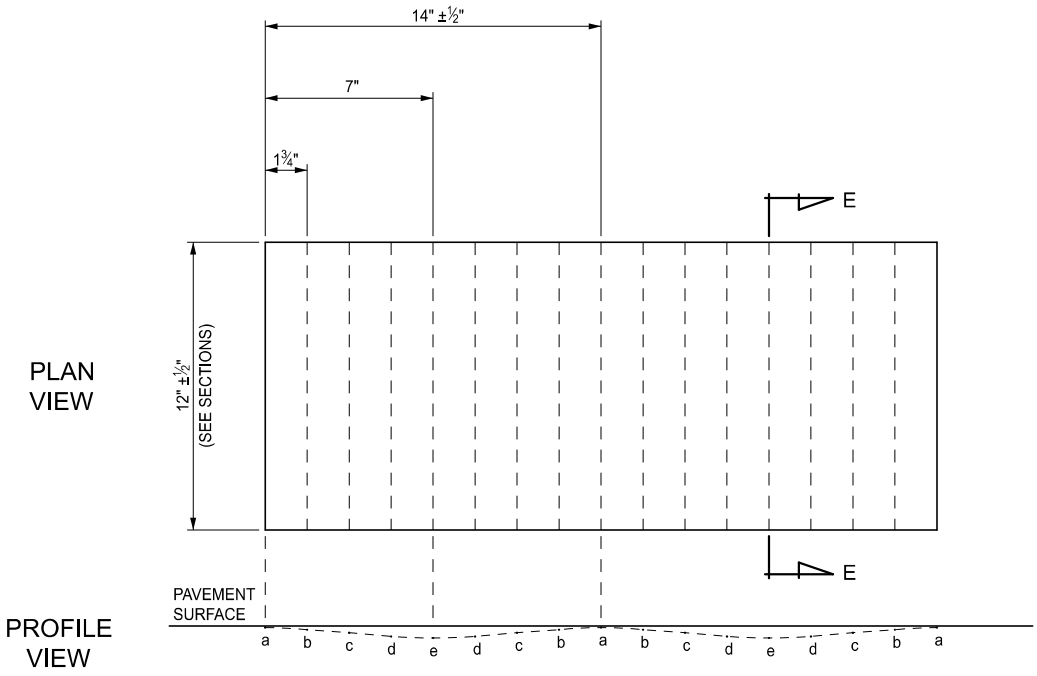


TYPICAL NON-FREEWAY
SHOULDER CORRUGATION INSTALLATION

* LATERAL DEVIATION SHALL NOT EXCEED 1" IN 100'.

NOTE:

ON CONCRETE PAVEMENTS, THE DISTANCE FROM A SHOULDER CORRUGATION TO A TRANSVERSE JOINT SHALL BE AT LEAST 6" BUT LESS THAN 12".

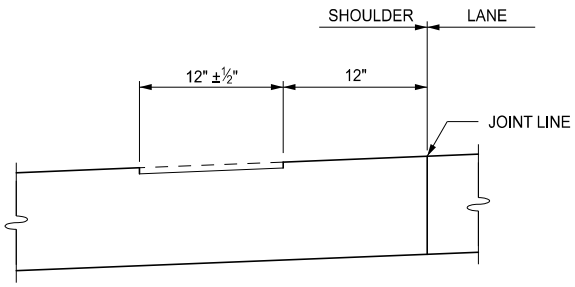


PLAN VIEW

PROFILE VIEW

	DEPTH AT EDGE	
LOCATION	MILS	INCHES *
a	62.5	1/16
b	156	5/32
c	281	9/32
d	438	7/16
e	500	½

* +⅛"



SECTION E-E

CONCRETE & HMA
SHOULDER

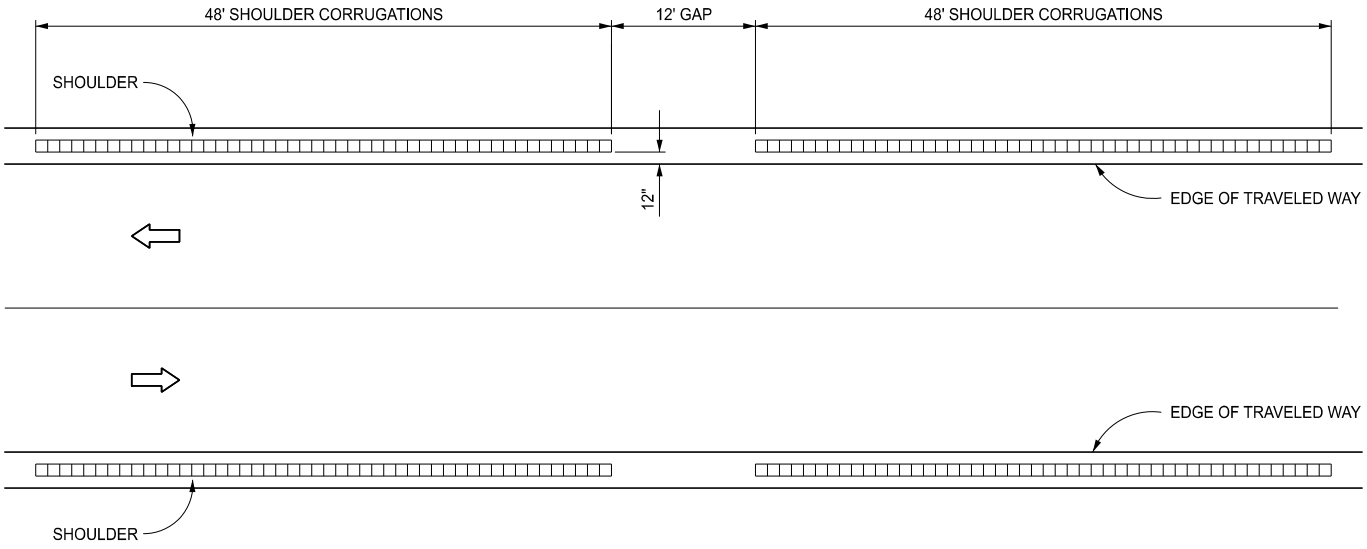
SINUSOIDAL CORRUGATIONS

MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
SHOULDER AND CENTER LINE CORRUGATIONS

(SPECIAL DETAIL) / FHWA APPROVAL	08/02/2023 / PLAN DATE	R-112-J	SHEET 3 OF 10

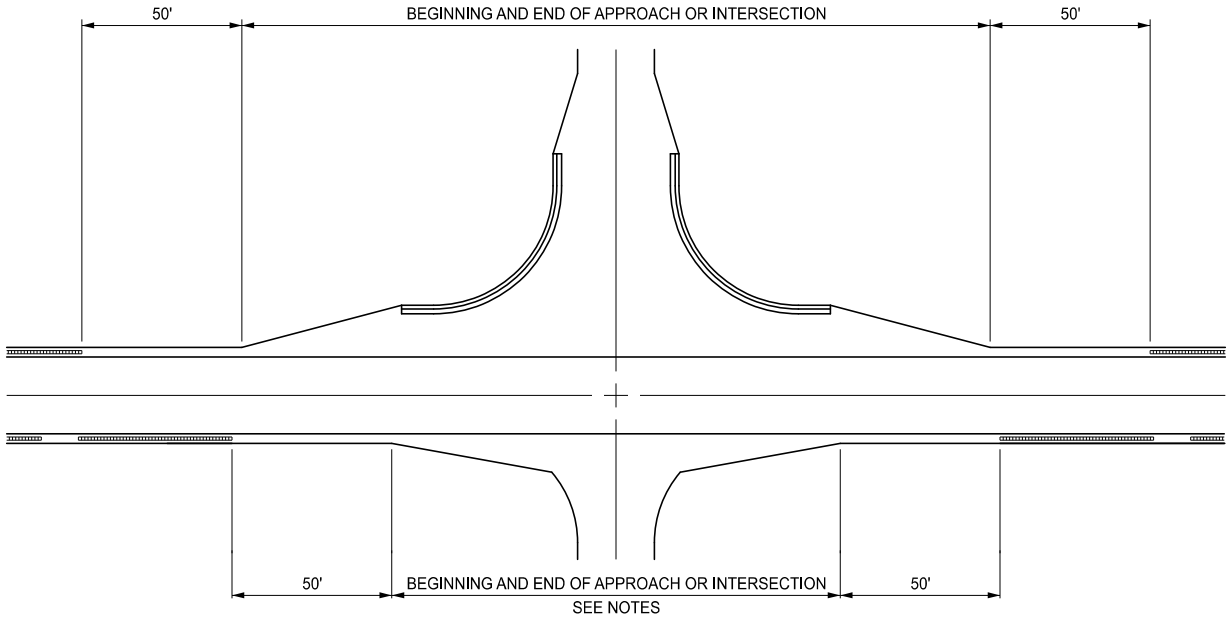


SHOULDER CORRUGATIONS ON TWO-WAY ROADWAYS

NON-FREEWAY SHOULDER CORRUGATIONS

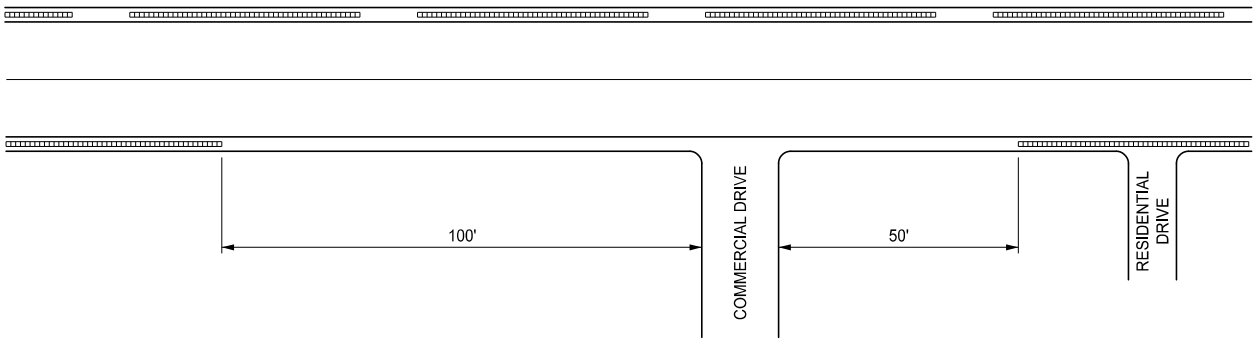
(FOR NON-FREEWAY SHOULDERS PAVED 6 FEET OR GREATER)

MDOT Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR SHOULDER AND CENTER LINE CORRUGATIONS			
	(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	SHEET 4 OF 10

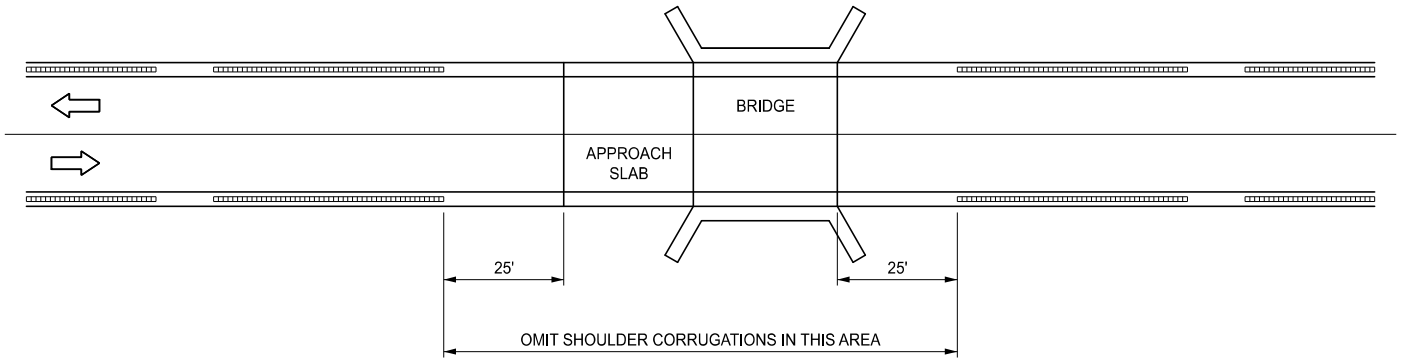


NOTE:

SHOULDER CORRUGATIONS MAY BE OMITTED IN AREAS WITH HIGH CONCENTRATIONS OF DRIVES, WHEN DIRECTED BY THE ENGINEER.



SHOULDER CORRUGATIONS AT INTERSECTIONS

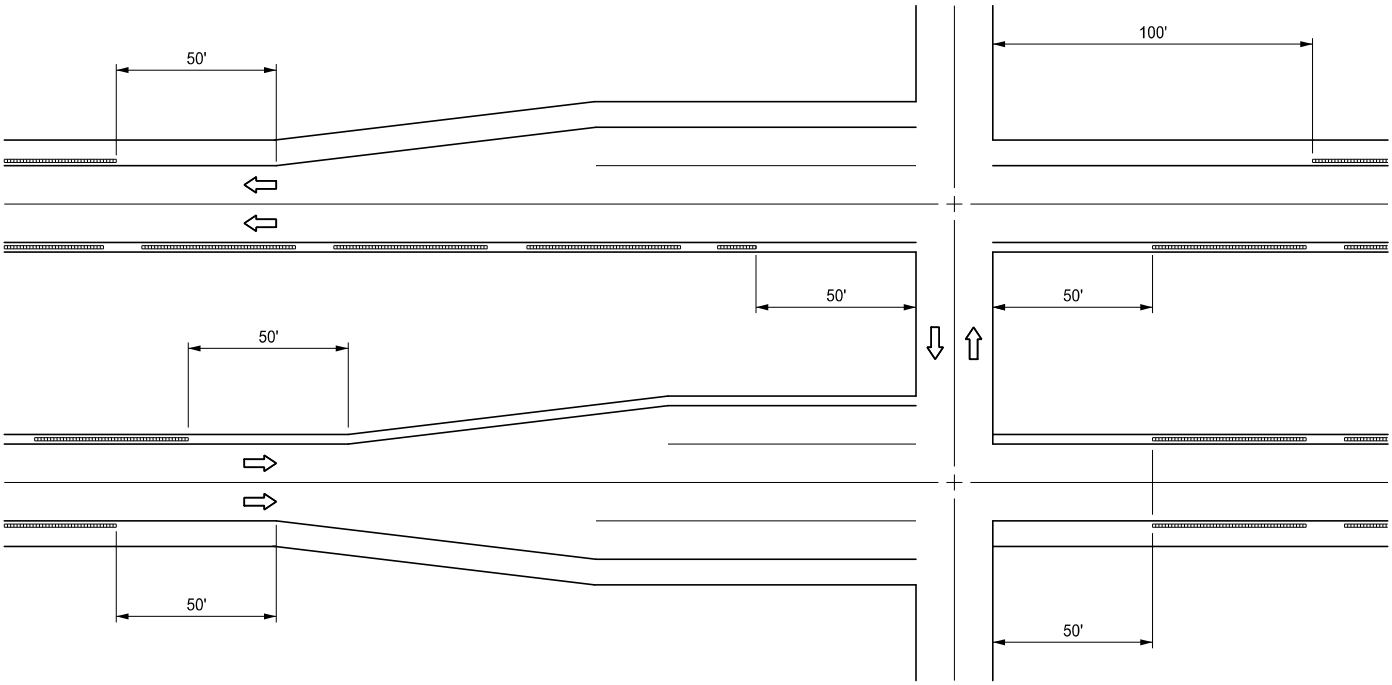


SHOULDER CORRUGATIONS AT BRIDGES

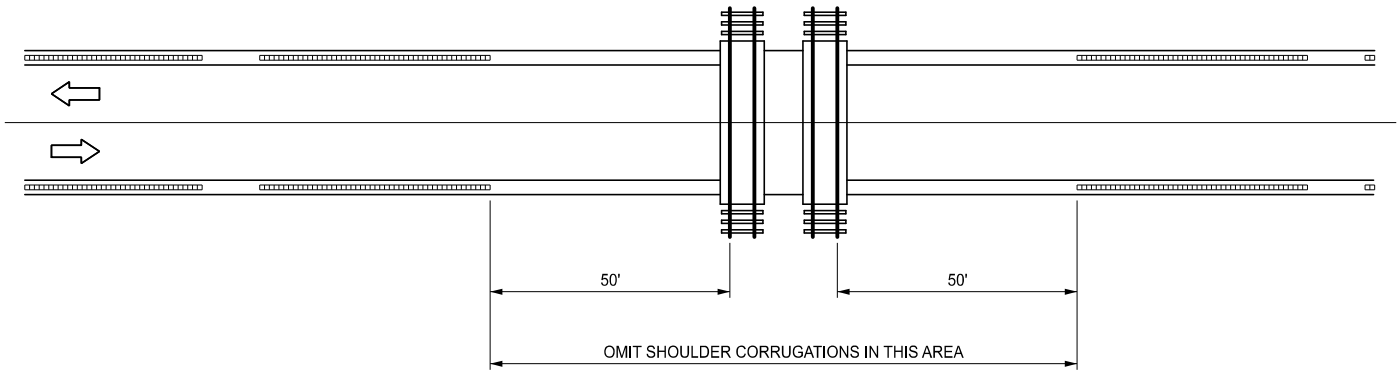
NON-FREEWAY SHOULDER CORRUGATIONS

(FOR NON-FREEWAY SHOULDERS PAVED 6 FEET OR GREATER)

MDOT Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR SHOULDER AND CENTER LINE CORRUGATIONS			
	(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	SHEET 5 OF 10



SHOULDER CORRUGATIONS AT INTERSECTIONS

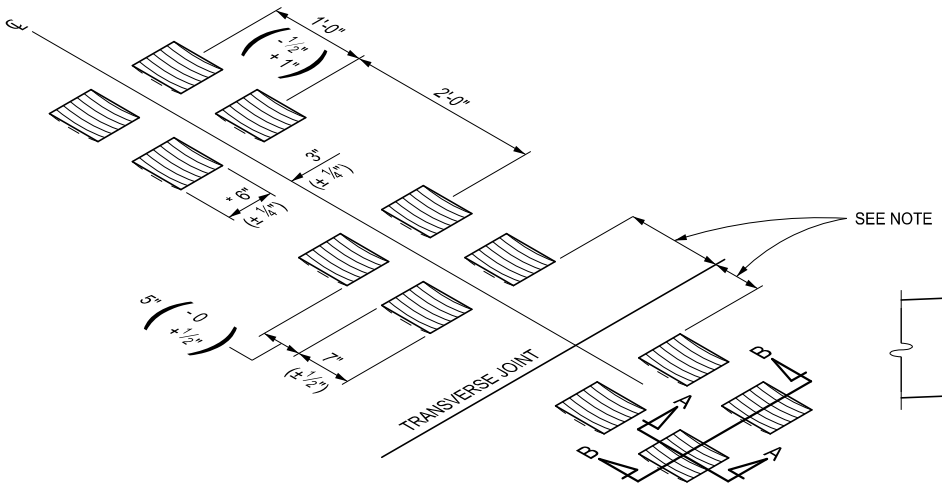


SHOULDER CORRUGATIONS AT RAILROADS

NON-FREEWAY SHOULDER CORRUGATIONS

(FOR NON-FREEWAY SHOULDERS PAVED 6 FEET OR GREATER)

MDOT Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR SHOULDER AND CENTER LINE CORRUGATIONS			
	(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	SHEET 6 OF 10



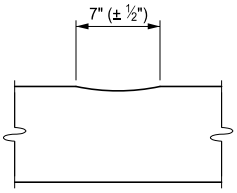
TYPICAL NON-FREEWAY CENTER LINE CORRUGATION INSTALLATION FOR CONCRETE PAVEMENT

* LATERAL DEVIATION SHALL NOT EXCEED 1" IN 100'.

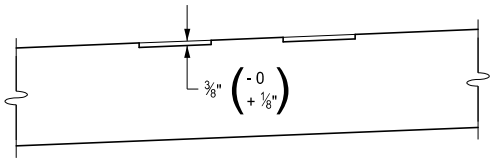
NOTES:

ON CONCRETE PAVEMENTS, THE DISTANCE FROM A CENTER LINE CORRUGATION TO A TRANSVERSE JOINT SHALL BE AT LEAST 6" BUT LESS THAN 12".

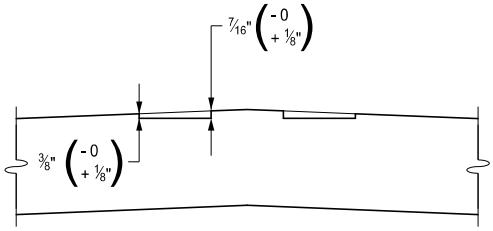
ON CONCRETE PAVEMENTS, CORRUGATIONS MAY BE CONSTRUCTED IN TWO PASSES AND THEREFORE NOT BE SYMMETRICAL ACROSS THE CENTER LINE.



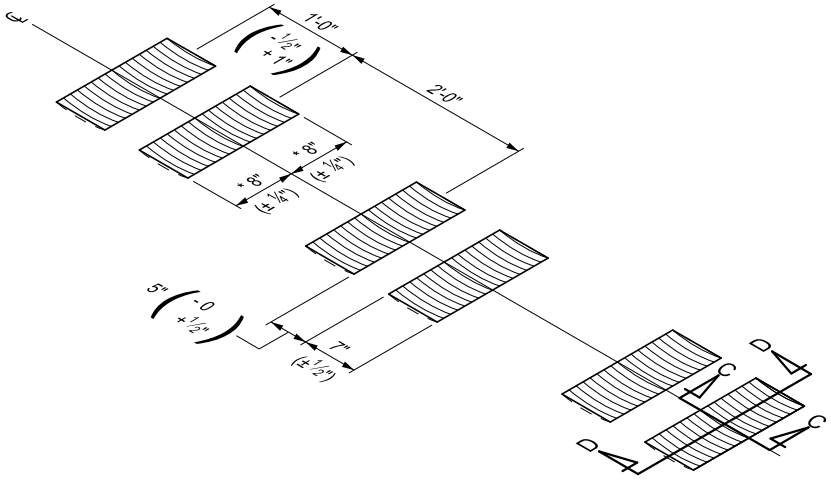
SECTION A-A



SECTION B-B
SUPERELEVATED ROADWAY

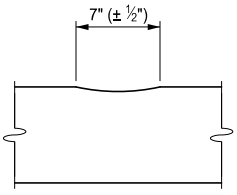


SECTION B-B
CROWNED ROADWAY

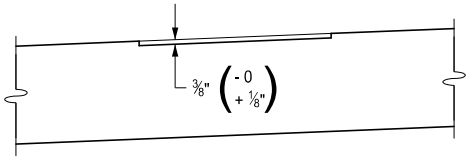


TYPICAL NON-FREEWAY CENTER LINE CORRUGATION INSTALLATION FOR HMA PAVEMENT

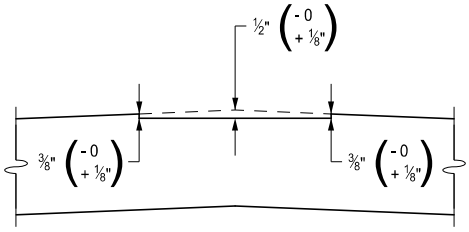
* LATERAL DEVIATION SHALL NOT EXCEED 1" IN 100'.



SECTION C-C



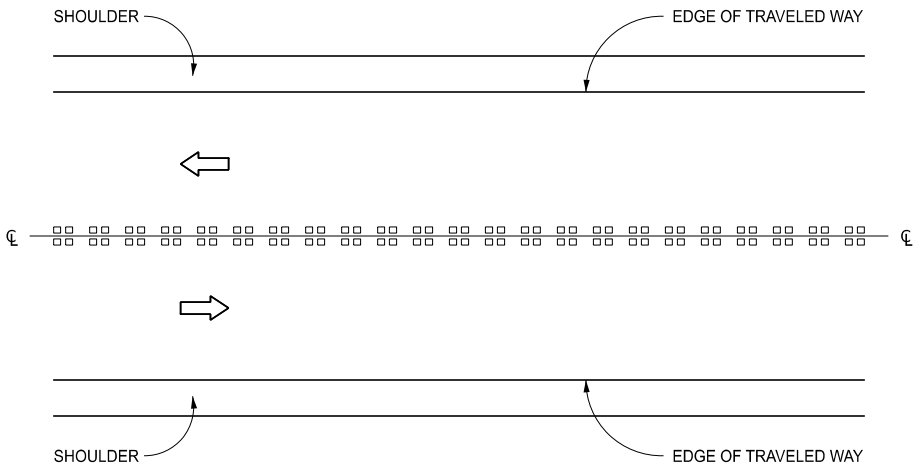
SECTION D-D
SUPERELEVATED ROADWAY



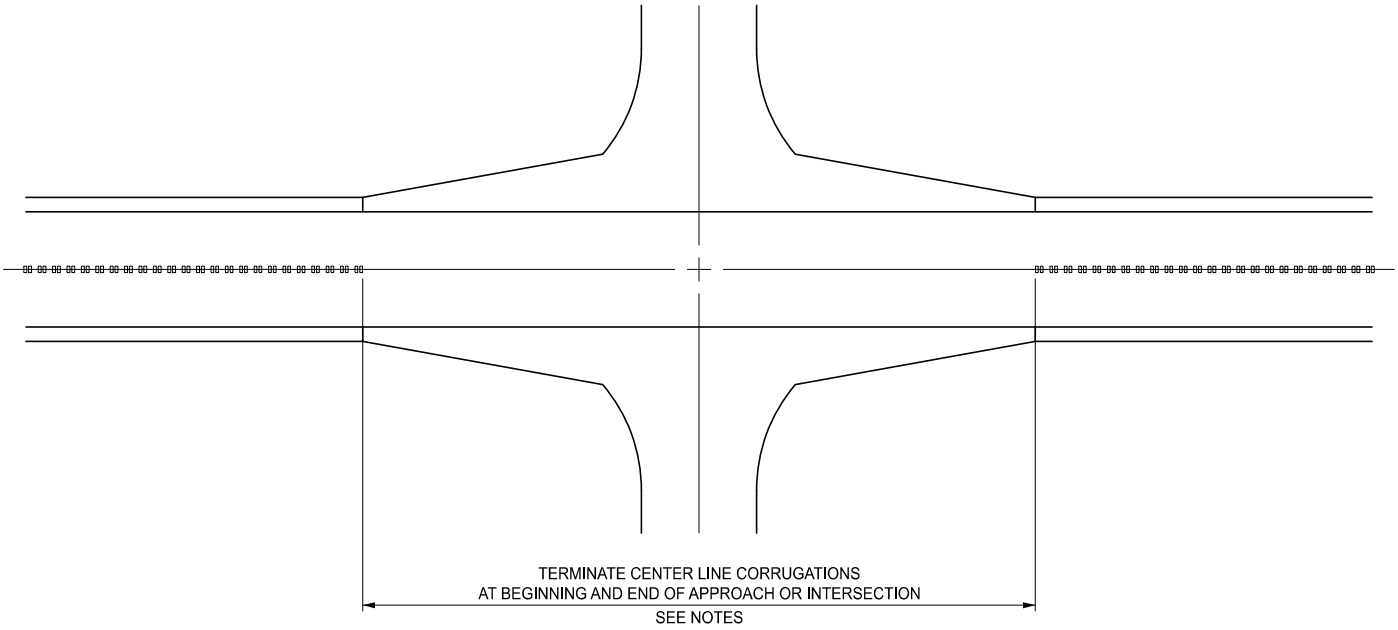
SECTION D-D
CROWNED ROADWAY

NON-FREEWAY CENTER LINE CORRUGATIONS

MDOT Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR SHOULDER AND CENTER LINE CORRUGATIONS			
	(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	SHEET 7 OF 10



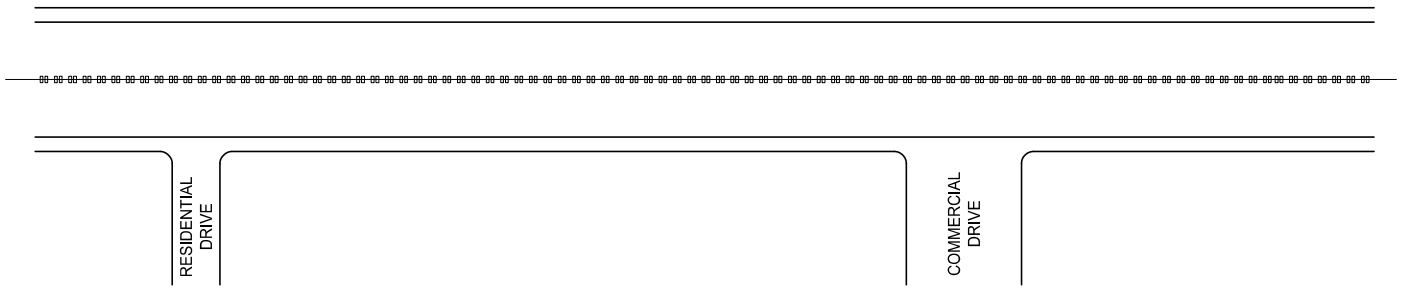
CENTER LINE CORRUGATIONS ON TWO-WAY ROADWAYS



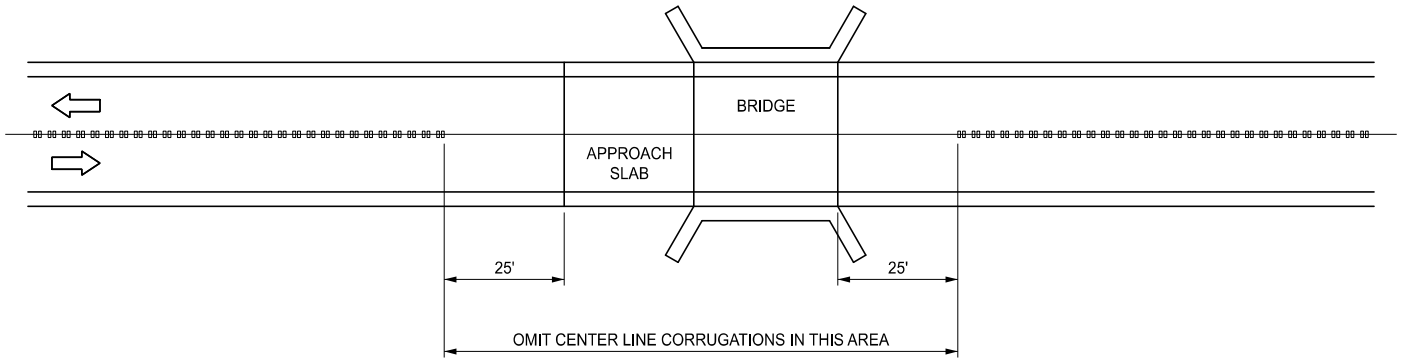
CENTER LINE CORRUGATIONS AT INTERSECTIONS

NON-FREEWAY CENTER LINE CORRUGATIONS

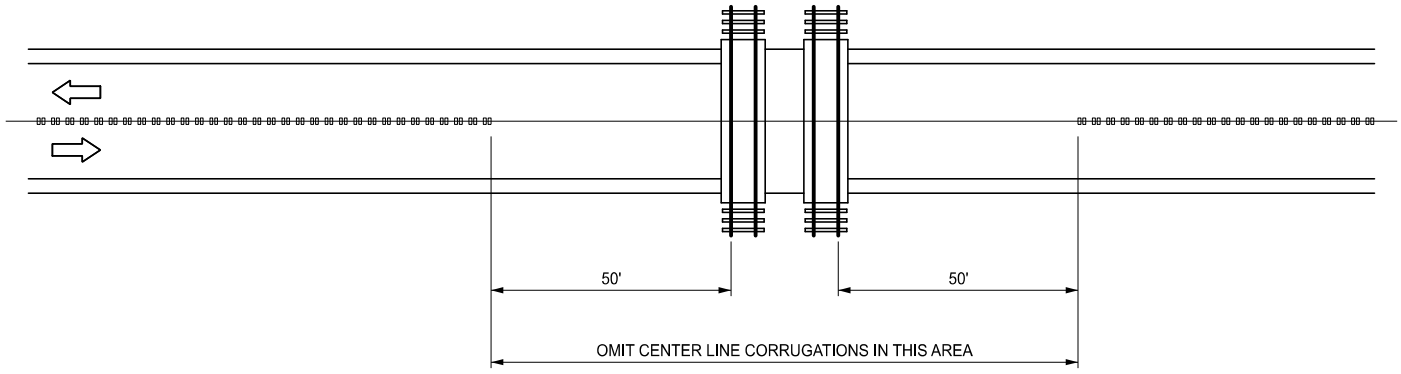
MDOT Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR SHOULDER AND CENTER LINE CORRUGATIONS			
	(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	SHEET 8 OF 10



CENTER LINE CORRUGATIONS AT DRIVEWAYS



CENTER LINE CORRUGATIONS AT BRIDGES



CENTER LINE CORRUGATIONS AT RAILROADS

NON-FREEWAY CENTER LINE CORRUGATIONS

MDOT Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR SHOULDER AND CENTER LINE CORRUGATIONS			
	(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	SHEET 9 OF 10

NOTES: (NON-FREEWAY)

SHOULDER CORRUGATION CROSS-SECTIONS AND LOCATIONS SHALL BE AS DETAILED ON THIS STANDARD. CORRUGATIONS ON NON-FREEWAYS SHALL BE IN CONCRETE AND HMA SHOULDERS PAVED AT LEAST 6'-0" WIDE WITH A POSTED SPEED OF 55 MPH. CORRUGATIONS CAN BE USED IN OTHER SITUATIONS WHERE THEY HAVE BEEN PREVIOUSLY APPROVED USING CURRENT GUIDELINES.

CORRUGATIONS SHALL NOT BE PLACED OVER A TRANSVERSE SHOULDER JOINT.

DO NOT MILL SHOULDER OR CENTER LINE CORRUGATIONS THROUGH ANY INTERSECTION, MARKED CROSSWALK, NON-MOTORIZED PATH CROSSING, OR SNOWMOBILE CROSSING.

NOTES: (FREEWAY)

SHOULDER CORRUGATION CROSS-SECTIONS AND LOCATIONS SHALL BE AS DETAILED ON THIS STANDARD. CORRUGATIONS ON FREEWAYS SHALL BE IN CONCRETE AND HMA SHOULDERS PAVED 4'-0" OR WIDER OR WHERE THE SHOULDER LIES BETWEEN THE PAVEMENT AND VALLEY GUTTER OR CURB AND GUTTER. CORRUGATIONS WILL NOT BE USED IN FREEWAY EXIT/ENTRANCE RAMP SHOULDERS OR WHERE SHOULDERS ARE SEPARATED FROM THE PAVEMENT BY VALLEY GUTTER OR CURB AND GUTTER. EXCEPT FOR LOOP RAMPS, CORRUGATIONS WILL BE USED ON FREEWAY TO FREEWAY RAMPS.

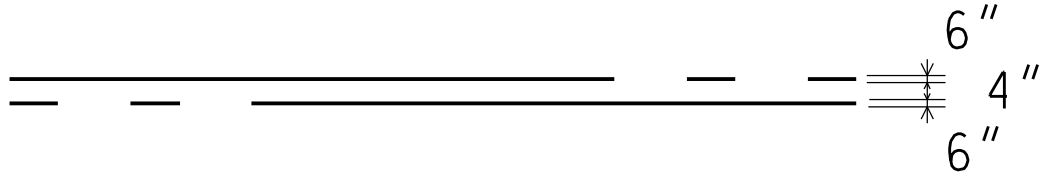
CORRUGATIONS SHALL NOT BE PLACED OVER A TRANSVERSE SHOULDER JOINT.

CORRUGATION LOCATION IN THE AREA OF FREEWAY RAMPS WILL BE AS FOLLOWS: THE TYPICAL OFFSET WILL BE INCREASED TO 24" AND BE LOCATED ON THE SHOULDER SIDE OF THE JOINT BEGINNING 300' IN ADVANCE OF THE EXIT RAMP TAPER. THIS OFFSET WILL CONTINUE UNTIL THE 2' POINT OF THE GORE. FOR EXIT/ENTRANCE RAMPS AND LOOPS RAMPS THE CORRUGATIONS WILL END ALONG THE RAMP AT THIS POINT AND SIMULTANEOUSLY RESUME ON THE MAINLINE SHOULDER AND GORE WITH THE NORMAL OFFSET. THE CONFIGURATION FOR ENTRANCE RAMPS WILL BE IN THE REVERSE ORDER OF THE EXIT RAMPS. FOR FREEWAY TO FREEWAY RAMPS, IN ADDITION TO RESUMING THE MAINLINE SHOULDER CORRUGATION AT THIS POINT, RETURN TO THE NORMAL MAINLINE OFFSET ALONG THE LENGTH OF THE RAMP SHOULDER.

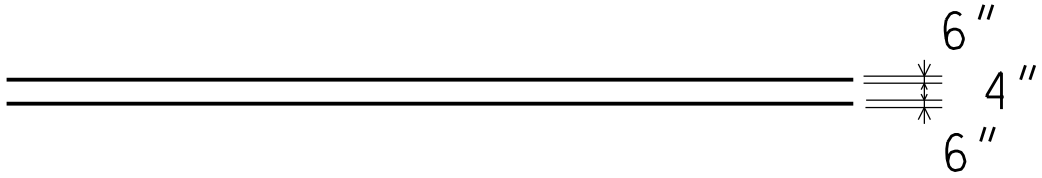
WITHIN AN URBAN FREEWAY AREA OR OTHER LIMITED FREEWAY AREA, SHOULDER CORRUGATIONS MAY BE OFFSET UP TO 12" FROM THE EDGE OF THE TRAVEL LANE, AS SHOWN IN THE PLANS, OR AS DIRECTED BY THE ENGINEER. IF NEEDED, THE CORRUGATION MAY BE LOCATED ON THE OPPOSITE SIDE OF THE JOINT FOR 14' LANES TO MAINTAIN THE MINIMUM OFFSET TO THE JOINT LINE.

MDOT Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR SHOULDER AND CENTER LINE CORRUGATIONS		
(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	SHEET 10 OF 10

TWO - LANE PASSING PROHIBITED (YELLOW)



DOUBLE SOLID YELLOW



6-INCH YELLOW LANE LINES AND CENTERLINES

NOT TO SCALE

MDOT Michigan Department of Transportation PREPARED BY TSMO DIVISION DRAWN BY: MKB CHECKED BY: CMW	DEPARTMENT DIRECTOR Paul C. Ajegba APPROVED BY: (SPECIAL DETAIL) DIRECTOR, BUREAU OF FIELD SERVICES APPROVED BY: (SPECIAL DETAIL) DIRECTOR, BUREAU OF DEVELOPMENT	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR 6-INCH YELLOW COMBINATION PAVEMENT MARKINGS			
		(SPECIAL DETAIL) F.H.W.A. APPROVAL	07/20/21 PLAN DATE	PAVE-903-A	SHEET 1 OF 1

Table 5: Density Frequency Curve Development

Tested by: _____ Date/Time: _____

Route/Location:		Air Temp:
Control Section/Job Number:		Weather:
Mix Type:	Tonnage:	Gauge:
Producer:	Depth:	Gmm:

Roller #1 Type:

Pass No.	Density	Temperature	Comments
1			
2			
3			
4			
5			
6			
7			
8			
Optimum			

Roller #2 Type:

Pass No.	Density	Temperature	Comments
1			
2			
3			
4			
5			
6			
7			
8			
Optimum			

Roller #3 Type:

Pass No.	Density	Temperature	Comments
1			
2			
3			
4			
5			
6			
7			
8			
Optimum			

Summary: _____

_____

_____

_____

_____