



## Hillsdale County Road Commission

1919 Hudson Road (M-99) • Hillsdale, MI 49242

517.437.4458 (main) • 517.437.0048 (fax)

hillsdale@hillsdalecrc.org

**Robert Griffis**  
Manager

**Kathryn Kirkpatrick**  
Clerk

### **BID SPECIFICATIONS FOR M-99** **FULL DEPTH CONCRETE PAVEMENT REPAIRS**

Sealed proposals will be received by the Board of County Road Commissioner of the County of Hillsdale at their office at 1919 Hudson Road (M-99), southeast of Hillsdale, Michigan, until 10:15 AM local times on Thursday, May 9, 2024, after which all bids will be publicly opened and read aloud for the concrete pavement repair work on state truck line on M-99 north of Hillsdale, from the pavement change HMA to Concrete 250' south of Gaige Steet centerline and continuing northerly to 645' north of Indiana Northern railway crossing 509885C. This project is in Jonesville City, Hillsdale County.

#### **Description of Work**

This work shall consist of full-depth concrete repairs in locations directed by the Engineer. Any existing pavement markings impacted by the repairs will be replaced with temporary pavement markings until replaced by MDOT permanent pavement marking contractor. Existing catch basin inlets shall be protected from slurry runoff using Erosion Control, Inlet Protection, Fabric Drop pay item. Traffic will be maintained by single lane closures as detailed in the Special Provision for Maintaining Traffic and/or as directed by the Engineer. All work shall be done according to this log of project, attached special provisions and supplemental specifications, the 2020 Standard Specifications for Construction, and all applicable standard plans.

#### **Schedule**

Start work within ten (10) days after receiving Notice of Award of Contract or on the date agreed upon with the Engineer. In no case shall any work be commenced prior to the receipt of formal Notice of Award by the Department. **This project must be completed, and an invoice submitted to Hillsdale County Road Commission no later than September 13, 2024.**

#### **Payment**

The Completed work shall be paid at the contract unit prices for the various items of work listed on the log and bid sheet which shall be payment in full for all labor, equipment, materials, transportation, and incidentals to satisfactorily complete the work described.

The contractor shall furnish to the road commission an invoice in duplicate, for services rendered at the completion of the work. **Please submit the invoice to Hillsdale County Road Commission no later than September 13, 2024**, for inclusion in our September billing to MDOT. The billing shall reference the appropriate purchase order number. The road commission shall pay in accordance with the

**Robert Godfrey**  
Chairman

**Gary Leininger**  
Vice-Chairman

**Kathleen Schmitt**  
Member

**Michael Parney**  
Member

**Mark Kline**  
Member

payment terms specified in the purchase order which are generally net 30 days after the invoice date and after receipt of funds from MDOT.

## **Equipment Requirements**

The contractor shall furnish, operate, and maintain suitable and adequate equipment necessary to remove and replace concrete pavement in a safe, productive, and professional manner.

## **Maintaining Traffic**

Work to be performed Special Provision for maintaining traffic pavement signing and pavement marking. Traffic shall be maintained in accordance with Section 812 of the Michigan Department of Transportation (MDOT) Standard Specifications for Construction, and part 6 of the Michigan Manual of Uniform Traffic Control Devices (MMUTCD). MDOT Maintaining Traffic Typical M0231a for one lane closure of a three-lane roadway shall be used. All operations shall be conducted in a manner that will not create a hazard to motorists.

It will be necessary to give us 2–3 days' notice prior to the start of work.

## **Public Convenience and Safety**

The contractor shall comply with all federal, state and local laws and regulations, and furnish and use all safeguards, safety devices and personal protective equipment. The contractor shall take any other actions, on either his/her own responsibility or as directed by the state highway foreman, reasonably necessary to protect the safety and health of employees on the job and the motoring public and to protect property during the performance of the project.

## **Liability Insurance Requirements**

The contractor, prior to issuance of a purchase order, shall file with the road commission a certificate of insurance, in form satisfactory to the commission, showing that he has the following minimum amounts of insurance in force: auto liability and general liability insurance with combined limits for bodily injury and property damage of \$500,000 and workers' compensation insurance in statutory limits. The Hillsdale County Road Commission and Michigan Department of Transportation shall be named as additional insured.

## **Bid Sheets and Award of Bid**

Bids must be submitted in a sealed envelope clearly marked with the words "**M-99 Concrete Repairs Bid**". Please note that facsimile bids will not be accepted.

The contractor shall fully examine the map, specifications, and the locations of the work herein. The contractor shall be fully informed as to the nature of the work and understand the same before the bid is submitted. Failure of the contractor to do so shall not be cause for an adjustment in unit prices. Please call the road commission office if you have questions about this bid. Direct all questions to Robert (Bob) Griffis, Manager.

The Hillsdale County Road Commission reserves the right to reject any or all bids, to waive details in specifications, to waive irregularities in the bidding, and to accept the bid which in their opinion is in the best interest of the Michigan Department of Transportation and the Hillsdale County Road Commission.

Hillsdale County Road Commission

Robert D. Griffis, Manager

**COORDINATION CLAUSE OTHER  
CONTRACTS IN VICINITY**

JAK: TPF

Page 1 of 1

04/15/24

Contracts for other projects within the work limits of this contract may be in force during the life of this contract. The contractor's attention is called to the requirements of cooperation with others as covered in Section 104.08 of the 2020 Standard Specifications for Construction. These contracts include the following:

C.S. 38082– JN 211797: This project consists of exit ramp wrong way treatments on various freeway ramp locations in the TSC area. This project will take place in the 2024 construction season.

C.S. Various– JN 217615: This project consists of HMA Crack treatment on various routes in the TSC area. This project will take place in the 2024 construction season.

No claim for extra compensation or adjustments in contract unit prices will be allowed on account of delay or failure of others to complete work units as scheduled.

Other unlisted contracts may be in force during this contract.

MICHIGAN  
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION  
FOR  
**MAINTAINING TRAFFIC**

JAK:TPF

1 of 5

APPR:UNIV:RJH:4/15/24

**a. Description.** This special provision consists of requirements and restrictions to maintain traffic on M-99 in the city of Hillsdale, Fayette Township, Hillsdale 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-99 from approximately Lake Wilson Road to ¼ mile south of Moore Road.

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 Industrial Drive, Lake Wilson Road, Beck Road, and Moore Road.

**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. 102-GEN-NOTES
- D. 103-GEN-SIGN
- E. 104-GEN-AB
- F. 106-GEN-SPEED-NFW
- G. 107-GEN-SPEED
- H. 137-CLT-SHIFT-OLC

- I. WZD-100-A
- J. WZD-125-E

2. Do not deliver material, or close lanes during the holiday periods as defined in Table 1. Cover or remove “45 where workers present” signing during the holiday periods as defined in Table 1.

**Table 1: 2024 Holiday Periods**

Holiday	Start Date and Time	End Date and Time
Memorial Day	Friday May 24 <sup>th</sup> 3:00 p.m.	Tuesday May 28 <sup>th</sup> 6:00 a.m.
Independence Day	Wednesday July 3 <sup>rd</sup> 3:00 p.m.	Monday July 8 <sup>th</sup> 6:00 a.m.
Labor Day	Friday August 30 <sup>th</sup> 3:00 p.m.	Tuesday September 3 <sup>rd</sup> 6:00 a.m.

3. Maintain a minimum of one lane(s) of traffic in each direction at all times on M-99 (And all intersecting roads and ramps, except where detoured.)

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

A. The maximum closure length is 1/2 mile unless otherwise approved by the Engineer.

5. 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.

6. 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-99 to 45 miles per hour (mph).

5. Develop and submit to the Engineer an Internal Traffic Control Plan (ITCP) per subsection 104.11.B of the Standard Specifications for Construction. The requirements listed herein are the requirements for a Type A ITCP. Submit the Type A ITCP at the preconstruction

meeting. The Engineer will have 7 calendar days to review the ITCP for approval or provide comments for revisions required to obtain approval. Include in the ITCP, at a minimum, the proposed ingress/egress locations for construction equipment and vehicles, traffic control devices that will be utilized to warn the motoring public of ingress/egress locations, and measures that will be taken to ensure compliance with the ITCP. Ensure that the ITCP minimizes conflicts between construction vehicles and motorists and maintains overall safety and mobility within the work zone. No work may begin prior to approval of the ITCP. Additional time required to obtain an approved ITCP will not be cause for delay or impact claims. All costs associated with obtaining an approved ITCP, providing and executing all parts of the approved ITCP including required traffic control devices, or resolving an incomplete or unacceptable ITCP will be borne by the Contractor.

6. Upon approval of the ITCP, complete and submit the "Lane Closure Notification/Request Form or approved equal" to the Engineer for approval prior to the actual closure date. Submit the lane closure request 7 calendar days in advance of the lane closure for approval. This includes all shifts/shoulder/lane/ramp closures as stated per the proposal or any new lane closure requests submitted by the Contractor. The Engineer will have 4 calendar days to review the lane closure request for approval or provide comments for revisions required to obtain approval. Do not implement a lane closure prior to approval by the Engineer. In addition, notify the Engineer when the lane closure is removed or cancelled. See Lane Closure Notification/Request Form contained in the proposal.

7. Protect the work area at the end of each day. Close all open access points on the project to traffic with Type III barricades or other devices approved by the Engineer.

8. The Engineer will be responsible for notifying emergency services, transit agencies, law enforcement and schools prior to any lane closures, detours or major traffic shifts. In addition, the Contractor will be responsible for working with and complying with any coordination that is necessary with the Department and emergency services, transit agencies, law enforcement and schools. All costs associated with these coordination efforts will be considered included in the pay item "Minor Traf Devices".

9. Obtain all necessary permits from local governments within areas of local jurisdiction, including noise/dust ordinance waivers when required, prior to placing construction signing on local roads.

10. 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.

11. 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, unless otherwise specified on the plans or as directed by the Engineer.

12. 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. Concrete Pavement.**

1. Delineate uncured/open concrete patches, within the work zone, with two channelizing devices meeting *MMUTCD* standards as directed by the Engineer.
2. Use “Concrete Curing” signs when active work is not taking place within lane closures.
3. Set up and maintain daytime lane closures as detailed in section d. Traffic Restrictions for layout. Work includes setup, maintenance, and removal of all traffic control devices necessary for the closures. Coordinate with the Engineer on the location, length, and duration of each lane closure.

**g. 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.

C. Space channelizing devices at 45 feet for tapers and 90 feet for tangents or tighter as directed by the Engineer.

**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.

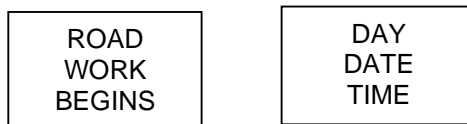
B. Fabricate, install, and remove temporary sign overlays on existing signs with the pay item for Sign, Type B, Temp, Prismatic, Furn. Attach the overlay in accordance with subsection 812.03.D.2 of the Standard Specifications for Construction.

6. Portable Changeable Message Signs (PCMS's). Use PCMS's to warn traffic of upcoming and changing traffic control during the life of the project. Obtain approval from the Engineer for all sign locations.

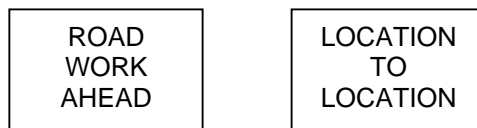
A. Install PCMS's and make them operational a minimum of 7 calendar days prior to the start of work, unless otherwise directed by the Engineer. Messages displayed on the PCMS's must conform to MDOT's policy on PCMS's. Notify the Engineer if displaying a different message than those listed below for the project.

B. Do not leave PCMS's with a blank screen within the clear zone of any roadway at any time. Remove the PCMS or display flashing dots in each corner of the screen when there is no message to display. Update the PCMS messages at the end of each work period to reflect current traffic lane restrictions.

C. Display the following two messages greater than 6 days prior to work:



D. Display the following two message during work:



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

3. Place solid 6" white pavement markings to delineate the edge line.

**i. 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:

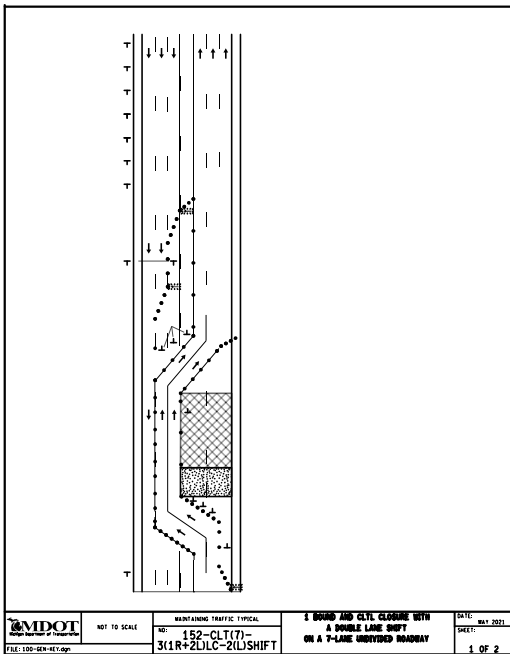
1. Transporting traffic control items from site to site.
2. Providing sufficient vehicles and staff to make changes as-needed on site during work.
3. Providing sufficient vehicles and staff to remove closures from the roadway.



# TYPICAL NUMBER KEY

## CODES

AB = ARROW BOARD AW = ADVANCE WARNING C = CLOSURE CLT = CENTER LEFT TURN LANE CROSS = CROSSOVER CruSha = CRUSH AND SHAPE EM = EARLY MERGE EnR = ENTRANCE RAMP ExR = EXIT RAMP FW = FREEWAY GEN = GENERAL INFORMATION GORE = FREEWAY GORE AREA IN = INSIDE INT = INTERSECTION L = LANE (L) = LEFT LC = LANE CLOSURE LD = LONG DURATION	LO = LANE OPEN O = OUTSIDE (LANE CLOSURE) OUT = OUTSIDE OF SHOULDER MID = MIDDLE OF INTERSECTION OR ROAD NFW = NON-FREEWAY PARK = PARKING LANE PCMS = PORTABLE CHANGEABLE MESSAGE SIGN (R) = RIGHT ROLL = ROLLING ROADBLOCK RUM = RUMBLE STRIP SD = SHORT DURATION SHL = SHOULDER CLOSURE SIGN = SIGN SP = SPECIAL SPEED = SPEED STA = STOPPED TRAFFIC ADVISORY TR = TRAFFIC REGULATOR TS = TEMPORARY SIGNAL ZIP = ZIPPER MERGE
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- 100 - GENERAL NOTES
- 110 - TRAFFIC REGULATORS
- 120 - NON-FREEWAY
- 130 - CENTER LEFT TURN (CLT) LANES
- 140 - PARKING LANES
- 150 - CLT 7 LANE SECTIONS
- 160 - SIGNAL WORK
- 200 - FREEWAY CLOSURES
- 210 - FREEWAY LANE SHIFTS
- 220 - FREEWAY ENTRANCE RAMPS
- 230 - FREEWAY EXIT RAMPS
- 300 - ADVANCE WARNINGS
- 310 - CROSSOVER CLOSURE
- 320 - CRUSH AND SHAPE
- 340 - MERGE SYSTEMS
- 350 - GORE LOCATIONS
- 360 - ROLLING ROADBLOCK
- 4000 - MAINTENANCE
- 5000 - SURVEY

EXAMPLE TYPICAL

CODE: 152-CTL(7)-3(1R+2L)LC-2(L)SHIFT

152 - TYPICAL NUMBER

CTL(7) = CENTER LEFT TURN LANE, 7 LANES TOTAL.

3(1R+2L)LC = 3 LANES CLOSED, (1 RIGHT LANE AND 2 LEFT LANES).

2(L)SHIFT = 2 LANES SHIFTED TO THE LEFT.

NOT TO SCALE

	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL	TYPICAL NUMBERING KEY	DATE: DECEMBER 2021
		NO: 100-GEN-KEY		SHEET: 1 OF 1

FILE: 100-GEN-KEY.dgn

**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

	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL	<b>"B", "D" AND "L" TABLES</b> <b>CHANNELIZING DEVICE SPACING,</b> <b>SIGN BORDER KEY, AND ROLL-AHEAD SPACING</b>	DATE: MAY 2021
		NO: 101-GEN-SPACING-CHARTS		SHEET: 1 OF 3

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

UPSTREAM TAPERS

- MERGING TAPER
- SHIFTING TAPER
- SHOULDER TAPER
- 2 TO 1 LANE ROAD TAPER

TAPER LENGTH

- L - MINIMUM
- 1/2 L - MINIMUM
- 1/3 L - MINIMUM
- 100' - MAXIMUM

DOWNSTREAM TAPERS  
 (USE IS RECOMMENDED)

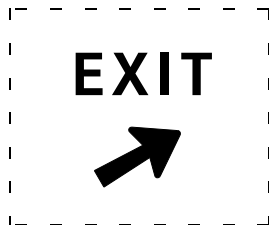
100' (PER LANE)

**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

	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL	<b>"B", "D" AND "L" TABLES</b> <b>CHANNELIZING DEVICE SPACING</b> <b>SIGN BORDER KEY AND ROLL-AHEAD SPACING</b>	DATE: MAY 2021
		NO: 101-GEN-SPACING-CHARTS		SHEET: 2 OF 3

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.



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

NO: 101-GEN-SPACING-CHARTS

"B", "D" AND "L" TABLES  
CHANNELIZING DEVICE SPACING  
SIGN BORDER KEY AND ROLL AHEAD SPACING

DATE: MAY 2021

SHEET:

3 OF 3

**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 RECOMMENDED 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 CHANNELIZING 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.



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MAINTAINING TRAFFIC TYPICAL

NO: 102-GEN-NOTES

TRAFFIC TYPICALS  
NOTE SHEET

DATE: MAY 2022  
SHEET:

1 OF 2

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 PROCEED 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.



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MAINTAINING TRAFFIC TYPICAL

NO: 102-GEN-NOTES

TRAFFIC TYPICALS  
NOTE SHEET

DATE: MAY 2022  
SHEET:

2 OF 2

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"

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103-GEN-SIGN

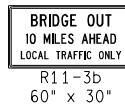
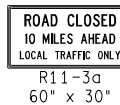
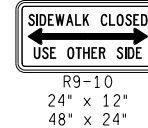
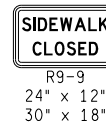
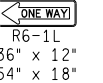
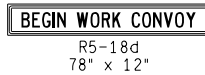
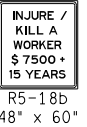
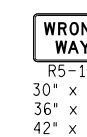
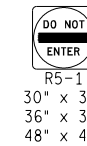
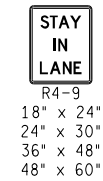
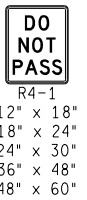
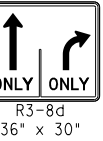
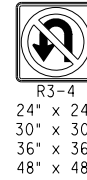
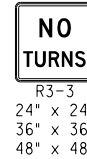
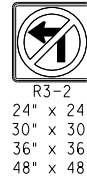
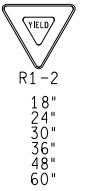
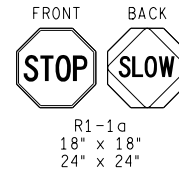
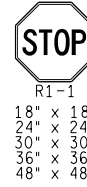
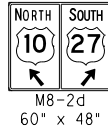
TRAFFIC TYPICALS  
SIGN SHEET

DATE:  
JUNE 2021

SHEET:

1 OF 5

SIGN NUMBER KEY



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NO:

103-GEN-SIGN

TRAFFIC TYPICALS SIGN SHEET

DATE: JUNE 2021  
SHEET:



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"



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

ALL LANES

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



W24-1R  
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48" x 48"



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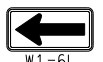
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W24-1bR  
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36" x 36"  
48" x 48"



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"



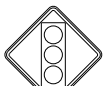
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W3-1  
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30" x 30"  
36" x 36"  
48" x 48"



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  
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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  
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48" x 48"



W5-4  
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48" x 48"



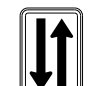
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48" x 48"



W6-2  
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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



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

NO:

103-GEN-SIGN

TRAFFIC TYPICAL  
SIGN SHEET

DATE:  
JUNE 2021

SHEET:

3 OF 5

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"



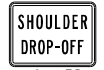
W8-15P  
24" x 18"  
30" x 24"  
36" x 30"



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  
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"



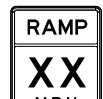
W12-2  
18" x 18"  
24" x 24"  
30" x 30"  
36" x 36"  
48" x 48"



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"



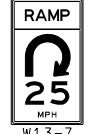
W13-4P  
24" x 24"  
36" x 36"



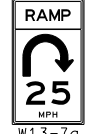
W13-6  
24" x 42"  
36" x 60"  
48" x 84"



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



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

NO:

103-GEN-SIGN

TRAFFIC TYPICALS  
SIGN SHEET

DATE:  
JUNE 2021

SHEET:

4 OF 5

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"



W20-14dP  
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"



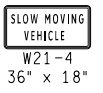
W21-2  
24" x 24"  
30" x 30"  
36" x 36"  
48" x 48"



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



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

NO:

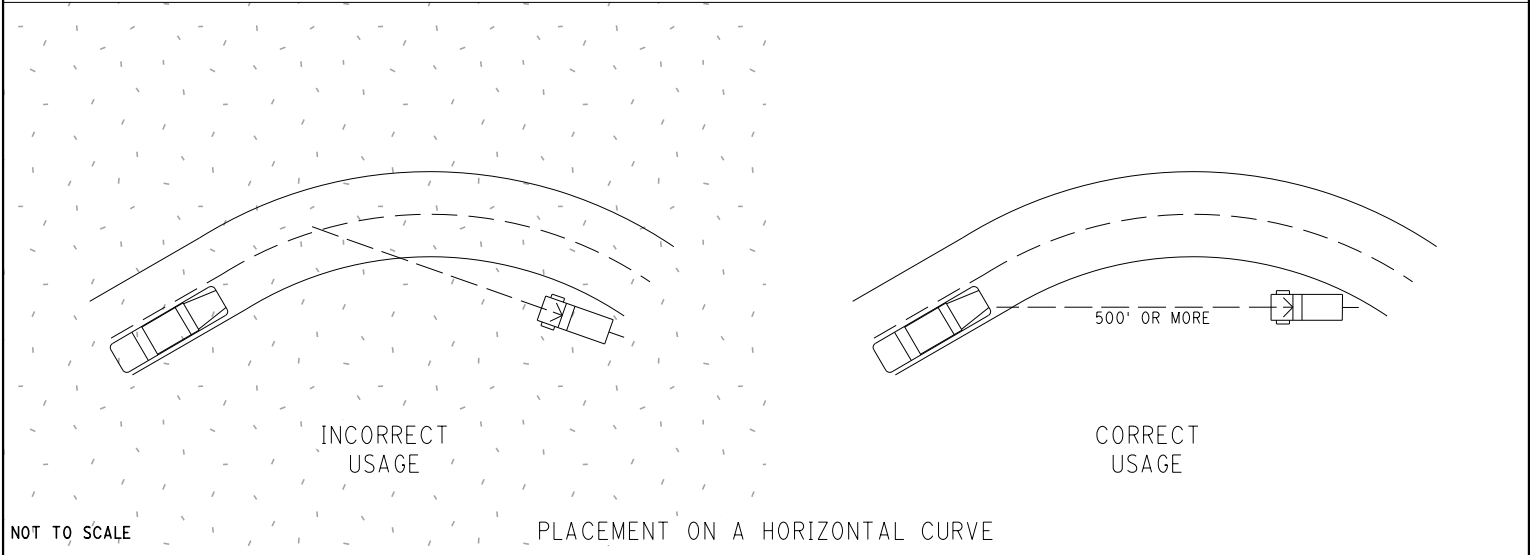
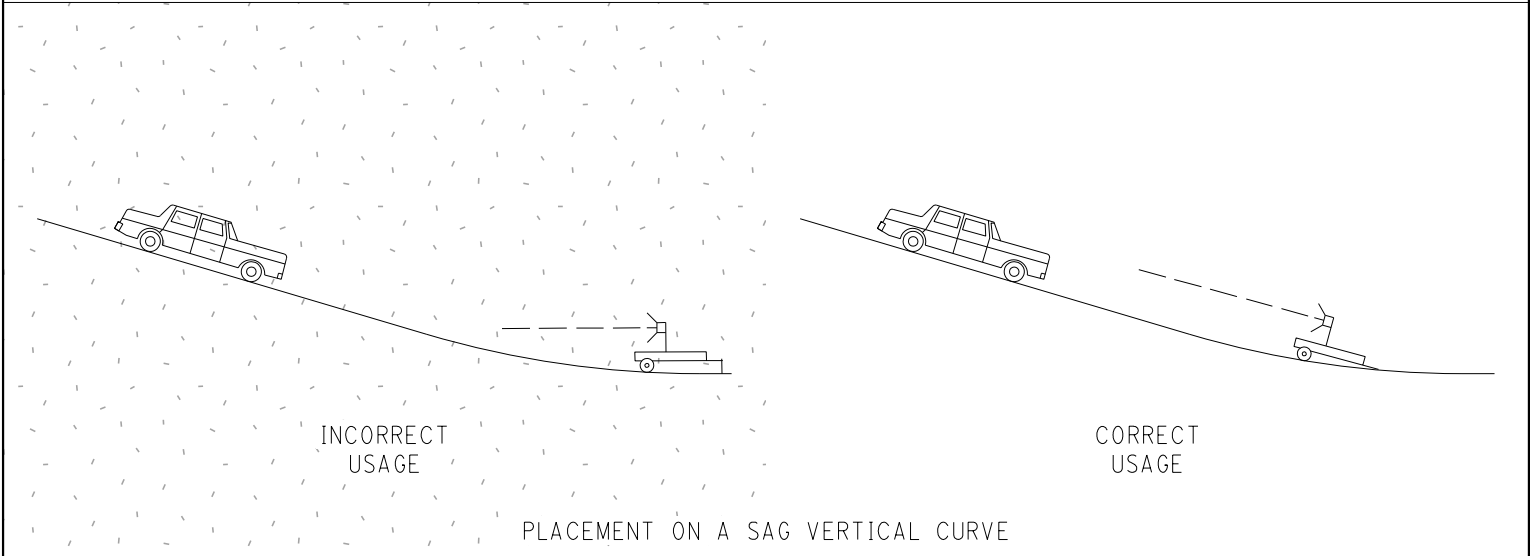
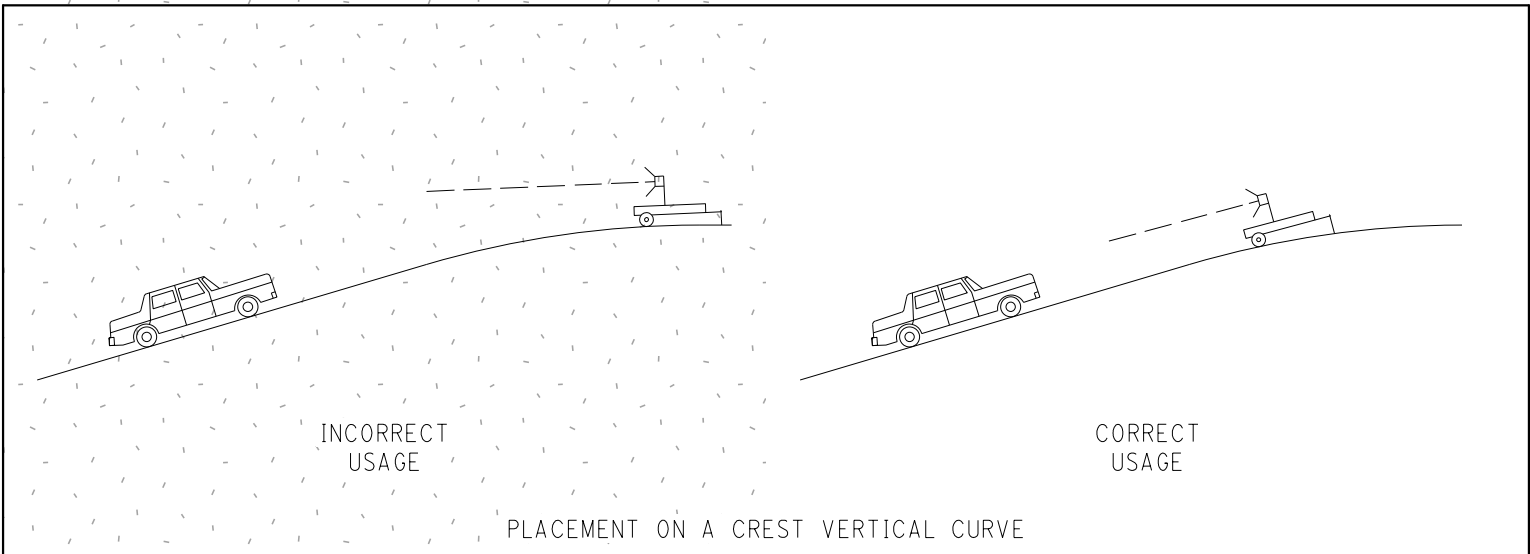
103-GEN-SIGN

TRAFFIC TYPICAL  
SIGN SHEET

DATE:  
JUNE 2021

SHEET:

5 OF 5



**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.

	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL	<b>USE OF ARROW BOARD ON HILL OR CURVE AND WORK ZONE LAYOUT</b>	DATE: MAY 2021
		NO: 104-GEN-AB		SHEET:
FILE: 104-GEN-AB.dgn				1 OF 1

**KEY**

- CHANNELIZING DEVICE
- ↑ TRAFFIC FLOW
- ⬆ LIGHTED ARROW PANEL
- I TYPE III BARRICADE
- ◊ PART OF LEAD-IN SIGNING SEQUENCE
- PLACE SIGN AS INDICATED IN NOTE S5

**STANDARD NOTES**

(SEE GEN-NOTES )

GENERAL: G1, G2, G3, G4  
 SIGNING: S1, S5, S8  
 DEVICES: TCD1, TCD2, TCD3, TCD6

MAJOR INTERSECTION

MAJOR INTERSECTION

MAJOR INTERSECTION

GREATER THAN 2 MILES  
 LESS THAN 4 MILES

LESS THAN 2 MILES

LESS THAN 2 MILES



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

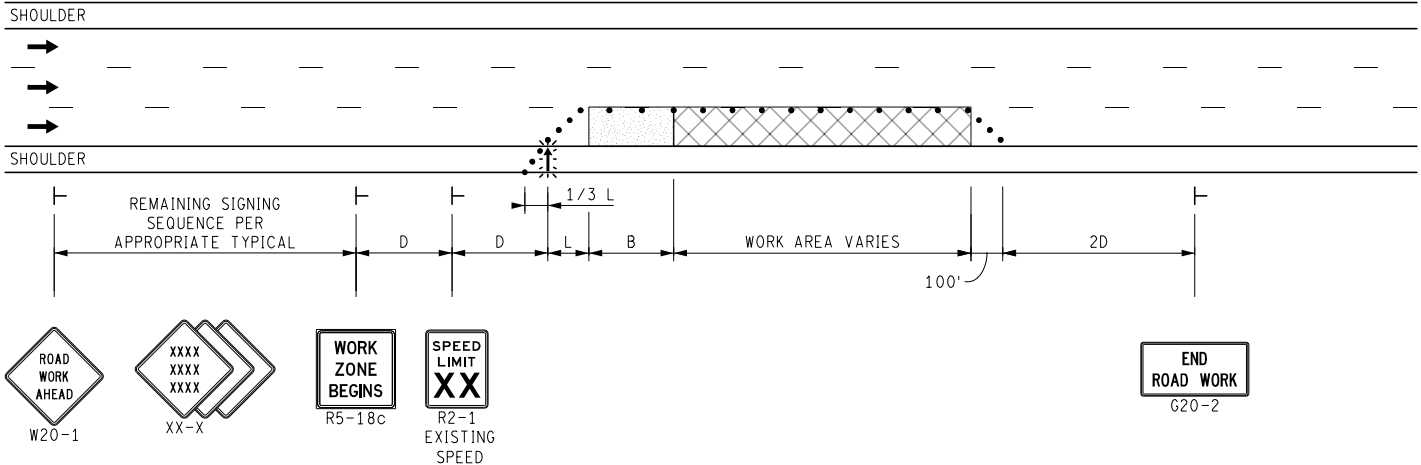
NO:  
**106-GEN-SPEED-NFW**

**SUPPLEMENTAL SPEED LIMIT  
 TREATMENT ON A 2-WAY ROADWAY  
 WHERE WORKERS PRESENT**

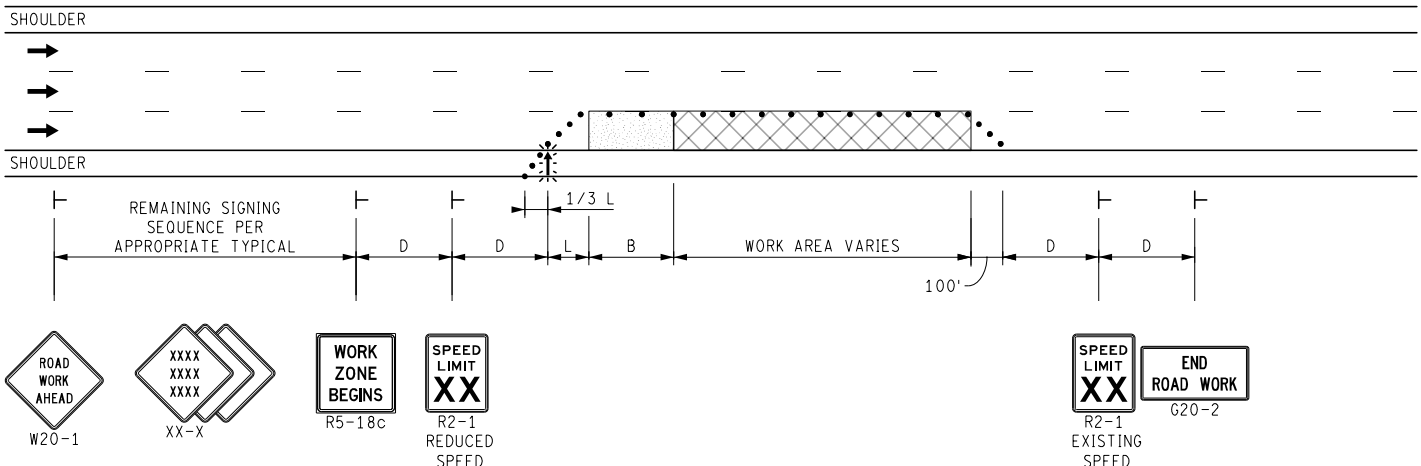
DATE:  
 DECEMBER 2021  
 SHEET:

1 OF 1

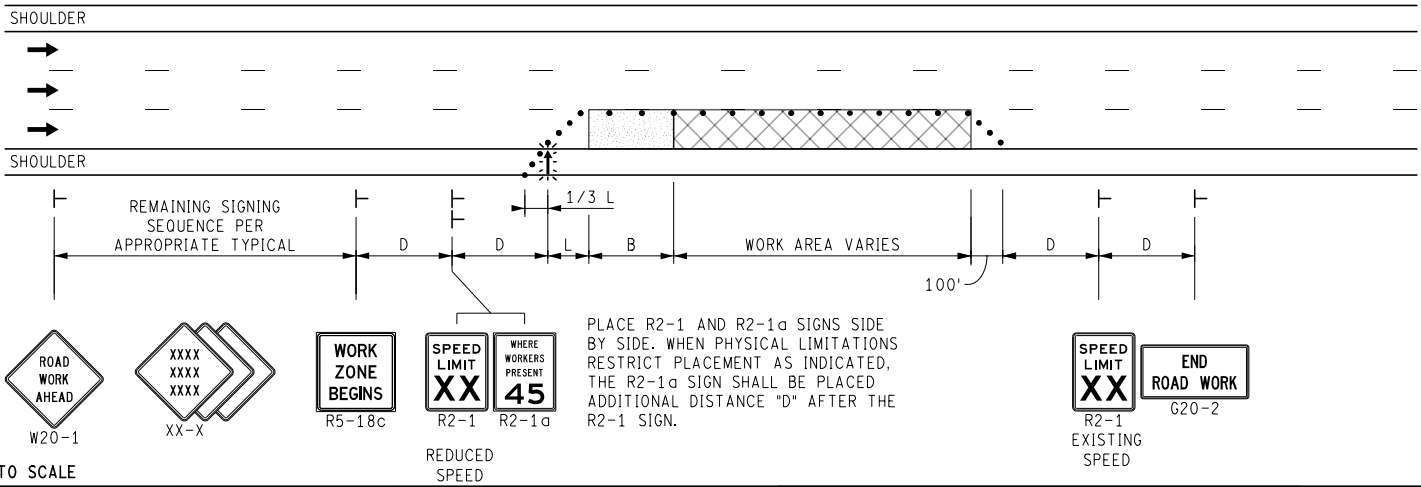
## NO SPEED REDUCTION THROUGH WORK ZONE



## REDUCED SPEED THROUGH WORK ZONE



## REDUCED SPEED THROUGH WORK ZONE USING "WHERE WORKERS PRESENT"



NOT TO SCALE



NOT TO SCALE

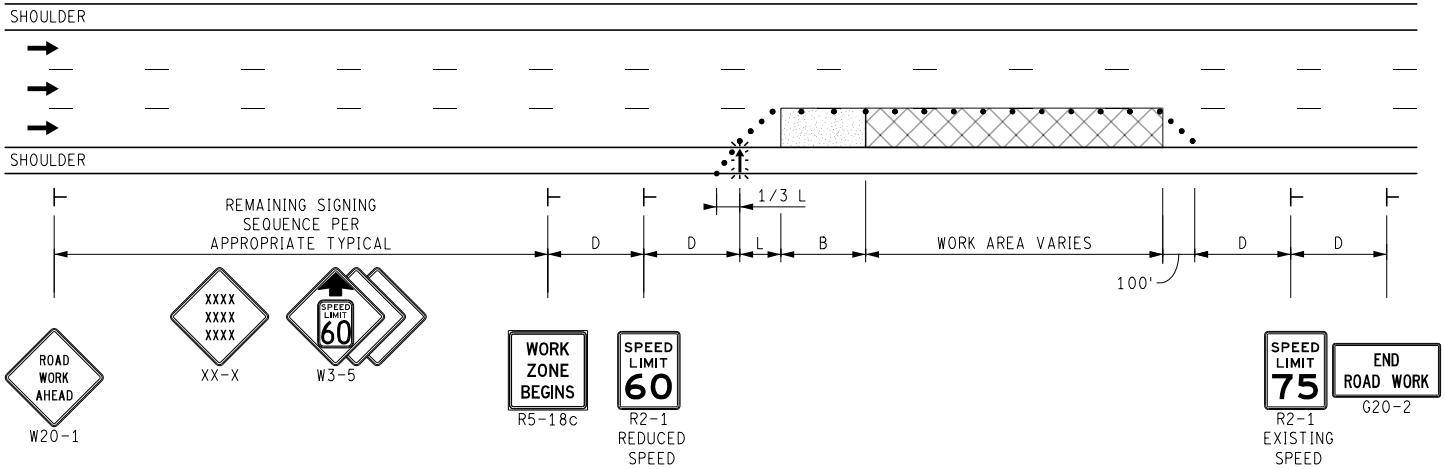
MAINTAINING TRAFFIC TYPICAL

NO: 107-GEN-SPEED

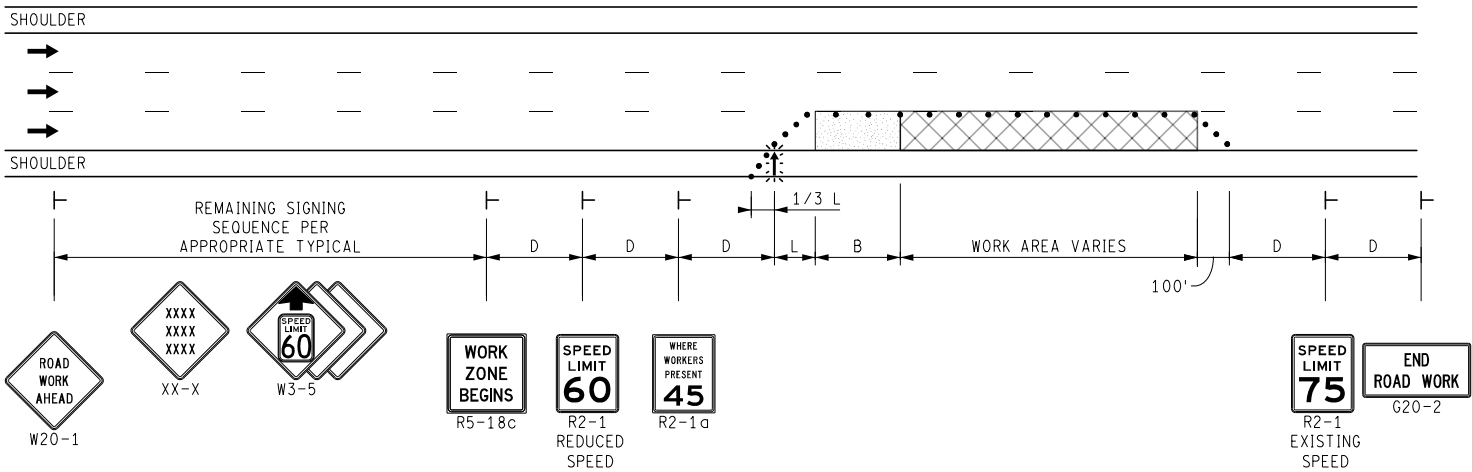
SPEED LIMIT LAYOUT

DATE: MAY 2021  
SHEET: 1 OF 2

# REDUCED SPEED FROM 75 TO 60 THROUGH WORK ZONE



# REDUCED SPEED FROM 75 TO 45 WWP THROUGH WORK ZONE



NOT TO SCALE



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

NO: 107-GEN-SPEED

SPEED LIMIT LAYOUT

DATE: MAY 2021  
SHEET:

FILE: 107-GEN-SPEED.dgn

2 OF 2

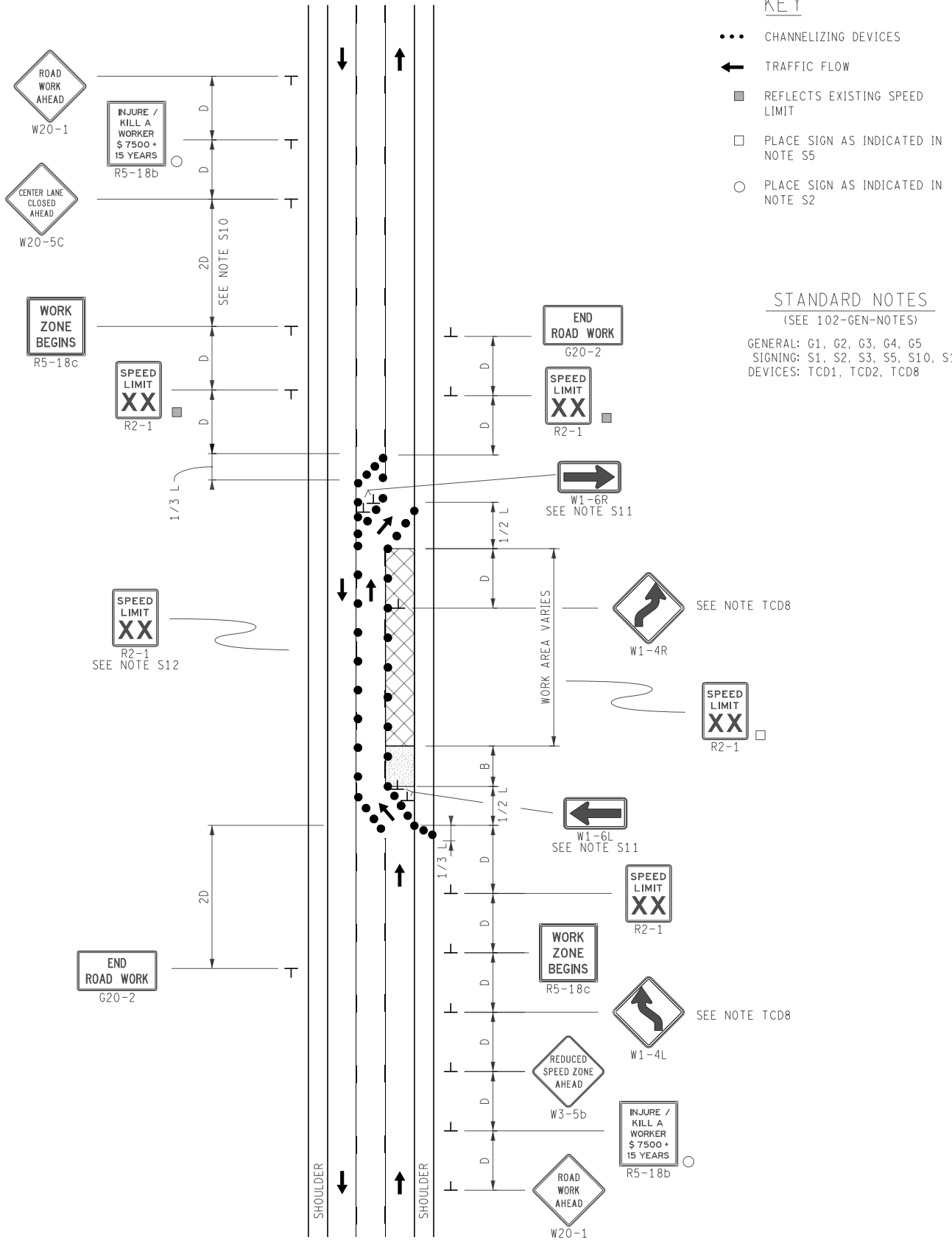
### KEY

- CHANNELIZING DEVICES
- ← TRAFFIC FLOW
- REFLECTS EXISTING SPEED LIMIT
- PLACE SIGN AS INDICATED IN NOTE S5
- PLACE SIGN AS INDICATED IN NOTE S2

### STANDARD NOTES

(SEE 102-GEN-NOTES)

GENERAL: G1, G2, G3, G4, G5  
 SIGNING: S1, S2, S3, S5, S10, S11, S12  
 DEVICES: TCD1, TCD2, TCD8





## SIGN MATERIAL SELECTION TABLE

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


TYPE I           ALUMINUM EXTRUSION  
 TYPE II          PLYWOOD  
 TYPE III         ALUMINUM SHEET

ROUNDING OF CORNERS IS NOT REQUIRED FOR TYPE I OR II SIGNS.  
 VERTICAL JOINTS ARE NOT PERMITTED.  
 HORIZONTAL JOINTS THROUGH SIGN LEGEND OR SYMBOLS ARE NOT PERMITTED.

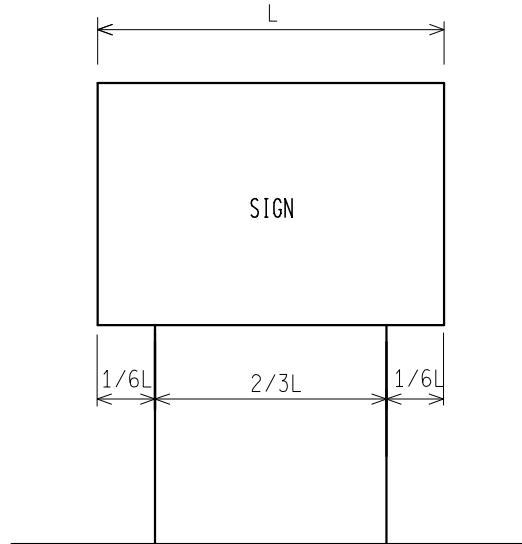
## POST SIZE REQUIREMENTS TABLE

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

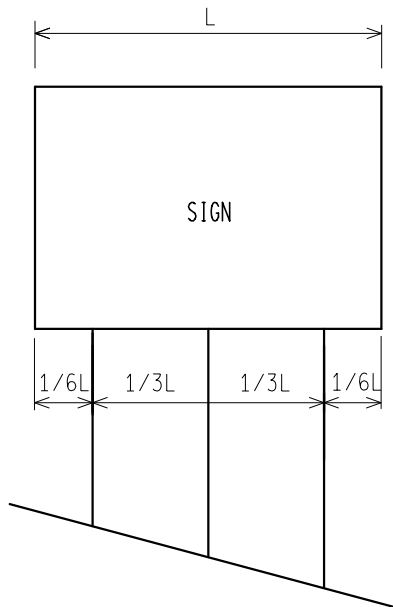
\*SIGNS 4 FEET AND GREATER IN WIDTH REQUIRE 2 POSTS.  
 SIGNS GREATER THAN 8 FEET IN WIDTH REQUIRE 2 OR 3 WOOD  
 POSTS DEPENDING ON AREA OF SIGN.  
 A MAXIMUM OF 2 POSTS WITHIN A 7' PATH IS PERMITTED.

  PREPARED BY DESIGN DIVISION	DEPARTMENT DIRECTOR Kirk T. Steudle  APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR  <b>GROUND DRIVEN SIGN          SUPPORTS FOR TEMP SIGNS</b>		
	DRAWN BY: <u>CON/ECH</u> CHECKED BY: <u>AUG</u>	APPROVED BY: _____ DIRECTOR, BUREAU OF DEVELOPMENT	_____ F.H.W.A. APPROVAL	<u>11/2/2017</u> PLAN DATE

## 2 POST SIGN SUPPORT SPACING



## 3 POST SIGN SUPPORT SPACING



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

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION  
BUREAU OF DEVELOPMENT STANDARD PLAN

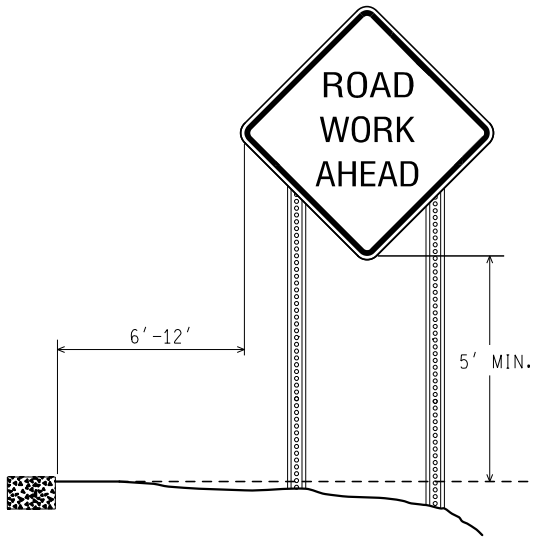
F.H.W.A. APPROVAL

11/2/2017  
PLAN DATE

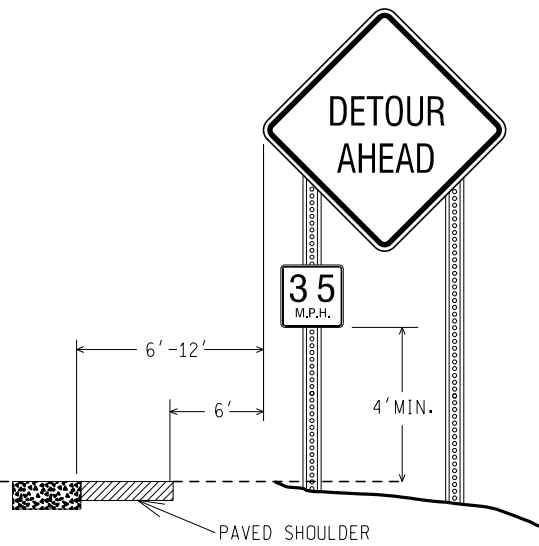
WZD-100-A

SHEET  
2 OF 11

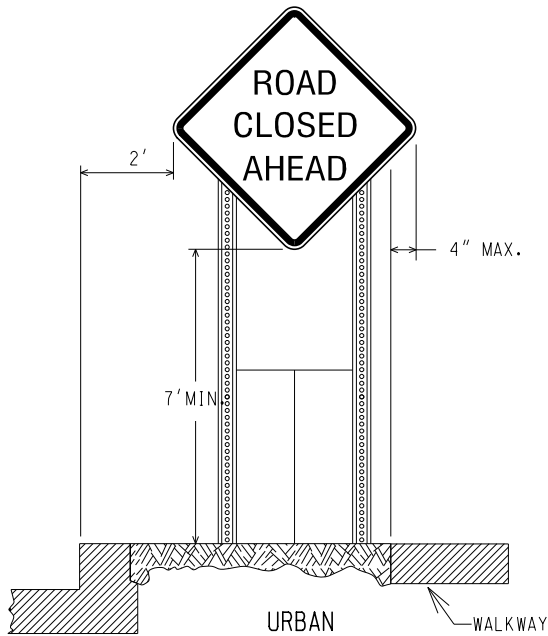
NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



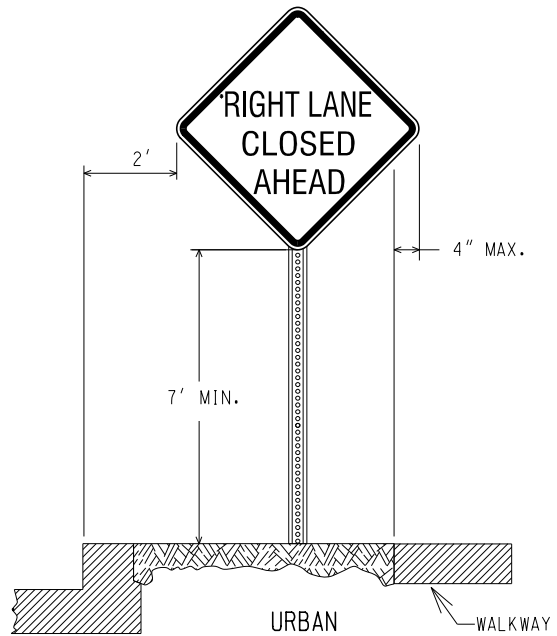
RURAL



RURAL WITH ADVISORY SPEED PLATE



(CURBED AREAS OR WHERE WALKWAYS ARE PRESENT)



(CURBED AREAS OR WHERE WALKWAYS ARE PRESENT)

BOTTOM HEIGHT AND OFFSET

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION  
BUREAU OF DEVELOPMENT STANDARD PLAN

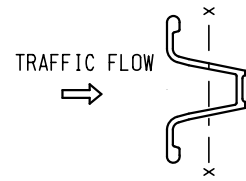
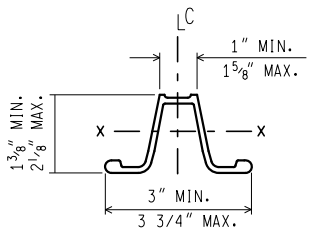
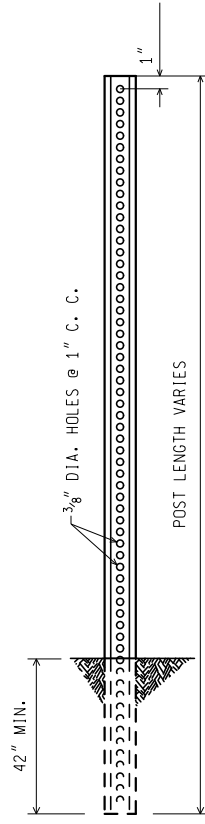
F.H.W.A. APPROVAL

11/2/2017  
PLAN DATE

WZD-100-A

SHEET  
3 OF 11

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



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

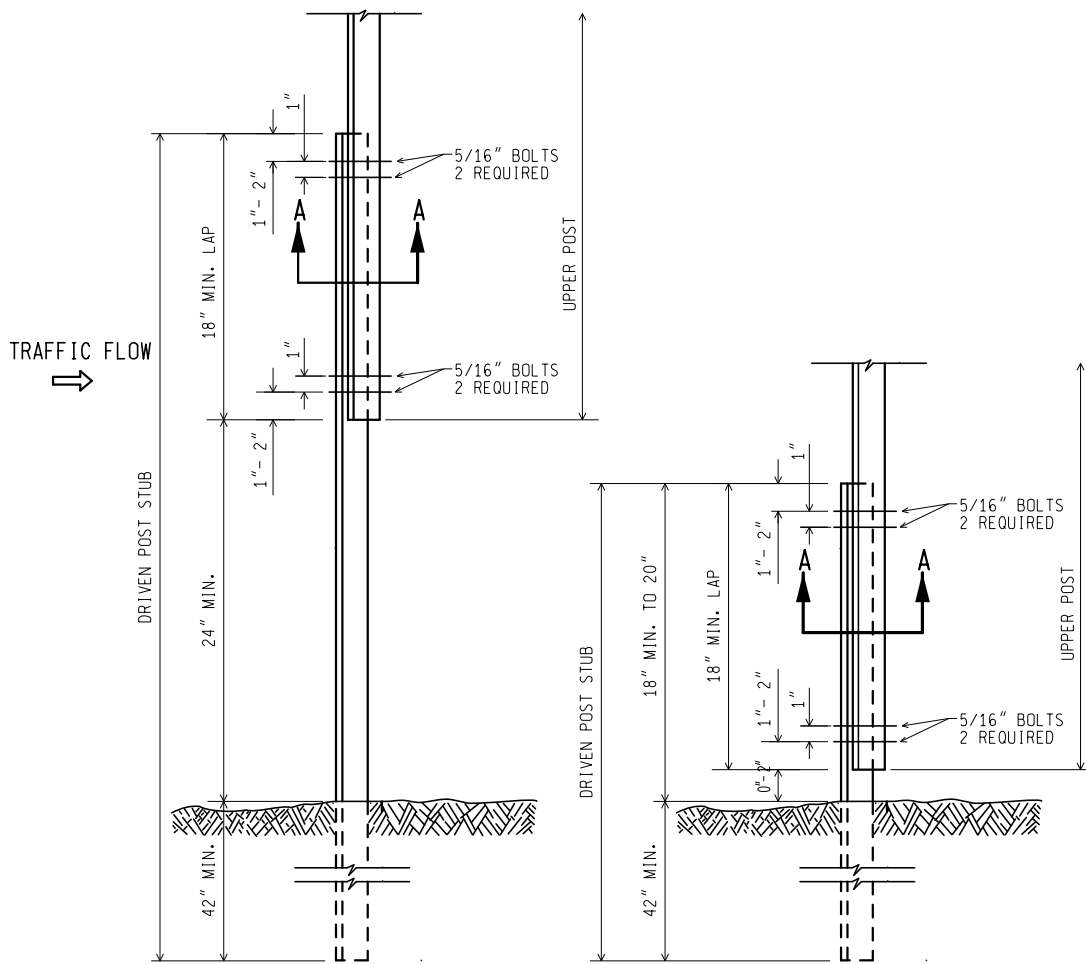
**3 lb. U - CHANNEL STEEL POST**  
 (NO SPLICE)

MOUNT SIGN ON OPEN FACE OF  
 U - CHANNEL STEEL POST

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN	F.H.W.A. APPROVAL	11/2/2017 PLAN DATE	WZD-100-A	SHEET 4 OF 11
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NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



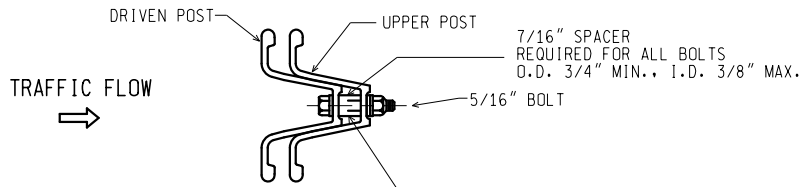
3 lb. U - CHANNEL STEEL POST  
(WITH SPLICE)

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

NOT TO SCALE

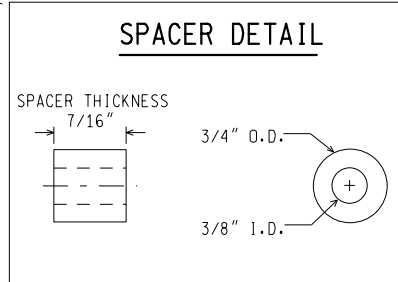
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN	F.H.W.A. APPROVAL	11/2/2017 PLAN DATE	WZD-100-A	SHEET 5 OF 11
--	-------------------	------------------------	-----------	------------------

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



SECTION A-A

7/16" SPACER  
 REQUIRED FOR ALL BOLTS  
 O.D. 3/4" MIN., I.D. 3/8" MAX.



NOTES:

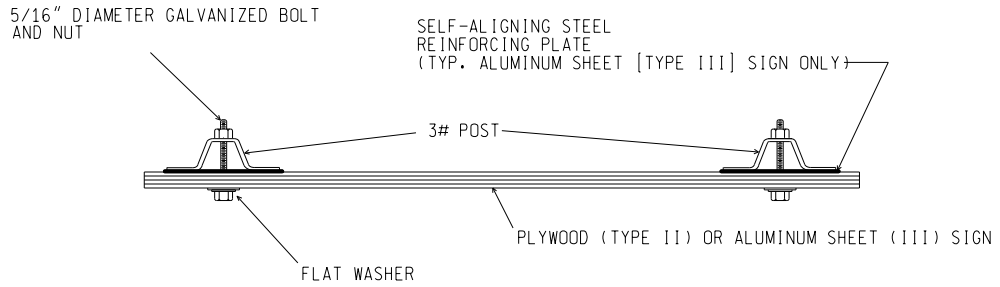
1. THE SPACER THICKNESS SHALL BE 1/16" LESS THAN THE GAP BETWEEN THE POST WHEN POSITIONED IN THE UNBOLTED CONFIGURATION.
2. THE EXTERIOR BOLT (CLOSEST TO LAP), SPACER, WASHER, AND NUT SHALL BE INSTALLED IN A PREPUNCHED HOLE 1" TO 2" FROM THE END OF THE LAP.
3. THE INTERIOR BOLT (FARTHEST FROM LAP), SPACER, WASHER, AND NUT SHALL BE INSTALLED IN THE NEXT PREPUNCHED HOLE.
4. THE DRIVEN POST SHALL ALWAYS BE MOUNTED IN FRONT OF THE UPPER POST WITH RESPECT TO THE ADJACENT ONCOMING TRAFFIC, REGARDLESS OF THE DIRECTION THE SIGN IS FACING.
5. THE SPLICE LAP SHALL BE FASTENED BY FOUR-5/16" DIA. GALVANIZED A449 BOLTS (SAE J429 GRADE 5) OR GALVANIZED A325 BOLTS.

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

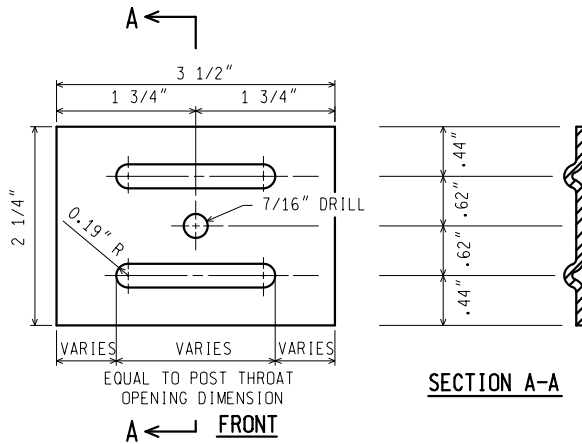
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN	F.H.W.A. APPROVAL	11/2/2017 PLAN DATE	WZD-100-A	SHEET 6 OF 11
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NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



SIGN TO 3 lb. POST CONNECTION



NOTES: (FOR STEEL SIGN REINF' PLATE)

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

STEEL SIGN REINFORCING PLATE  
REQUIRED FOR TYPE III SIGNS ONLY

3 lb. U - CHANNEL STEEL POST SIGN CONNECTION

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION  
BUREAU OF DEVELOPMENT STANDARD PLAN

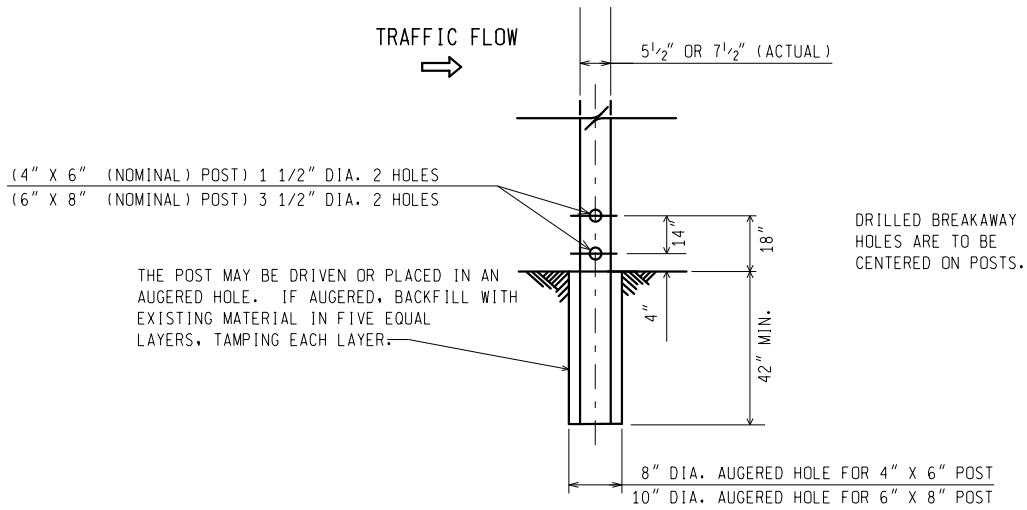
F.H.W.A. APPROVAL

11/2/2017  
PLAN DATE

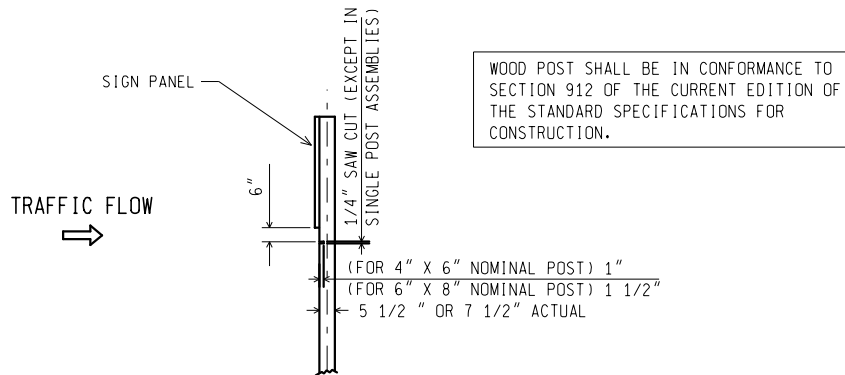
WZD-100-A

SHEET  
7 OF 11

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



WOOD POST BREAKAWAY HOLES/  
 DIRECT EMBEDMENT DETAILS



SAW CUT DETAIL  
 (MULTIPLE POST INSTALLATIONS)

WOOD POST DETAILS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION  
 BUREAU OF DEVELOPMENT STANDARD PLAN

F.H.W.A. APPROVAL

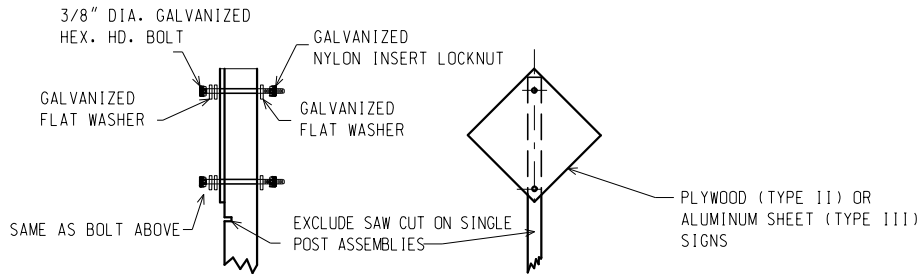
11/2/2017  
 PLAN DATE

WZD-100-A

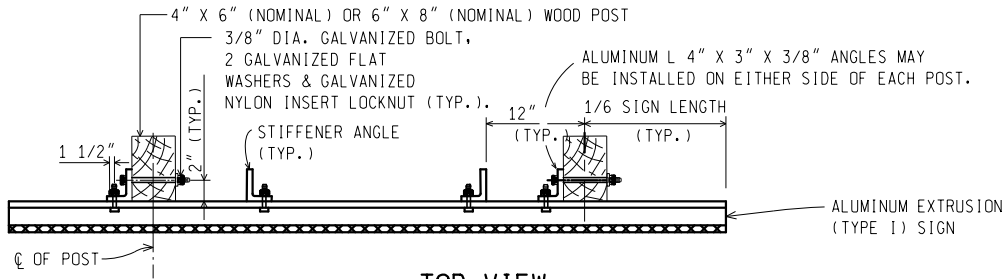
SHEET  
 8 OF 11

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

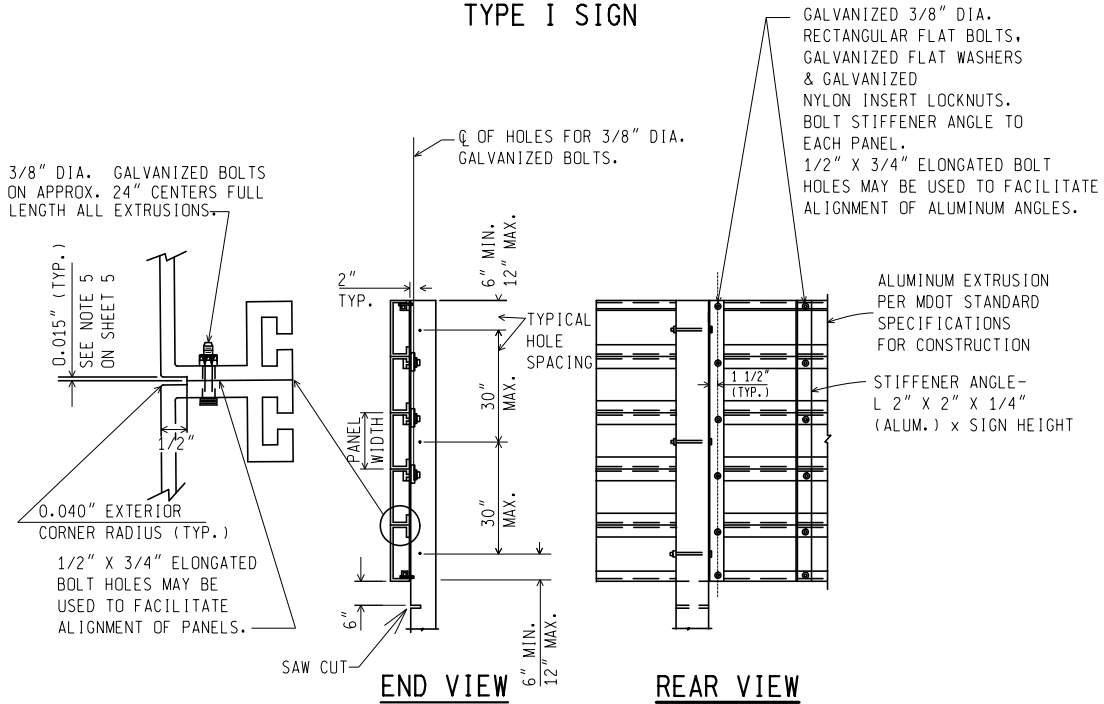




**TYPE II AND TYPE III SIGNS**



**TOP VIEW  
TYPE I SIGN**



**TYPE I SIGN - ERECTION DETAILS**

**WOOD POST CONNECTIONS**

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION  
BUREAU OF DEVELOPMENT STANDARD PLAN

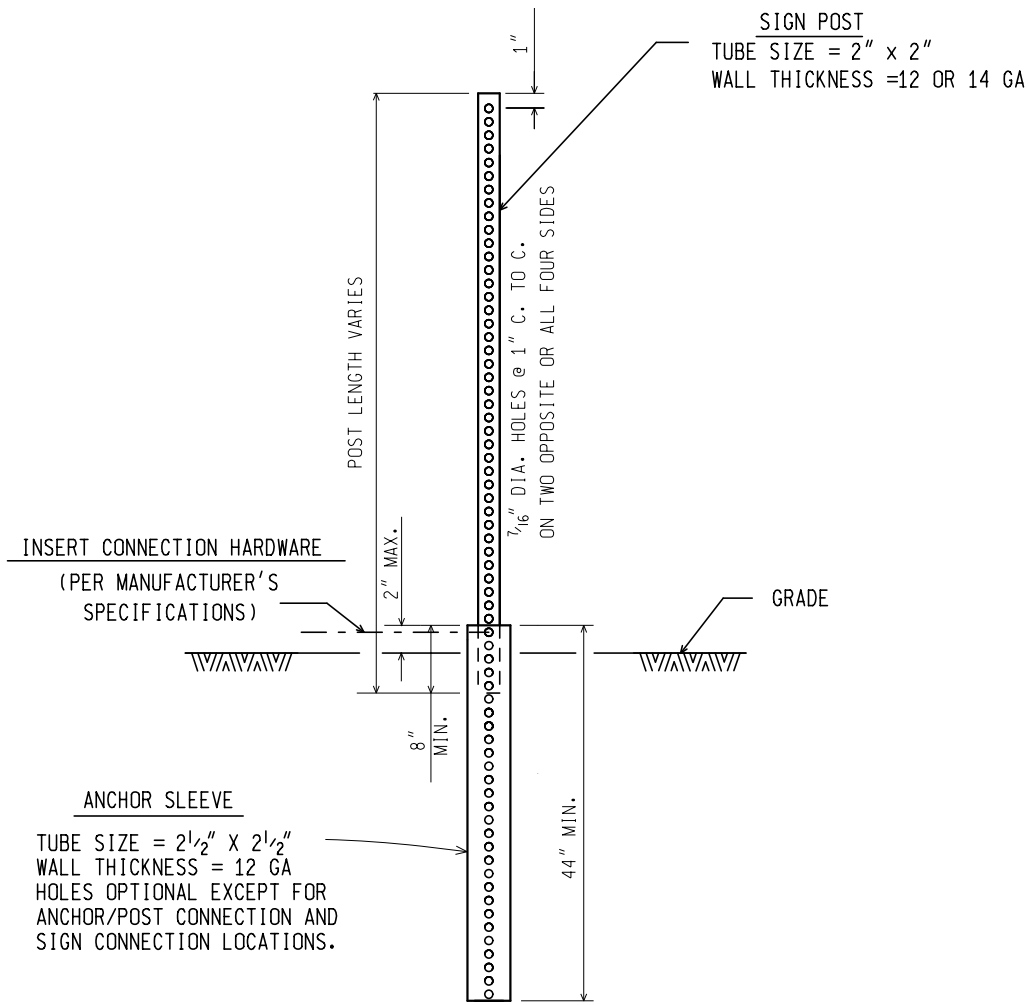
F.H.W.A. APPROVAL

11/2/2017  
PLAN DATE

WZD-100-A

SHEET  
9 OF 11

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



SQUARE TUBULAR STEEL POST

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN	F.H.W.A. APPROVAL	11/2/2017 PLAN DATE	WZD-100-A	SHEET 10 OF 11
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NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.

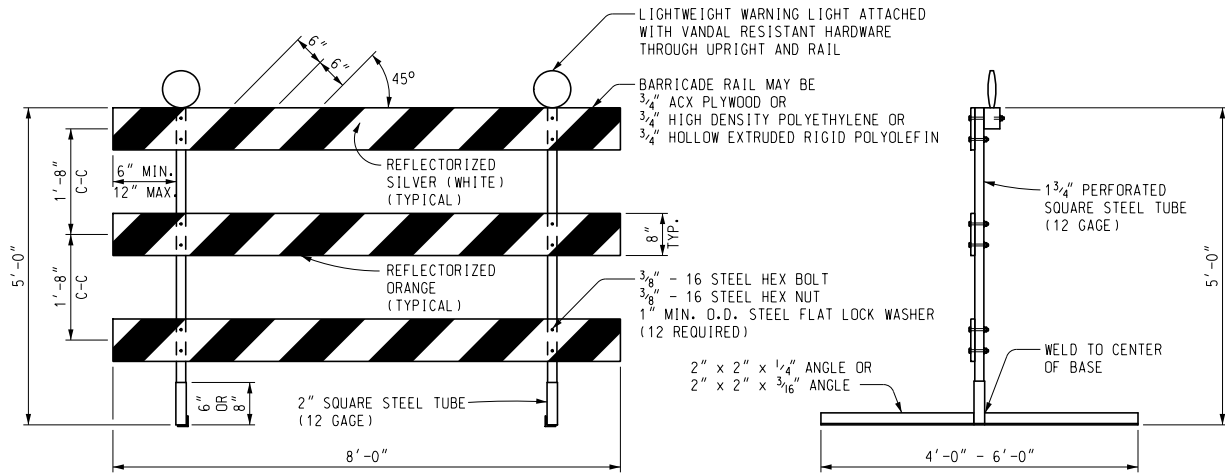
GENERAL NOTES:

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

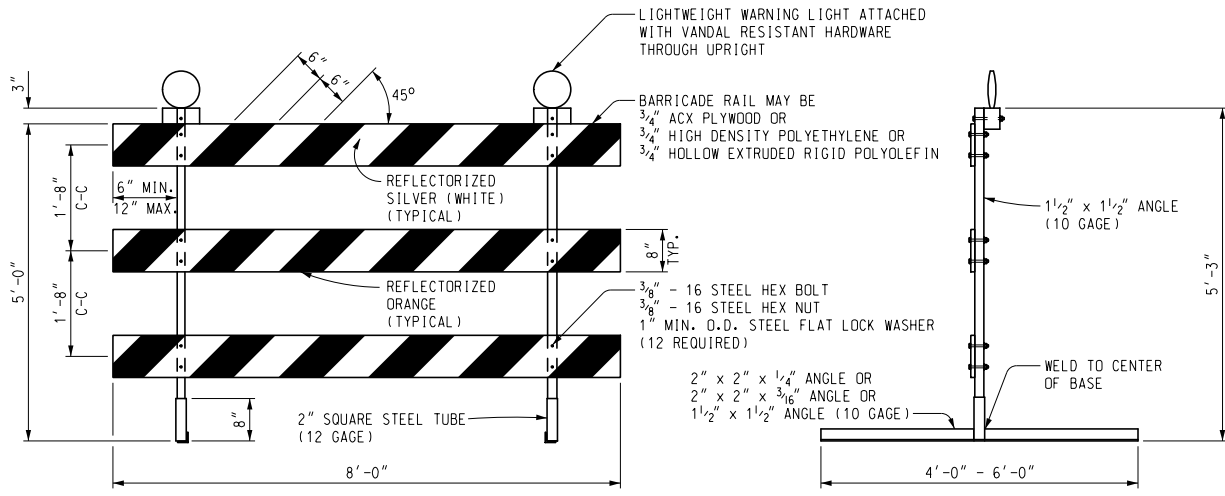
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN	F.H.W.A. APPROVAL	11/2/2017 PLAN DATE	WZD-100-A	SHEET 11 OF 11
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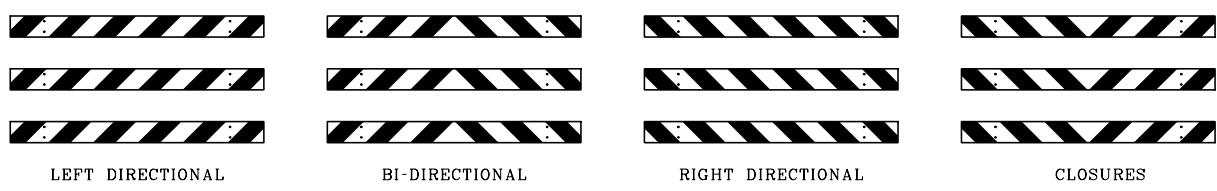
NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



FRONT ELEVATION SIDE VIEW  
**PERFORATED SQUARE STEEL TUBE OPTION**



FRONT ELEVATION SIDE VIEW  
**ANGLE IRON OPTION**



**BARRICADE RAIL SHEETING OPTIONS  
 TYPE III BARRICADES**

Other Type III Barricades meeting current NCHRP crash worthy criteria can be found on the FHWA Safety website at [http://safety.fhwa.dot.gov/roadway\\_dept/road\\_hardware/wzd.htm](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

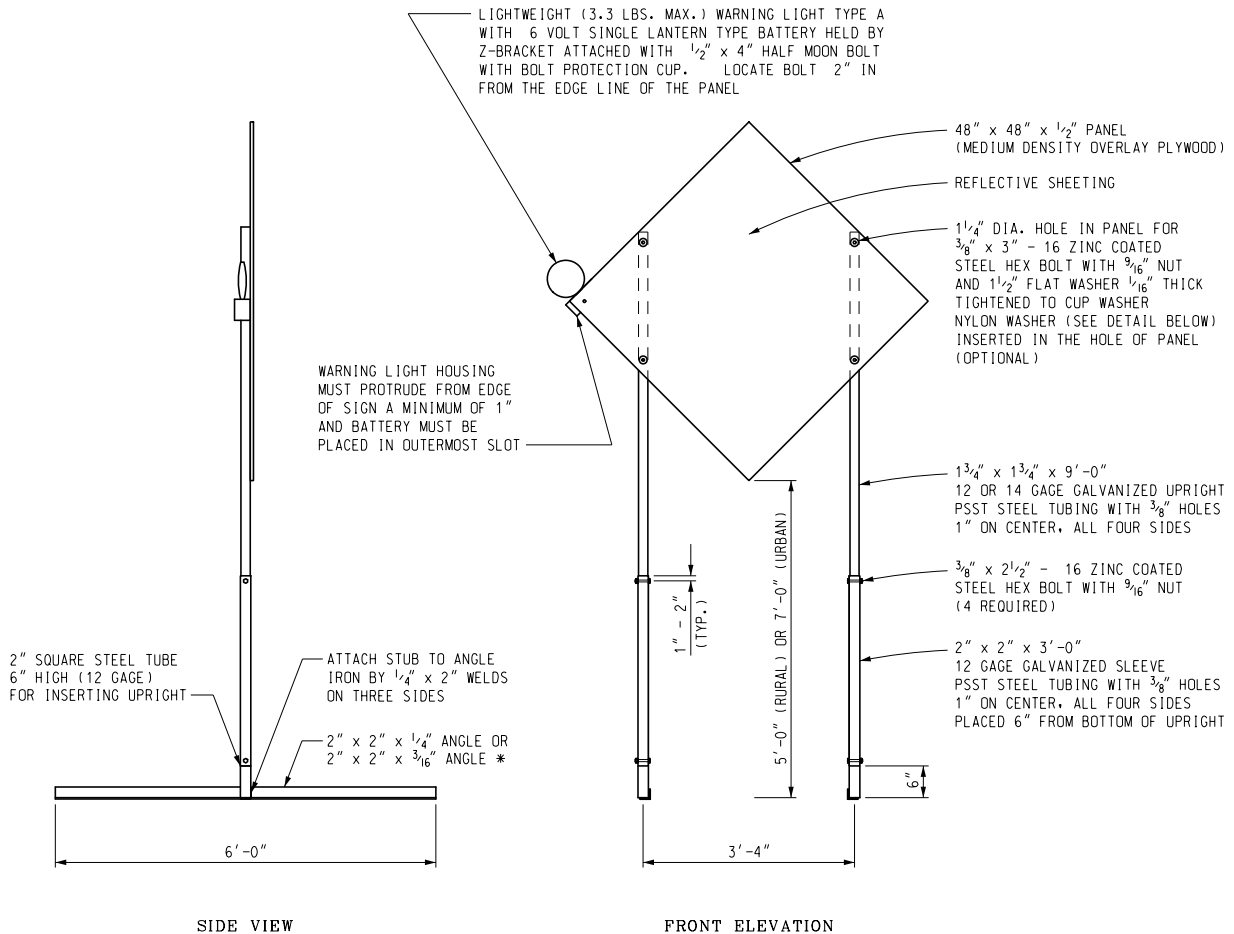
MICHIGAN DEPARTMENT OF TRANSPORTATION  
 BUREAU OF FIELD SERVICES SPECIAL DETAIL FOR

Temporary  
 Traffic Control Devices

6/16/22  
 PLAN DATE

WZD-125-E

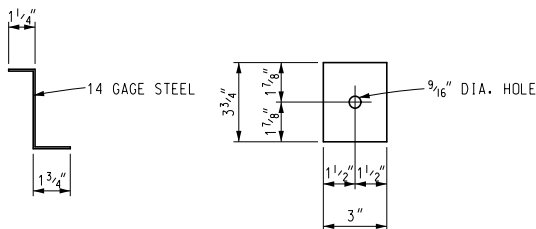
SHEET 1 OF 3



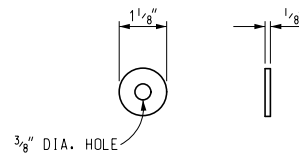
### TEMPORARY SIGN SUPPORT

(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](http://safety.fhwa.dot.gov/roadway_dept/road_hardware/wzd.htm)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION  
BUREAU OF FIELD SERVICES SPECIAL DETAIL

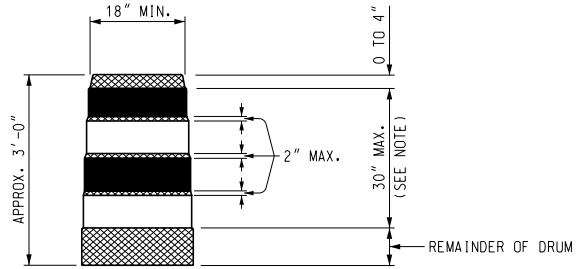
SPECIAL DETAIL  
F.H.W.A. APPROVAL

6/16/22  
PLAN DATE

WZD-125-E

SHEET  
2 OF 3

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- REFLECTORIZED ORANGE
- REFLECTORIZED WHITE
- NON REFLECTORIZED ORANGE

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 BARRICADE.

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 TEMPORARY 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

(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

ROUTE: M-99  
 CITY OF HILLSDALE  
 FAYETTE TOWNSHIP  
 HILLSDALE COUNTY



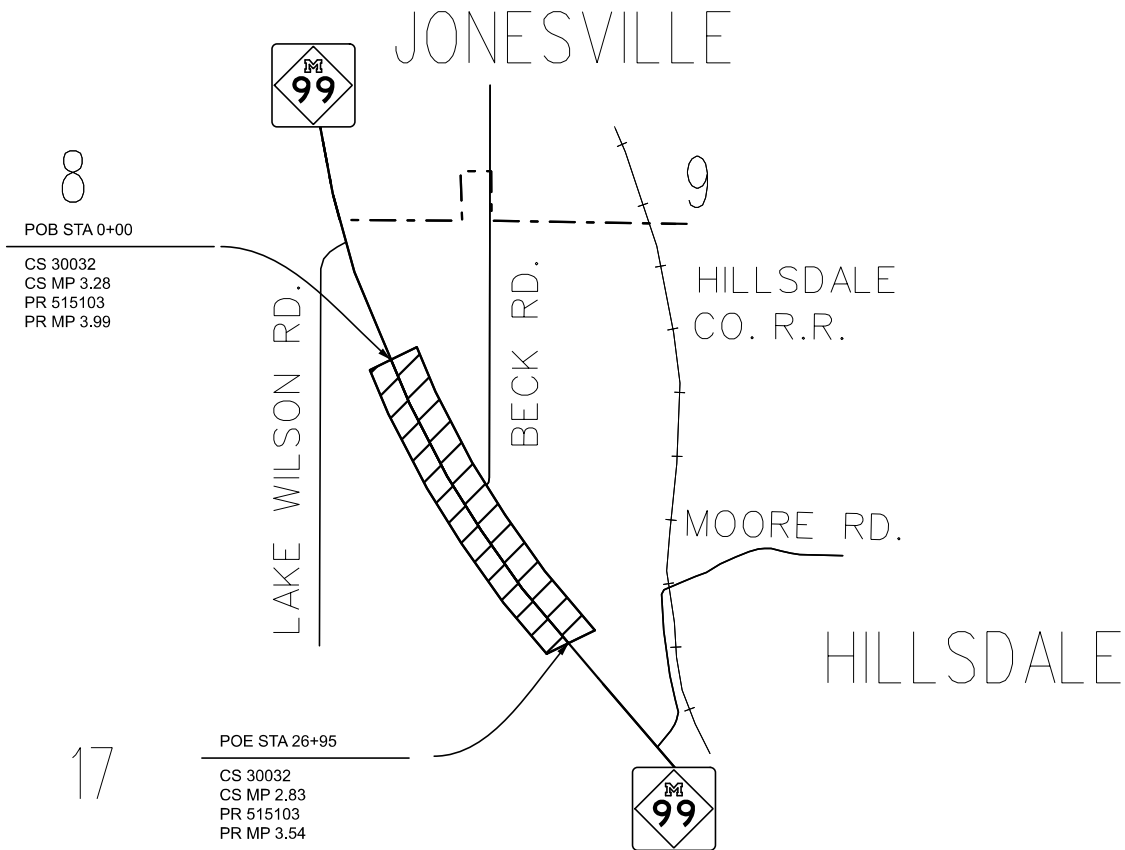
HILLSDALE  
 COUNTY

COUNTY KEY



<u>SECTION</u>	<u>CONTROL SEC</u>	<u>JOB NO.</u>	<u>FED AID PROJ</u>
1	30032	N/A	NO

ROAD	YEAR	TRAFFIC DATA			SPEED DATA		LIMITS
		ADT	DHV	COMM	DESIGNPOSTED	POB TO POE	
M-99	2022	13,050	1,207	536	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 # 23.

MILES: 0.450  
 CONTRACT FOR:  
 FULL DEPTH CONCRETE PAVEMENT REPAIRS,  
 TEMPORARY PAVEMENT MARKINGS

BRADLEY C. WIEFERICH, P.E. - DIRECTOR



**NO SCALE**

DESIGN UNIT: JTSC  
 CS: 30032  
 JN:

TSC: JACKSON

M-99 CONCRETE REPAIR TITLE SHEET

DATE: 4/2/2024  
 DRAWING SHEET  
 M99  
 TITLE  
 001  
 SECT 1

**Log of Project**  
**1 of 4**

**Control Section 30032**

**General Information**

CS 30032 is located on M-99 north of Hillsdale, from a point beginning at the pavement change (HMA to Concrete) approximately 950 feet south of Lake Wilson Road intersection and proceeding southerly approximately 2,385 feet. This project is located in the city of Hillsdale and Fayette Township, Hillsdale County.

**M-99**

CS	CS MP	TO	CS MP	STA	TO	STA
30032	3.28		2.83			
PR	PR MP	TO	PR MP	0+00		23+85
515103	3.99		3.54			

**Location of Repairs**

There are 39 repairs identified on M-99. The approximate locations are as follows:

<b>Patch #</b>	<b>Sta.</b>	<b>Lane</b>	<b>Length (Ft)</b>	<b>Width (Ft)</b>
1	0+48	SB Long.	52	4
2	0+88	SB	5	12
3	1+26	SB	20	12
4	1+87	SB	5	12
5	2+85	SB	5	12
6	3+12	SB	5	12
7	3+43	SB	40	12
8	4+26	SB	5	12
9	4+80	SB	5	12
10	5+39	SB Long.	200	4
11	5+60	SB	5	12
12	5+94	SB	5	12
13	6+45	SB	5	12
14	6+92	SB	5	12
15	7+17	SB	5	12
16	7+98	SB Long.	225	4
17	8+51	SB	5	12
18	8+75	SB	70	12
19	9+68	SB	55	12
20	10+87	SB	5	12
21	11+62	SB	20	12
22	12+43	SB	5	12



**Log of Project**  
**2 of 4**

**Control Section 30032**

23	13+30	SB	5	12
24	13+57	SB	5	12
25	14+25	SB	5	12
26	14+87	SB	5	12
27	15+90	SB Long.	340	4
28	16+30	SB	5	12
29	16+52	SB	25	12
30	17+20	SB	5	12
31	17+44	SB	5	12
32	17+90	SB	5	12
33	18+90	SB	5	12
34	19+36	SB	5	12
35	19+40	SB Long.	120	4
36	20+60	SB	5	12
37	21+26	SB	10	12
38	21+90	SB Long.	200	4
39	23+85	SB	5	12

**Description of Work**

This work shall consist of full depth concrete repairs in locations directed by the Engineer. Any existing pavement markings impacted by the repairs will be replaced with temporary pavement markings until replaced by MDOT permanent pavement marking contractor. Traffic will be maintained by single lane closures as detailed in the Special Provision for Maintaining Traffic and/or as directed by the Engineer. All work shall be done according to this log of project, attached special provisions and supplemental specifications, the 2020 Standard Specifications for Construction, and all applicable standard plans.

<b><u>Items of Work</u></b>	<b><u>Quantity</u></b>	<b><u>Unit</u></b>
Erosion Control, Inlet Protection, Fabric Drop	5	Ea
Pavt, Rem	168	Syd
Pavt Repr, Rem	338	Syd
Pavt Repr, Nonreinf Conc, 10 inch	506	Syd
Cement	14	Ton
Joint, Contraction, Crg	840	Ft
Joint, Contraction, Cp	432	Ft
Joint, Tied, 4 foot	1,137	Ft
Pavt Repr, 4 foot, Rem	508	Syd
Pavt Repr, 4 foot, Nonreinf, 10 inch	508	Syd
Lane Tie, Epoxy Anchored	206	Ea
Saw Cut, Intermediate	444	Ft
Non-chloride Accelerator	450	Gal

**Log of Project**  
**3 of 4**

**Control Section 30032**

<b><u>Items of Work, Cont.</u></b>	<b><u>Quantity</u></b>	<b><u>Unit</u></b>
Pavt, Cleaning	1	LSUM
Pavt Mrkg, Wet Reflective, Type NR, Paint, 6 inch, Yellow, Temp	1,137	Ft
Pavt Mrkg, Wet Reflective, Type NR, Paint, 6 inch, White, Temp	300	Ft
Sign, Type B, Temp, Prismatic, Furn	500	Sft
Sign, Type B, Temp, Prismatic, Oper	500	Sft
Plastic Drum, Fluorescent, Furn	20	Ea
Plastic Drum, Fluorescent, Oper	20	Ea
Channelizing Devices, 42 inch, Fluorescent, Furn	70	Ea
Channelizing Devices, 42 inch, Fluorescent, Oper	70	Ea
Lighted Arrow, Type C, Furn	2	Ea
Lighted Arrow, Type C, Oper	2	Ea
Sign, Portable Changeable Message, Furn	2	Ea
Sign, Portable Changeable Message, Oper	2	Ea
Minor Traf Devices	1	LSUM

**General Plan Notes**

This work shall be constructed as specified and according to the provisions included in this project.

**Temporary Pavement Markings**

Temporary pavement markings shall be placed using the following types:

Pavt Mrkg, Wet Reflective, Type NR, Paint, 6 inch, Yellow, Temp  
Pavt Mrkg, Wet Reflective, Type NR, Paint, 6 inch, White, Temp

**Prequalification**

Work for this project must be completed by an MDOT prequalified Contractor.

**Progress Clause**

Start work within ten (10) days after receiving Notice of Award of Contract or on the date agreed upon with the Engineer. In no case shall any work be commenced prior to the receipt of formal Notice of Award by the Department. **This project must be completed and an invoice submitted to Hillsdale County Road Commission no later than September 13, 2024.**

**Pavement Cleaning**

Using methods approved by the Engineer, clean dirt and debris from the pavement surface at the end of each work day. The Department will pay for removal of material in accordance with subsection 501.04.E.

**Concrete Testing**

MDOT and/or Hillsdale County Road Commission will provide concrete testing for this project.

**Stationing**

Stationing for this project is in English Standard Units and is based upon measured distances using a distance measuring tool (DMI) and are approximate. The exact

**Log of Project**  
**4 of 4**

**Control Section 30032**

locations of work shall be verified by the Engineer prior to the start of construction.

**Specifications for Construction**

The improvements covered by these plans shall be done in accordance with MDOT 2020 Standard Specifications for Construction, Special Provisions, and Supplemental Specifications which are combined within this project.

**Utility Information**

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 [elocate.missdig.org](http://elocate.missdig.org) for single address or [rte.missdig.org](http://rte.missdig.org), a minimum of 3 work days prior to excavating, excluding weekends and holidays.

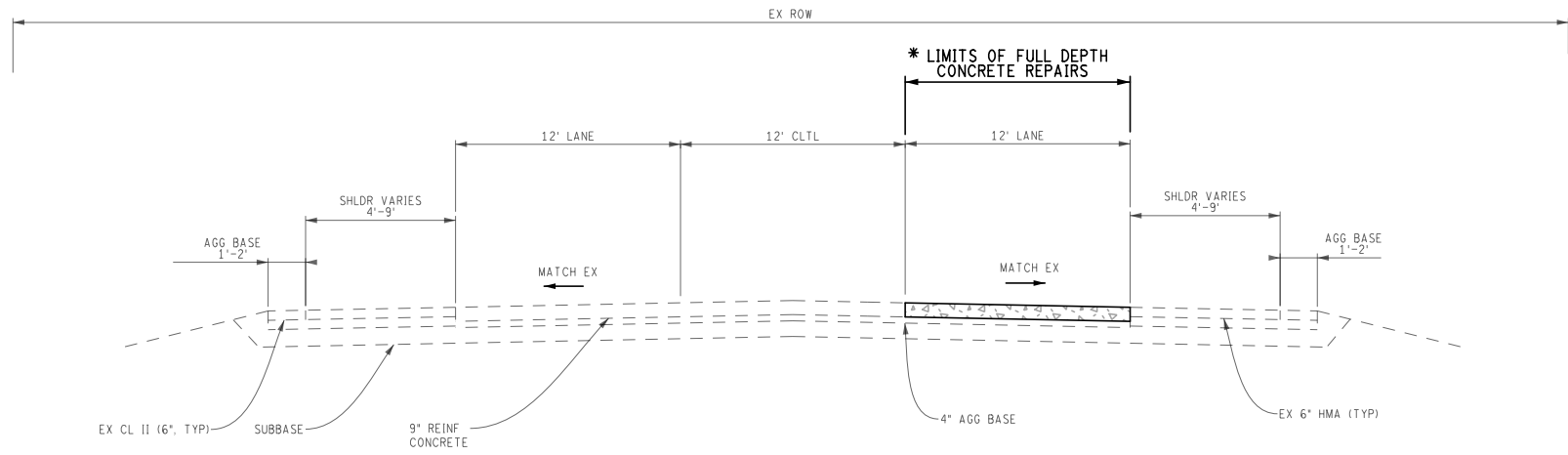
**Notes Applying to Standard Plans**

Transverse Pavement Joints (Plain Concrete Pavement)	R-39-K
Load Transfer Assemblies for Transverse Joints	R-40-I
Longitudinal Pavement Joints	R-41-H
Typical Joint Layouts for Concrete Pavement	R-42-F
Location of Transverse Joints in Plain Concrete Pavement	R-43-J (SPEC DET)
Concrete Pavement Repair	R-44-G (SPEC DET)
Soil Erosion and Sedimentation Control Measures	R-96-E

**Notes Applying to Traffic and Safety Standard Plans**

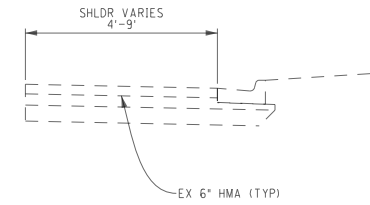
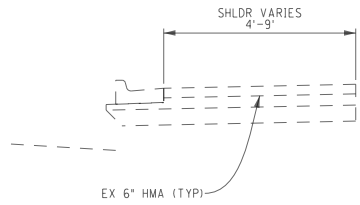
Where the following items are called for on the plans, they are to be constructed according to the Standard Plans given:

Temporary Longitudinal Line Types and Placement	PAVE-904-B
Ground Driven Sign Supports for Temp Signs	WZD-100-A (SPEC-DET)
Temporary Traffic Control Devices	WZD-125-E (SPEC-DET)



**EXISTING NORMAL SECTION**

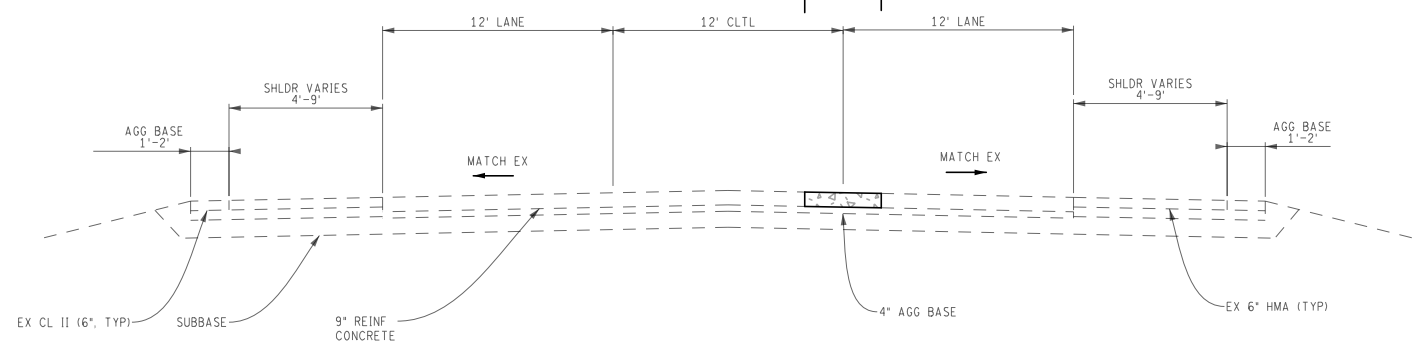
SECTION APPLIES TO:  
 STA 0+00 (POB) TO STA 23+85 (POE)  
 LOOKING SOUTH



STA 0+00 TO STA 13+73

STA 16+90 TO STA 21+65

\* LIMITS OF FULL DEPTH LONGITUDINAL JOINT CONCRETE REPAIRS



**EXISTING NORMAL SECTION**

SECTION APPLIES TO:  
 STA 0+00 (POB) TO STA 23+85 (POE)  
 LOOKING SOUTH

\* LOCATIONS AS SHOWN IN LOG OF PROJECT



FILE: M99\_TYP\_001.dgn

**NO SCALE**

DATE: 4/02/24  
 DESIGN UNIT: JTSC  
 TSC: JACKSON

CS: 30032  
 JN:

M-99 TYPICAL CROSS SECTION

DRAWING	SHEET
M99 EXTYP 001	SECT 1

MICHIGAN  
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION  
FOR  
**4 FOOT FULL DEPTH CONCRETE CENTERLINE REPAIR**

CFS:BRB

1 of 3

APPR:ARB:JFS:04-28-21

**a. Description.** This work consists of constructing full depth concrete centerline repair in jointed concrete pavement at the longitudinal joint between lanes. Complete this work in accordance with section 603 of the Standard Specifications for Construction, except as modified herein.

**b. Materials.** Provide materials in accordance with subsection 603.02 of the Standard Specifications for Construction.

**c. Equipment.** The drilling machine must produce drilled holes of proper diameter, depth, and location as shown in the details included herein.

**d. Construction.** Construct the concrete pavement repair in accordance with subsection 603.03 of the Standard Specifications for Construction and details provided herein. Limit overcuts into the original reinforced pavements to 3 inches maximum in both the transverse and longitudinal directions along repair. Overcuts are not permitted into the original non-reinforced concrete pavements in both the transverse and longitudinal directions along repairs. Saw and seal joints as shown in Figures 1 and 2 in the new concrete pavement repair. Establish transverse contraction joints in the new concrete pavement to panel lengths of 8 to 12 feet for all repairs 16 feet or longer, and matching existing joints and cracks, as directed by the Engineer. Saw joints when the concrete has hardened enough that no excess raveling or spalling occurs, but before random cracks develop. Establish transverse contraction and expansion joint reservoirs in accordance with Standard Plan R-39-Series. Establish transverse contraction joint load transfer assembly in accordance with the details included in this special provision.

**e. Acceptance.** Repair damage to any adjacent pavement, roadway structure, or appurtenance that results from the repair operation prior to final acceptance, as directed by the Engineer.

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

<b>Pay Item</b>	<b>Pay Unit</b>
Pavt Repr, 4 foot, Rem .....	Square Yard
Pavt Repr, 4 foot, Nonreinf, __ inch .....	Square Yard
Joint, Tied, 4 foot.....	Foot

1. **Pavt Repr, 4 foot, Rem** includes saw cuts as needed for concrete pavement removal; full depth removal and disposal of concrete and hot mix asphalt (HMA) patches; lifting the repair section out; loading, hauling, and disposing of the material removed; and compacting of disturbed base material.

2. **Pavt Repr, 4 foot, Nonreinf, \_\_\_ inch** includes furnishing, placing, finishing, texturing, and curing the concrete; furnishing any additional concrete required to correct low base conditions; sawing, cleaning, and preparing the transverse and longitudinal joints; and furnishing and installing joint sealant.

3. **Joint, Tied, 4 foot** includes drilling and cleaning the holes for the deformed bars; furnishing, mixing, and installing the grout; and furnishing and installing the deformed bars for all exterior faces of the repair. Measurement for payment will be feet of repair along centerline

4. Transverse contraction (CP) and expansion (E2) joints will be paid for separately.

FIGURE 1 - 4 FOOT FULL DEPTH CENTERLINE REPAIR WITHOUT TRANSVERSE JOINT

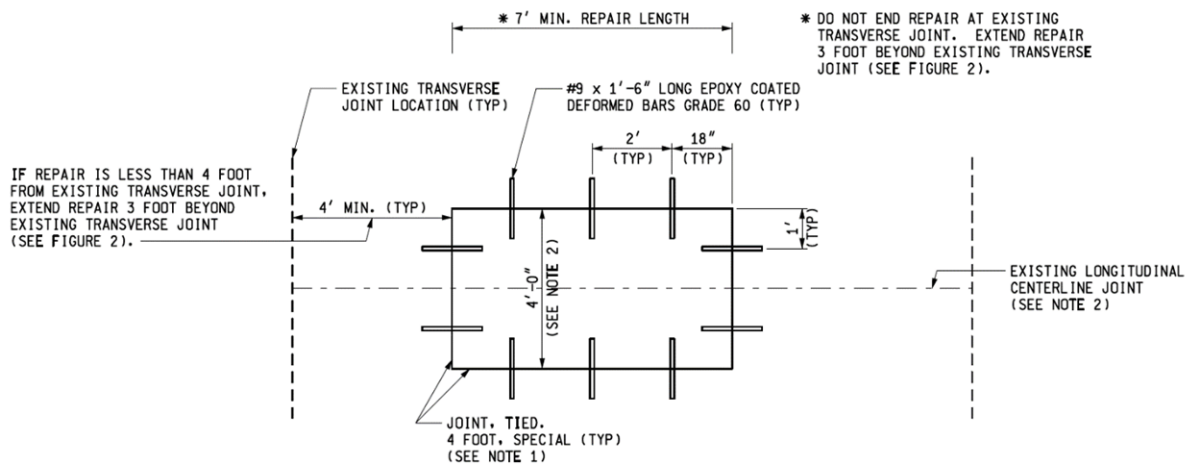
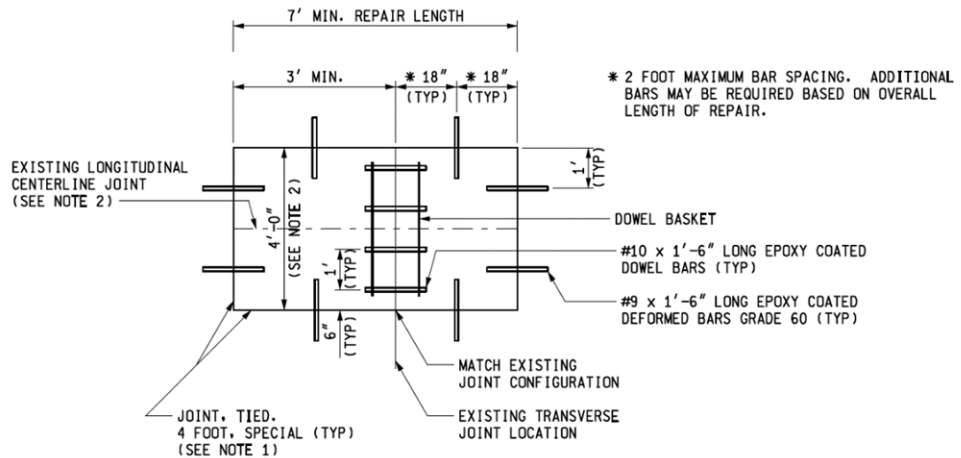


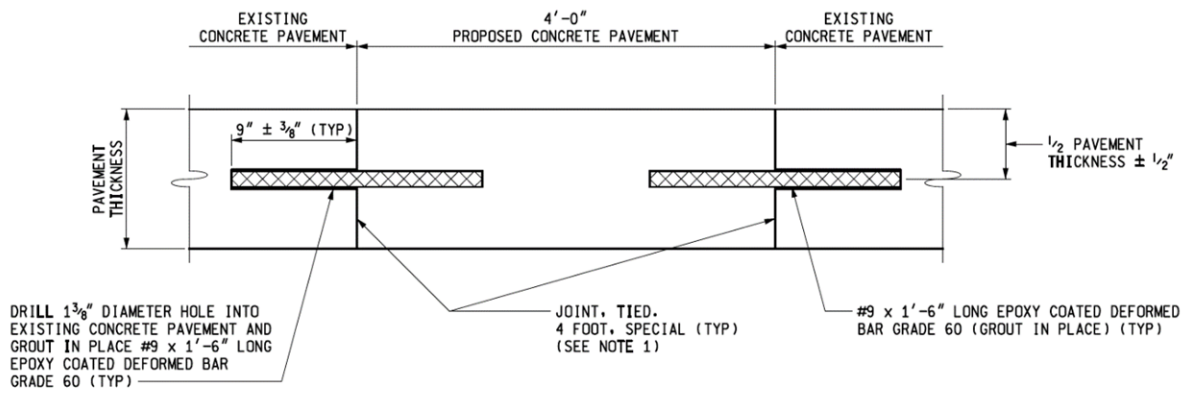
FIGURE 2 - 4 FOOT FULL DEPTH CENTERLINE REPAIR WITH TRANSVERSE JOINT



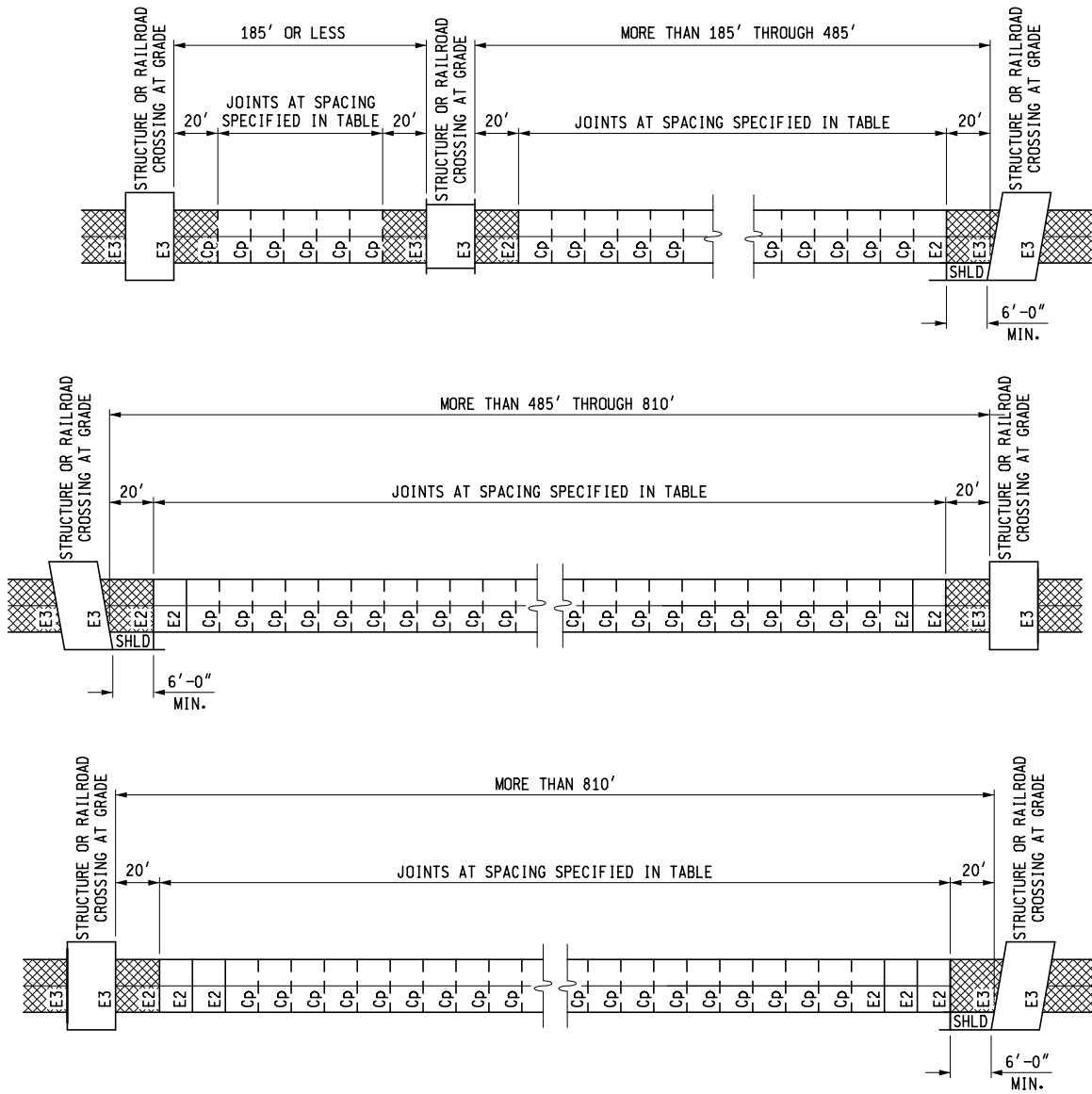
NOTE 1: SAW 1/4" TO 5/16" WIDE BY 3/8" TO 1/2" DEPTH, SEAL WITH HOT-POURED JOINT SEALANT.

NOTE 2: EXISTING LONGITUDINAL CENTERLINE JOINT. SPLIT THE DIFFERENCE OF THE CENTERLINE REPAIR (2'-0") ON EACH SIDE OF THE EXISTING LONGITUDINAL CENTERLINE JOINT ± 2 INCHES BASED ON EXISTING PAVEMENT CONDITIONS. LONGITUDINAL CENTERLINE JOINT IS NOT REQUIRED IN THE CONCRETE PAVEMENT REPAIR.

FIGURE 3 - DEFORMED BAR PLACEMENT DETAILS



NOTE:  
THE HOLE SPACING MAY BE ADJUSTED 1" HORIZONTALLY,  
TO AVOID EXISTING REINFORCEMENT.



**PLAN VIEW SHOWING TRANSVERSE JOINT LOCATIONS**

NOTE:  
SEE SHEET 2 FOR DETAIL OF JOINT SPACING  
WITH INTEGRAL / SEMI-INTEGRAL ABUTMENTS  
AND SLEEPER SLAB.

- JOINT LEGEND**  
ACCORDING TO STANDARD PLAN R-39-SERIES
- (E2) 1" TRANSVERSE EXPANSION JOINT WITH LOAD TRANSFER ASSEMBLY
  - (E3) 1" TRANSVERSE EXPANSION JOINT WITHOUT LOAD TRANSFER ASSEMBLY
  - (Cp) TRANSVERSE CONTRACTION JOINT
  - REINFORCED CONCRETE PAVEMENT ADJACENT TO BRIDGE REFERENCE LINE OR SLEEPER SLAB

JOINTED PLAIN CONCRETE PAVEMENT	
PAVEMENT THICKNESS	JOINT SPACING
6 1/2" TO 8 3/4"	12'
9" TO 11 3/4"	14'
12" OR MORE	16'



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

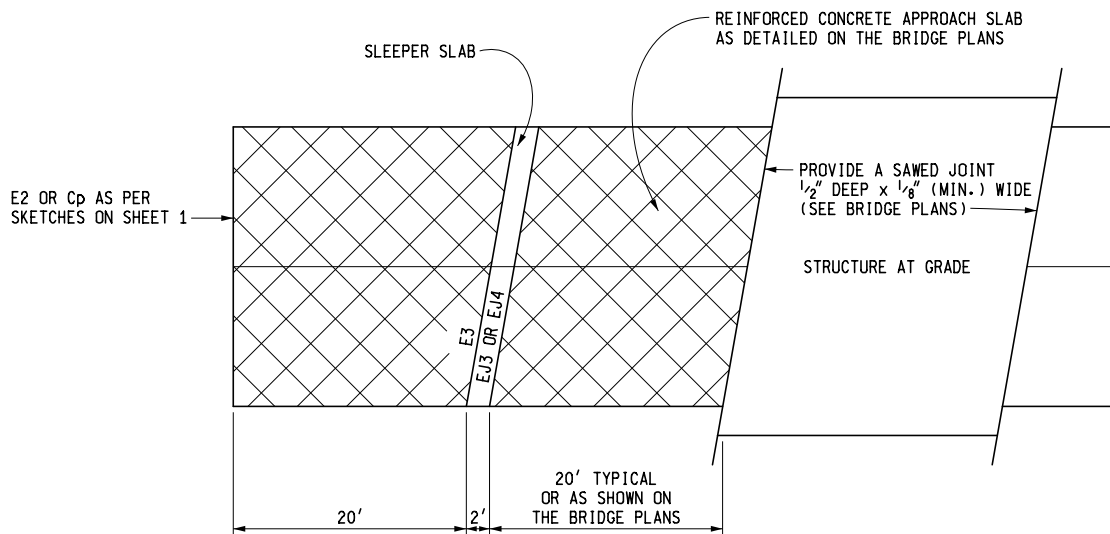
APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION  
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**LOCATION OF TRANSVERSE JOINTS  
IN PLAIN CONCRETE PAVEMENT**

_____	1-4-2022	<b>R-43-J</b>	SHEET 1 OF 2
F.H.W.A. APPROVAL	PLAN DATE		





**JOINT SPACING WITH  
INTEGRAL / SEMI-INTEGRAL ABUTMENTS AND SLEEPER SLABS**

**NOTES:**

UNLESS OTHERWISE SPECIFIED ON THE PLANS OR DIRECTED BY THE ENGINEER, TRANSVERSE JOINTS SHALL BE PLACED AS SPECIFIED ON THIS STANDARD PLAN AND ON CURRENT STANDARD PLAN R-42-SERIES.

MAXIMUM JOINT SPACING SHALL NOT EXCEED THE DISTANCE SPECIFIED. WHEN A JOINT SPACING ADJUSTMENT IS REQUIRED, IT SHALL BE MADE BETWEEN CONTRACTION JOINTS WITH THE ADJUSTED SPACE BEING NOT LESS THAN 6'-6".

EXPANSION JOINTS SHALL ONLY BE PLACED AT STRUCTURES, INTERSECTIONS AND SPECIFIED LOCATIONS.

JOINTS ABUTTING RAILROAD TRACKS SHALL BE AS SPECIFIED ON CURRENT STANDARD PLAN R-121-SERIES.

MICHIGAN DEPARTMENT OF TRANSPORTATION  
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

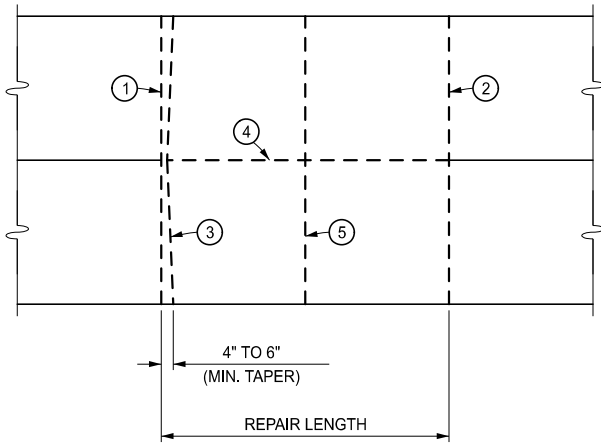
**LOCATION OF TRANSVERSE JOINTS  
IN PLAIN CONCRETE PAVEMENT**

F.H.W.A. APPROVAL

1-4-2022  
PLAN DATE

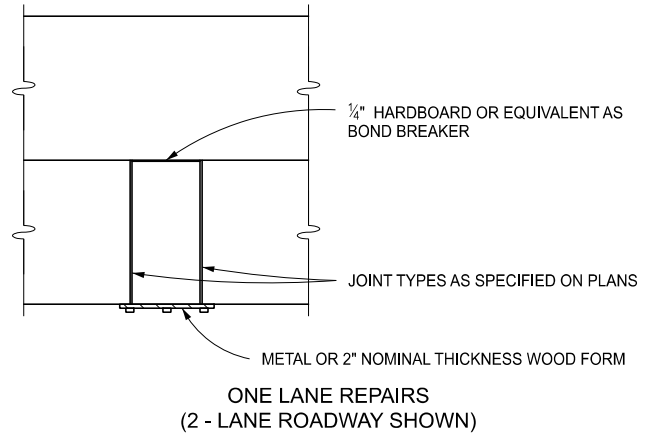
**R-43-J**

SHEET  
2 OF 2

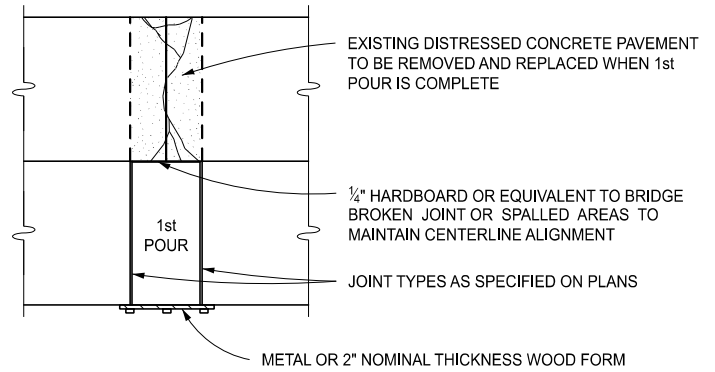


**SAWING DIAGRAM FOR FULL DEPTH CAST IN PLACE REPAIRS**

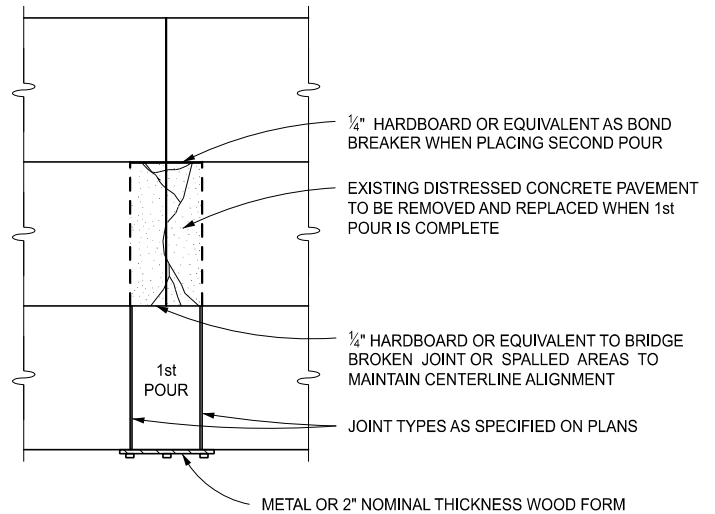
- ① & ② THESE SAW CUTS SHALL BE FULL DEPTH AND PERPENDICULAR TO THE EDGE OF THE ROADWAY, WITHIN A TOLERANCE OF 1". OVERCUTTING IS ALLOWED INTO ADJACENT SHOULDERS AND WITHIN THE LIMITS OF A SUBSEQUENT REPAIR TO THE ADJACENT LANE. OUTSIDE THESE LIMITS, OVERCUTTING IS NOT ALLOWED INTO ADJACENT NON-REINFORCED CONCRETE PAVEMENTS AND IS RESTRICTED TO 3" INTO ADJACENT REINFORCED CONCRETE PAVEMENTS.
  - ③ THIS FULL DEPTH SAW CUT IS MADE TO FACILITATE OPENING A TRENCH ACROSS THE SLAB TO RELIEVE COMPRESSION IN THE PAVEMENT PRIOR TO REMOVAL OF THE FAILED AREA. THIS SAW CUT MAY BE OMITTED PROVIDED NO SPALLING OF THE REMAINING CONCRETE OCCURS. IF SPALLING DOES OCCUR, THE CONTRACTOR WILL BE REQUIRED TO MAKE THIS SAW CUT ON SUBSEQUENT REPAIRS. WHEN THIS SAW CUT IS USED AND THE ADJACENT LANE IS NOT REPAIRED, NO OVERCUTTING INTO THAT LANE SHALL BE MADE.
  - ④ THIS LONGITUDINAL FULL DEPTH SAW CUT IS MADE BETWEEN LANES OR BETWEEN ANY COMBINATION OF THE FOLLOWING: LANE, RAMP, CURB, CONCRETE SHOULDER, OR PARTIAL LANE WIDTH REPAIR.
  - ⑤ IF REQUIRED, INTERMEDIATE SAW CUTS MAY BE MADE TO REMOVE A SECTION OF PAVEMENT LANE WHICH IS OVER 5'-0" IN LENGTH, TO PERMIT LOADING INTO THE HAULING UNITS.
- ADDITIONAL SAW CUTS, AT CONTRACTOR'S EXPENSE, MAY BE MADE INSIDE THE REPAIR LIMITS TO REDUCE 5'-0" BY 12'-0" OR LESS SLABS INTO SMALLER PIECES TO FACILITATE REMOVAL.



**ONE LANE REPAIRS  
(2 - LANE ROADWAY SHOWN)**



**ALL LANES REPAIRED  
(2 - LANE ROADWAY SHOWN)**



**MORE THAN ONE LANE REPAIRED  
BUT REPAIR LESS THAN FULL WIDTH  
(3 - LANE ROADWAY SHOWN)**

**FORMING NOTES:**

STAKES USED TO HOLD HMA FILLER OR HARDBOARD IN PLACE DURING CONCRETE PLACEMENT SHALL BE REMOVED BEFORE SCREEDING THE CONCRETE.

ADJACENT LANE REPAIRS MAY BE CAST INTEGRALLY, WHEN APPROVED BY THE ENGINEER.

**FORMING REQUIREMENTS FOR  
CAST-IN-PLACE REPAIRS 12'-0" OR LESS**

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF DEVELOPMENT



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

**STANDARD PLAN FOR  
CONCRETE PAVEMENT REPAIR**

(SPECIAL DETAIL)  
FHWA APPROVAL

09/18/2023  
PLAN DATE

**R-44-G**

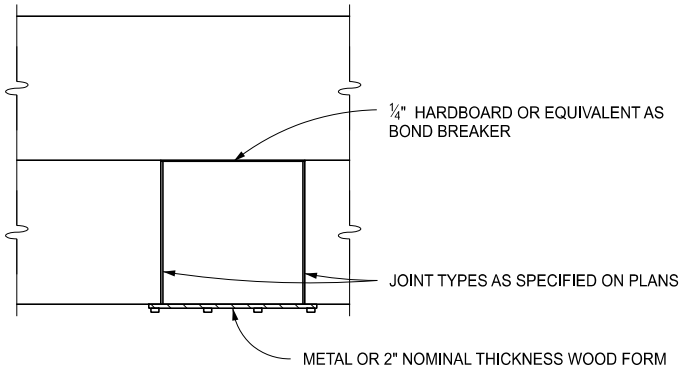
SHEET  
1 OF 7

FORMING NOTES:

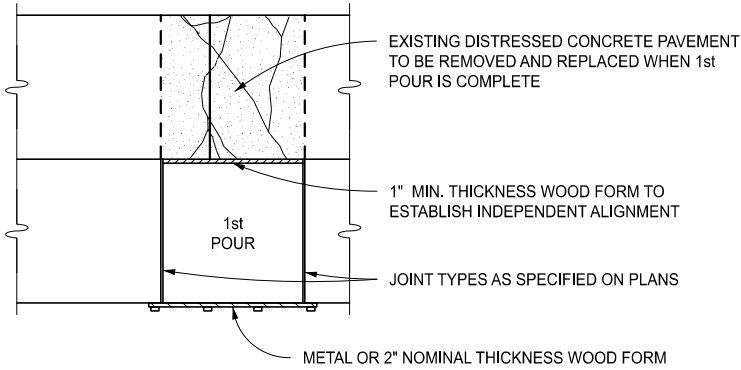
WHERE REPAIRS LONGER THAN 12'-0" ARE REQUIRED, A NEW GRADE MUST BE ESTABLISHED ALONG THE OLD PAVEMENT INNER JOINT LINE INDEPENDENT OF THE OLD PAVEMENT SURFACE, SO THAT SCREEDING MAY BE DONE PERPENDICULAR TO THE CENTERLINE AND INDEPENDENT OF THE OLD PAVEMENT GRADE.

STAKES USED TO HOLD HMA FILLER OR HARDBOARD IN PLACE DURING CONCRETE PLACEMENT SHALL BE REMOVED BEFORE SCREEDING THE CONCRETE.

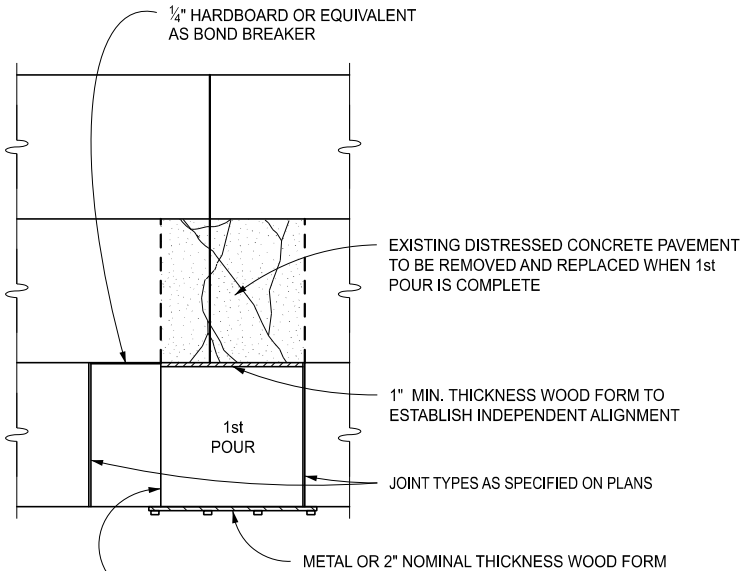
ADJACENT LANE REPAIRS MAY BE CAST INTEGRALLY, WHEN APPROVED BY THE ENGINEER.



ONE LANE REPAIRS  
(2 - LANE ROADWAY SHOWN)



ALL LANES REPAIRED  
(2 - LANE ROADWAY SHOWN)



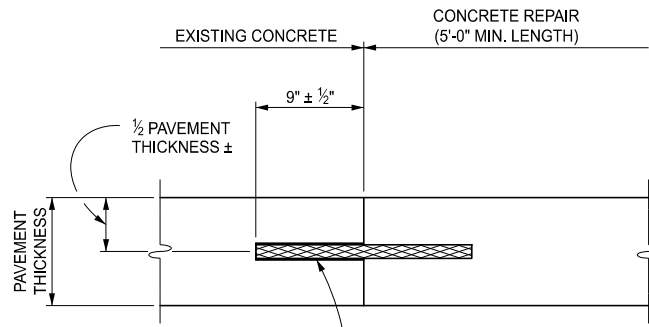
WHEN OFFSET IS GREATER THAN 6'-0" PLACE (C2) JOINT  
IN LINE WITH ADJACENT LANE REPAIR JOINT.

MORE THAN ONE LANE REPAIRED  
BUT REPAIRS ARE OFFSET  
(3 - LANE ROADWAY SHOWN)

FORMING REQUIREMENTS FOR  
CAST-IN-PLACE REPAIRS GREATER THAN 12'-0"

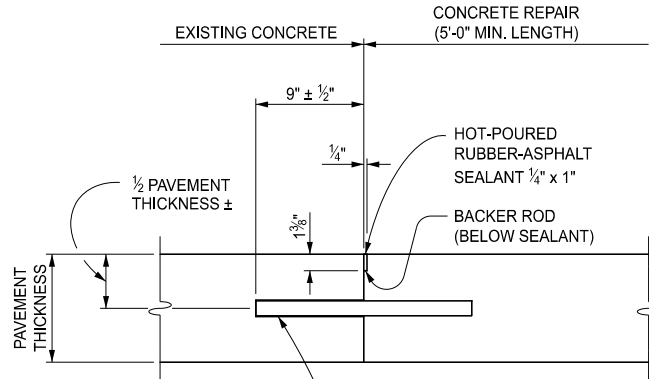
DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR CONCRETE PAVEMENT REPAIR		<b>R-44-G</b>	SHEET 2 OF 7
(SPECIAL DETAIL) FHWA APPROVAL	09/18/2023 PLAN DATE		



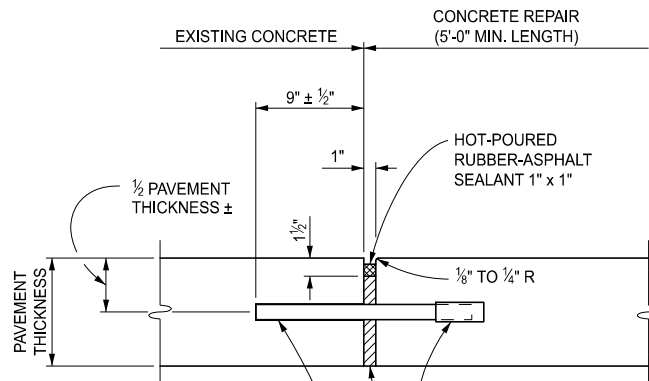
\* DRILL 1 3/8" DIAMETER HOLE INTO EXISTING CONCRETE PAVEMENT AND GROUT-IN-PLACE #9 x 1'-6" LONG EPOXY COATED DEFORMED BARS

TIED JOINT, Trg



\* DRILL 1 3/8" DIAMETER HOLE INTO EXISTING CONCRETE PAVEMENT AND GROUT-IN-PLACE 1 1/4" DIAMETER x 1'-6" LONG EPOXY COATED BARS

CONTRACTION JOINT, Crg



\* DRILL 1 3/8" DIAMETER HOLE INTO EXISTING CONCRETE PAVEMENT AND GROUT-IN-PLACE 1 1/4" DIAMETER x 1'-6" LONG EPOXY COATED BARS

\* EXPANSION CAP  
\* FIBER JOINT FILLER

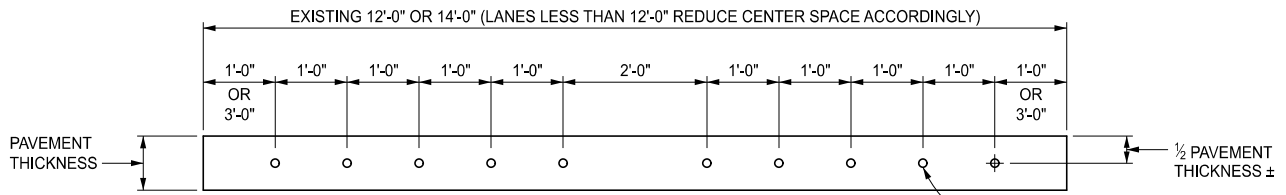
EXPANSION JOINT, Erg

\* SEE SHEET 3 OF 6 FOR BAR SPACING AND SHEET 6 OF 6 FOR NOTES.

CAST-IN-PLACE REPAIR JOINTS USING GROUTED DOWEL OR DEFORMED BARS

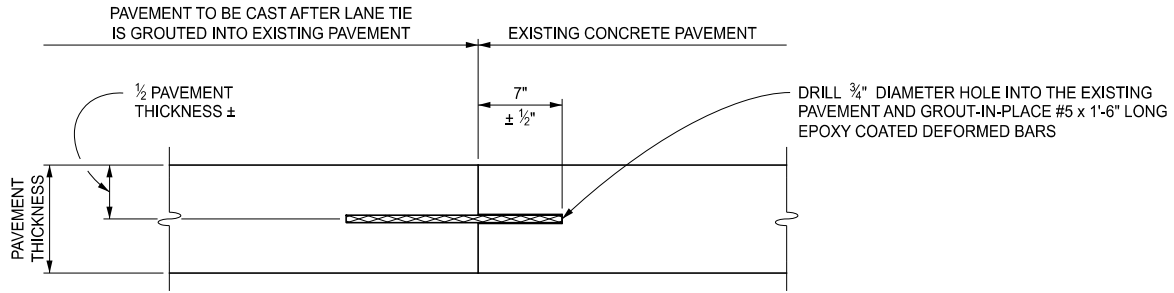
DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR CONCRETE PAVEMENT REPAIR		<b>R-44-G</b>	SHEET 3 OF 7
(SPECIAL DETAIL) FHWA APPROVAL	09/18/2023 PLAN DATE		

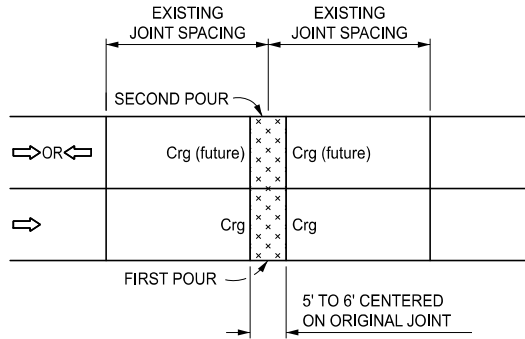


NOTE:  
 THE HOLE SPACING MAY BE ADJUSTED 1" HORIZONTALLY, RAISED 1/2", OR LOWERED 1/2" FROM THE ABOVE LOCATIONS TO AVOID DRILLING INTO THE REINFORCEMENT.

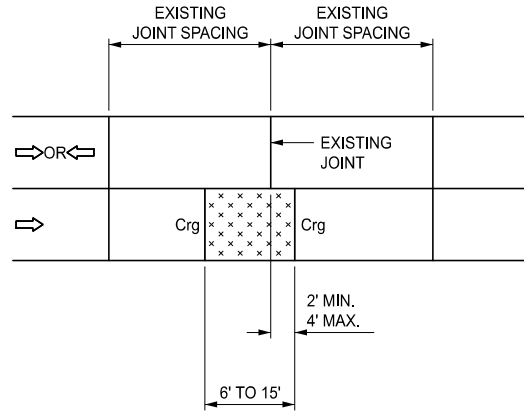
**DOWEL OR DEFORMED BAR SPACING FOR CONCRETE REPAIRS**



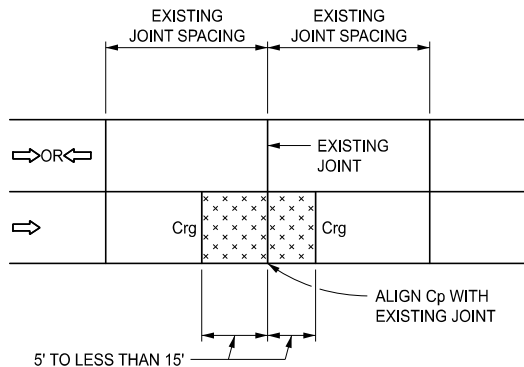
**EPOXY ANCHORED LANE TIE**



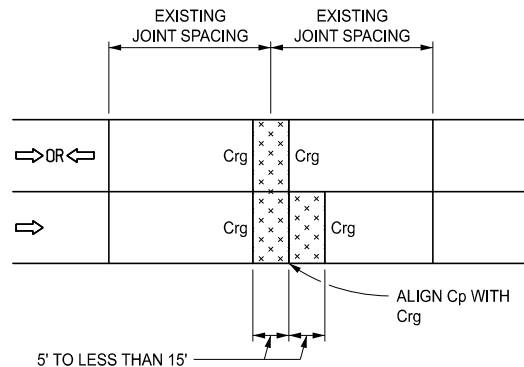
**SINGLE LANE OR FULL WIDTH REPAIR**



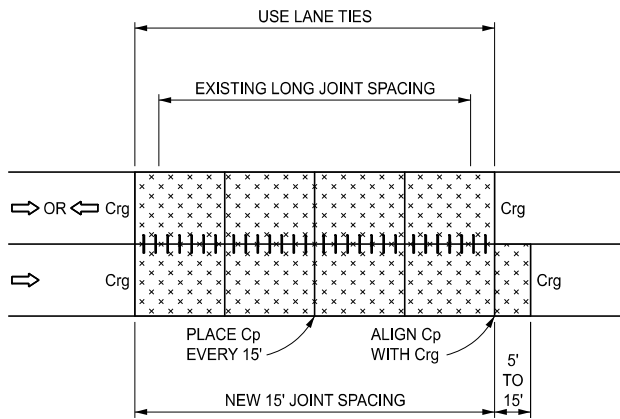
**REPAIR LENGTH 6' - 15' WITH ONE JOINT NEAR AN EXISTING JOINT (SINGLE LANE REPAIR)**



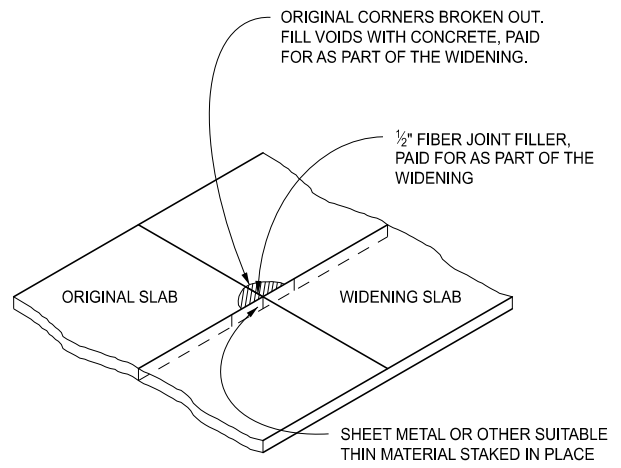
**REPAIR LENGTHS OVER 15' WITH Cp JOINT (SINGLE LANE REPAIR)**



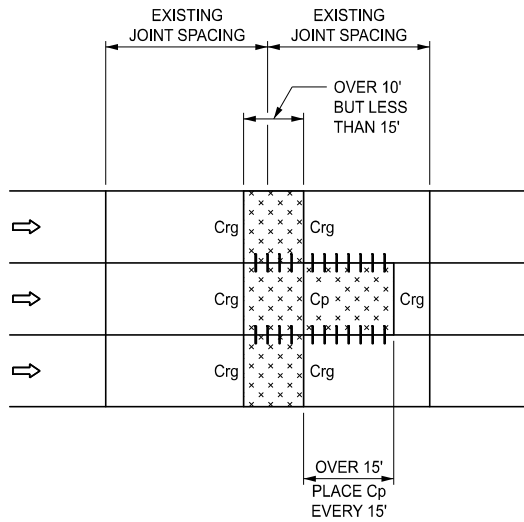
**OFFSETTING LANE REPAIRS WITH Cp JOINT**



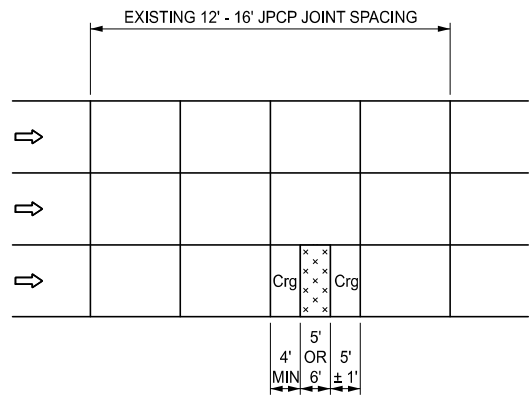
**LONG REPAIR SHOWING Cp JOINT ALIGNMENTS AND LANE TIES**



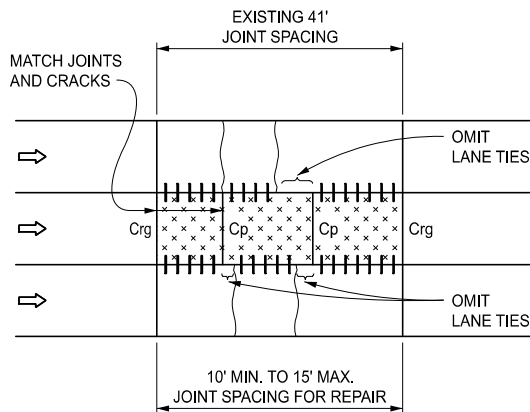
**JOINT PATCH ADJACENT TO WIDENING SLAB**



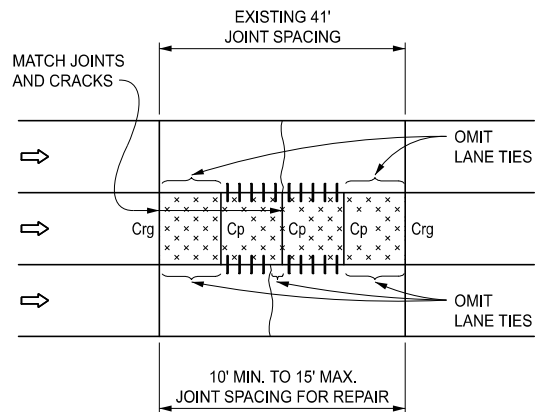
**FULL WIDTH MULTI-LANE REPAIRS WITH OFFSET IN ONE LANE**



**REPAIR OF 12' - 16' JPCP WITH ONLY ONE MID-PANEL CRACK**  
(IF THE PANEL HAS MORE THAN ONE MID-PANEL CRACK OR IF THE JOINT SPACING IS 12' REPLACE ENTIRE PANEL)  
(SINGLE LANE OR FULL WIDTH REPAIR)



**TWO CRACK PANEL REPAIR**



**MID PANEL CRACK REPAIR**



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

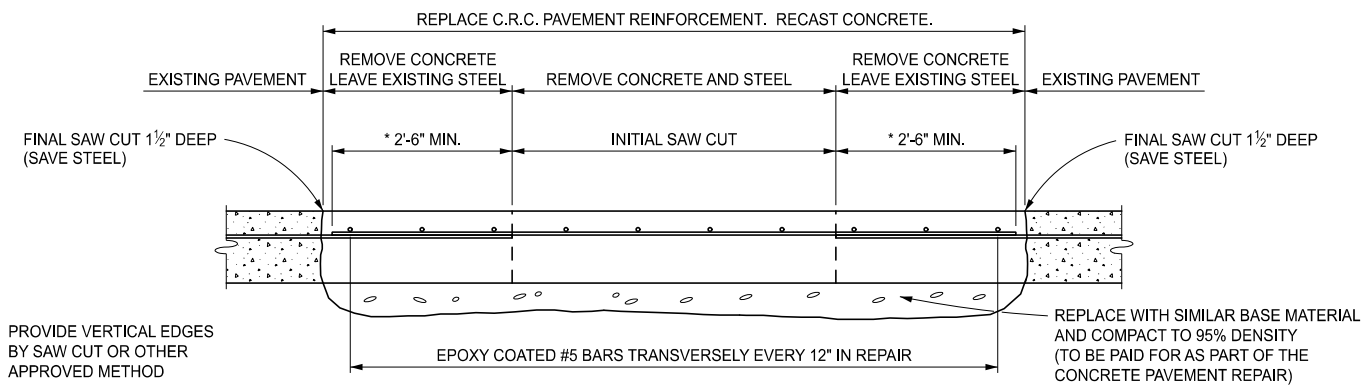
STANDARD PLAN FOR  
CONCRETE PAVEMENT REPAIR

(SPECIAL DETAIL)  
FHWA APPROVAL

09/18/2023  
PLAN DATE

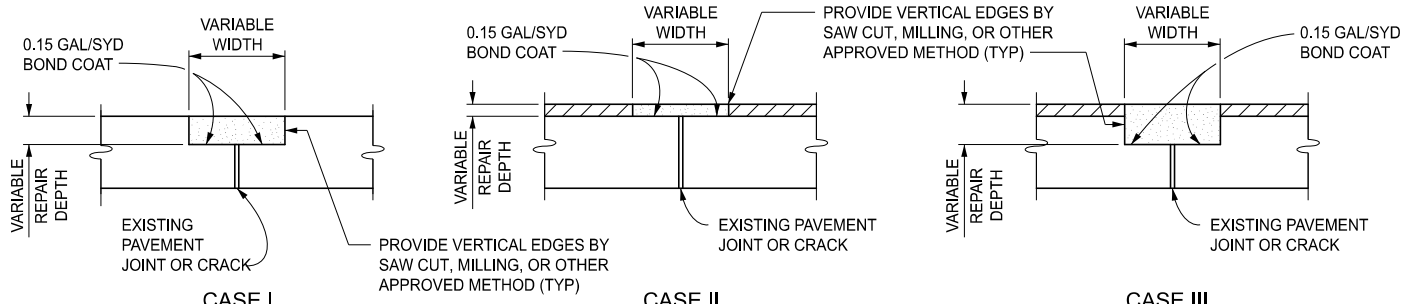
**R-44-G**

SHEET  
5 OF 7



\* NOTE: IF EXISTING REINFORCEMENT LAPS ARE ENCOUNTERED IN THIS AREA, FINAL SAW CUT MUST BE MOVED BACK TO PROVIDE MINIMUM 2'-6" LAP OF PAVEMENT REINFORCEMENT.

**REPAIRING CONTINUOUSLY REINFORCED CONCRETE**



**CASE I**  
HMA REPAIR OF CONCRETE PAVEMENT  
REMOVE LOOSE DETERIORATED CONCRETE. (NOT TO EXCEED PAVEMENT THICKNESS)

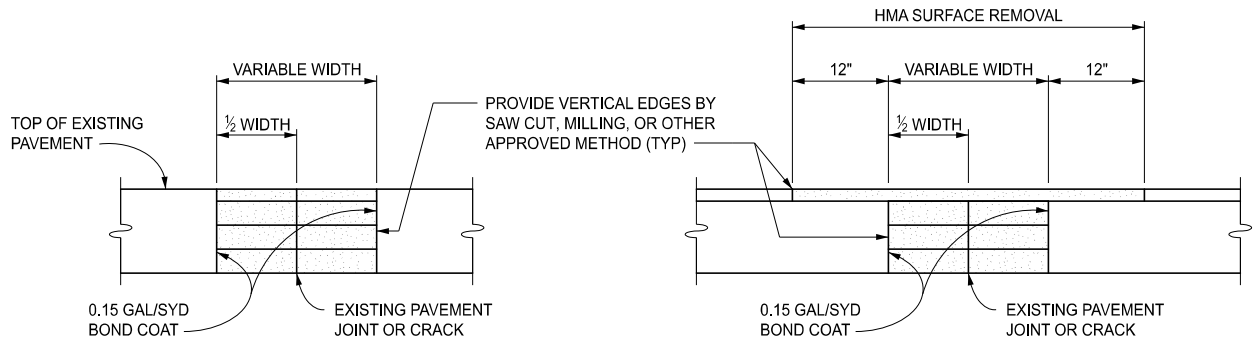
**CASE II**  
HMA REPAIR OF CONCRETE PAVEMENT WITH HMA SURFACE  
REMOVE HMA OVERLAY TO CONCRETE SURFACE.

**CASE III**  
HMA REPAIR OF CONCRETE PAVEMENT WITH HMA SURFACE  
REMOVE HMA OVERLAY AND LOOSE DETERIORATED CONCRETE. (NOT TO EXCEED PAVEMENT THICKNESS)

FOR CASES I, II, & III, THE REMOVED MATERIAL SHALL BE REPLACED WITH A HMA TOP COURSE MIXTURE, OR OTHER APPROVED MIXTURE. THE HMA SHALL BE COMPACTED WITH A MACHINE VIBRATOR OR APPROVED ROLLER WITH BASE LIFT THICKNESSES NOT TO EXCEED 3" AND WITH THE TOP LIFT THICKNESS NOT TO EXCEED 2". THE FINAL SURFACE OF THE REPAIR SHALL BE FLUSH WITH THE EXISTING PAVEMENT SURFACE.

**SURFACE REPAIR FOR JOINT OR CRACK (TRANSVERSE OR LONGITUDINAL)**

DETAIL 7



**CASE IV**  
FULL DEPTH HMA REPAIR OF CONCRETE PAVEMENT  
REMOVE THE DETERIORATED CONCRETE FULL DEPTH. COMPACT LOOSE EXISTING BASE. REPLACE AND COMPACT WITH HMA ANY LOST BASE.

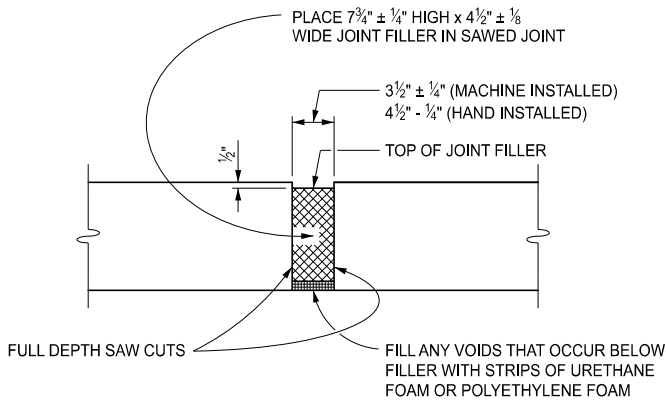
**CASE V**  
FULL DEPTH HMA REPAIR OF CONCRETE PAVEMENT WITH HMA SURFACE  
REMOVE EXISTING HMA DETERIORATED CONCRETE PAVEMENT FULL DEPTH. COMPACT LOOSE EXISTING BASE. REPLACE AND COMPACT WITH HMA ANY LOST BASE.

FOR CASES IV, & V, THE REMOVED MATERIAL SHALL BE REPLACED WITH A HMA TOP COURSE MIXTURE, OR OTHER APPROVED MIXTURE. THE HMA SHALL BE COMPACTED WITH A MACHINE VIBRATOR OR APPROVED ROLLER WITH BASE LIFT THICKNESSES NOT TO EXCEED 3" AND WITH THE TOP LIFT THICKNESS NOT TO EXCEED 2". THE FINAL SURFACE OF THE REPAIR SHALL BE FLUSH WITH THE EXISTING PAVEMENT SURFACE.

**FULL DEPTH REPAIR FOR JOINT OR CRACK (TRANSVERSE OR LONGITUDINAL)**

DETAIL 8

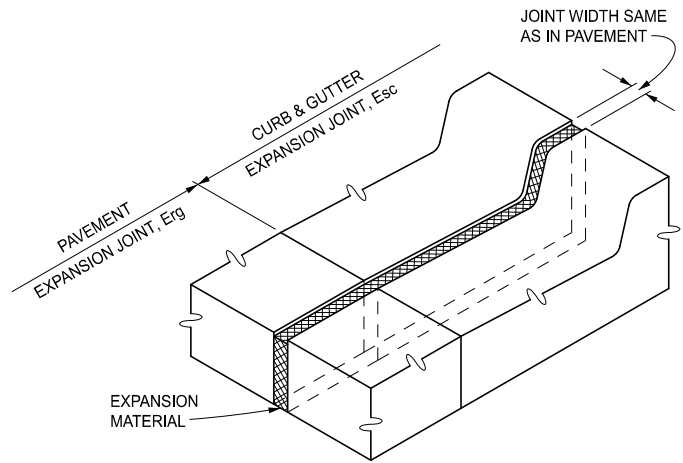
<p>DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE</p>	<p>STANDARD PLAN FOR CONCRETE PAVEMENT REPAIR</p>		<p><b>R-44-G</b></p>	<p>SHEET 6 OF 7</p>
	<p>(SPECIAL DETAIL) FHWA APPROVAL</p>	<p>09/18/2023 PLAN DATE</p>		



NOTES:  
 WHEN PRESSURE RELIEF JOINT IS TO BE CONSTRUCTED THROUGH CONCRETE SHOULDER, TRENCHING BELOW CONCRETE MAY BE NECESSARY TO ALLOW ROOM FOR  $7\frac{3}{4}''$  FILLER.

**PRESSURE RELIEF JOINT**

THIS DETAIL ALSO APPLIES TO HMA SURFACED CONCRETE PAVEMENT REQUIRING PRESSURE RELIEF JOINTS



CURB, GUTTER, AND CURB FACE SHALL BE SAWED AS DEEP AS THE EXISTING PAVEMENT THICKNESS. THE REMAINING CONCRETE SHALL BE CHIPPED OUT AND EXPANSION MATERIAL OF SUFFICIENT THICKNESS SHALL BE PLACED IN SAWED JOINT TO FILL THE GAP AS DIRECTED BY THE ENGINEER.

**EXPANSION JOINT, Esc**

NOTES:

CONCRETE PAVEMENT REPAIRS (INCLUDING JOINT TYPES) OR PRESSURE RELIEF DETAILS SHALL BE AS SPECIFIED ON THE PLANS OR IN THE LOG OF PROJECT.

IF THE EXISTING PAVEMENT HAS A HMA SURFACE, THE SAW CUTS SHALL EXTEND THROUGH THE UNDERLYING PORTLAND CEMENT CONCRETE.

SAW OVERCUTS IN ADJACENT LANE, SHOULDER, RAMP, AND GUTTERS THAT WILL REMAIN IN PLACE, SHALL BE CLEANED AND THEN SEALED WITH HOT-POURED RUBBER-ASPHALT.

WHEN THE CONCRETE PAVEMENT REPAIR IS CONSTRUCTED IN PREPARATION FOR AN OVERLAY, Crg JOINT RESERVOIRS AND SEALANTS SHALL BE OMITTED AND EXPANSION JOINTS (Erg) SHALL HAVE THE FIBER JOINT FILLER KEPT FLUSH TO THE PAVEMENT SURFACE.

EXPANSION CAPS SHALL BE ACCORDING TO STANDARD PLAN R-40-SERIES.

TRANSVERSE CONTRACTION Cp AND EXPANSION E2 JOINTS SHALL BE ACCORDING TO STANDARD PLAN R-39-SERIES.

DOWEL AND DEFORMED BARS USED IN Trg, Crg, AND Erg JOINTS SHALL BE EPOXY COATED ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS.

DOWEL BARS AND DEFORMED BARS FOR TIED JOINTS SHALL BE GROUTED INTO EXISTING PAVEMENT WITH A GROUT SELECTED FROM THE PREQUALIFIED MATERIALS LISTED IN THE DEPARTMENT'S "MATERIALS SOURCE GUIDE" UNDER ADHESIVE SYSTEMS FOR GROUTING DOWEL BARS AND TIE BARS FOR FULL-DEPTH CONCRETE PAVEMENT REPAIRS.

THE BACKER ROD SHALL MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.

THE SAME TYPE JOINT SHALL EXTEND ACROSS ADJACENT LANE REPAIRS.

AFTER GROUTING IN-PLACE, RC-250 OR AN APPROVED BOND BREAKER SHALL BE APPLIED TO THAT PORTION OF Crg AND Erg DOWEL BARS THAT EXTEND INTO THE CAST CONCRETE.

REPAIRED CONCRETE PAVEMENTS REQUIRE THAT 1" OF Erg EXPANSION JOINTS BE DISTRIBUTED THROUGHOUT A GIVEN 1000' SECTION.

WHERE THERE ARE NO REPAIR LOCATIONS WITHIN A 1000' LENGTH, NO EXPANSION SPACE WILL BE PROVIDED.

EXPANSION JOINT FILLER SHALL EXTEND THE FULL DEPTH OF THE REPAIR AND BE FLUSH WITH THE EXISTING PAVEMENT SURFACE. PRIOR TO SEALING, THE JOINT FIBER FILLER AT THE PAVEMENT SURFACE SHALL BE REMOVED BY CUTTING 1" WIDE AND  $1\frac{1}{2}''$  DEEP TO PERMIT THE PLACEMENT OF THE HOT-POURED RUBBER ASPHALT SEALANT. HOLES IN EXPANSION JOINT FILLER SHALL BE  $1\frac{1}{2}''$  MAXIMUM DIAMETER AND SHALL BE ALIGNED TO FIT DRILLED HOLES IN CONCRETE.

Erg JOINTS SHALL BE CONSTRUCTED ONLY WHEN THEY EXTEND ACROSS ALL LANES, RAMPS, OR SHOULDERS.

WHEN Erg JOINTS ARE PLACED ADJACENT TO CONCRETE CURB AND GUTTER THAT IS NOT REQUIRED TO BE REMOVED, AN Esc JOINT SHALL BE CONSTRUCTED IN THE CURB AND GUTTER.

JOINT RESERVOIRS FOR THE HOT-POURED RUBBER-ASPHALT SEALANT SHALL BE ABRASIVE BLAST CLEANED, FOLLOWED BY A FINAL CLEANING OF OIL-FREE COMPRESSED AIR PRIOR TO SEALING.

LANE TIES (TO ADJACENT PAVEMENT LANE, WHEN REQUIRED) SHALL BE SPACED ACCORDING TO STANDARD PLAN R-41-SERIES, EXCEPT THAT THE FIRST LANE TIE ADJACENT TO A TRANSVERSE JOINT SHALL BE INSTALLED AT A DISTANCE OF 1'-8" FROM THE JOINT. WHEN BOTH SIDES OF A LONGITUDINAL JOINT ARE POURED INTEGRALLY, LANE TIES SHALL BE STRAIGHT DEFORMED EPOXY COATED BARS CAST-IN-PLACE AS SPECIFIED ON STANDARD PLAN R-41-SERIES. WHEN ADJACENT LANES ARE CAST SEPARATELY, LANE TIES SHALL BE GROUTED-IN-PLACE AS SPECIFIED ON THIS PLAN. THE GROUT SHALL BE SELECTED FROM THE PREQUALIFIED MATERIALS LISTED IN THE DEPARTMENT'S "MATERIALS SOURCE GUIDE", UNDER LANE TIES.

THE MONTH AND YEAR OF CASTING AND STATION NUMBER (IF REMOVED) SHALL BE STENCILED ON EACH CONCRETE REPAIR.

ALL REPAIRS WILL BE JOINTED PLAIN CONCRETE PAVEMENT.



DEPARTMENT DIRECTOR  
 BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR  
**CONCRETE PAVEMENT REPAIR**

(SPECIAL DETAIL)  
 FHWA APPROVAL

09/18/2023  
 PLAN DATE

**R-44-G**

SHEET  
 7 OF 7



## NOTICE TO BIDDERS - INQUIRY

All inquiries concerning the plans and proposal for this project are to be directed to:

Name

Title

[MDOT-eProposal@Michigan.gov](mailto:MDOT-eProposal@Michigan.gov)

E-mail Address

**All inquiries must be made by E-mail through the electronic proposal system at [MILogin for Third Party](#)'s MDOT e-Proposal application.**

Telephone inquiries will not be answered.

To be able to process and distribute an addendum, if required, all inquiries shall be made at least seven (7) calendar days before the letting.

Inquiries made after this date will be considered by MDOT, but will not require a response.

Inquiries made by MDOT's e-Proposal application must include the following information:

- Proposal Item Number
- Contract ID
- Name of Inquiring Person
- Company Name
- Phone and E-mail address
- Detailed question(s) with reference to proposal page and plan sheet number

Other employees of MDOT have been instructed to direct all inquiries to the person mentioned above.

07/2021