

ROAD COMMISSION FOR IONIA COUNTY

170 E. Riverside Drive • P.O. Box 76 • Ionia, Michigan 48846 • Phone (616) 527-1700 • Fax (616) 527-8848

CHARLES G. MINKLEY
Commissioner

WILLIAM E. WEISGERBER
Commissioner

KENNETH L. GASPER
Commissioner

ALBERT A. ALMY
Commissioner

KAREN D. BOTA
Commissioner

DOROTHY G. POHL, CPA
Managing Director

PAUL A. SPITZLEY, P.E.
County Highway Engineer

A mandatory pre-bid meeting will be held at 9:00 a.m. on Thursday, June 2, 2016 at the Ionia County Road Commission Office, located at 170 E. Riverside Drive, Ionia, MI 48846. All prospective bidders must attend in order to be considered eligible to bid.

Notice to Bidders

Sealed bids will be received by the Board of Ionia County Road Commissioners until 11:30 a.m., Tuesday, June 14, 2016 at which time they will be publicly opened and read in the Commission offices for:

I-96 CONCRETE REPAIRS

The contractor shall certify that all materials and equipment meet current Michigan Department of Transportation specifications. All bids will meet or exceed the specifications established by the Ionia County Road Commission and/or the Michigan Department of Transportation.

Further information on which bids shall be based is available at the road commission office; phone 616-527-1700 or www.ioniacountyroads.org on the "Doing Business" page. The bid form is to be returned in a sealed envelope and plainly marked "Sealed Bid for I-96 Concrete Repairs" and shall include the name and address of the bidder.

The Ionia County Road Commission and/or Michigan Department of Transportation reserve the right to reject any and all proposals or to waive irregularities therein, and to accept any proposals which, in their opinion, may be most advantageous and in the best interest of the Ionia County Road Commission and the Michigan Department of Transportation.

Board of County Road Commissioners Ionia County, Michigan

Albert A. Almy - Chairman
Karen D. Bota - Vice Chairman
Charles G. Minkley - Member
William E. Weisgerber - Member
Kenneth L. Gasper - Member

**BOARD OF COUNTY ROAD COMMISSIONERS
Of the County of Ionia**

INSTRUCTIONS TO BIDDERS

Sealed bids will be publicly opened at the offices of the Board of County Road Commissioners of the County of Ionia, State of Michigan, located at 170 E. Riverside Drive, Ionia, MI 48846.

Refer to the **NOTICE TO BIDDERS** for the exact timing and for the identification of the bids as related to furnishing materials, services, equipment, work and/or supplies with the terms, conditions, specifications, drawings, plans and special provisions as stated herein and hereto attached.

The Board's practice is to open and read the bids at the designated time and then refer the file to staff for tabulation and analysis. During this period, bid files are closed until presented to the Board of County Road Commissioners at their next regular meeting. Notifications of award, pending award, or other outcome, will be made in writing. The bid tabulation will accompany award, as is customary for item bid, or may be requested by phone at (616) 527-1700.

1. Bids must be submitted on the Board's blank form when provided. The bid shall be legibly prepared in ink or typewriter. The bidder must initial any erasures or alterations.
2. Specifications and plans should not be returned unless otherwise stated herein.
3. Bids shall be mailed or delivered. **Bids shall be in a sealed envelope and identified on the outside as to the bid concerned.** Bids will NOT be accepted by fax or email.
4. Bids will not be accepted after the time designated for the opening of the bids. The bidder shall assume full responsibility for delivery of bids prior to the appointed hour and shall assume the risk of late delivery or non-delivery regardless of the manner used for the transmission thereof. **Bids will be accepted at the Road Commission office** on behalf of the Board at any time during normal business hours only, said hours being 6:00 a.m. to 4:00 p.m., Monday through Thursday, with the exception of legal holidays.
5. It is understood that the Board of County Road Commissioners is a governmental unit and as such, is exempt from the payment of all State and Federal taxes, except as allowed by the regulatory agencies to be included in the cost of materials and services.
6. The bidder, as evidenced by the execution of the bid form, thereby declares that the bid is made without collusion with any other person, firm, or corporation and agrees to furnish all bid items in strict adherence with all Federal regulatory measures.
7. The Board reserves the right to reject any and all bids, to waive any irregularities therein, and to accept any bid which, in the opinion of the Board, may be most advantageous and in the best interest of the County. In case of error in the extension of prices in the bid or other arithmetical error, the unit prices will govern.

CONTRACT FOR: I-96 Concrete Pavement Repairs

It is the intent of the Ionia County Road Commission to contract for the Michigan Department of Transportation for concrete pavement repairs on west & east bound I-96 between the 62 mile-mark and Kent St.

Scope: The contractor shall furnish all the materials, labor and equipment needed for concrete pavement repairs as required, per the Michigan Department of Transportation plans and specifications.

General Specifications

Locations: West bound (WB) I-96 between Kent St and the 62 mile-mark and east bound (EB) from the 62 mile-mark to Kent St. as per the enclosed inventory lists.

A. Qualifications:

1. Licensed by the State of Michigan
2. State of Michigan Pre-qualified
3. Minimum of 5 years experience in the field

B. Completion Date:

September 30, 2016

C. Contacts:

Questions concerning the plans or specifications should be directed to Ken Hildebrand, MDOT at 231-250-6396 or Lon Finch, Ionia County Operations Director at 616-902-0718.

D. Schedule of Work:

Upon award, work will be scheduled with the Michigan Department of Transportation and as specified.

E. Traffic Control:

1. Traffic control shall be in compliance with the minimum requirements set forth in Part VI of the current "Michigan Manual of Uniform Traffic Controls." This section is inclusive of traffic control requirements for equipment.
2. Any questions on this subject should be directed to MDOT at (231) 250-6396.

F. Barriers:

Contractor shall be responsible for providing and maintaining adequate barriers and or safe guards to protect the public and the workers.

G. Disposal

Contractor shall be responsible for the cleanup of all construction debris, its removal and disposal as required. All Concrete debris shall be placed at **Bugbee Pit** located on Quarry Rd in Ionia County.

H. Insurance Requirements:

1. To the fullest extent permitted by law, the contractor shall indemnify and hold harmless the Michigan Department of Transportation and the Ionia County Road Commission and its agents and employees from and against all claims, damages, losses and expenses including, but not limited to, attorneys' fees arising out of or resulting from the performance of this contract including claims, damages, losses and expenses attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, but only to the extent caused by the fault, negligent acts, or

omissions of the contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage loss or expense is caused in part by the parties indemnified hereunder. This obligation does not include an obligation to indemnify the parties, indemnified hereunder for their sole negligence and shall not be construed to negate or modify other rights or obligations of indemnity that otherwise exist as to the parties or persons described herein, arising out of and during the progress and to the completion of work all in accordance with Public Act 468 of 2012 and the 2012 Michigan Department of Transportation's "Standard Specifications for Construction", Division 1, paragraph 1.07.10 with the following minimum requirements:

Workman's Compensation: Statutory Coverage

Bodily Injury and Property Damage Other Than Automobile:

Each Occurrence	\$1,000,000
Aggregate	\$2,000,000

Bodily Injury Liability and Property Damage Liability Automobile:

Bodily Injury Liability Each Person	\$500,000
Each Occurrence	\$1,000,000
Property Damage Liability, Each Occurrence	\$1,000,000

Combined Single Limit for Bodily Injury and Property Damage Liability:

Each Occurrence	\$2,000,000
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2. Insurance Certificate declaring The Michigan Department of Transportation and Ionia County Road Commission as additional insured, not certificate holder, must be issued and shall become part of the contract.
3. Contractor shall maintain current up-to-date insurance coverage during the term of the contract and failure to do so shall result in termination of said contract.
4. Certificate must be submitted within fifteen days upon notification of award of contract and prior to contract signing.

J. Payment:

Upon completion, payment will be authorized and approved by the Michigan Department of Transportation.

K. Warranty:

1. Upon completion, a one-year warranty on the installation must be furnished.
2. Upon completion, all manufacturer's warranties, if applicable, must be furnished.

L. Submission of bid will be construed as a conclusive presumption that the contractor is thoroughly familiar with the bid requirements and specifications and that he/she understands and agrees to abide by each and all of the stipulations and requirements contained therein.

M. "The ICRC, in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 USC 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Federally-assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, minority

business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of gender, disability, race, color, or national origin in consideration for an award.”

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

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

action with respect to any subcontract or procurement as the Ionia County Road Commission may direct as a means of enforcing such provisions including sanctions for non-compliance: Provided however, that in the event a contractor becomes involved in, or is threatened with litigation with a subcontractor or supplier as a result of such direction; the contractor may request the Ionia County Road Commission to enter into such litigation to protect the interests of the County, and in addition the contractor may request the State highway department to enter into such litigation to protect the interests of the State and/or the United States to enter into such litigation to protect the interests of the United States.

Technical Specifications

A. Concrete Pavement Repairs and Debris Removal/Disposal

1. The contractor shall provide equipment, labor, and material and traffic control. The equipment and labor will be used to perform the work of saw cutting existing concrete pavement, removal of the existing pavement, placement of the concrete pavement repair and disposal of the removed existing concrete pavement and related debris. The contractor shall also perform the saw cutting and resealing after the concrete pavement repairs are placed.
2. The single pay item within this contract will be per cubic yard for placed concrete pavement. The as-bid unit price for this item shall include all equipment, labor, and materials needed to perform all aspects of the joint repairs including all specified traffic control measures.

B. Setup

1. Work shall be performed as described in the Maintenance of Traffic section of this document. All work shall be completed by September 30, 2016.
2. **No work will be performed or lane closures allowed during holiday periods.**
3. **The ONLY allowable lane closure timeframes:**
 - **Nightly Saturday through Thursday from 8 pm – 7 am**
 - **Friday 9 pm – Monday 5 am**
4. **In efforts to meet the timeframes specified, the contractor may utilize Rapid Set Concrete for shortening of joint cure time. Rapid Set Concrete must be in accordance with special provision, 12DS603. If the contractor elects to use Rapid Set Concrete as specified, it must be stated in the submitted bid.**
5. The contractor shall notify the Road Commission and MDOT 10 days before the start of work. Once the work starts the contractor shall stay on site until the work is completed per the Road Commission.
6. Perform concrete pavement repairs in accordance with the MDOT 2012 Standard Specifications for Construction, MDOT standard plans (R-44 -F and R-45-G are included in this document), and as directed by the MDOT Engineer.
7. The location of the concrete pavement repairs shall be determined by the ICRC and the MDOT Maintenance Coordinator. The location, size and quantity of patches may be field

adjusted by ICRC or the MDOT Maintenance Coordinator, depending on conditions. For informational purposes assume 12' x 7' on average.

8. All contraction joints (CRG and C2) and expansion joints (ERG) shall be placed as directed by the Engineer.
9. The contractor shall locate the existing Perforated Drainage System (PDS). The general location is under the shoulder. Damaged PDS shall be the responsibility of the contractor and repaired according to the engineer.
10. The contractor is informed that the existing concrete pavement thickness is approximately 9 inches.

Bid Form: I-96 Concrete Pavement Repair

Concrete Placed Cost per Cu. Yd. \$ _____

State License Number _____

MDOT Prequalified Copy _____

Years of Experience _____

References of contracts completed in this type of installation:

Co. Name	Contact Person	Phone #
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_____	_____	_____
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_____	_____	_____
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Warranty per specifications _____

Fed. Emp. ID# _____

Authorized Signature

Date

Print Name / Title

Phone Number

Company Name

Fax Number

Address

Cell Phone Number

City, State, ZIP

Email address

MICHIGAN
DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION
FOR
**MAINTAINING TRAFFIC,
PERMANENT SIGNING AND PAVEMENT MARKING**

GND:SAH

1 of 5

GND:APPR:BEF:KH:05-20-16

- a. **Description.** This work shall consist of concrete joint repairs on eastbound and westbound I-96 from approximately the 62-mile mark to Kent Street in Ionia County.
- b. **General.** Traffic shall be maintained according to the most current edition of the Standard Specifications for Construction, including any Supplemental Specifications, and as specified herein.
 1. The contractor shall notify the Engineer a minimum of 72 hours prior to the implementation of any detours, road, bridge, ramp or lane closures and major traffic shifts. The contractor shall start work at the time agreed upon with the Engineer. Any delay in the start time may result in delaying the project, until another start date can be agreed upon with the Engineer. Any delay on a new start date may not be reason for an extension of time.
 2. The contractor shall coordinate his operations with contractors performing work on other projects within or adjacent to the Construction Influence Area (CIA) as described below.
 3. MDOT maintenance crews and/or Contract Maintenance Agencies may perform maintenance work within or adjacent to the Construction Influence Area (CIA). The Maintenance Division of MDOT and/or Contract Maintenance Agency will coordinate their operations with the Engineer to minimize the interference to the Contractor. No additional payment will be made to the contractor for the joint use of the traffic control items.
- c. **Construction Influence Area (CIA).** The CIA will include the rights-of-way of the following roadways and ramps within the approximate limits described below:
 1. On I-96 from approximately 3 miles west of the 62-mile mark to 3 miles east of Kent Street.
 2. In addition, the CIA will include the right-of-way of any intersecting roads and ramps adjacent to the work zone for a distance of approximately ¼ mile in advance of the state trunkline.

d. Traffic Restrictions.

1. No work will be performed or lane closures allowed during the Memorial Day, July 4th, Labor Day, or Thanksgiving holiday periods, as defined by the Engineer.
2. A minimum of 1 lane of traffic shall be maintained at all times on eastbound & westbound I-96.
3. Allowable lane closure timeframes:
 - Nightly Saturday through Thursday from 8 pm – 7 am
 - Friday 9 pm – Monday 5 am
4. Additional lane closure restrictions will be required on Saturdays when there is a home football game at Michigan State University or the University of Michigan. The dates below are subject to change.
 - September 2 (8 pm MSU game)
 - September 3 (TBD for U of M game)
 - September 10 (TBD for U of M game)
 - September 17 (TBD for U of M game)
 - September 24 (TBD for both)
5. No lane closures will be allowed outside of the allowable timeframes listed.
6. No more than 1 lane closure on each bound, maximum 3 miles in length, will be permitted at one time.
7. All centerline saw cutting must be done during left lane closures.
8. Lighting for night work shall meet the requirements set in the attached Special Provision.
9. Restrict access between traveled lanes and work areas to specific locations for construction vehicles. The number of access points and their locations requires the approval of the Engineer. If requested, the Contractor will be required to submit a "Work Zone Traffic Control Plan" to the Engineer, at the pre-construction meeting, in accordance with Section 104 of the Standard Specifications for Construction. The Engineer will have seven (7) calendar days to review the plan for acceptance or provide comments for plan revisions required to obtain acceptance. At a minimum, the Plan shall include 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 Plan. No work shall begin prior to acceptance of the "Work Zone Traffic Control Plan". Additional time required to obtain an accepted "Work Zone Traffic Control Plan" shall not be cause for delay or impact claims. All costs associated with obtaining an acceptable Plan, providing and executing all parts of the accepted Plan including required traffic control devices, or resolving an incomplete or unacceptable Plan shall be borne by the Contractor.
10. Once work is initiated that includes any lane restrictions, that work shall be continuous until completed. A lack of work activity for more than 3 hours (with the

exception of mainline concrete curing) will require the removal and replacement of lane restrictions at the Contractor's expense.

11. Two channelizing devices meeting MMUTCD standards shall be used to delineate uncured/open concrete joints as directed by the Engineer.
12. The location and duration of equipment and materials stored in the right of way, public or private property shall be as approved by the Engineer.
13. Sign covers shall be placed over existing regulatory, warning and construction signs that are not applicable during construction.
14. Changes or adjustments in the temporary signs and maintaining traffic typicals provided may be necessary to fit field conditions as determined by the Engineer.

e. Traffic Control Devices.

1. General

- A. All traffic control devices and their usage shall conform to the most current edition of the Michigan Manual of Uniform Traffic Control Devices (MMUTCD) specifically part 6, which is available on the Traffic and Safety Support Area web site www.michigan.gov/tands.
- B. During non-working periods, any work site with uncompleted work shall have applicable advance warning signs and channelizing devices, at specific locations, as directed by the Engineer, at no additional cost to the Department.
- C. The contractor shall be required to drive through the Construction Influence Area at a minimum at the beginning and end of each work day to ensure all traffic control devices remain properly installed.
- D. All items used for maintaining traffic, which include but are not limited to temporary signs, plastic drums, and Type III barricades, must meet the "**acceptable**" criteria as defined in the most current version of the ATSSA publication entitled "Quality Guidelines for Temporary Traffic Control Devices and Features" at the time of initial deployment and as needed throughout the project.

2. Temporary Signs

- A. Refer to the attached sheet M0020a for device spacing, taper/shift lengths, and buffer zones.
- B. Signing for the supplemental speed limit signs will be as shown on attached Figure M0100a.
- C. Signing for a nighttime only single lane closure will be as shown on attached Figure M0990a.
- D. Signing for a single lane closure that will be in place during the day will be as shown on attached Figure M1040a.

- E. All temporary signs on this project will be on portable supports and must be laid down with the feet off when they are not applicable.
- F. 'Andy's Law' signs will not be placed on this project.
- G. Temporary traffic control devices shall be as shown on attached Special Detail WZD-125-E or shall be a NCHRP-350 compliant or MASH accepted design.
- H. All temporary signs shall be mounted at a 5-foot minimum bottom height in uncurbed areas and 7-foot minimum bottom height in curbed or pedestrian areas.
- I. All temporary signs shall be faced with fluorescent prismatic retro-reflective sheeting.
- J. Portable Changeable Message Signs (PCMS)
 - 1. PCMS shall be used during the life of this project. The PCMS shall be used to inform traffic of upcoming work and changing traffic control during the life of the project and as directed by the Engineer. They shall be installed off the shoulder where possible with the wheels blocked up, and operated a minimum of 7 calendar days prior to the start of work. Each PCMS shall be delineated with 3 plastic drums. The drums shall be placed on the shoulder at an offset and alignment as directed by the Engineer.
 - 2. Moving the PCMS's to multiple locations and displaying different messages will be expected through the life of the project. All messages and locations of the signs shall have the approval of the Engineer prior to displaying the message. All PCMS shall have the ability to change/update the message from a remote location. PCMS shall be turned off and removed from the roadway when not being used to display a message approved by the Engineer. Turning the sign parallel to traffic is not acceptable.
 - 3. Sample messages include:

I-96	Fri 8 PM
Lane	Thru
Closures	Mon 5 AM
Nightly	8 PM
Lane	TO
Closures	7 AM

3. Channelizing Devices

- A. Channelizing devices required shall be high intensity plastic drums.
- B. If the right lane is closed in the vicinity of an entrance ramp and patch locations allow, the channelizing devices shall be arranged to allow the

ramp the same acceleration taper to merge into the left lane as the ramp has during periods without construction. Channelizing devices shall have a maximum spacing of 25' in the tapers of ramps.

- C. A miscellaneous quantity of 20 each of Plastic Drum, High Intensity, Furn & Oper are included to be used at the discretion of the Engineer.

f. **Measurement and Payment**-The estimate of quantities for maintaining traffic is based on signing and related traffic control devices for 1 single lane closure, and the description in this Special Provision. Payment for these devices shall be in accordance with the most current edition of the Standard Specifications for Construction unless otherwise specified.

1. Payment for temporary signs shall be made on the maximum square foot of sign legends in use at any one time during the project.
2. Any additional signing or maintaining traffic devices required to expedite the construction shall be at the contractor's expense.

ESTIMATE OF TEMPORARY SIGN QUANTITIES

(for information only)

SIGN	MESSAGE	QTY.	inch x inch		Square Foot
W3-2	YIELD AHEAD Symbol	2	48	48	32
R1-2	YIELD	4	48	48	28
Sign, Type A, Temp, Prismatic, Furn/Oper			Total (Sft):		60

SIGN	MESSAGE	QTY.	inch x inch		Square Foot
E5-1	Exit with arrow symbol	2	72	60	60
R2-1	SPEED LIMIT 45	3	48	60	60
R2-1	SPEED LIMIT 60	3	48	60	60
R2-1	SPEED LIMIT 70	2	48	60	40
W3-5b	REDUCED SPEED ZONE AHEAD	2	48	48	32
W4-2 (R)	Rt Channelizing Symbol	2	48	48	32
W4-2 (L)	Lt Channelizing Symbol	2	48	48	32
W20-1	ROAD WORK AHEAD	4	48	48	64
W20-5 (R)	RIGHT LANE CLOSED AHEAD	2	48	48	32
W20-5 (L)	LEFT LANE CLOSED AHEAD	2	48	48	32
W20-5 (Mod) (R)	RIGHT LANE CLOSED 1 MILE	2	48	48	32
W20-5 (Mod) (L)	LEFT LANE CLOSED 1 MILE	2	48	48	32
W20-5 (Mod) (R)	RIGHT LANE CLOSED 2 MILES	2	48	48	32
W20-5 (Mod) (L)	LEFT LANE CLOSED 2 MILES	2	48	48	32
Sign, Type B, Temp, Prismatic, Furn/Oper			Total (Sft):		572

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
LIGHTING FOR NIGHT WORK

OPR:JAJ

1 of 3

APPR:RJZ:BRZ:11-04-10
FHWA:APPR:06-01-11

Delete subsection 812.03.H, on page 619 of the Standard Specifications for Construction in its entirety and replace it with the following:

H. Lighting for Night Work. Furnish, install, operate, maintain and replace, as needed, fixed, portable, or equipment mounted lighting systems that provide lighting to ensure worker and inspector safety on and around the worksite. Provide lighting that allows workers and inspectors to clearly conduct all operations and inspections during hours of darkness. Provided lighting systems must meet the requirements set forth in *MIOSHA Rule 408.40133 Illumination, MIOSHA Rule 408.42223 (7) Traffic Control*, section 706 of the Standard Specifications for Construction, and the contract.

Provide and position the lamps to meet the following lighting requirements: Provide a minimum illumination intensity of 10 foot-candles (108 lux) on a jobsite where construction work is being performed. Maintain a minimum of 5 foot-candles (54 lux) throughout the entire area of operation where workers may pass through on foot or are present but are not performing construction work. Vehicle or equipment headlights are not considered as an approved light source.

Lighting levels will be measured with an illuminance meter. Readings will be taken where the work is being performed, in a horizontal plane 3 feet above the pavement or ground surface. When necessary, provide additional lights to overlap the footprints of the lights so that the lighting requirements are continuous, and do not fall below the minimum lighting requirements throughout the work area.

Submit a "work area lighting plan" to the Engineer for review for approval a minimum of 14 calendar days prior to the start of work. The Engineer will have 7 calendar days to review the plan for approval or provide comments for plan revisions required to obtain approval. At a minimum, the plan must include the proposed lighting locations for construction equipment, vehicles and pedestrian paths, and measures that will be taken to ensure compliance with the plan. All costs and any additional time required to obtain an approved "work area lighting plan" will not be cause for delay or impact claims.

Design and operate the lighting system to avoid glare that interferes with traffic, workers, or inspection personnel. Aim flood, spot or stadium type luminaries downward at the work and rotated outward no greater than 30 degrees from nadir (straight down). Position balloon lights at least 12 feet above the roadway.

Design the lighting system to light the work area without spilling over to adjoining property. Modify the lighting system, if directed by the Engineer, by rearranging the lights or adding hardware to shield the lights when the lighting system is disturbing adjoining properties.

Provide a power source that adequately powers the lamps to their full capacity. Provide all lighting equipment in good operating condition and in accordance with applicable safety and design codes.

Provide backup lighting to replace lights and equipment during nighttime operations. Store the backup equipment on the project site and have it available for use at all times during the nighttime operations. The backup systems must meet the same criteria as the primary system.

Drive through and observe the lighted area from all traveled directions, including cross roads after initial lighting set up to determine the adequacy of placement and potential for glare. Adjust lighting alignment if necessary. Ensure that the alignment of the lighting does not interfere with or impede traffic on open roadways.

At any time during the course of the nighttime work, should the lighting not meet the requirements of this special provision, the work must be halted until adequate lighting is provided. This suspension of work will be at no additional cost to the Department and the contractor cannot receive an extension of time to complete the work.

Use balloon lighting for nighttime traffic regulating operations. Position the balloon lighting for traffic regulators so that the light illuminates the front of the traffic regulator without casting a shadow on the front of the regulator, the light or equipment does not impair the regulator's vision, and the equipment does not impede the regulator's escape path. Position the lighting so that the light does not wash out the lighted arrow at the regulator's station and does not obscure the lighted arrow. Position lighting so that it does not create glare or shine directly in the eyes of oncoming drivers. Illuminate the traffic regulator's station with a minimum illumination intensity of 10 foot-candles (108 lux). Lighting devices used to illuminate nighttime traffic regulator operation that have failed or have been damaged are to be replaced immediately.

Mount the light fixtures on the construction equipment in a mobile operation, in such a way that the view of the equipment operator is not obstructed and a secure connection to the equipment is ensured, with minimum vibration.

Provide each paver with the minimum illumination as specified in this special provision so that the operator and paving crew can clearly see the material going into the hopper, the auger area, and for alignment. Provide a continuous power source to ensure the lighting is in operation at all times during work. The light should be adjustable up and down, and rotatable horizontally. The area behind the paver must be lighted so the work and operations can be seen clearly and inspected properly.

Equip each roller with four headlights, two facing in each direction of travel. Turn headlights off when facing oncoming traffic and only use them when moving equipment from one location to another.

Provide a continuous power source on each roller with a light tower. The light tower must be a minimum of 4 feet higher than the roller.

When light equipment is not in use, it must be removed from the work area.

Delete subsection 812.04.T, on page 631 of the Standard Specifications for Construction in its entirety and replace it with the following:

T. **Ltg for Night Work.** The unit price for Ltg for Night Work includes submittal of a work area lighting plan and furnishing, installing, relocating, replacing, and maintaining lighting for the entire project. The pay item also includes providing a light meter to the Engineer for use throughout the project duration. There will be no adjustments in the lump sum price regardless of the number or type of lighting systems or if stand by units are required to complete all night work on the project as described in subsection 812.03.H and as directed by the Engineer.

603.02

a calcium chloride admixture. Provide coarse aggregate with no greater than 2.5 percent absorption in accordance with ASTM C 127.

The Engineer will proportion Grade P-NC mixtures. Provide the mixture as ready-mixed concrete, with the required consistency, to the project.

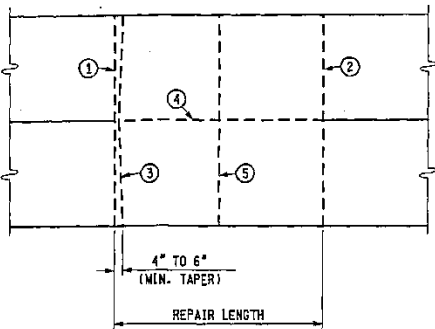
Use Grade P-NC concrete patching mixture containing 658 pounds per cubic yard (7 sacks) of cement when the forecasted air temperature is above 59 °F. Use 752 pounds per cubic yard (8 sacks) of concrete when the forecasted air temperature is 59 °F or less.

The Contractor may provide a non-chloride, Type C, or Type E, set accelerating admixture, from the Qualified Products List, with the required cement content to achieve the flexural strength of 300 psi by the required opening-to-traffic time.

603.03. Construction.

A. Equipment Requirements. Provide equipment necessary to perform the work in accordance with section 602 and the following:

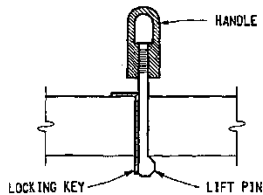
1. **Drilling Machine.** Provide a drilling machine and use methods to drill holes in the existing pavement vertical surfaces in accordance with the following:
 - a. Drill the holes to the required diameter and depth ($\pm\frac{1}{2}$ inch) midway between the top and bottom surfaces of the concrete pavement.
 - b. Drill holes parallel to the pavement surface and parallel to the longitudinal joint within a tolerance of $\pm\frac{1}{4}$ inch.
 - c. When positioned against the face of the existing pavement, drill holes parallel to the longitudinal joint.
 - d. Support the drill on rails that rest on the pavement surface at both ends of an 8 foot long repair, or by other alignment methods approved by the Engineer, to ensure holes meet the requirements of subsection 603.03.A.1.b.
 - e. Provide a drill that uses mechanically applied pressure for forward and reverse travel. Match the drill and pressure mechanism to drill the nominal depth holes to prevent cracking the concrete and causing spalls more than $\frac{1}{2}$ inch horizontally or vertically.
 - f. Equip the drill with a snug fitting drill guide bushing, positioned against the face of the concrete to prevent eccentricity or overriding of the holes more than $\frac{1}{16}$ inch, and to maintain the alignment tolerances.
 - g. Space bars in accordance with Standard Plan R-44 Series.



PLAN OF SAWING DIAGRAM

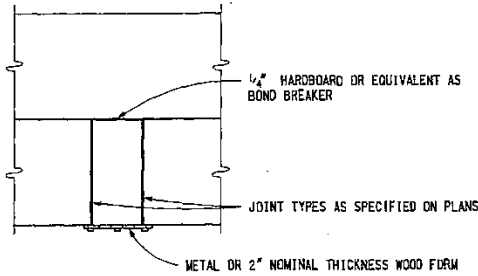
THIS METHOD OF REMOVING DISTRESSED CONCRETE SHALL BE USED IN CONJUNCTION WITH FULL DEPTH CAST-IN-PLACE REPAIRS LESS THAN 50'-0" LONG AND IS OPTIONAL FOR REPAIRS OVER 50'-0" IN LENGTH.

- ① & ② THESE SAW CUTS SHALL BE FULL DEPTH AND PERPENDICULAR TO THE EDGE OF THE ROADWAY, WITHIN A TOLERANCE OF 1". NO OVERCUTTING INTO ADJACENT LANES SHALL BE MADE UNLESS THE OVERCUT IS WITHIN THE LIMITS OF A SUBSEQUENT REPAIR TO THE ADJACENT LANE. SHOULDER OVERCUTS WILL BE ALLOWED.
 - ③ THIS FULL DEPTH SAW CUT IS MADE TO FACILITATE OPENING A TRENCH ACROSS THE SLAB TO RELIEVE COMPRESSION IN THE PAVEMENT PRIOR TO LIFTING OUT 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 6'-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 6'-0" BY 12'-0" OR LESS SLABS INTO SMALLER PIECES TO FACILITATE REMOVAL.

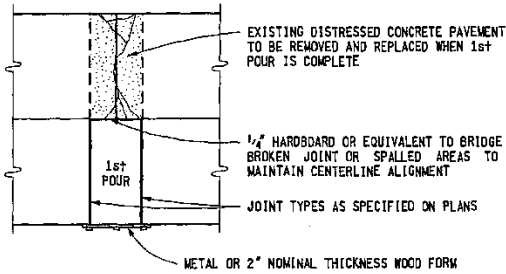


SCHEMATIC OF TYPICAL LIFT PIN ASSEMBLY

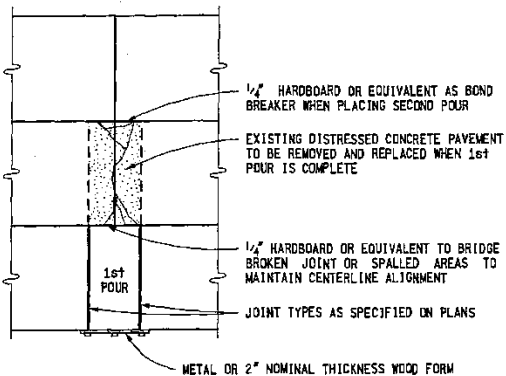
SAWING DIAGRAM & LIFT PIN FOR REMOVING OLD SLAB



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



PREPARED BY
DESIGN DIVISION
DRAWN BY: B.L.T.
CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

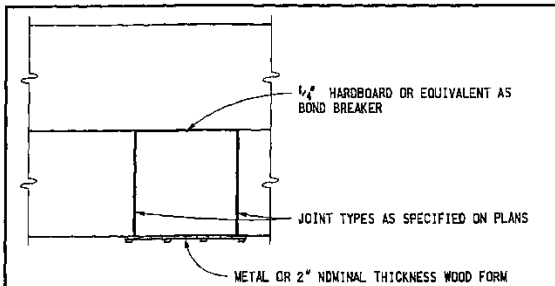
APPROVED BY: *John C. Friend*
ENGINEER OF DELIVERY

APPROVED BY: *Paul A. Van Pelt*
ENGINEER OF DEVELOPMENT

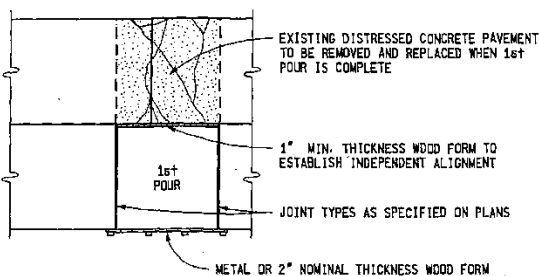
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

CONCRETE PAVEMENT REPAIR

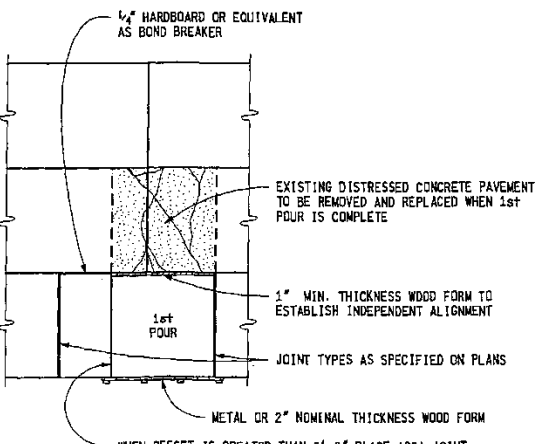
9-10-2010 F.H.W.A. APPROVAL	8-9-2010 PLAN DATE	R-44-F	SHEET 1 OF 6
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ONE LANE REPAIRS
(2 - LANE ROADWAY SHOWN)



ALL LANES REPAIRED
(2 - LANE ROADWAY SHOWN)



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

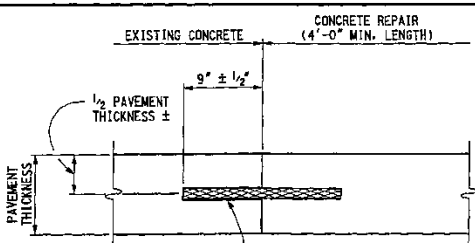
FORMING NOTES:

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.

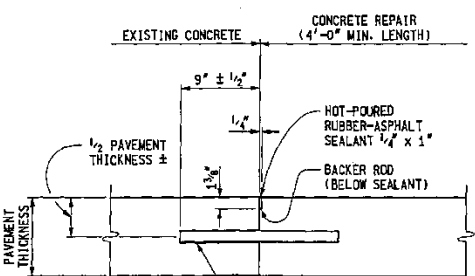
ADJACENT LANE REPAIRS MAY BE CAST INTEGRALLY, WHEN APPROVED BY THE ENGINEER.

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



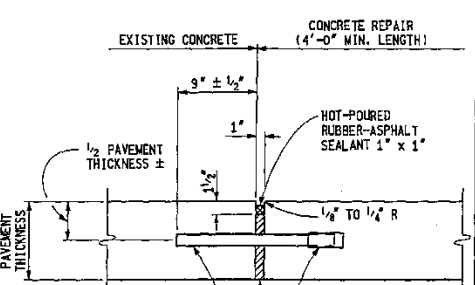
* DRILL 1 3/8" DIAMETER HOLE INTO EXISTING CONCRETE PAVEMENT AND GROUT-IN-PLACE #9 x 1'-6" LONG EPOXY COATED DEFORMED BARS

TIED JOINT, Trg



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

* EXPANSION CAP

* FIBER JOINT FILLER

EXPANSION JOINT, Erg

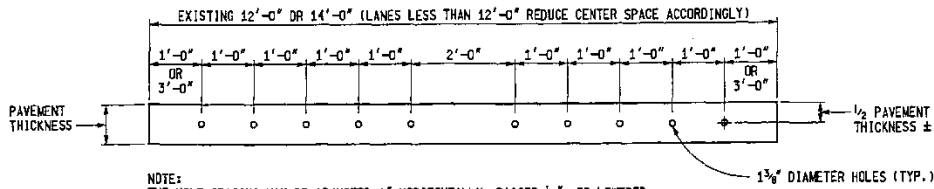
* SEE SHEET 3 OF 6 FOR BAR SPACING AND SHEET 6 OF 6 FOR NOTES.

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

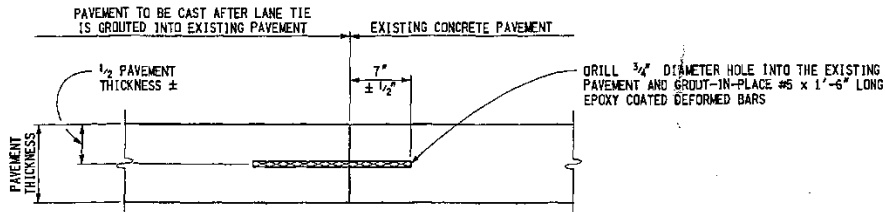
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

CONCRETE PAVEMENT REPAIR

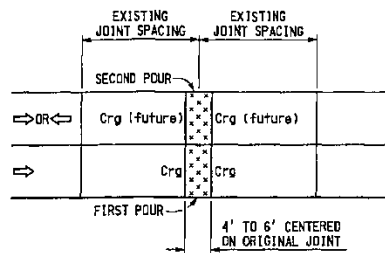
9-10-2010 F.H.V.A. APPROVAL	8-9-2010 PLAN DATE	R-44-F	SHEET 2 OF 6
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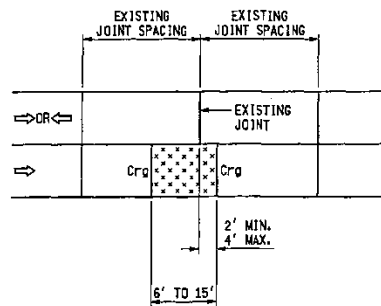
DOWEL OR DEFORMED BAR SPACING FOR CONCRETE REPAIRS



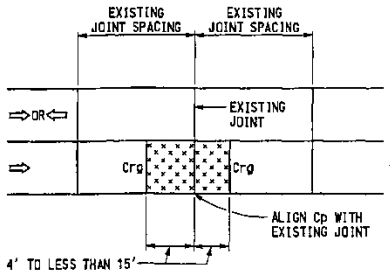
EPOXY ANCHORED LANE TIE



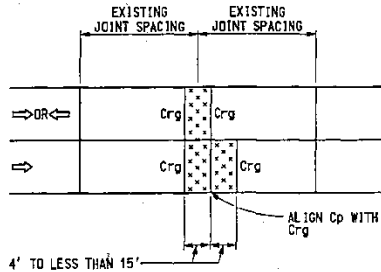
SINGLE LANE OR FULL WIDTH REPAIR



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

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

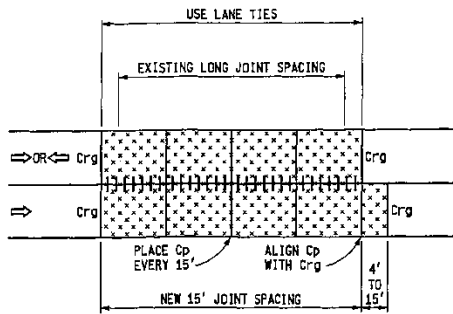
CONCRETE PAVEMENT REPAIR

9-10-2010
F.H.W.A. APPROVAL

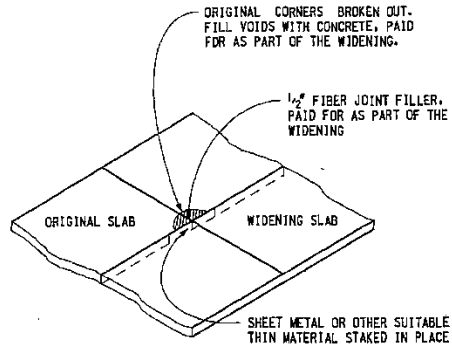
8-9-2010
PLAN DATE

R-44-F

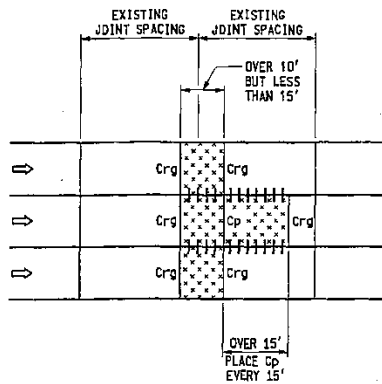
SHEET
3 OF 6



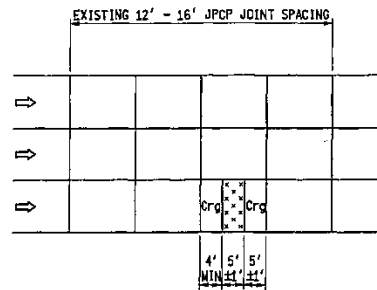
LONG REPAIR SHOWING Cp JOINT ALIGNMENTS AND LANE TIES



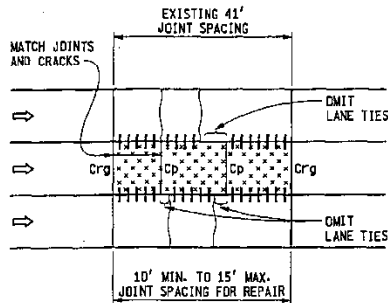
JOINT PATCH ADJACENT TO WIDENING SLAB



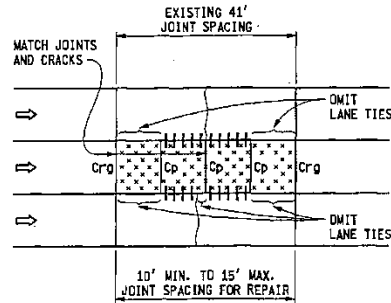
FULL WIDTH MULTI-LANE REPAIRS WITH OFFSET IN ONE LANE



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



TWO CRACK PANEL REPAIR



MID PANEL CRACK REPAIR

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

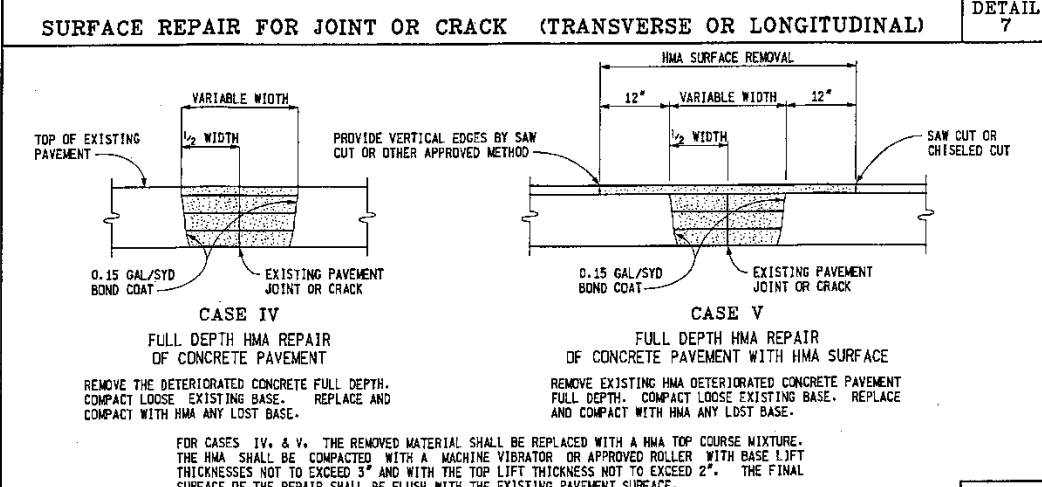
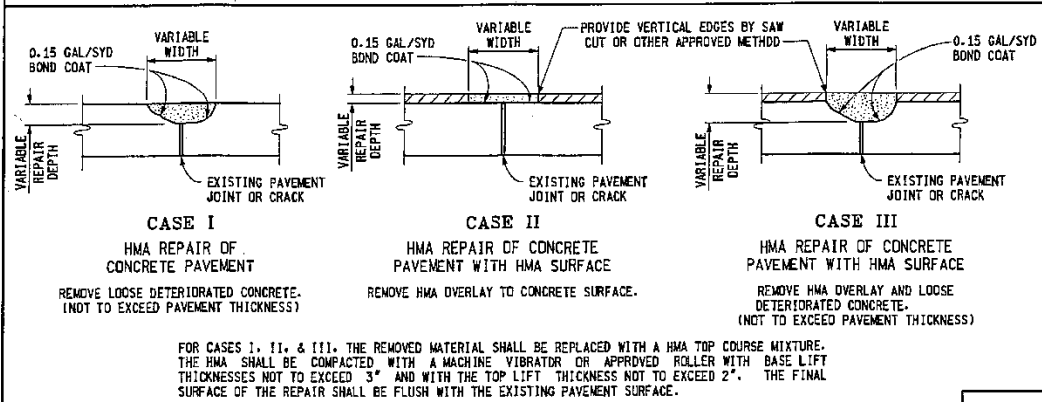
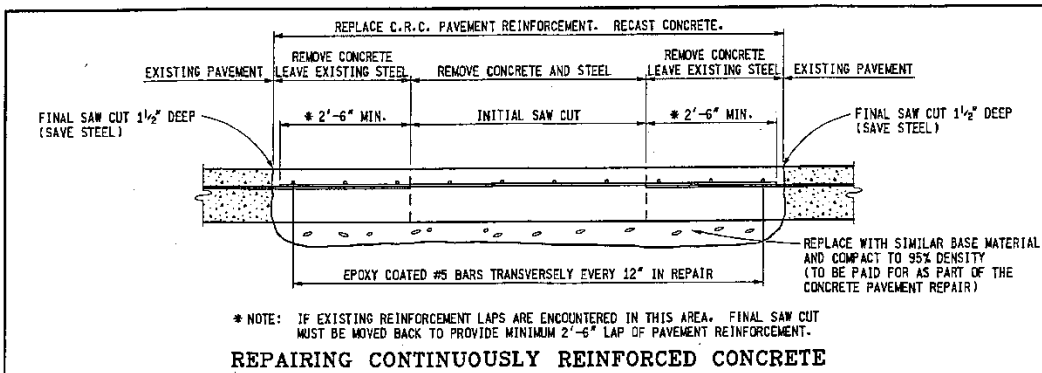
CONCRETE PAVEMENT REPAIR

9-10-2010
F.R.M.A. APPROVAL

8-9-2010
PLAN DATE

R-44-F

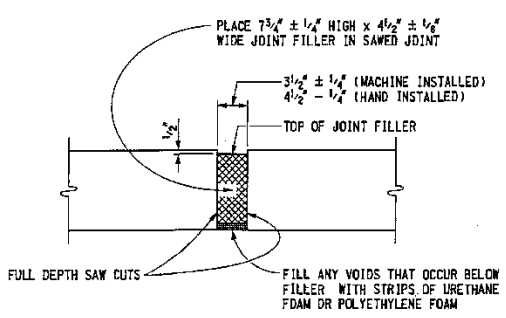
SHEET
4 OF 6



MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

CONCRETE PAVEMENT REPAIR

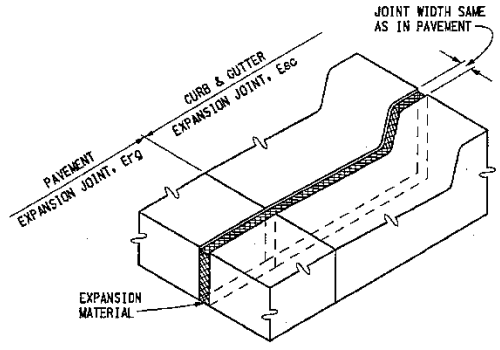
9-10-2010 F.R.W.A. APPROVAL	8-9-2010 PLAN DATE	R-44-F	SHEET 5 OF 6
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NOTES:
 WHEN PRESSURE RELIEF JOINT IS TO BE CONSTRUCTED THROUGH CONCRETE SHOULDER, TRENCHING BELOW CONCRETE MAY BE NECESSARY TO ALLOW ROOM FOR 7 1/4" FILLER.

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-39P-SERIES.

DOWEL AND DEFORMED BARS USED IN Trg, Crg, AND Erg JOINTS SHALL BE EPDXY 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 1/2" DEEP TO PERMIT THE PLACEMENT OF THE HOT-POURED RUBBER ASPHALT SEALANT. HOLES IN EXPANSION JOINT FILLER SHALL BE 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, RAMP, 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'-0" FROM THE JOINT. WHEN BOTH SIDES OF A LONGITUDINAL JOINT ARE POURED INTEGRALLY, LANE TIES SHALL BE STRAIGHT DEFORMED EPDXY 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.

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

CONCRETE PAVEMENT REPAIR

9-1D-2010 F.H.W.A. APPROVAL	8-9-2010 PLAN DATE	R-44-F	SHEET 6 OF 6
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MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
2.5 FOOT FULL DEPTH CONCRETE CENTERLINE REPAIR

CFS:JJT

1 of 3

APPR:ARB:JFS:01-30-14

a. Description. This work consists of full depth concrete centerline repair of jointed concrete pavement at the longitudinal joint between lanes. Complete this work according to 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 according to the details provided herein. Limit overcuts into the original pavement to 3 inches in both the transverse and longitudinal directions along repair. Saw a relief cut in the new concrete in alignment with the longitudinal joint in the existing concrete. Saw a relief cut in the new concrete transversely to match existing joints and cracks in the original pavement, as directed by the Engineer. Make the relief cut when the concrete has hardened enough that no excess raveling or spalling occurs, but before random cracks develop. Establish transverse joint reservoirs and load transfer in accordance with the details included herein.

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:

Pay Item	Pay Unit
Pavt Repr, Rem, Special.....	Square Yard
Pavt Repr, Nonreinf, __ inch, Special.....	Square Yard
Joint, Tied, Special.....	Foot

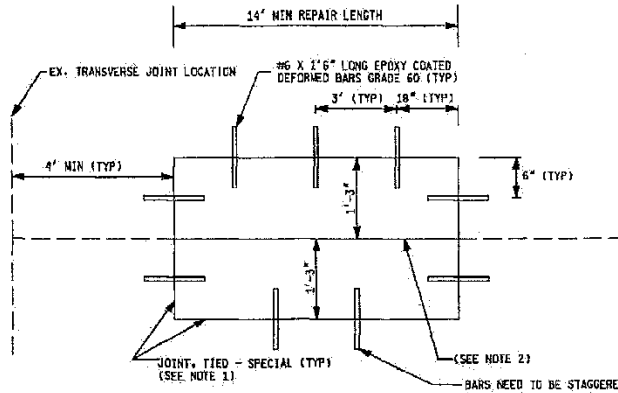
1. **Pavt Repr, Rem, Special** includes saw cuts as needed for concrete pavement removal; full depth removal and disposal of concrete and Hot Mix Asphalt patches; lifting the repair section out; loading, hauling, and disposing of the material removed; and compacting of disturbed base material.

2. **Pavt Repr, Nonreinf, __ inch, Special** 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 joint reservoir and relief cuts; and furnishing and installing joint sealant.

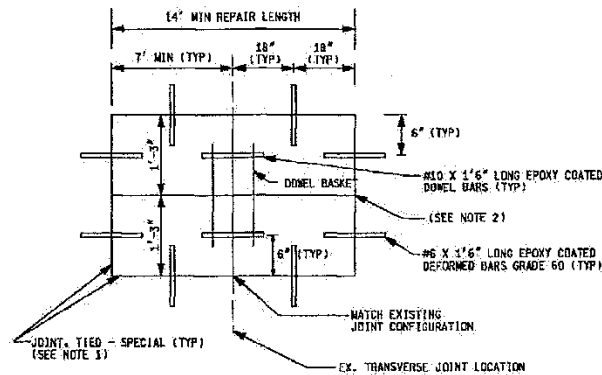
3. **Joint, Tied, Special** includes drilling and cleaning the holes for the deformed bars; furnishing, mixing, and installing the grout; and furnishing and installing the deformed bars for all exterior faces of the repair. Measurement for payment will be feet of repair along centerline.

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

2.5' FULL DEPTH CENTERLINE REPAIR WITHOUT TRANSVERSE JOINT



2.5' FULL DEPTH CENTERLINE REPAIR WITH TRANSVERSE JOINT

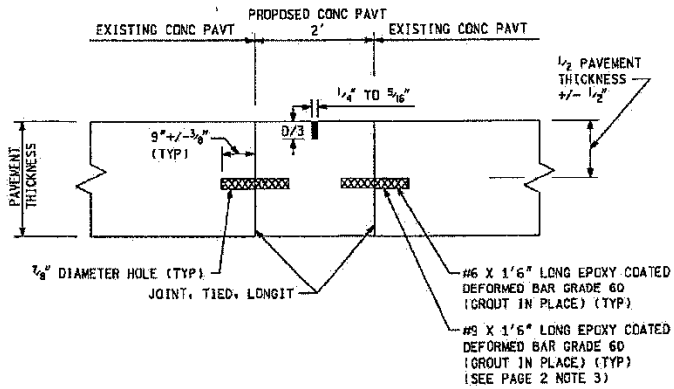
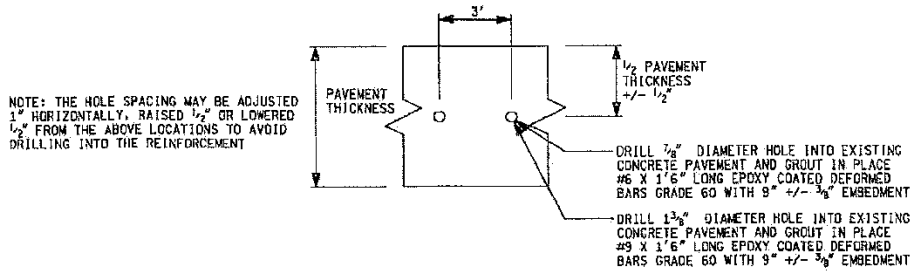


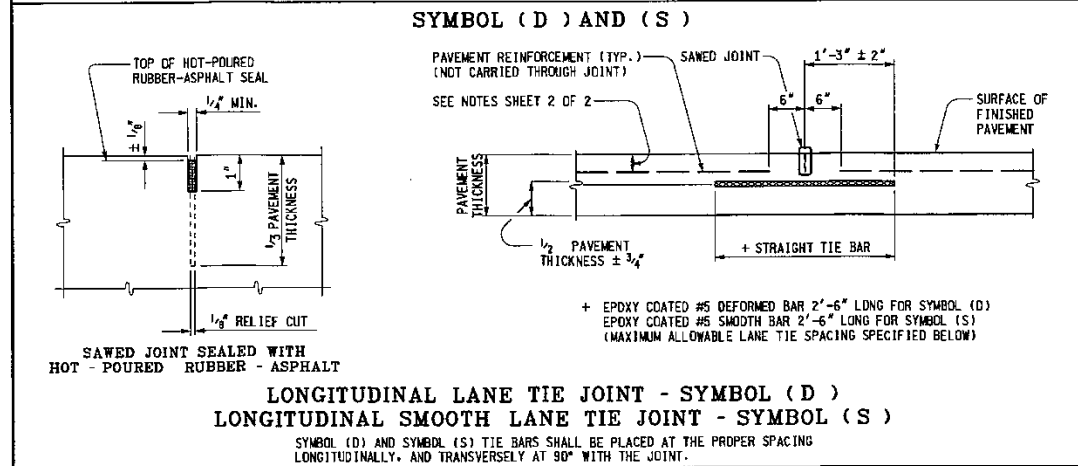
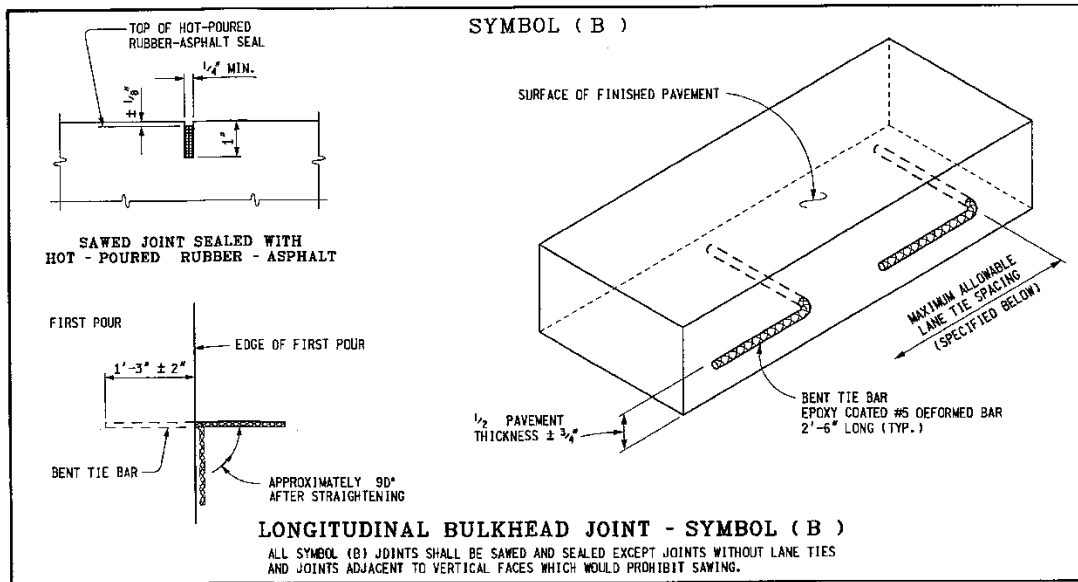
NOTE 1: SAW 1/4" TO 3/8" WIDE BY 3/8" TO 1/2" DEPTH, SEAL WITH LOW MODULUS HOT-POURED RUBBER - ASPHALT TYPE JOINT SEALING COMPOUND.

NOTE 2: SAW 1/4" TO 3/8" WIDE BY 1/3 PAVEMENT DEPTH TO MATCH EXISTING LONGITUDINAL JOINT. SEAL WITH LOW MODULUS HOT-POURED RUBBER - ASPHALT TYPE JOINT SEALING COMPOUND.

NOTE 3: USE #6 BARS IN RAMP AREAS WHERE TRAFFIC CROSSES OVER JOINTS, AND IN REPAIR AREAS BEING BUILT ON OPEN GRADE BASES.

DEFORMED BAR PLACEMENT DETAIL





MAXIMUM ALLOWABLE LANE TIE SPACING SYMBOLS (B), (D), (L2), AND (S)		* TOTAL DISTANCE OF TIED JOINT FROM NEAREST FREE EDGE
(B) GRADE 4D	(D), (L2), AND (S) GRADE 6D	
2'-10"	3'-7"	12' OR LESS
1'-11"	2'-7"	OVER 12' THROUGH 17'
1'-5"	1'-11"	OVER 17' THROUGH 24'
1'-2"	1'-9"	OVER 24' THROUGH 28'
1'-2"	1'-4"	OVER 28' THROUGH 36'
1'-1"	1'-1"	36' OR GREATER **

* INCLUDES ANY TIED COMBINATION OF LANE WIDTH, VALLEY GUTTER, CURB & GUTTER, OR SHOULDER
 ** FOR WIDTHS GREATER THAN 48' USE #6 DEFORMED BARS AT 1'-2" SPACING.

MAXIMUM ALLOWABLE LANE TIE SPACING

MDOT
Michigan Department of Transportation

PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Stuedle

APPROVED BY: Randy V. Puffel
DIRECTOR, BUREAU OF FIELD SERVICES

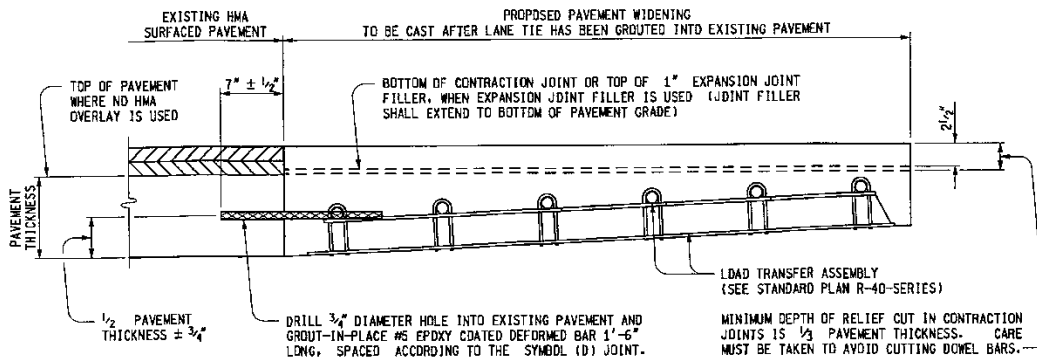
APPROVED BY: Mark A. Van Pelt
DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

LONGITUDINAL PAVEMENT JOINTS

1-25-2013 F.H.W.A. APPROVAL	4-9-2012 PLAN DATE	R-41-G	SHEET 1 OF 2
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SYMBOL (L2)



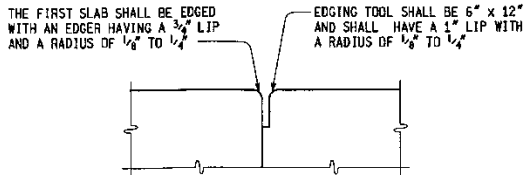
NOTE:
SYMBOL (L2) JOINT USED FOR WIDENING CONCRETE PAVEMENTS WITHOUT HMA OVERLAYS SHALL BE SAWS AND SEALED ACCORDING TO THE SYMBOL (B) JOINT.

THE LONGITUDINAL JOINT USED FOR WIDENING EXISTING CONCRETE BASE COURSE OR CONCRETE PAVEMENT HAVING A HMA SURFACE SHALL HAVE EPOXY ANCHORED LANE TIES PLACED AS SPECIFIED.

TAPERED PAVEMENT THICKNESS OVER THE DISTANCE OF PAVEMENT WIDENING OR IN ONE LANE WIDTH WHEN WIDENING IS FOR TWO OR MORE LANES.

LONGITUDINAL BULKHEAD JOINT

FOR WIDENING EXISTING CONCRETE PAVEMENT OR CONCRETE BASE COURSE (USING EPOXY ANCHORED LANE TIES)



METHOD OF EDGING

NOTES:

ALL LANE TIE BARS SHALL BE DEFORMED EXCEPT SYMBOL (S) WHICH WILL BE SMOOTH.

THE EPOXY COATED S BARS ARE TO BE FACTORY COATED WITH AN APPROVED BOND RELEASE AGENT, UNIFORMLY APPLIED BY DIPPING AND WITHOUT EXCESSIVE DRIPS OR THICKNESS.

THE INSTALLATION OF LANE TIE BARS AND THE SAWING OF LONGITUDINAL JOINTS WILL NOT BE REQUIRED FOR TEMPORARY CONCRETE PAVEMENT UNLESS SPECIFIED ON PLANS OR IN THE PROPOSAL. THE EDGING OF TEMPORARY CONCRETE PAVEMENT WILL NOT BE REQUIRED.

FOR JOINT LAYOUT DETAILS, SEE STANDARD PLAN R-42-SERIES.

SAWING PROCEDURES AND RELATED OPERATIONS ARE DESCRIBED IN THE CURRENT STANDARD SPECIFICATIONS.

NO SAWS OR SEALED JOINT SHALL BE CONSTRUCTED BETWEEN THE PAVEMENT AND CURB OR PAVEMENT AND CURB AND GUTTER, WHERE THESE ITEMS ARE CAST INTEGRALLY.

WHEN JOINTED PLAIN CONCRETE IS SPECIFIED AT INTERSECTIONS SYMBOL (S) JOINTS ARE TO BE USED FOR THE LONGITUDINAL JOINT BETWEEN THE E2 JOINT AT THE SPRINGPOINT OF THE SIDE STREET AND THE THROUGH LANE GUTTER PAN LINE. WHEN THE E2 JOINT IS MOVED TO THE THROUGH LANE GUTTER PAN LINE USE SYMBOL (D) JOINT AS NORMALLY REQUIRED.

ALL STRAIGHT TIE BARS SHALL BE EPOXY COATED ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS FOR EPOXY COATED STEEL REINFORCEMENT FOR STRUCTURES.

WHEN LANE TIES ARE GROUDED INTO AN EXISTING PAVEMENT, THE GROUT SHALL BE SELECTED FROM THE PREQUALIFIED MATERIALS LISTED IN THE DEPARTMENT'S "MATERIALS SAMPLING GUIDE" FOR LANE TIES.

IN ORDER TO AVOID CONFLICT WITH THE LOAD TRANSFER ASSEMBLY, THE PLACEMENT OF THE END LANE TIE ADJACENT TO ANY TRANSVERSE JOINT SHALL BE AS FOLLOWS:

1. WHEN MAXIMUM ALLOWABLE LANE TIE SPACING EXCEEDS 3'-4", PLACE FIRST AND LAST LANE TIE HALF THE MAXIMUM ALLOWABLE LANE TIE SPACING FROM JOINT.
2. WHEN MAXIMUM ALLOWABLE LANE TIE SPACING IS LESS THAN 3'-4", PLACE FIRST AND LAST LANE TIE A MINIMUM OF 1'-8" FROM JOINT.

IT MAY BE NECESSARY TO ADJUST THE LAST THREE LANE TIE SPACINGS TO ENSURE UNIFORM LOADING RESISTANCE ALONG THE LONGITUDINAL JOINT.

FOR THE USE AND PLACEMENT OF STEEL REINFORCEMENT, SEE STANDARD PLAN R-45-SERIES.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**LONGITUDINAL
PAVEMENT JOINTS**

1-25-2013 F.H.W.A. APPROVAL	4-9-2012 PLAN DATE	R-41-G	SHEET 2 OF 2
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QUALIFIED PRODUCTS LIST (QPL)

ADMIXTURES FOR CONCRETE Air Entraining - ASTM C 260; Chemical - ASTM C 494 (See Notes Following Listing of Admixtures)

Spec. # and Material Name	Manufacturer or Supplier and Trade Name	Type	Producer and Description	Dosage min. or range fl oz/cwt	Dosage min. or range ml/100kg
903.01 Air Entraining Admixtures	<u>BASF CONSTR. CHEM.</u> MasterSet DELVO	D	Water-reducer retarder	3	195
	MasterAir AE 400	AE	Air-entraining	1- 4	65 - 260
903.02 Water Reducing and Water Reducing Retarding Admixtures for Concrete	MasterGlenium 3400	F	High-range water-reducer	3	195
	MasterGlenium 7500	A F	Water-reducer High-range water-reducer	1.5 3 - 15	100 195 - 978
903.04 Concrete Accelerators	MasterGlenium 7700	MR F	Mid-range water-reducer High-range water-reducer	2 - 4 4 - 15	130 - 160 160 - 980
	MasterGlenium 7710	F	High-range water-reducer	4	260
	MasterAir AE 90	AE	Air-entraining	1	65
	MasterAir VR 20	AE	Air-entraining (vinsol resin)	1	65
	MasterAir VR 10	AE	Air-entraining (vinsol resin)	1	65
	MasterAir AE 200	AE	Air-entraining	1	65
	MasterPolyheed 900	A MR	Water-reducer Mid-range water-reducer	4 7	260 455
	MasterPolyheed 997	A MR F	Water-reducer Mid-range water-reducer High-range water-reducer	3 6 10	195 390 650
	MasterPolyheed 1725	A MR F	Water-reducer Mid-range water-reducer High-range water-reducer	2.5 - 4 5.5 - 7 8 - 12	165 - 260 360 - 455 520 - 780
	MasterPolyheed 100	A MR	Water-reducer Mid-range water-reducer	4 8	260 520
	MasterPozzolith 200	A D	Water-reducer Water-reducer retarder	2 4	130 260
	MasterPozzolith 322	A D	Water-reducer Water-reducer retarder	3 5	195 325

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Specifications for Contract #518-450F:
Concrete Pavement Repairs, contd.

QUALIFIED PRODUCTS LIST (QPL)					
ADMIXTURES FOR CONCRETE Air Entraining - ASTM C 260; Chemical - ASTM C 494 (See Notes Following Listing of Admixtures)					
Spec. # and Material Name	Manufacturer or Supplier and Trade Name	Type	Producer and Description	Dosage min. or range fl oz/cwt	Dosage min. or range ml/100kg
903.01 Air Entraining Admixtures	<u>BASF CONSTR. CHEM.</u>				
	MasterPozzolith 700	A D	Water-reducer Water-reducer retarder	2 5	130 325
903.02 Water Reducing and Water Reducing Retarding Admixtures for Concrete	MasterSet AC 534	C	Accelerator (non-chloride)	10	650
	MasterSet FP 20	C	Accelerator (non-chloride)	10	650
	PS 1481	MR F	Mid-range water-reducer High-range water-reducer	3 6	195 390
903.04 Concrete Accelerators	MasterGlenium 7511	A MR F	Water-reducer Mid-range water-reducer High-range water-reducer	2 - 4 4 - 6 6 - 15	130 - 260 260 - 390 390 - 980
	MasterRheobuild 1000	MR F	Mid-range water-reducer High-range water-reducer	9 13	585 850
	<u>EUCLID CHEMICAL CO.</u>				
	Eucon AEA 92	AE	Air-entraining	1.5	100
	Accelguard 80	C	Accelerator (non-chloride)	18 - 32	1,175-2,085
	Accelguard NCA	C	Accelerator (non-chloride)	15	980
	Eucon Air Mix 200	AE	Air-entraining	3	195
	EUCON MR	A MR F	Water-reducer Mid-range water-reducer High-range water-reducer	4.5 5.5 12	290 360 780
	EUCON MRX	MR F	Mid-range water-reducer High-range water-reducer	3.5 7.5	230 490
	EUCON WR-91	A MR D	Water-reducer Mid-range water-reducer Water-reducer retarder	3 5 6	195 325 390
	EUCON A+	A MR	Water-reducer Mid-range water-reducer	3.5 4.5	230 290
	EUCON Retarder75	D	Water-reducer retarder	3.5	230
	EUCON SPC	F	High-range water-reducer	5 - 12	325 - 780
	EUCON AIR MAC12	AE	Air-entraining	1.5 - 4	100 - 260
	PLASTOL 341	F	High-range water-reducer	7.5	490
	PLASTOL 5500	F	High-range water-reducer	3	195
(Continued)					

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QUALIFIED PRODUCTS LIST (QPL)

ADMIXTURES FOR CONCRETE
Air Entraining - ASTM C 260; Chemical - ASTM C 494
(See Notes Following Listing of Admixtures)

Spec. # and Material Name	Manufacturer or Supplier and Trade Name	Type	Producer and Description	Dosage min. or range fl oz/cwt	Dosage min. or range ml/100kg
903.01 Air Entraining Admixtures	KB-1200	A	Water-reducer	3 - 5	195 - 325
		MR	Mid-range water-reducer	5 - 8	325 - 520
903.02 Water Reducing and Water Reducing Retarding Admixtures for Concrete	Melchem	F	High-range water-reducer	8 - 20	520 - 1300
	Polychem VR	AE	Air-entraining (vinsol resin)	0.5	35
903.04 Concrete Accelerators	Polychem AE	AE	Air-entraining	1	65
	Polychem SA	AE	Air-entraining	0.5	35
	Polychem SA-50	AE	Air-entraining	1 - 3	65 - 195
	Polychem 400 NC	A	Water-reducer	3 - 5	195 - 325
	Polychem Super Set	C	Accelerator (non-chloride)	16 - 32	1045 - 2090
	Polychem R	D	Water-reducer retarder	3 - 5	195 - 325
	Polychem SPC	F	High-range water-reducer	5.5	360

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QUALIFIED PRODUCTS LIST (QPL)

ADMIXTURES FOR CONCRETE
Air Entraining - ASTM C 260; Chemical - ASTM C 494
(See Notes Following Listing of Admixtures)

Spec. # and Material Name	Manufacturer or Supplier and Trade Name	Type	Producer and Description	Dosage min. or range fl oz/cwt	Dosage min. or range mi/100kg
903.01 Air Entraining Admixtures	PREMIERE CONCRETE ADMIXTURES EcoFlo Green	A	Water-reducer	1.5 - 3	100 - 195
		MR	Mid-range water-reducer	4.5 - 7.5	290 - 490
		F	High-range water-reducer	8.0 - 14.0	520 - 910
903.02 Water Reducing and Water Reducing Retarding Admixtures for Concrete	Optiflo 700	A	Water-reducer	4 - 5	260 - 325
		MR	Mid-range water-reducer	5 - 8	325 - 520
903.04 Concrete Accelerators	OptiFlo 50	A	Water-reducer	3	195
		MR	Mid-range water-reducer	5	325
	OptiFlo 500	D	Water-reducer retarder	6	390
		A	Water-reducer	2 - 3.5	130 - 230
	OptiFlo MR	D	Water-reducer retarder	3.5 - 5	230 - 325
		A	Water-reducer	3 - 5	195 - 325
	OptiFlo Plus	MR	Mid-range water-reducer	5 - 8	325 - 520
		E	Water-reducer accelerator (non-chloride)	12 - 16	780 - 1045
		MR	Mid-range water-reducer	5 - 12	325 - 780
	OptiFlo 100R	E	Water-reducer accelerator (non-chloride)	12 - 90	780 - 5,870
		D	Water-reducer retarder	3 - 5	195 - 325
	ConAir	AE	Air-entraining	0.5 - 4	35 - 260
	ConAir 260	AE	Air-entraining	0.5 - 4	35 - 260
	UltraFlo 2000	A	Water-reducer	2 - 4	130 - 260
		MR	Mid-range water-reducer	4 - 6	260 - 390
		F	High-range water-reducer	6 - 12	390 - 780
UltraFlo 4800	MR	Mid-range water-reducer	7 - 12	455 - 780	
	F	High-range water-reducer	12 - 20	780 - 1300	
UltraFlo 5600	MR	Mid-range water-reducer	6 - 10	390 - 650	
	F	High-range water-reducer	10 - 24	650 - 1565	
UltraFlo DP	F	High-range water-reducer	5 - 12	325 - 780	
NitroCast K	E	Water-reducer accelerator (non-chloride)	10 - 90	650 - 5870	
ProLong L	D	Water-reducer retarder	2.5 - 10	165 - 650	

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Specifications for Contract #518-450F:
Concrete Pavement Repairs, contd.

QUALIFIED PRODUCTS LIST (QPL)					
ADMIXTURES FOR CONCRETE Air Entraining - ASTM C 260; Chemical - ASTM C 494 (See Notes Following Listing of Admixtures)					
Spec. # and Material Name	Manufacturer or Supplier and Trade Name	Type	Producer and Description	Dosage min. or range fl oz/cwt	Dosage min. or range ml/100kg
903.01 Air Entraining Admixtures	SIKA CORP. MultiAir 25	AE	Air-entraining	1	65
	Plastiment ES	D	Water-reducer retarder	2 - 4	130 - 260
903.02 Water Reducing and Water Reducing Retarding Admixtures for Concrete	Plastocrete 10N	A	Water-reducer	2	130
	Plastocrete 161	D	Water-reducer retarder	3.5	230
		A	Water-reducer	3	195
	D	Water-reducer retarder	6	390	
903.04 Concrete Accelerators	Sika AEA-14	AE	Air-entraining	2	130
	Sika AIR 260	AE	Air-entraining	1	65
	Sika AIR 360	AE	Air-entraining	1 - 3	65 - 195
	Sika AER-C	AE	Air-entraining	1 - 5	65 - 325
	Sikament AFM	A	Water-reducer	2	130
		MR	Mid-range water-reducer	6	390
		F	High-range water-reducer	11	720
	Sikament SPMN	MR	Mid-range water-reducer	8 - 10	520 - 650
		F	High-range water-reducer	10 - 40	650 - 2610
	Sikament 686	A	Water-reducer	3	195
		MR	Mid-range water-reducer	5.5	360
		F	High-range water-reducer	8	520
	SikaPlast 200	A	Water-reducer	3 - 8	195 - 520
		MR	Mid-range water-reducer	8	520
	SikaPlast 500	A	Water-reducer	3.0 - 5.0	195 - 325
		MR	Mid-range water-reducer	5.0 - 7.0	325 - 455
	SikaSet NC	C	Accelerator (non-chloride)	10	650
	Sikatard 440	D	Water-reducer retarder	3	195
	Rapid - 1	C	Accelerator (non-chloride)	20	1300
	ViscoCrete 1000	MR	Mid-range water-reducer	3	195
		F	High-range water-reducer	8	520
	ViscoCrete 2100	F	High-range water-reducer	5	325
ViscoCrete 4100	F	High-range water-reducer	5	325	
ViscoCrete 6100	F	High-range water-reducer	5	325	

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QUALIFIED PRODUCTS LIST (QPL)

ADMIXTURES FOR CONCRETE Air Entraining - ASTM C 260; Chemical - ASTM C 494 (See Notes Following Listing of Admixtures)

Spec. # and Material Name	Manufacturer or Supplier and Trade Name	Type	Producer and Description	Dosage min. or range fl oz/cwt	Dosage min. or range ml/100kg
903.01 Air Entraining Admixtures	W.R. GRACE & COMPANY				
	ADVA 405	F	High-range water-reducer	11 - 18	720 - 1175
903.02 Water Reducing and Water Reducing Retarding Admixtures for Concrete	Daracem 19	F	High-range water-reducer	12.5	815
	Daracem 65	A MR	Water-reducer Mid-range water-reducer	4 6 - 9	260 390 - 585
	Daraset 400	C	Accelerator (non-chloride)	15	980
903.04 Concrete Accelerators	Daratarad 17	D	Water-reducer retarder	2	130
	Daravair 1400	AE	Air-entraining	1	65
	Mira 62	A	Water-reducer	4.5	290
		MR	Mid-range water-reducer	6 - 12	390 - 780
		F	High-range water-reducer	12 - 15	780 - 980
	Mira 110	MR	Mid-range water-reducer	9 - 12	585 - 780
		F	High-range water-reducer	12 - 15	780 - 980
	Polarsset	C	Accelerator (non-chloride)	8	520
Terapave AEA	AE	Air-entraining	1.5	100	
WRDA 82	A	Water-reducer	3	195	

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SPEC. 903 ADMIXTURE NOTES:

1. Dosage Rate

The dosage rate shown is the minimum quantity permitted according to the Qualified Products List. The dosage indicated is that recommended by the producer or that used in qualification tests for approval of the admixture. There is no assurance that the desired water-reduction and/or retardation will be achieved with these dosages with a particular cement being used, as the effect is dependent on the cement chemistry, concrete temperature, and other factors. Increasing the dosage appreciably above that recommended may result in abnormal behavior of the concrete, such as extremely long or very short setting times. Reducing the dosage below that recommended may have the effect of substantially no change from concrete without the admixture. The dosage shown for retarding admixtures will normally produce a 1- to 3-hour retardation in the setting of the concrete, compared to similar concrete without the admixture, when used at normal temperatures (approximately 21 C). Increased dosage, within reasonable limits, will usually increase the retardation. Use of a retarding admixture will not slow the stiffening of concrete due to loss of slump.

2. Air-Entraining Admixtures

The contractor is responsible for verifying the compatibility of all chemical admixtures and the air-entraining admixture. If admixtures are from more than one manufacturer, run a trial batch prior to concrete placement. Provide test results for slump, air-entrainment and seven-day compression for two (2) cylinders. Actual dosage for Air-Entrainers may vary from those listed on the Qualified Products List as required by the mix design.

3. Lignin Type Admixtures

Lignin (or lignosulfonate) admixtures typically will cause the entrainment of additional air in air-entrained concrete. This type admixture does not generally entrain air by itself, but makes other air-entraining materials much more efficient. Thus, a change in dosage of either the chemical admixture or the air-entraining admixture may have a more significant effect on the air content than normally expected. It is the contractor's responsibility to be sure the specific admixture proposed for use is compatible with his operations so that excessive air content in the concrete is not developed. Most lignosulfonate type water-reducers will provide a moderate retardation if used at higher dosage rates.

4. High-Range Water-Reducers

Type F and G high range water-reducing (HRWR) admixtures (frequently called "superplasticizers") are capable of greater water reduction and greater strength gain than regular Type A water-reducers, or can provide substantial increase in slump while maintaining a cohesive concrete without loss of strength. Type G admixtures will also provide retardation of setting similar to Type D admixtures. Problems with this type of admixture include the following: (a) Loss of slump is frequently much more rapid than with plain concrete or when other admixtures are used, especially for older formulations of superplasticizers; (b) Effectiveness depends on the chemistry of the Portland cement, and the cements generally available in Michigan do not have the most favorable chemistry; (c) The air-void system may be adversely affected. Type F and G admixtures are to be used only according to the provisions of the Standard Specifications.

5. Admixtures Containing Chlorides

Some Type A and D admixtures may contain chlorides, as noted in the above listing. Section 903.03 of the Standard Specifications permits the use of these admixtures, except they are prohibited in concrete for bridge superstructure, prestressed concrete, and concrete containing galvanized steel or aluminum.

(End of Admixture Notes)

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Table 601-2 Concrete Pavement Mixtures											
Concrete Grade (b, c, g)		Section Number Reference (i)		Cement Content (d, h)		Minimum Class Design Strength (a)					
						Flexural Strength (psi)			Compressive Strength (psi)		
						3days	7days	14days	28days	3days	7days
P-NC	603, 801	658	7.0	550	600	—	650	2,600	3,000	—	3,500
P1M (f)	602, 803	470 - 564	5.0 - 6.0	—	550	600	650	650	—	2,600	3,500
P1	602, 803, 804, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819	564	6.0	—	550	600	650	650	—	2,600	3,500
	602, 803, 804, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819	526 (e)	5.6	—	500	550	600	650	—	2,200	3,000
P2	602, 803, 804, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819	517	5.5	—	500	550	600	650	—	2,200	3,000
M	602, 803, 804, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819	489 (e)	5.2	—	500	550	600	650	—	2,200	3,000
X	Commercial grade concrete containing 517 lb/cyd (5 1/2 sacks/cyd) of cement. If substituting 1.0 lb of fly ash for each pound of cement removed, the Contractor may reduce portland cement up to 20% by weight. Unless otherwise specified, Grade X concrete contains at least 282 lb/cyd (3.0 sacks/cyd) of cement. If substituting 1.0 lb of fly ash for each pound of cement removed, the Contractor may reduce portland cement up to 20% by weight.										

MATERIALS ACCEPTANCE REQUIREMENTS

See Miscellaneous area at the end of table for materials deleted from the 2012 Standard Specifications for Construction.
*** Must be tested unless provided by an Approved Manufacturer.**

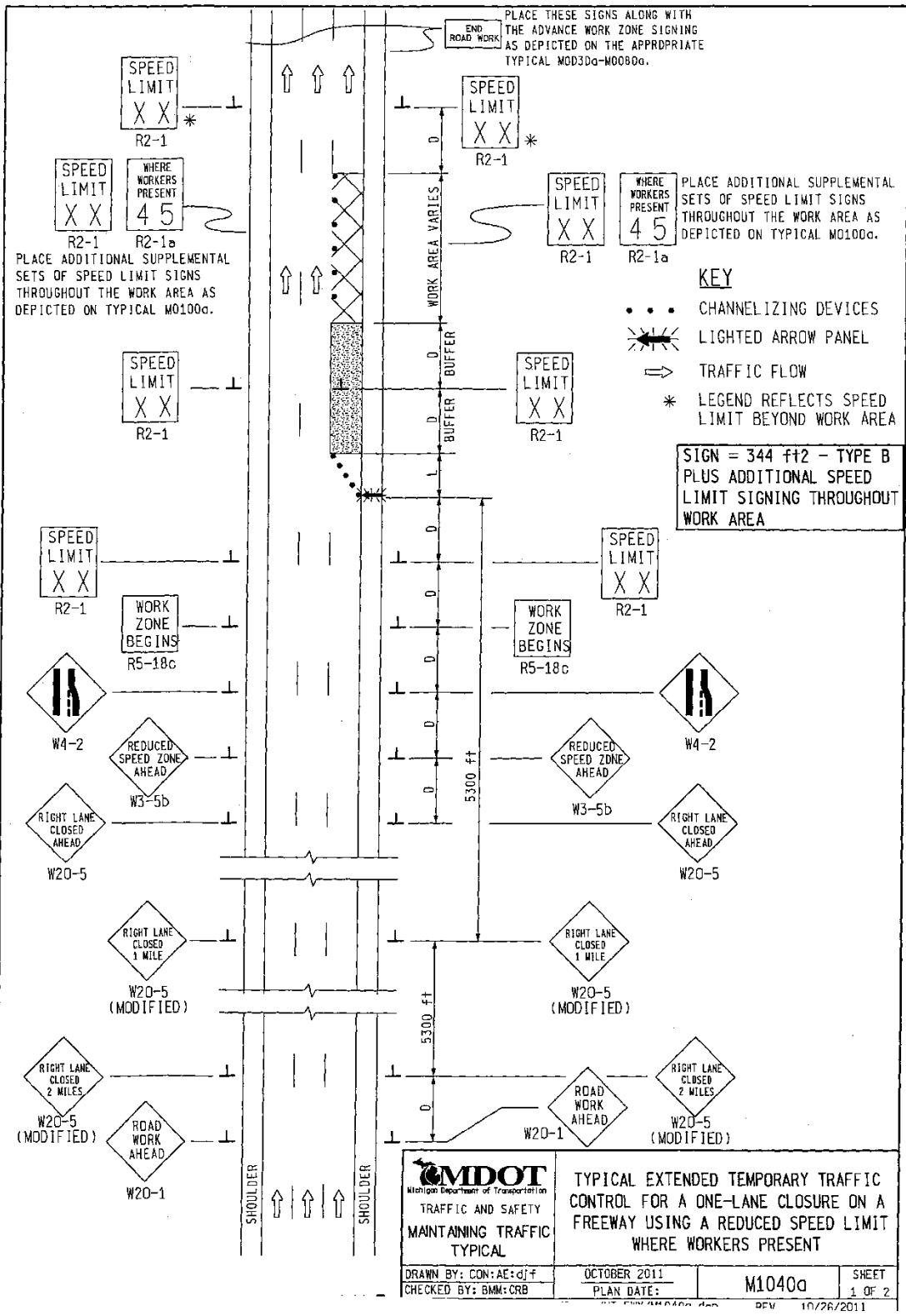
**** When the Basis of Acceptance is not "Test", the sampling criteria below may be used when there are concerns with material quality.**

Spec. No. and Material Name	Basis of Acceptance	Sample Frequency If Required by the Engineer**	Sample Size	Maximum VI Quantity	Remarks (QPL Reference)
902 Mineral Filler for HMA Mixtures	Test See Remark	1 per project	1 qt	10 ton	Refer to Section 902.11 of the 2012 Standard Specifications.
903.01 Air Entraining Admixtures	QPL	-	-	-	Must be a Qualified Product (903.01).
903.02 Water Reducing and Water Reducing Retarding Admixtures for Concrete	QPL	-	-	-	Must be a Qualified Product (903.02).
903.03 Latex Admixture for Concrete	Appr Mfr *	1 per lot	1 qt	-	
903.04 Concrete Accelerators 1. Calcium Chloride 2. All Others	VI QPL	- -	- -	- -	For calcium chloride note the chemical composition. Other accelerators must be Qualified Products (903.04).
903.06 Membrane Curing Compound	Test Data Cert	1 per lot or batch	1 qt	200 gal	
NOTE: Curing compounds must not be used after ONE year from manufacture. Date of manufacture must be clearly printed on the outside of containers.					
903.07A Interim Curing (Linseed Oil Based)	Test Data Cert	1 per lot or batch	1 qt	50 gal	See Note for 903.06 above.
903.07C Insulating Blanket	Test Data Cert	-	-	10 sheets	
903.07D Polystyrene Insulation	Test Data Cert	-	-	-	
904.03A Asphalt Binder for HMA Mixtures	See Remark	See Remark	See Remark	-	See Special Instructions.
904.03B Liquid Asphalt (MC)	Gen Cert	1 per batch	See Remark	-	1 gal from the top and 1 gal from the bottom of tank.
904.03B Liquid Asphalt (RC-250)	Gen Cert	1 per batch	2 qt	5 gal	

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Table 601-2 Concrete Pavement Mixtures (continued)	
<p>a. Use flexural strength for opening to traffic and compressive strength for acceptance in other paving situations.</p> <p>b. Use coarse aggregate 6A, 6AA or 6AAA for Grades P-NC, P1, P2 and M. Use Class 6AAA coarse aggregate exclusively for mainline and ramp concrete pavement if the directional ADT is greater than or equal to 5,000 vehicles per day.</p> <p>c. The mix design basis for bulk volume (dry, loose) of coarse aggregate per unit volume of concrete is 72% for Grades P-NC and P1; 74% for Grade P2.</p> <p>d. If the local average minimum temperature for the next 10 consecutive days after concrete placement is forecast to be below 40 °F, submit a revised quality control plan for the Engineer's approval prior to cold weather concrete placement. The revised plan must detail changes in materials, concrete batching and mixing processes, construction methods, curing, and protection of the in situ concrete to ensure that the quality characteristics of the hardened concrete are not compromised by the cold weather.</p> <p>e. Use the manufacturer's recommended quantity of water-reducing admixture, specified in the Qualified Products List, to provide reduction in mixing water for mixes with reduced cement content.</p> <p>f. Grade P1M concrete requires an optimized aggregate gradation as specified in section 604 (MTM.130). Use aggregates from only geologically natural sources. Coarse aggregates must meet the physical requirements specified in subsection 602.03.C.</p> <p>g. The Contractor may use an optimized aggregate gradation, as required (MTM.130).</p> <p>h. Type III cement is not permitted.</p> <p>i. Number Reference</p>	<p>602 Concrete Pavement</p> <p>603 Concrete Pavement Restoration</p> <p>604 Concrete Curb, Gutter and Dividers</p> <p>605 Concrete Driveways</p> <p>606 Concrete Sidewalk, Sidewalk Ramps, and Steps</p> <p>607 Permanent Traffic Signs and Supports</p> <p>608 Paved Ditches</p> <p>609 Slope Protection</p> <p>610 Electrical and Lighting</p>



MDOT
Michigan Department of Transportation

TRAFFIC AND SAFETY
MAINTAINING TRAFFIC
TYPICAL

TYPICAL EXTENDED TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A FREEWAY USING A REDUCED SPEED LIMIT WHERE WORKERS PRESENT

DRAWN BY: CON:AE:djf
CHECKED BY: BMM:CRB

OCTOBER 2011
PLAN DATE:

M1040a

SHEET
1 OF 2


REV 10/26/2011

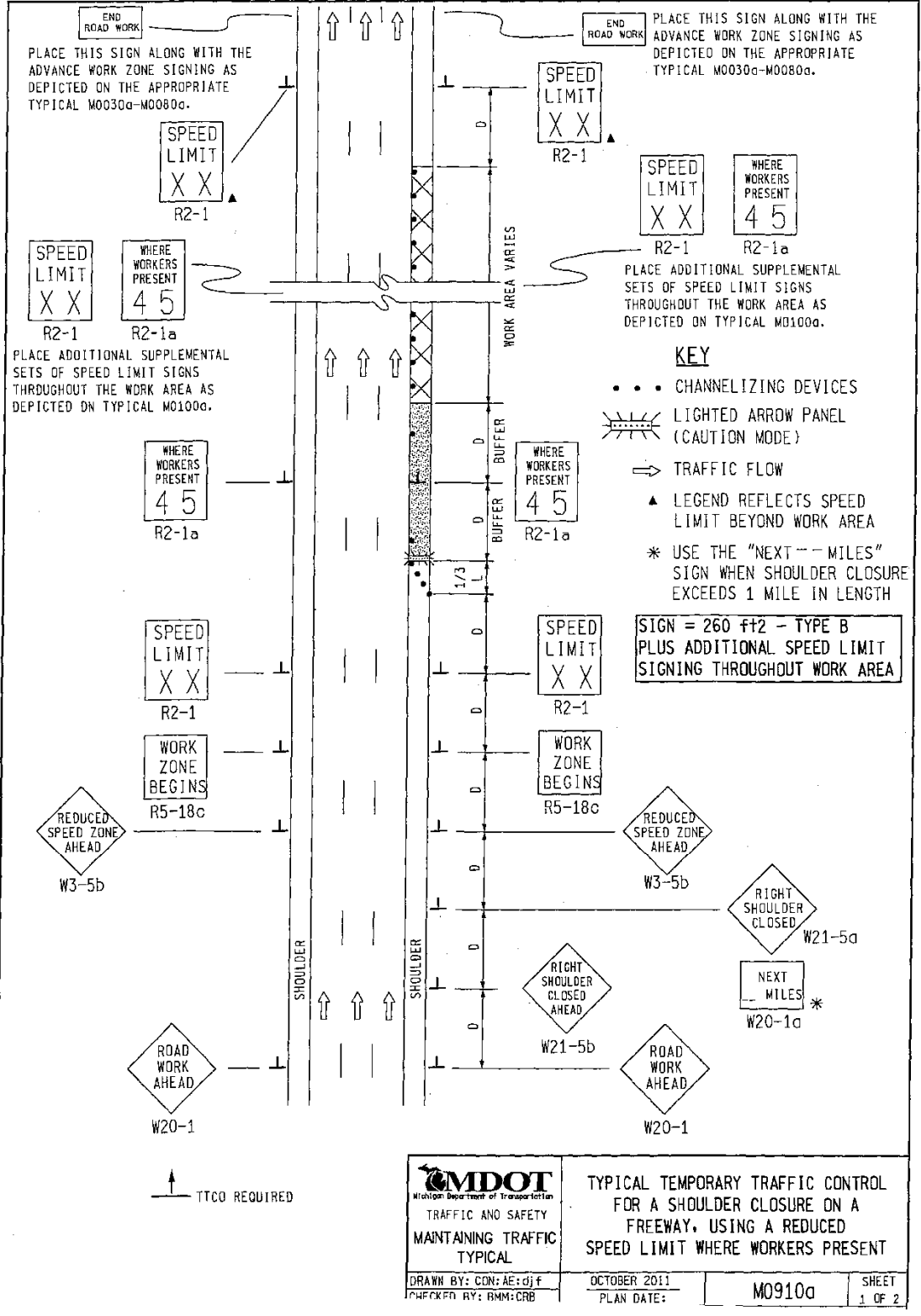
NOTES

1. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
AND LENGTH OF LONGITUDINAL BUFFERS
L = MINIMUM LENGTH OF TAPER
SEE M0020a FOR "D" AND "L" VALUES
2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.
3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
- 3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.
- 4D. THE SPACING OF CHANNELIZING DEVICES SHOULD NOT EXCEED 45 FEET WHEN USED FOR TAPER CHANNELIZATION, AND SHOULD NOT EXCEED 90 FEET WHEN USED FOR TANGENT CHANNELIZATION.
5. FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED
6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.
7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDT WILL BE ALLOWED.
8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.
- 16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.
21. ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.
26. THE LIGHTED ARROW PANEL SHALL BE LOCATED AT THE BEGINNING OF THE TAPER AS SHOWN. WHEN PHYSICAL LIMITATIONS RESTRICT ITS PLACEMENT AS INDICATED, THEN IT SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE.

SIGN SIZES

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

 TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TYPICAL EXTENDED TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A FREEWAY USING A REDUCED SPEED LIMIT WHERE WORKERS PRESENT		
	DRAWN BY: CON:AE:djf CHECKED BY: BMM:CRB	OCTOBER 2011 PLAN DATE:	M1040a




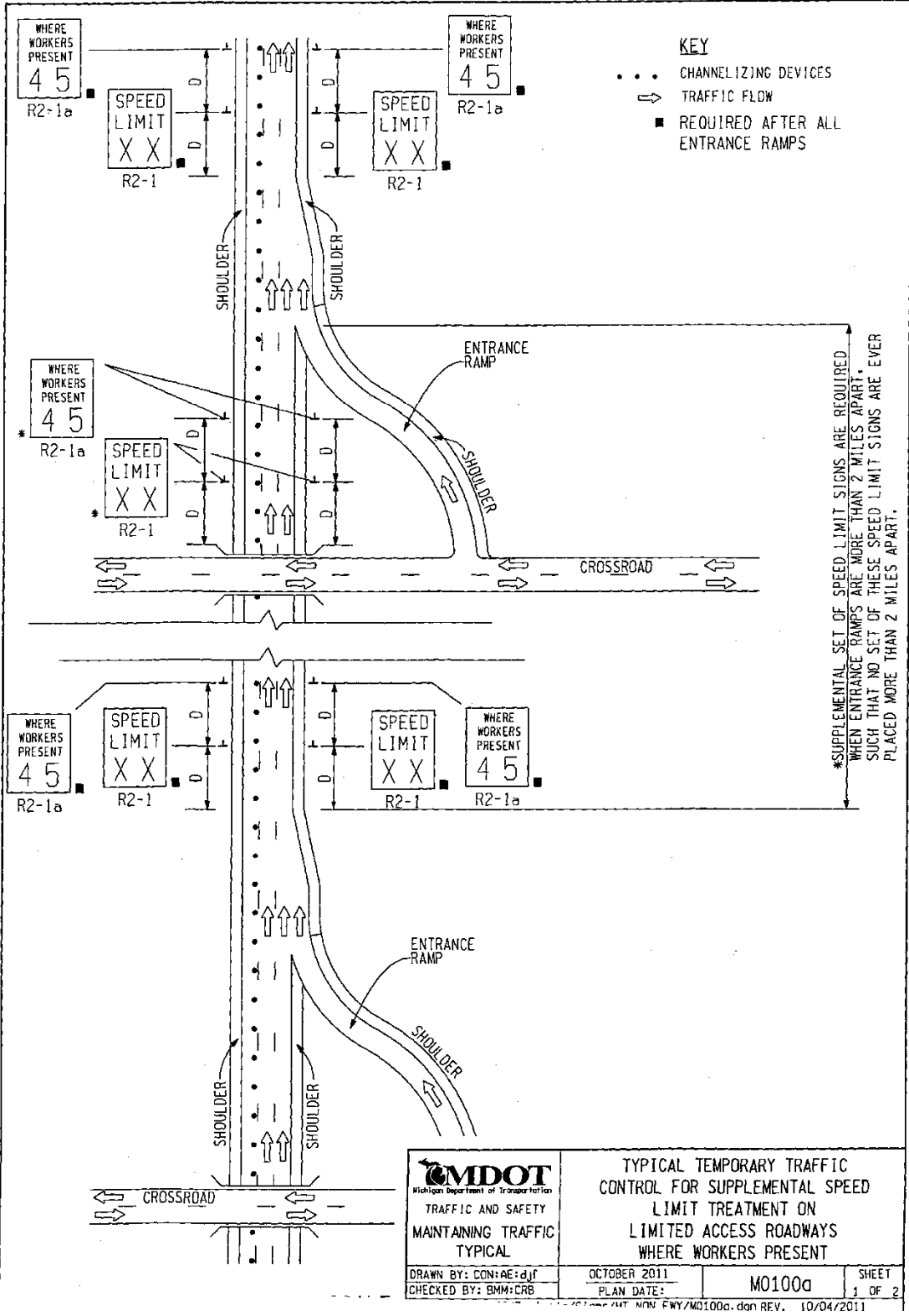
NOTES

- 1G. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES AND LENGTH OF LONGITUDINAL BUFFERS
1/3 L = MINIMUM LENGTH OF TAPER
SEE M0020a FOR "D" AND "L" VALUES
2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.
3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
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6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.
7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MODT WILL BE ALLOWED.
8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.
- 16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.
- 29C. THE TYPE OF REFLECTIVE SHEETING USED FOR THE W20-1a PLAQUE AND THE "WHERE WORKERS PRESENT" PLAQUE SHALL BE THE SAME AS THE TYPE USED FOR THE PARENT SIGN.

SIGN SIZES

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

 Michigan Department of Transportation TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TYPICAL TEMPORARY TRAFFIC CONTROL FOR A SHOULDER CLOSURE ON A FREEWAY, USING A REDUCED SPEED LIMIT WHERE WORKERS PRESENT
DRAWN BY: CON:AE:djf	OCTOBER 2011
CHECKED BY: BHM:CRB	PLAN DATE:
	M0910a
	SHEET 2 OF 2
	REV 10/27/2011



MDOT
 Michigan Department of Transportation
 TRAFFIC AND SAFETY
 MAINTAINING TRAFFIC
 TYPICAL

DRAWN BY: CON:AE:djt
 CHECKED BY: BMM:CRB


TYPICAL TEMPORARY TRAFFIC CONTROL FOR SUPPLEMENTAL SPEED LIMIT TREATMENT ON LIMITED ACCESS ROADWAYS WHERE WORKERS PRESENT

OCTOBER 2011
 PLAN DATE: M0100a SHEET 1 OF 2

MDOT HWY/M0100a.dan REV. 10/04/2011

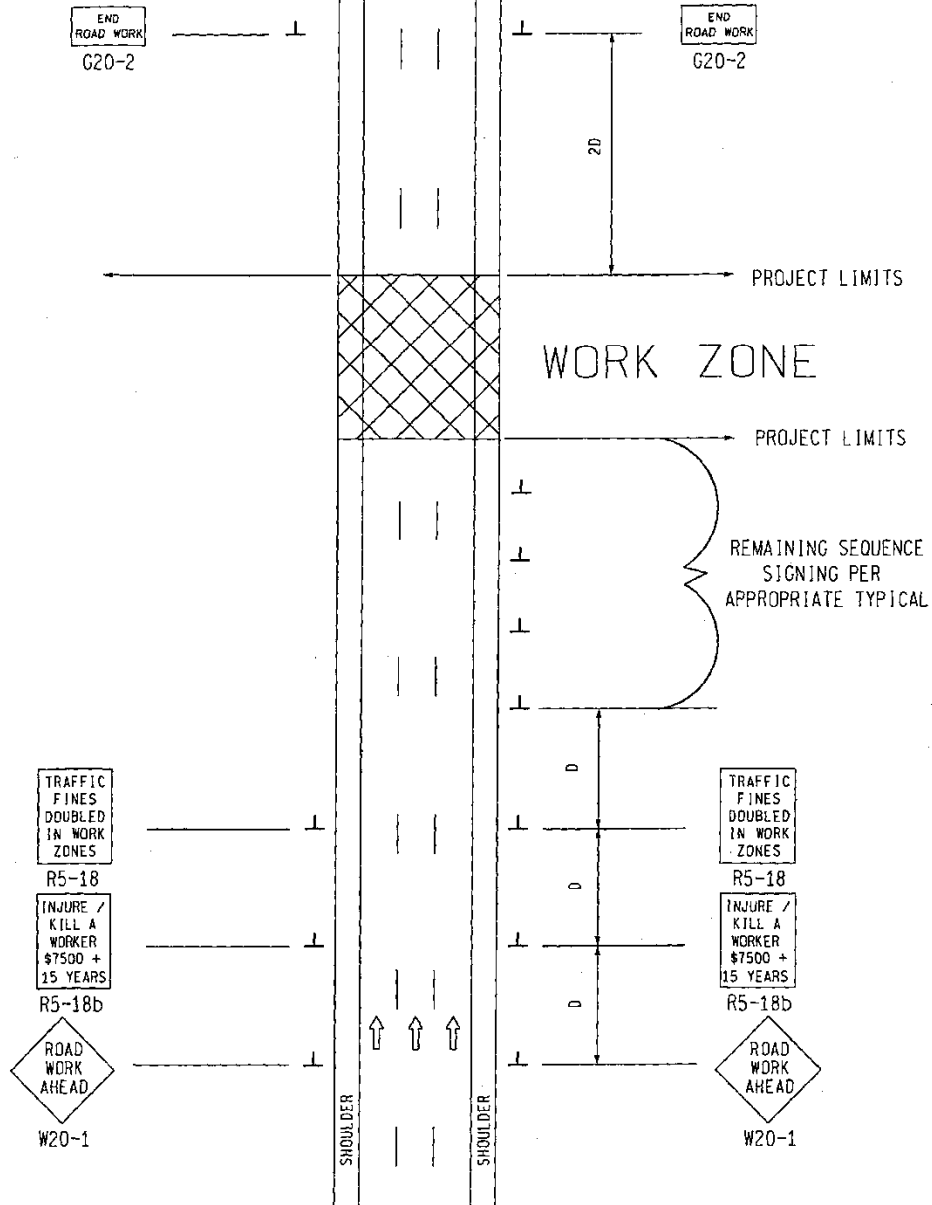
NOTES

- 1N. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
SEE M0020d FOR "D" VALUES
2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.
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8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.


 TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TYPICAL TEMPORARY TRAFFIC CONTROL FOR SUPPLEMENTAL SPEED LIMIT TREATMENT ON LIMITED ACCESS ROADWAYS WHERE WORKERS PRESENT		
	DRAWN BY: CON:AE:djf CHECKED BY: BMM:CRB	OCTOBER 2011 PLAN DATE:	M0100d SHEET 2 OF 2

MICHIGAN DEPARTMENT OF TRANSPORTATION REV. 10/04/2011

SIGN PLACEMENT
IS THE SAME FOR
BOTH DIRECTIONS



SIGN = 96 ft2 - TYPE B
FOR ONE DIRECTION OF TRAFFIC
W20-1 QUANTITY INCLUDED WITH
APPROPRIATE TYPICAL FOR
SEQUENCE SIGNING

 Michigan Department of Transportation TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TYPICAL ADVANCE SIGNING TREATMENT FOR INTERMEDIATE AND SHORT TERM STATIONARY WORK ZONE OPERATIONS WHERE ALL TRAFFIC CONTROL DEVICES ARE REMOVED AT END OF EACH WORK DAY ON A DIVIDED ROADWAY		
	DRAWN BY: CON:AE:dj+f CHECKED BY: BMM:CRB	OCTOBER 2011 PLAN DATE:	M0080a


10/13/2011

NOTES

- 30. THE APPROPRIATE ADVANCE SIGNING SEQUENCE(S), (M0030d THROUGH M0080d) SHALL BE USED ON ALL PROJECTS.
- 35. THESE SIGNS ARE INTENDED TO BE USED WITHIN THE LIMITS OF THE TEMPORARY SEQUENCE SIGNING AS IS SHOWN ON 1 OF 2. THESE SIGNS ARE NOT TO BE INTERMINGLED WITH ANY OTHER TEMPORARY SEQUENCE SIGNING EXCEPT AS SHOWN.

SIGN SIZES

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

 TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TYPICAL ADVANCE SIGNING TREATMENT FOR INTERMEDIATE AND SHORT TERM STATIONARY WORK ZONE OPERATIONS WHERE ALL TRAFFIC CONTROL DEVICES ARE REMOVED AT END OF EACH WORK DAY ON A DIVIDED ROADWAY		
	DRAWN BY: CON:AE:djf CHECKED BY: BMM:CRB	OCTOBER 2011 PLAN DATE:	M0080d

10/13/2011

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

TAPER LENGTH "L" IN FEET

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

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

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


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

TYPES OF TAPERS

- UPSTREAM TAPERS
- MERGING TAPER
- SHIFTING TAPER
- SHOULDER TAPER
- TWO-WAY TRAFFIC TAPER
- DOWNSTREAM TAPERS
(USE IS OPTIONAL)

TAPER LENGTH

- L - MINIMUM
- 1/2 L - MINIMUM
- 1/3 L - MINIMUM
- 100' - MAXIMUM
- 100' - MINIMUM
(PER LANE)

 Michigan Department of Transportation TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TABLES FOR "L", "D" AND "B" VALUES		
	DRAWN BY: CON:AE:dj:f CHECKED BY: BMM	JUNE 2006 PLAN DATE:	M0020a
FILE: K:\DGN\TSR\STDS\ENGLISH\MNTTRF\M0020a.dgn REV. 08/21/2006			

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


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

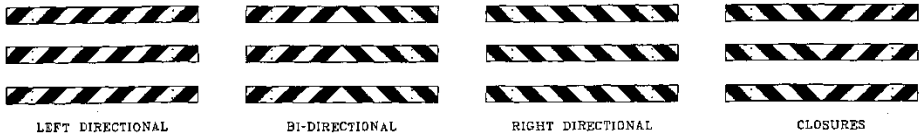
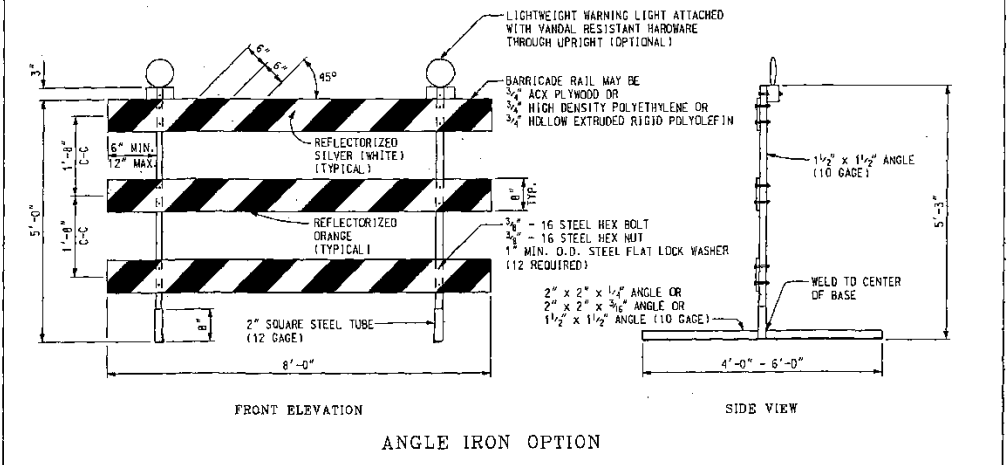
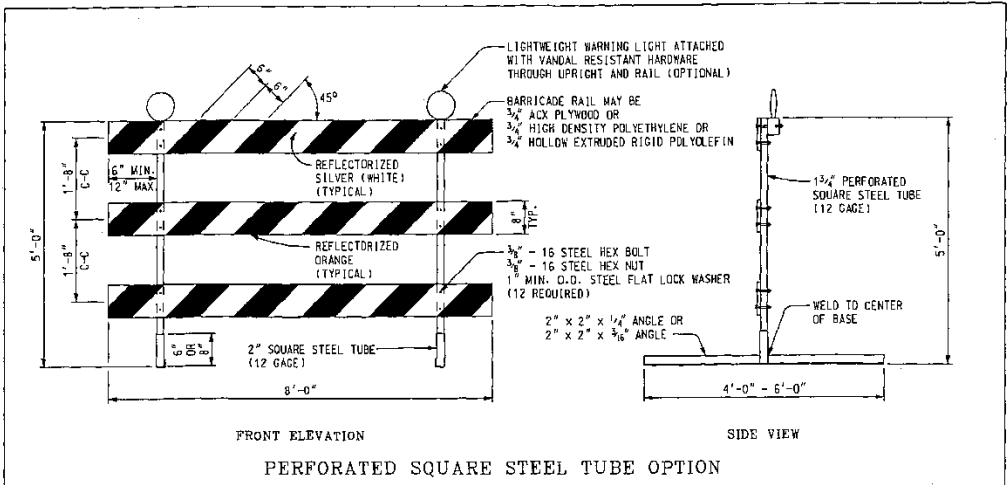
GUIDELINES FOR LENGTH OF
LONGITUDINAL BUFFER SPACE "B"

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

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

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

 TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TABLES FOR "L", "D" AND "B" VALUES		
	DRAWN BY: CON:AE:dj# CHECKED BY: BMM	JUNE 2006 PLAN DATE:	M0020a



BARRICADE RAIL SHEETING OPTIONS
TYPE III BARRICADES

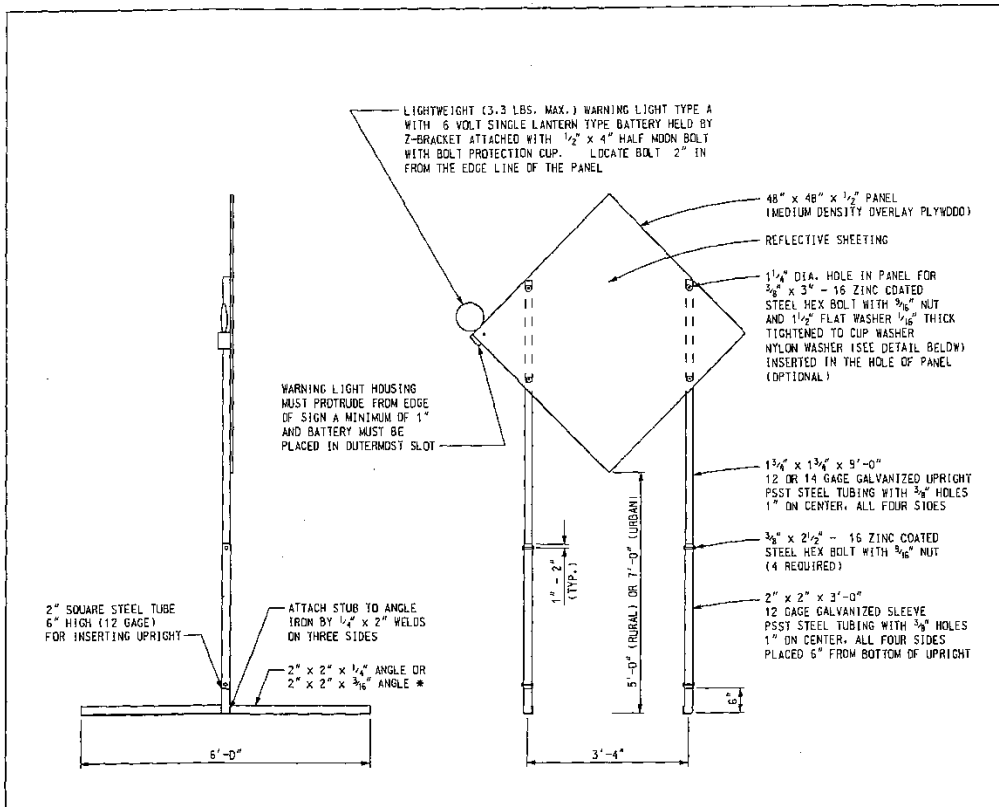
Other Type III Barricades meeting current NCHRP crash worthy criteria can be found on the FHWA Safety website at http://safety.fhwa.dot.gov/roadway_dept/road_hardware/wzd.htm

NOT TO SCALE

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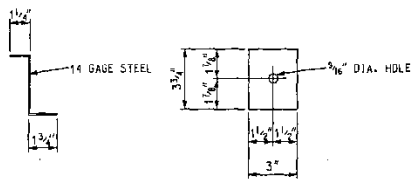
<p>PREPARED BY TRAFFIC AND SAFETY</p>	ENGINEER OF DELIVERY	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR Temporary Traffic Control Devices	
	ENGINEER OF DEVELOPMENT (SPECIAL DETAIL)		
DRAWN BY: ECH	FHWA APPROVAL DATE	9/22/09	WZD-125-E
CHECKED BY: MWB		PLAN DATE	SHEET 1 of 3

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

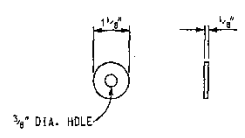


TEMPORARY SIGN SUPPORT

(WARNING LIGHT PLACED ON SIDE CLOSEST TO TRAFFIC)
 * SIGN STAND IS BALLASTED WITH FOUR OR MORE 35 LB SANDBAGS. A MINIMUM OF ONE ON EACH END.
 UPRIGHTS SHALL NOT EXTEND ABOVE THE SIGN PANEL.



Z-BRACKET DETAIL



OPTIONAL NYLON WASHER

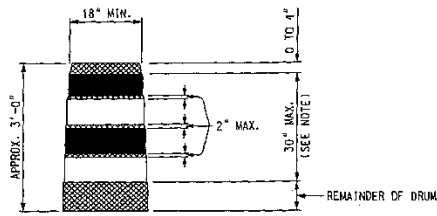
Other temporary sign supports meeting current NCHRP crash worthy criteria can be found on the FHWA Safety website at http://safety.fhwa.dot.gov/roadway_dept/road_hardware/wzd.htm

NOT TO SCALE					
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	9/22/09	WZD-125-E	SHEET 2 of 3	
File: T&S/Typ/Signs/WorkZones/wzd 125 d	Rev. 09/22/09 PJ	PLAN DATE			

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

- PLASTIC DRUM
- ▲▲▲ PROPOSED TYPE III BARRICADE
- ▲▲▲ EXISTING TYPE III BARRICADE

SYMBOLS TO BE USED ON PLANS



- 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 WHEN THEY ARE USED ON TYPE III BARRICADES.

SEE ROAD STANDARD PLANS R-113-SERIES FOR TEMPORARY CROSSOVERS FOR DIVIDED ROADWAY, AND R-126-SERIES FOR TYPICAL LOCATION AND SPACING OF PLASTIC DRUMS FOR PLACEMENT OF 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 HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	9/22/09	WZD-125-E	SHEET 3 of 3
File: T&S/Typ/Signs/WorkZones/wzd 125 d	Rev. 09/22/09 PJ	PLAN DATE		

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

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 ²)	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.

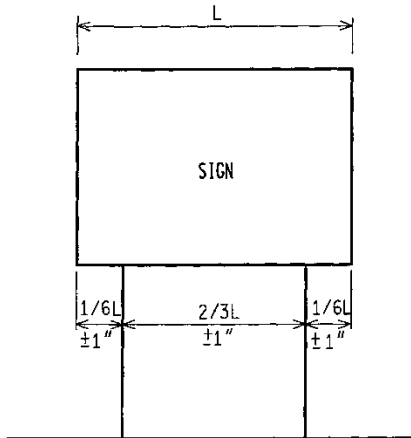
NOT TO SCALE

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

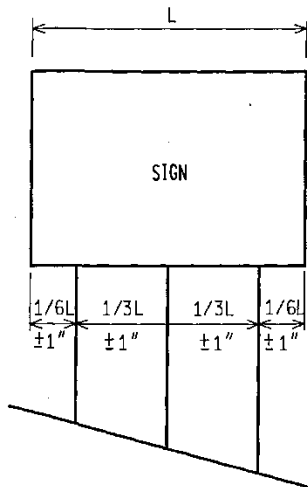
 MICHIGAN DEPARTMENT OF TRANSPORTATION	_____ ENGINEER OF DELIVERY	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR GROUND DRIVEN SIGN SUPPORTS FOR TEMP SIGNS		
	PREPARED BY TRAFFIC AND SAFETY SUPPORT AREA DRAWN BY: CON/ECH CHECKED BY: AUG	_____ ENGINEER OF DEVELOPMENT PENDING _____ FHWA APPROVAL DATE	8/2006 PLAN DATE	WZD-100-A

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2 POST SIGN SUPPORT SPACING



3 POST SIGN SUPPORT SPACING

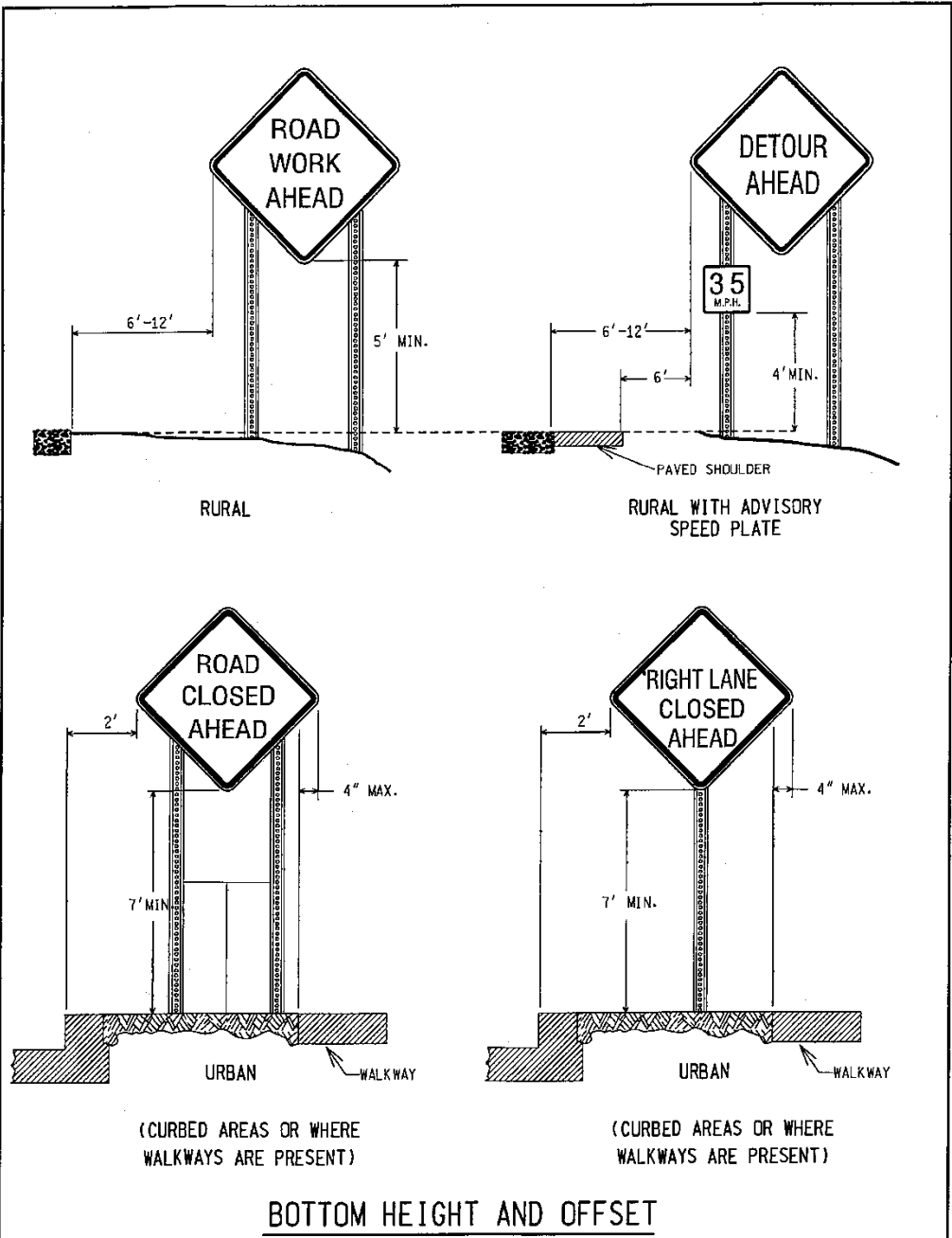


* FOR ALL 11' AND 12' LONG SIGNS ON 3 WOOD SUPPORTS, SPREAD POSTS SO AS TO HAVE A 8' MIN. TO 9' MAX. DISTANCE BETWEEN OUTSIDE POSTS.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	PENDING FHWA APPROVAL DATE	8/2006 PLAN DATE	WZD-100-A	SHEET 2 of 11
File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraff D/WZD-100-A Rev. 8/21/06 ECH				

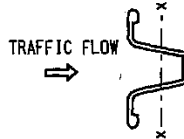
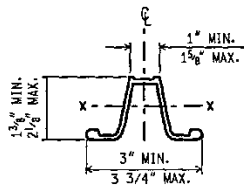
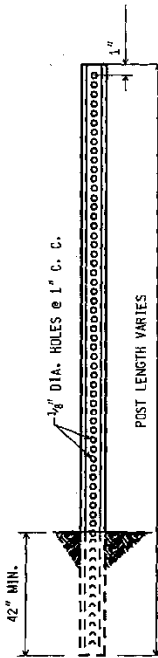
NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	PENDING FHWA APPROVAL DATE	8/2006 PLAN DATE	WZD-100-A	SHEET 3 of 11
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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.

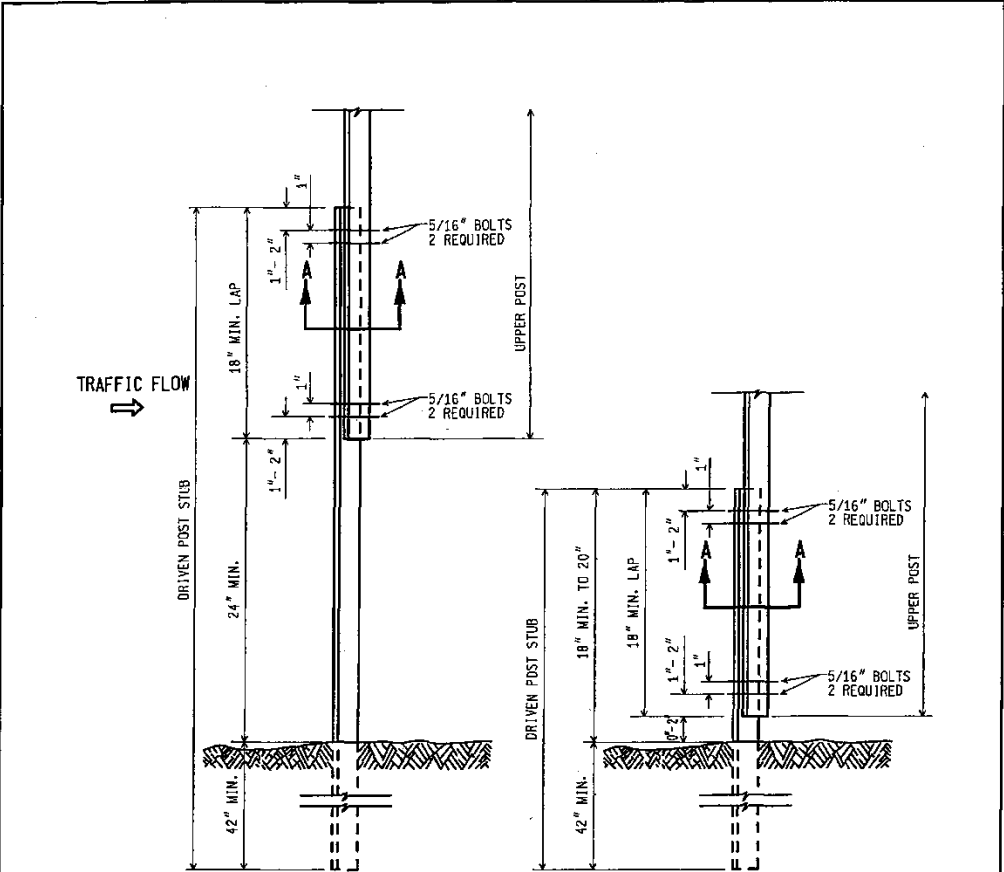
**3 lb. U - CHANNEL STEEL POST
 (NO SPLICE)**

MOUNT SIGN ON OPEN FACE OF
 U - CHANNEL STEEL POST

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	PENDING FHWA APPROVAL DATE	8/2006 PLAN DATE	WZD-100-A	SHEET 4 of 11
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UPPER SPLICE

LOWER SPLICE

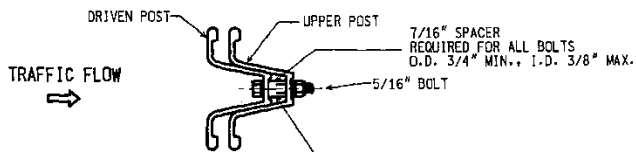
**3 lb. U - CHANNEL STEEL POST
(WITH SPLICE)**

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

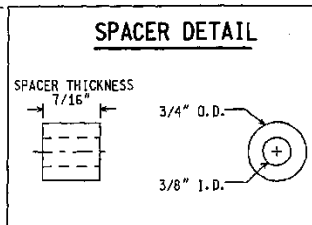
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	PENDING	8/2006	WZD-100-A	SHEET 5 of 11
	FHWA APPROVAL DATE			

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



SECTION A-A



NOTES:

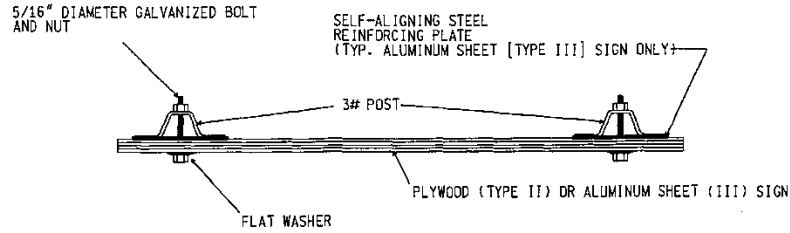
1. THE SPACER THICKNESS SHALL BE 1/16" LESS THAN THE GAP BETWEEN THE POST WHEN POSITIONED IN THE UNBOLTED CONFIGURATION.
2. THE EXTERIOR BOLT (CLOSEST TO LAP), SPACER, WASHER, AND NUT SHALL BE INSTALLED IN A PREPUNCHED HOLE 1" TO 2" FROM THE END OF THE LAP.
3. THE INTERIOR BOLT (FARTHEST FROM LAP), SPACER,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

**3 1b. U - CHANNEL STEEL POST
(WITH SPLICE)**

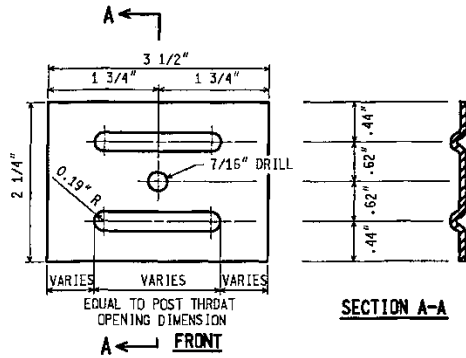
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	PENDING FHWA APPROVAL DATE	8/2006	WZD-100-A	SHEET 6 of 11
File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH		PLAN DATE		

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

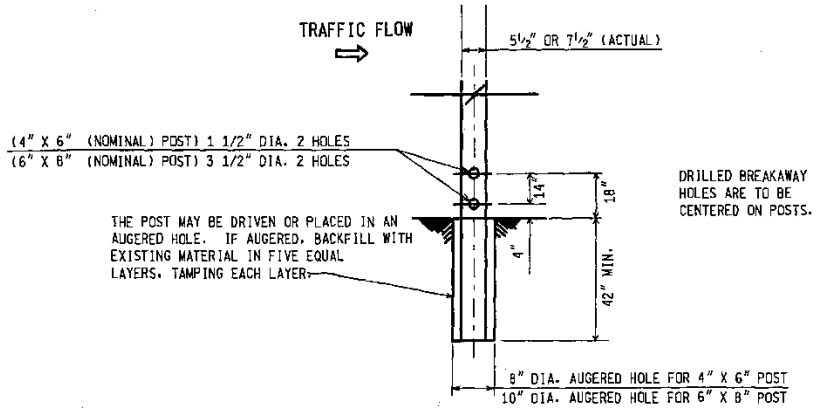
**STEEL SIGN REINFORCING PLATE
REQUIRED FOR TYPE III SIGNS ONLY**

3 lb. U - CHANNEL STEEL POST SIGN CONNECTION

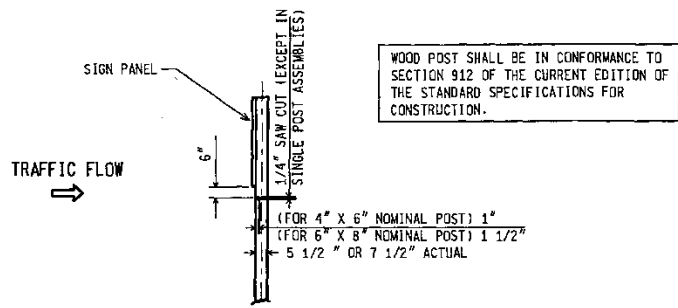
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	PENDING FHWA APPROVAL DATE	8/2006	WZD-100-A	SHEET 7 of 11
File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH	PLAN DATE			

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**WOOD POST BREAKAWAY HOLES/
 DIRECT EMBEDMENT DETAILS**



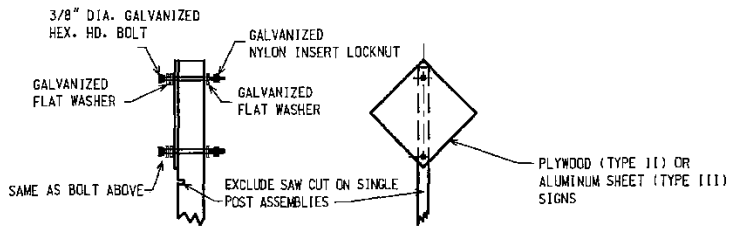
**SAW CUT DETAIL
 (MULTIPLE POST INSTALLATIONS)**

WOOD POST DETAILS

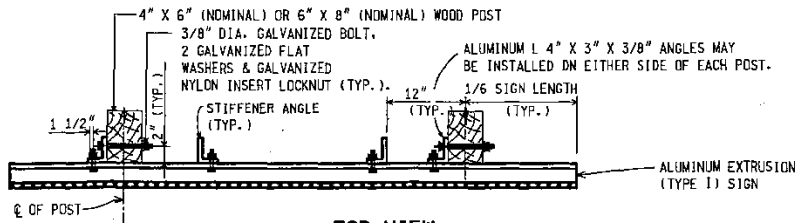
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	PENDING FHWA APPROVAL DATE	8/2006 PLAN DATE	WZD-100-A	SHEET 8 of 11
File#PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH				

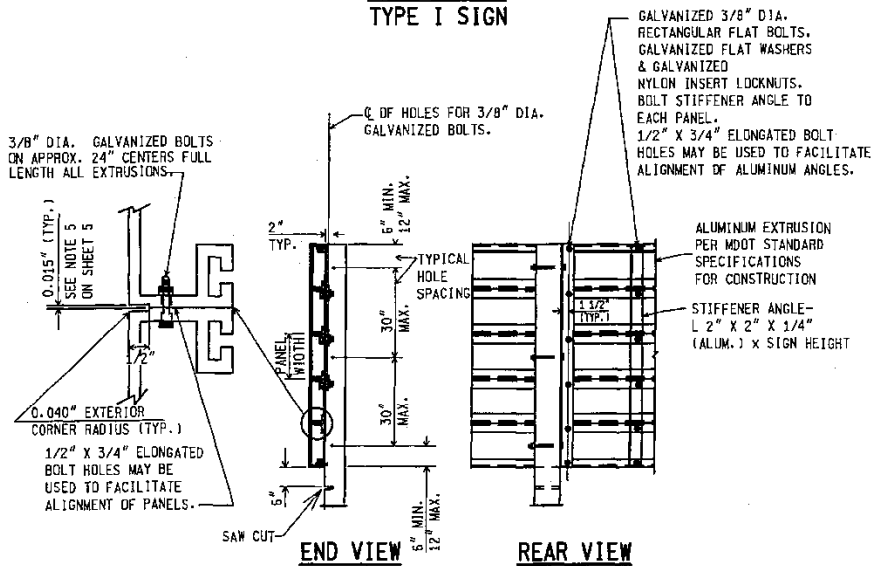
NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



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 HIGHWAYS DELIVERY STANDARD PLAN

PENDING
 FHWA APPROVAL DATE

8/2006

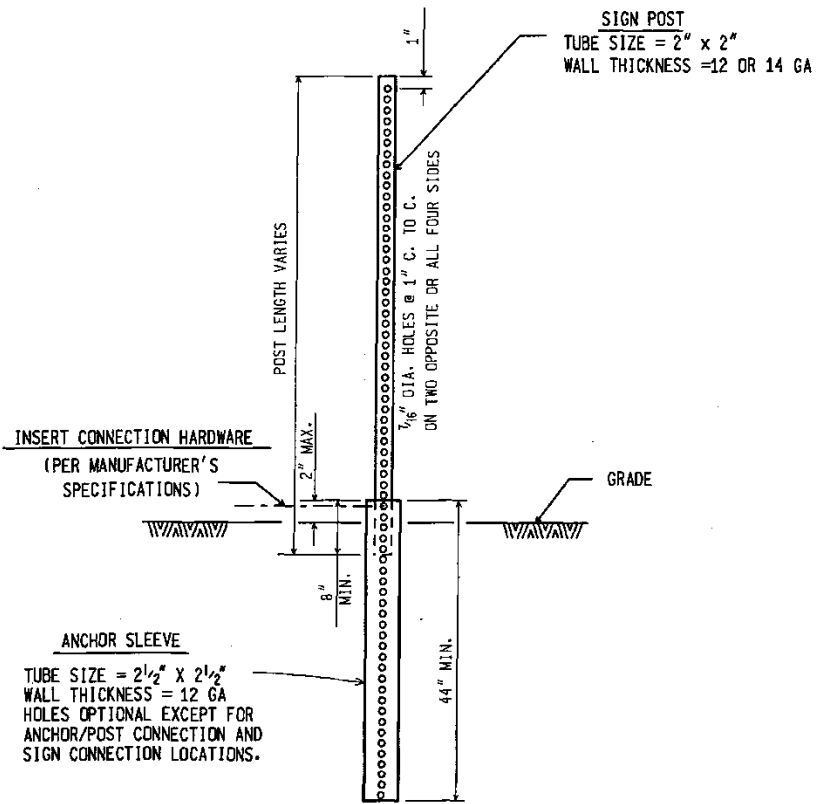
WZD-100-A

SHEET
 9 of 11

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

PLAN DATE

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SQUARE TUBULAR STEEL POST

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	PENDING FHWA APPROVAL DATE	8/2006 PLAN DATE	WZD-100-A	SHEET 10 of 11
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NOTE: THE ORIGINAL STONED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.

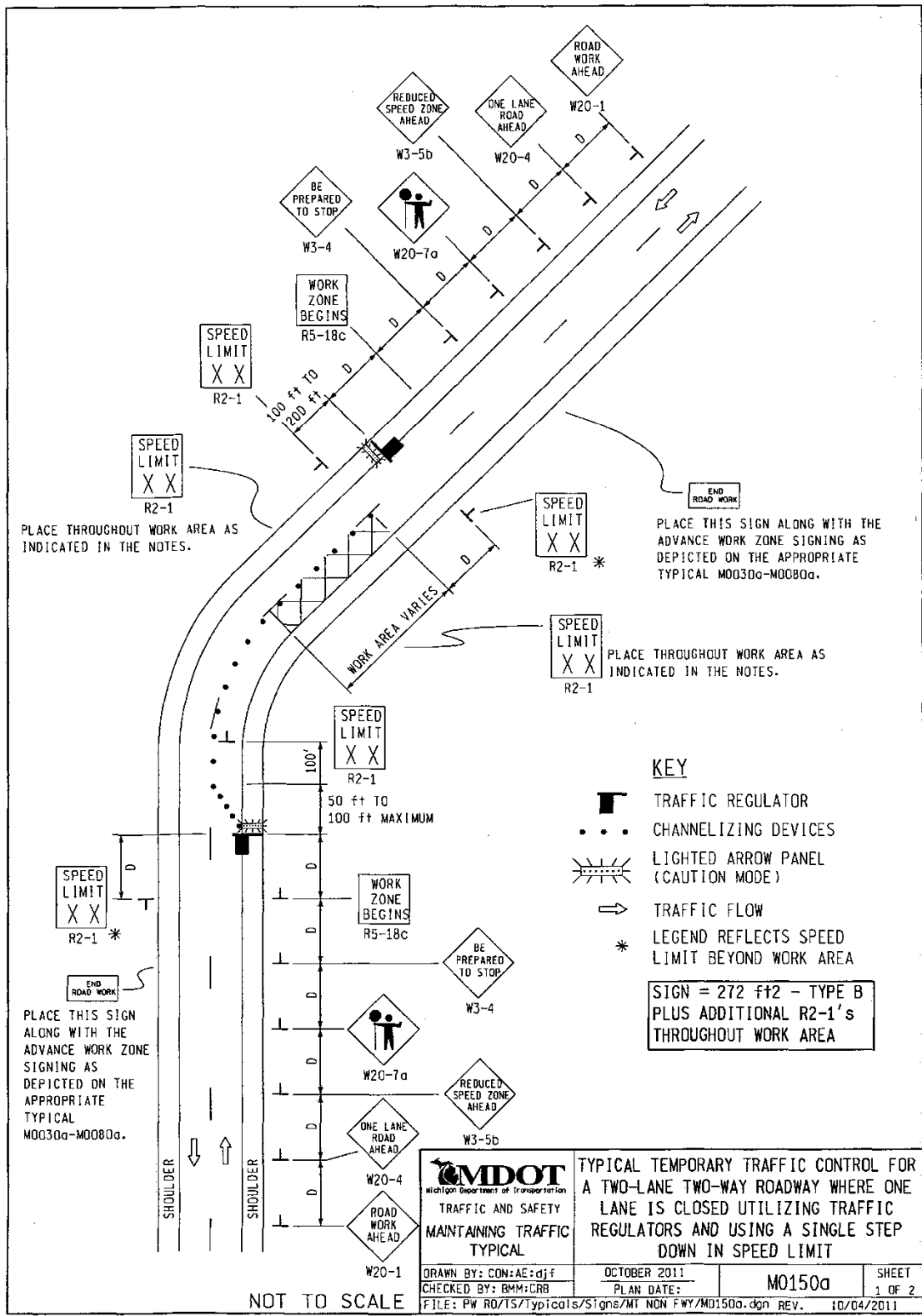
GENERAL NOTES:

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, COVER, AND/OR REMOVE THE TEMPORARY SIGN, INCLUDING SUPPORTS, ARE CONSIDERED TO BE INCLUDED IN THE COST OF THE TEMPORARY SIGN.
12. SAW CUTS IN WOOD POSTS ARE TO BE PARALLEL TO THE BOTTOM OF THE SIGN.
13. POSTS SHALL NOT EXTEND MORE THAN 4" ABOVE TOP OF SIGN.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	PENDING FHWA APPROVAL DATE	8/2006	WZD-100-A	SHEET 11 of 11
File#W/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH	PLAN DATE			

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



PLACE THROUGHOUT WORK AREA AS INDICATED IN THE NOTES.

PLACE THIS SIGN ALONG WITH THE ADVANCE WORK ZONE SIGNING AS DEPICTED ON THE APPROPRIATE TYPICAL M0030a-M0080a.

PLACE THROUGHOUT WORK AREA AS INDICATED IN THE NOTES.

PLACE THIS SIGN ALONG WITH THE ADVANCE WORK ZONE SIGNING AS DEPICTED ON THE APPROPRIATE TYPICAL M0030a-M0080a.

KEY

- TRAFFIC REGULATOR
- CHANNELIZING DEVICES
- LIGHTED ARROW PANEL (CAUTION MODE)
- TRAFFIC FLOW
- LEGEND REFLECTS SPEED LIMIT BEYOND WORK AREA

SIGN = 272 ft² - TYPE B PLUS ADDITIONAL R2-1's THROUGHOUT WORK AREA

MDOT
Michigan Department of Transportation

TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

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

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

NOT TO SCALE


NOTES

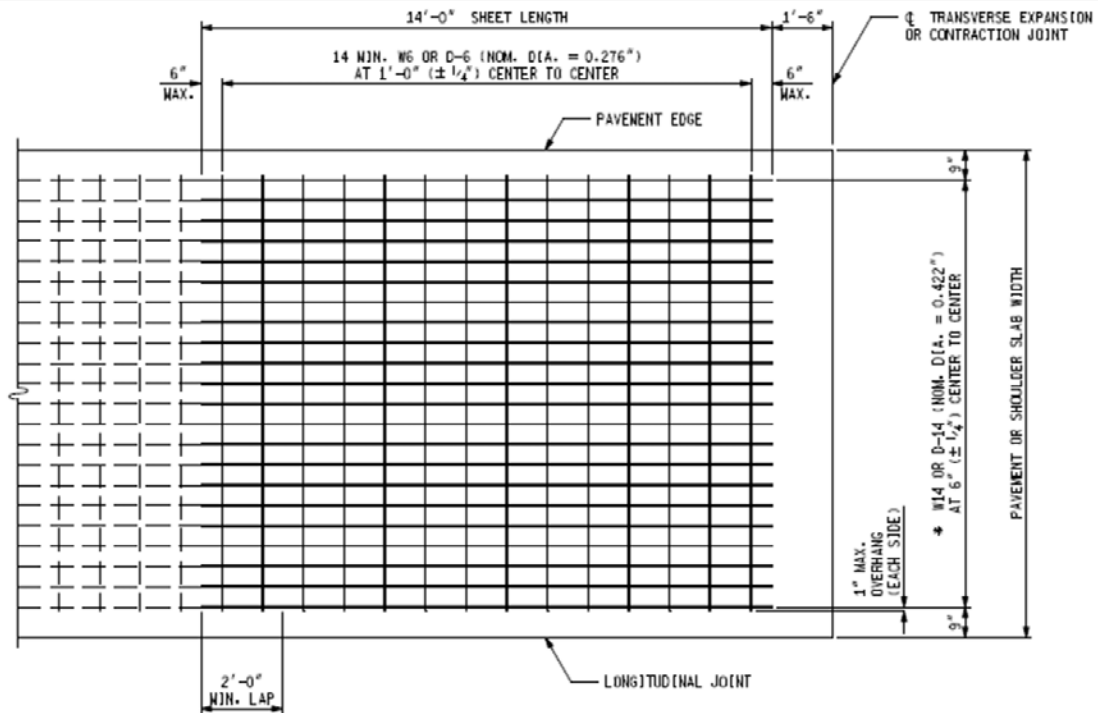
- 1H. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES AND LENGTH OF LONGITUDINAL BUFFERS
SEE M0020a FOR "D" VALUES.
2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.
3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
- 3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.
- 4A. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES IN THE TAPER AREA(S) SHOULD BE 15 FEET AND SHOULD BE EQUAL IN FEET TO TWICE THE POSTED SPEED IN MILES PER HOUR IN THE PARALLEL AREA(S).
5. FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED.
6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.
7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDT WILL BE ALLOWED.
9. ALL TRAFFIC REGULATORS SHALL BE PROPERLY TRAINED AND SUPERVISED.
- 9A. IN ANY OPERATION INVOLVING MORE THAN ONE TRAFFIC REGULATOR, ONE PERSON SHOULD BE DESIGNATED AS HEAD TRAFFIC REGULATOR.
10. ALL TRAFFIC REGULATORS' CONDUCT, THEIR EQUIPMENT, AND TRAFFIC REGULATING PROCEDURES SHALL CONFORM TO THE CURRENT EDITION OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD) AND THE CURRENT EDITION OF THE MDT HANDBOOK ENTITLED "TRAFFIC REGULATORS INSTRUCTION MANUAL."
11. WHEN TRAFFIC REGULATING IS ALLOWED DURING THE HOURS OF DARKNESS, APPROPRIATE LIGHTING SHALL BE PROVIDED TO SUFFICIENTLY ILLUMINATE THE TRAFFIC REGULATOR'S STATIONS.
- 12E. THE MAXIMUM DISTANCE BETWEEN THE TRAFFIC REGULATORS SHALL BE NO MORE THAN 2 MILES IN LENGTH UNLESS RESTRICTED FURTHER IN THE SPECIAL PROVISIONS FOR MAINTAINING TRAFFIC. ALL SEQUENCES OF MORE THAN 2 MILES IN LENGTH WILL REQUIRE WRITTEN PERMISSION FROM THE ENGINEER BEFORE PROCEEDING.
13. WHEN INTERSECTING ROADS OR SIGNIFICANT TRAFFIC GENERATORS (SHOPPING CENTERS, MOBILE HOME PARKS, ETC.) OCCUR WITHIN THE ONE-LANE TWO-WAY OPERATION, INTERMEDIATE TRAFFIC REGULATORS AND APPROPRIATE SIGNING SHALL BE PLACED AT THESE LOCATIONS.
14. ADDITIONAL SIGNING AND/OR ELONGATED SIGNING SEQUENCES SHOULD BE USED WHEN TRAFFIC VOLUMES ARE SIGNIFICANT ENOUGH TO CREATE BACKUPS BEYOND THE W3-4 SIGNS.
15. THE HAND HELD (PADDLE) SIGNS REQUIRED BY THE MMUTCD TO CONTROL TRAFFIC WILL BE PAID FOR AS PART OF FLAG CONTROL.
- 16A. ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED SHALL BE PLACED AFTER EACH MAJOR CROSSROAD THAT INTERSECTS THE WORK AREA WHERE THE REDUCED SPEED IS IN EFFECT, AND AT INTERVALS ALONG THE ROADWAY SUCH THAT NO SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED ARE MORE THAN TWO MILES APART.
- 16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.
- 16E. WHEN EXISTING SPEED LIMITS ARE REDUCED MORE THAN 10 MPH, THE SPEED LIMIT SHALL BE STEPPED DOWN IN NO MORE THAN 10 MPH INCREMENTS.
- 28E. THE TRAFFIC REGULATORS SHOULD BE POSITIONED AT OR NEAR THE SIDE OF THE ROAD SO THAT THEY ARE SEEN CLEARLY AT A MINIMUM DISTANCE OF 500 FEET. THIS MAY REQUIRE EXTENDING THE BEGINNING OF THE LANE CLOSURE TO OVERCOME VIEWING PROBLEMS CAUSED BY HILLS AND CURVES.

SIGN SIZES

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

NOT TO SCALE

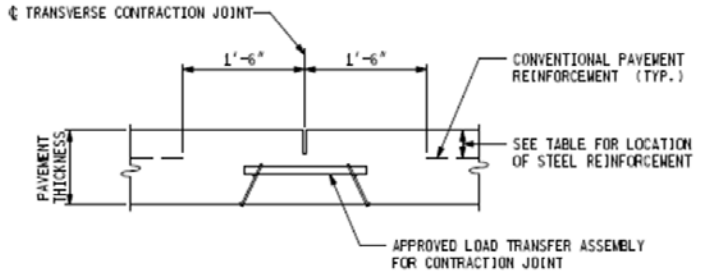
 TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TYPICAL TEMPORARY TRAFFIC CONTROL FOR A TWO-LANE TWO-WAY ROADWAY WHERE ONE LANE IS CLOSED UTILIZING TRAFFIC REGULATORS AND USING A SINGLE STEP DOWN IN SPEED LIMIT		
	DRAWN BY: CON:AE:djf CHECKED BY: BMM:CRB	OCTOBER 2011 PLAN DATE:	M0150a
FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0150a.dgn REV. 10/04/2011			



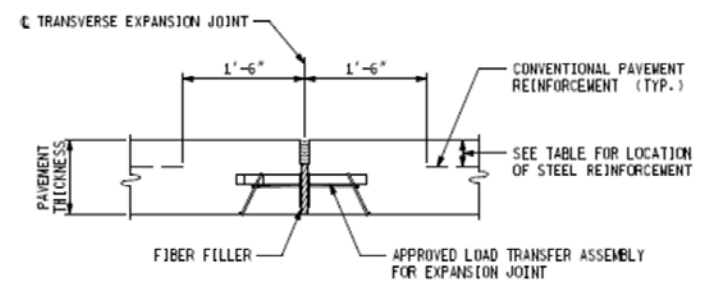
SIDE LAPS SHALL NOT BE LESS THAN THE SPACING OF THE LONGITUDINAL WIRES.

- * 18 WIRES MIN. FOR 10'-0" PAVEMENT SLAB WIDTH, 20 WIRES MIN. FOR 11'-0" PAVEMENT SLAB WIDTH, 22 WIRES MIN. FOR 12'-0" PAVEMENT SLAB WIDTH, 26 WIRES MIN. FOR 14'-0" PAVEMENT SLAB WIDTH, 4 WIRES MIN. FOR 3'-0" SHOULDER SLAB WIDTH, 6 WIRES MIN. FOR 4'-0" SHOULDER SLAB WIDTH, 8 WIRES MIN. FOR 5'-0" SHOULDER SLAB WIDTH, 12 WIRES MIN. FOR 7'-0" SHOULDER SLAB WIDTH, 16 WIRES MIN. FOR 9'-0" SHOULDER SLAB WIDTH.

WIRE FABRIC REINFORCEMENT



PAVEMENT REINFORCEMENT AT CONTRACTION JOINT



PAVEMENT REINFORCEMENT AT EXPANSION JOINT

** COMPUTED WEIGHTS OF STEEL (WIRE FABRIC REINFORCEMENT)		
PAVEMENT SLAB WIDTH	WEIGHT PER SHEET (LBS)	AVG. WEIGHT PER SYD OF PAVEMENT (LBS)
10'-0"	144.8	9.7
11'-0"	161.0	9.8
12'-0"	177.2	9.8
14'-0"	209.6	10.0

** BASED ON MINIMUM NUMBER OF WIRES REQUIRED

LOCATION OF STEEL REINFORCEMENT (BELOW TOP OF SURFACE)	
3" DEPTH	4" DEPTH
CONCRETE PAVEMENT OR BASE COURSE LESS THAN 11"	CONCRETE PAVEMENT OR BASE COURSE 11" OR GREATER

MDOT
Michigan Department of Transportation

PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Stegmann

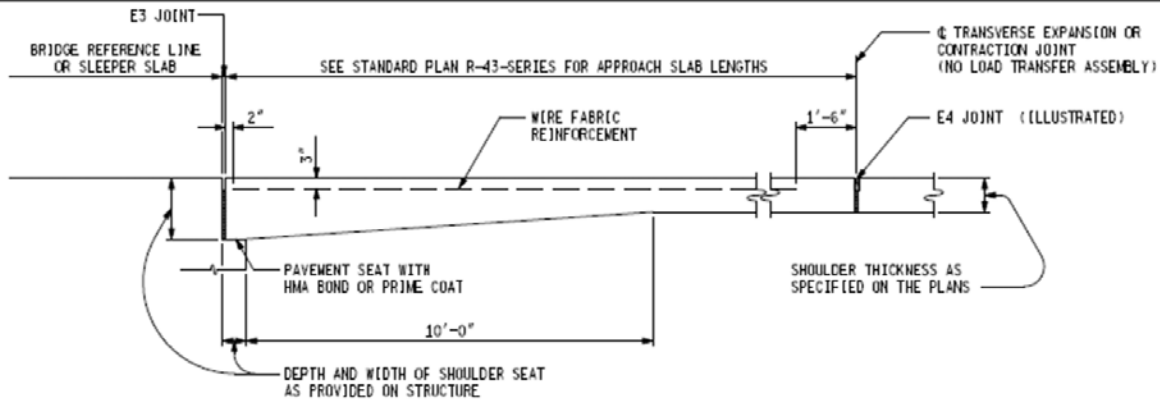
APPROVED BY: John C. [Signature]
ENGINEER OF DELIVERY

APPROVED BY: Mark [Signature]
ENGINEER OF DEVELOPMENT

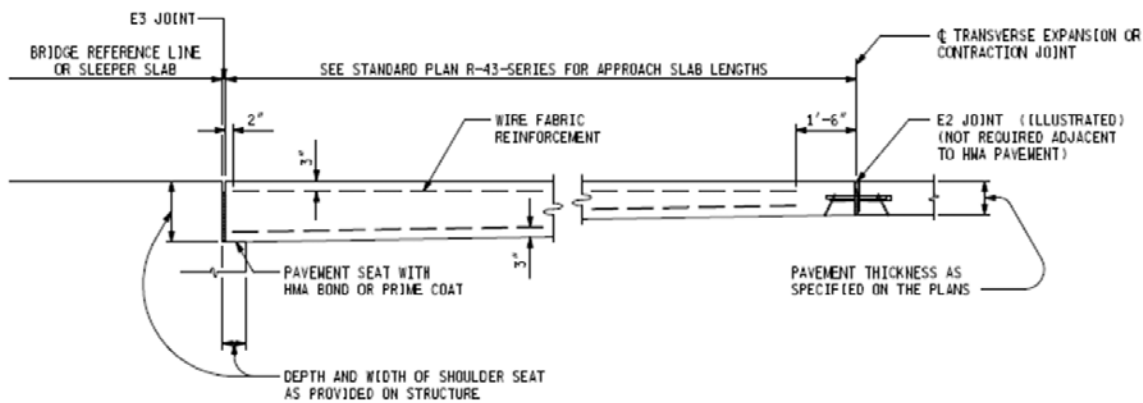
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

CONVENTIONAL PAVEMENT REINFORCEMENT
(WIRE FABRIC)

9-16-2009 F.H.S.A. APPROVAL	6-16-2009 PLAN DATE	R-45-G	SHEET 1 OF 2
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SHOULDER SLAB ADJACENT TO STRUCTURE



PAVEMENT SLAB ADJACENT TO STRUCTURE

**** COMPUTED WEIGHTS OF STEEL FOR SHOULDER SLAB ADJACENT TO STRUCTURE (WIRE FABRIC REINFORCEMENT)**

SHOULDER SLAB WIDTH	WEIGHT (LBS)
3'-0"	94.2
4'-0"	142.8
5'-0"	191.4
7'-0"	288.6
9'-0"	385.8

**** COMPUTED WEIGHTS OF STEEL FOR PAVEMENT SLAB ADJACENT TO STRUCTURE (WIRE FABRIC REINFORCEMENT)**

PAVEMENT SLAB WIDTH	WEIGHT (LBS)
10'-0"	868.8
11'-0"	966.0
12'-0"	1063.2
14'-0"	1257.6

** BASED ON MINIMUM NUMBER OF WIRES REQUIRED

NOTES:

WIRE FABRIC REINFORCEMENT USED TO FIT 27' JOINT SPACING SHALL HAVE TWO SHEETS OF 14'-0" LENGTH.

WIRE FABRIC REINFORCEMENT SHALL LAY FLAT WHEN DELIVERED TO THE WORK AREA. THE USE OF SPACER BARS WILL BE REQUIRED FOR LIFTING BUNDLES OF REINFORCEMENT.

WHERE UNIT OF PAVEMENT OR SHOULDER SLAB IS OTHER THAN SPECIFIED ON THIS STANDARD, SPECIAL SHEETS OF THE REQUIRED WIDTH MAY BE USED OR STANDARD SHEETS MAY BE CUT TO THE REQUIRED SIZE OR SPLT SHEETS MAY BE ADDED TO STANDARD SHEETS TO OBTAIN THE REQUIRED SIZE.

THE ENDS OF THE WIRE FABRIC REINFORCEMENT SHEETS SHALL BE FASTENED IN AT LEAST TWO PLACES ON EACH END.

SEE STANDARD PLANS R-39-SERIES AND R-40-SERIES FOR DETAILS OF JOINTS AND LOAD TRANSFER ASSEMBLIES.

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR			
CONVENTIONAL PAVEMENT REINFORCEMENT (WIRE FABRIC)			
9-16-2009 F.H.W.A. APPROVAL	6-16-2009 PLAN DATE	R-45-G	SHEET 2 OF 2