

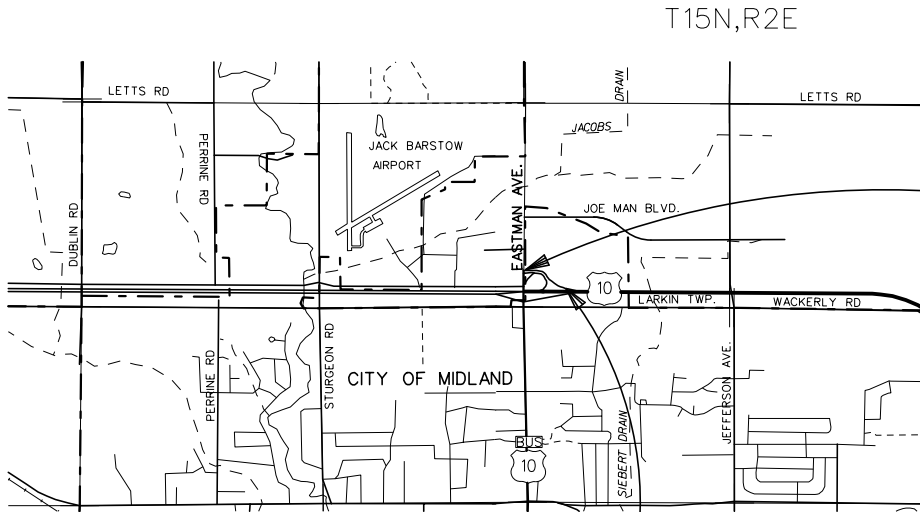
MICHIGAN DEPARTMENT OF TRANSPORTATION

ROUTE: WB US-10 EASTMAN OFF-RAMP (EXIT 122)

CITY OF MIDLAND
MIDLAND COUNTY

| SECTION | CONTROL SEC | JOB NO. | FEDERAL PROJECT | ITEM |
|---------|-------------|---------|-----------------|------|
| | 56044 | 15-5601 | | |

| ROAD | YEAR | TRAFFIC DATA | | | SPEED DATA | | LIMITS OF TRAFFIC DATA |
|----------|------|--------------|------|------|------------|--------|---------------------------------------|
| | | ADT | DHV | COMM | DESIGN | POSTED | |
| WB US-10 | 2012 | 10100 | 1280 | 9% | 75 | 70 | W JCT US-10 BR MIDLAND TO ECL MIDLAND |



POB WB US-10 EASTMAN OFF RAMP
INTERSECTION WITH EASTMAN AVE
(EXIT 122)
STA 1+10
PR 886003
PR MP 0.02
CS 56044

POE WB EASTMAN OFF RAMP (EXIT 122)
STA 13+00
PR 886003
PR MP 0.25
CS 56044



COUNTY KEY

THE IMPROVEMENTS COVERED BY THESE PLANS SHALL BE DONE IN ACCORDANCE WITH THE MICHIGAN DEPARTMENT OF TRANSPORTATION 2012 STANDARD SPECIFICATIONS FOR CONSTRUCTION. PHYSICAL ROAD NUMBER (PR#) & MILEPOST (MP) DATA ARE FROM MICHIGAN GEOGRAPHIC FRAMEWORK VERSION # 14.

MILES: 0.23
CONTRACT FOR:
CONCRETE PAVEMENT REPAIRS AND PAVEMENT MARKINGS



KIRK T. STEUDLE, P.E. - DIRECTOR

DATE: 6/2/15

DESIGN UNIT: MYERS

TSC: MT PLEASANT

DRAWING SHEET

1

LOG OF PROJECT

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WB US-10 Eastman Ave Off-Ramp
C.S. 56044/P.R. 886003
15-5601

JOB LOCATION AND DESCRIPTION

PROGRESS SCHEDULE

Work may start immediately after receiving approval from MDOT (estimated date: Aug 3), and the project must be completed by September 18, 2015. Work shall commence on a Monday and be completed within 21 consecutive calendar days. Notice must be provided to Jason Potts at 989-737-0211 three (3) calendar days prior to beginning any work.

LOCATION

The project begins at the intersection of Eastman Ave and the WB US-10 Off-Ramp (Exit 122) and continues up the ramp approximately 1200 feet, City of Midland, Midland County.

CS/PR Information

P.O.B. = Station 1+23

C.S. = 56044

C.S. Mile Point: 13.642

P.R. = 886003

P.R. Mile Point: 0.02

P.O.E. = Station 13+00

C.S. = 56044

C.S. Mile Point: 13.851

P.R. = 886003

P.R. Mile Point: 0.25

Location Length = 0.23 miles

DESCRIPTION OF WORK

The work shall consist of concrete pavement repairs and pavement markings on the WB US-10 Off-Ramp to Eastman Road, Exit 122. The treatment and locations of all concrete pavement repairs are shown in the concrete repair log below or as directed by the Engineer.

LOG OF PROJECT

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WB US-10 Eastman Ave Off-Ramp
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| Concrete Repair Location Table (for information only) | | | | |
|---|--|--------------|--------------------|--|
| Station | Lane | Patch Length | Patch (Lane) Width | Notes |
| 0+00 | REFERENCE: CL of US-10 BR (Eastman Ave) | | | |
| 1+23 | R turn Ln | 4 | 13 | Joint runs through "ONLY" Pavt Marking |
| 1+23 | C Ln | 4 | 13 | |
| 1+23 | L turn Ln | 4 | 13 | Joint runs through "ONLY" Pavt Marking |
| 1+49 | R turn Ln | 20 | 7 | Not full lane width |
| 1+59 | R turn Ln | 9 | 12 | |
| 1+59 | C Ln | 9 | 13 | |
| 1+59 | L turn Ln | 9 | 13 | |
| 1+86 | L turn Ln | 9 | 7 | Not full lane width |
| 1+86 | C Ln | 9 | 10 | Not full lane width |
| 2+18 | L turn Ln | 9 | 11 | |
| 2+18 | C Ln | 9 | 12 | |
| 2+60 | Ramp | 16 | 38 | Just past lane lines |
| 3+21 | Ramp | 11 | 35 | |
| 3+76 | Ramp | 11 | 31 | |
| 4+34 | Ramp | 9 | 24 | |
| 4+51 | Ramp | 18 | 7 | Where ramp starts to widen, far left section |
| 5+69 | Ramp | 10 | 16 | |
| 5+96 | Ramp | 9 | 16 | |
| 6+48 | Ramp | 72 | 16 | |
| 6+93 | Ramp | 9 | 16 | |
| 7+10 | Ramp | 9 | 16 | |
| 7+46 | Ramp | 19 | 16 | |
| 7+90 | Ramp | 12 | 16 | Extra length required due to uneven pavt |
| 8+30 | Ramp | 10 | 16 | |
| 8+84 | Ramp | 12 | 16 | |
| 9+32 | Ramp | 11 | 8 | |
| 9+90 | Ramp | 4 | 16 | |
| 11+49 | Ramp | 4 | 16 | |

MAINTAINING TRAFFIC

Traffic Restrictions

Maintaining traffic will be accomplished with traffic shifts and lane closures utilizing Maintaining Traffic Typical M0020a, M0070a, and M0950a-MOD. Traffic shall be maintained according to Sections 104.07, 104.11, and 812 of the 2012 Standard Specifications for Construction, including any Supplemental Specifications, and as specified herein.

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WB US-10 Eastman Ave Off-Ramp
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15-5601

The staging listed below follows the Engineer's suggested work sequence. Alternate staging plans may be submitted to the Engineer for consideration and will be subject to approval by the Engineer. Staging details and typicals are attached.

Stage 1

Maintain traffic on the right side of the ramp, while constructing the left side. Maintain the left turn and the left/thru lane, while closing the right turn lane. Open the right turn lane at Station 1+23 for right turn storage.

Stage 2

Maintain traffic on the left side of the ramp, while constructing the right side. Maintain the right turn lane and the left/thru lane, while closing the left turn lane. Open the left turn lane at Station 1+23 for left turn storage.

Stage 3

Close center lane (left/thru lane) from station 1+23 to station 4+51. Maintain traffic in the left turn and, and right turn lane on both sides of the closure, while constructing the center lane. Use signs W9-3, R3-7d and W12-1 to close center lane, distinguish lane assignments, and split traffic with 42" channelizing devices. Open the left/thru lane at Station 1+23 for left/thru traffic.

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

The Contractor shall not create any unsafe conditions within the Construction Influence Area (CIA) that form a hazard for motorists. Extra caution should be used when delineating the work zone overnight to protect the roadway users.

Maintain a minimum of one lane of ramp traffic at all times. Maintain two lanes in the three lane portion per the attached staging sheets, and have all lanes open prior to the patch at station 1+23.

No work shall be performed or lane closures/traffic shifts allowed during the Labor Day holiday period starting from Thursday at noon until Tuesday at normal starting time.

Once work is initiated that includes any lane restrictions, that work shall be continuous until completed. A lack of work activity for more than two calendar days will require the removal and replacement of lane or shoulder restrictions, at the Contractor's expense.

The storage restrictions in section 812.03.G.5 of the 2012 Standard Specifications for Construction will be strictly adhered to. The Contractor shall not park any vehicle or store any material on public recreational property.

Daily maintenance of traffic control items will not be paid for separately, but will be included in the lump sum price for the project.

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15-5601

ESTIMATED QUANTITIES

The quantities included in the summations below are approximate and for reference only. Contractor will be responsible for verifying quantities before bidding by site inspection and plan review. If any major discrepancies are noted, contractor must contact Krista Hickman at (989) 773-7756.

This project is a Maintenance funded project, which means that there will be absolutely no overpayment or extras. All material, labor and mobilization shall be included in the bid.

MDOT will have the low bid reviewed and approved for funding. MDOT reserves the right to reject any bid that appears to be unqualified. Before award, MDOT may request a site and plan review meeting with the low bid contractor.

ITEMS OF WORK (for information only)

Ramp Concrete Pavement Repairs

| | |
|-----------------------------------|---------|
| Aggregate Base | 40 Ton |
| Joint, Contraction, Cp | 248 Ft |
| Joint, Contraction, Crg | 886 Ft |
| Joint, Expansion, Erg | 384 Ft |
| Lane Tie, Epoxy Anchored | 38 Ea |
| Pavt Repr, Nonreinf Conc, 10 inch | 609 Syd |
| Pavt Repr, Rem | 609 Syd |
| Saw Cut, Intermediate | 468 Ft |

Miscellaneous

| | |
|---------------|-------|
| Hand Patching | 3 Ton |
|---------------|-------|

Items for Maintaining Construction Zone Traffic

| | |
|-------------------------------------|---------|
| Minor Traf Devices | 1 LS |
| Channelizing Device, 42 inch, Furn | 100 Ea |
| Channelizing Device, 42 inch, Oper | 100 Ea |
| Plastic Drum, High Intensity, Furn | 30 Ea |
| Plastic Drum, High Intensity, Oper | 30 Ea |
| Lighted Arrow, Type C, Furn | 1 Ea |
| Lighted Arrow, Type C, Oper | 1 Ea |
| Sign, Type B, Temp, Prismatic, Furn | 484 Sft |
| Sign, Type B, Temp, Prismatic, Oper | 484 Sft |
| Sign Cover | 2 Ea |

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Permanent Pavement Markings

| | |
|--|---------|
| Pavt Mrkg, Ovly Cold Plastic, Only | 2 Ea |
| Pavt Mrkg, Waterborne, 6 inch, White | 1625 Ft |
| Pavt Mrkg, Waterborne, 6 inch, Yellow | 1225 Ft |
| Pavt Mrkg, Waterborne, 2 nd Application, 6 inch, White | 1625 Ft |
| Pavt Mrkg, Waterborne, 2 nd Application, 6 inch, Yellow | 1225 Ft |

GENERAL PLAN NOTES

Miss Dig/Underground Utility Notification

For the protection of underground utilities and in conformance with Public Act 174 of 2013, the Contractor shall contact MISS DIG System, Inc. by phone at 811 or 800-482-7171 or via the web at either elocate.missdig.org for single address or rte.missdig.org, a minimum of 3 business days prior to excavating, excluding weekends and holidays.

Stationing

Stationing on this project was taken from Right-of-Way plans and from measurements made in the field. The stationing is not necessarily accurate.

Aggregate Base

Aggregate bases shall use aggregate 21A, unless otherwise specified.

Concrete Hand Finishing

Hand finishing of concrete pours to be struck off and consolidated by hand methods will be permitted on variable width lanes and lanes formed by flexible forms for short radius curves, as directed by the Engineer.

Permanent Signs

Any permanent signs requiring relocation due to Contractor operations shall be salvaged and reset by the Contractor at locations designated by the Engineer. Signs and posts damaged during the removal and storage operations shall be replaced with new signs and posts. The cost of this work shall be borne by the Contractor.

Sign Covers

All existing signs shall be covered when not applicable.

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NOTES APPLYING TO STANDARD PLANS

Where the following items are called for on the plans, they are to be constructed according to the Standard Plan or Special Detail given below opposite each item unless otherwise indicated.

| | |
|---|-------------|
| Transverse Pavement Joints..... | R-39-I |
| Load Transfer Assemblies for Transverse Joints..... | R-40-H |
| Longitudinal Pavement Joints..... | R-41-H |
| Typical Joint Layouts for Concrete Pavement..... | R-42-F |
| Location of Transverse Joints in Plain Concrete Pavement..... | R-43-I |
| Concrete Pavement Repair..... | R-44-F |
| Ground Driven Sign Supports for Temporary Signs | * WZD-100-A |
| Temporary Traffic Control Devices..... | *WZD-125-E |

**indicates Special Detail*

PUBLIC UTILITIES

Utility Owner

Type of Utility

AT&T

136 E. 4th St.

Clare, Michigan 48617

Ph: 989-980-7801(W)

Attn: Rob Augustine

Telecom

Charter Communications

7372 Davison Rd

Davison, Michigan 48423

Ph: 810-658-5140(W)

Attn: David Kelly

Cable

City of Midland

333 W. Ellsworth

Midland, Michigan 48640

Ph: 989-837-3353(W)

Attn: Brian McManus

Water

Consumers Energy

2400 Weiss Street

Saginaw, Michigan 48602

Ph: 989-791-5353(W)

Attn: Greg Squanda

Electric

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C.S. 56044/P.R. 886003
15-5601

Utility Owner

Type of Utility

Consumers Energy
1945 West Parnall Road, P12-208A
Jackson, Michigan 49201
Ph: 517-788-0817(W)
Attn: Pete Mulhearn

Electric

Consumers Energy
2400 Weiss Street
Saginaw, Michigan 48602
Ph: 989-791-5885(W)
Attn: Kevin Couturier

Gas

Consumers Energy
1945 West Parnall Road, P23-228
Jackson, Michigan 49201
Ph: 517-788-0998(W)
Attn: Timothy Coppernoll

Gas

DOW Chemical Co.
921 Building
Midland, Michigan 48667
Ph: 989-636-6779(W)
Attn: Martin Hill

Other

METC
27175 Energy Way
Novi, Michigan 48377
Ph: 248-946-3298(W)
Attn: Erin Keeler

Electric

Midland County Drain Commissioner
220 West Ellsworth Street, Room 229-30
Midland, Michigan 48640
Ph: 989-832-6772(W)
Attn: Doug Enos

County Drain

Midland County Water District No. 1
P.O. Box 320
Sanford, Michigan 48657
Ph: 989-687-2709(W)
Attn: Ron Rose

Water

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C.S. 56044/P.R. 886003
15-5601

Utility Owner

Type of Utility

TDS Telecom (Wolverine Telephone)
104 N. Cedar St., P.O. Box 78
Sanford, Michigan 48657
Ph: 989-687-2111(W)
Attn: Ron Cay

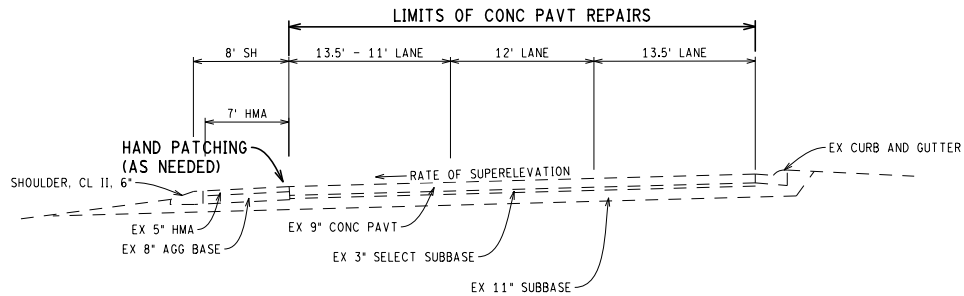
Telecom

US Signal Company
201 Ionia Avenue, SW
Grand Rapids, Michigan 49503

Telecom

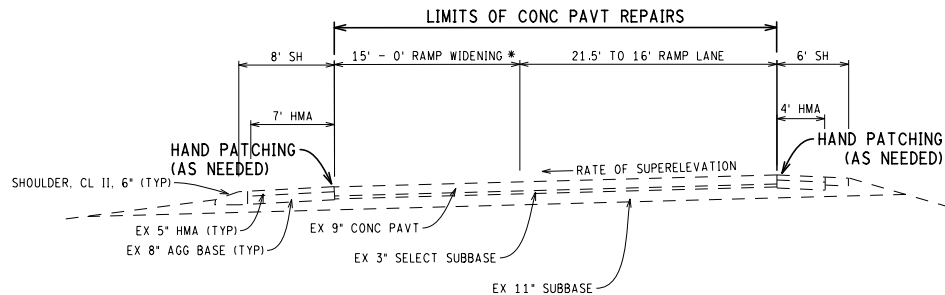
Windstream KDL
4074 S. Linden Road
Flint, Michigan 48507
Ph: 810-691-1035(W)
Attn: Dirk Welte

Telecom



EXISTING AND PROPOSED SUPERELEVATED SECTION

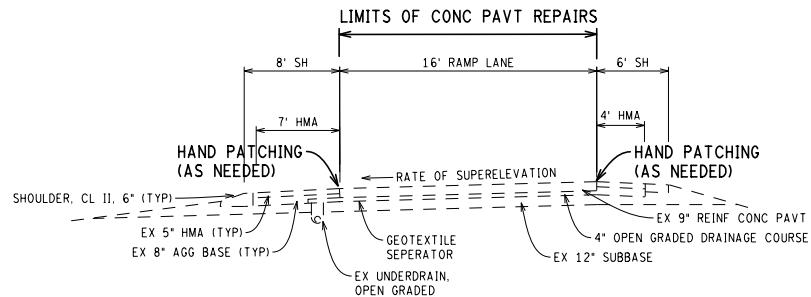
SECTION APPLIES TO:
STA 1+10 TO STA 2+66



EXISTING AND PROPOSED SUPERELEVATED SECTION

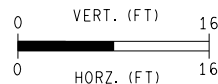
SECTION APPLIES TO:
STA 2+66 TO STA 9+84

* STA 2+66 TO STA 5+74 = 15' TO 0'
STA 5+74 TO STA 9+84 = 0'



EXISTING AND PROPOSED SUPERELEVATED SECTION

SECTION APPLIES TO:
STA 9+84 TO STA 13+00



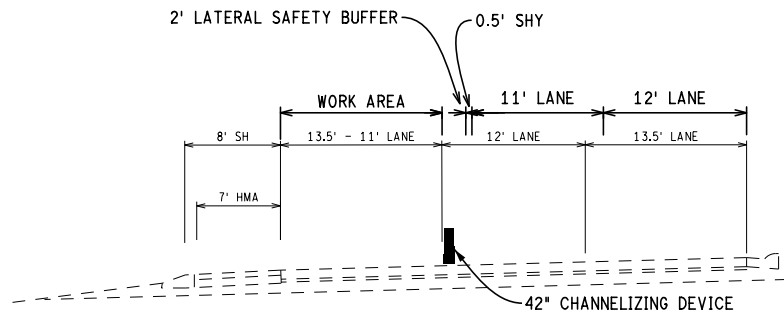
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DESIGN UNIT: MYERS
TSC: MT PLEASANT

CS: 56044
JN: 15-5601

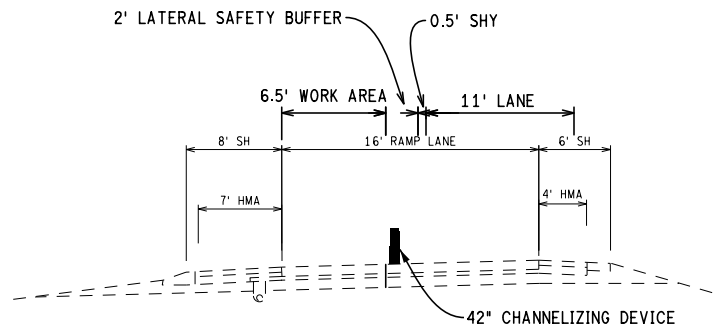
TYPICAL SECTIONS

DRAWING SHEET
SECT 1
10

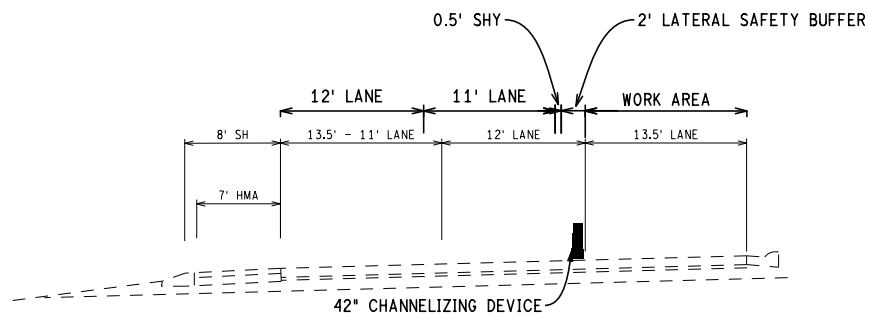
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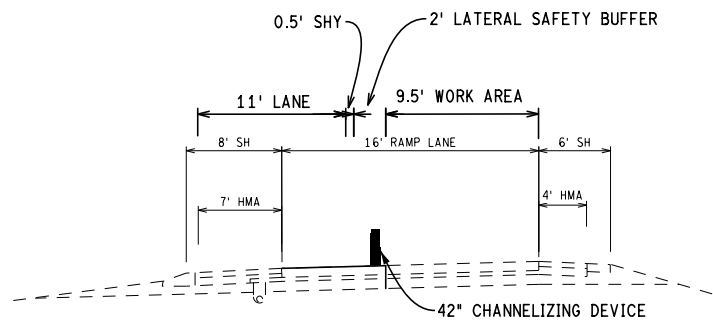
STAGE 1
STA 1+23 TO STA 2+66



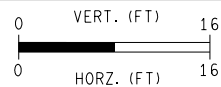
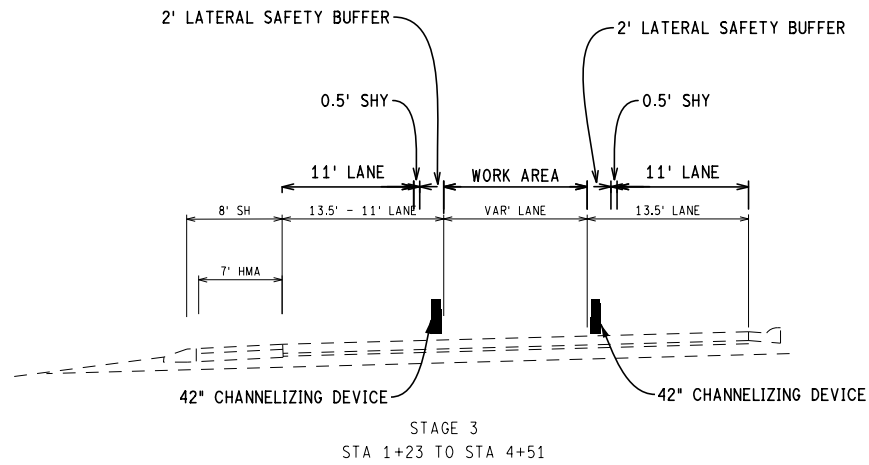
STAGE 1
STA 2+66 TO STA 11+49



STAGE 2
STA 1+23 TO STA 2+66



STAGE 2
STA 2+66 TO STA 11+49



DATE: 6/19/2015
 DESIGN UNIT: MYERS
 TSC: MT PLEASANT

CS: 56044
 JN: 15-5601

STAGING CROSS-SECTIONS

DRAWING SHEET

FILE:

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)

| | | | |
|---|------------------------------------|-----------------|--------------|
|  TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL | TABLES FOR "L", "D" AND "B" VALUES | | |
| | DRAWN BY: CON:AE:djf | JUNE 2006 | SHEET 1 OF 2 |
| CHECKED BY: BMM | 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"

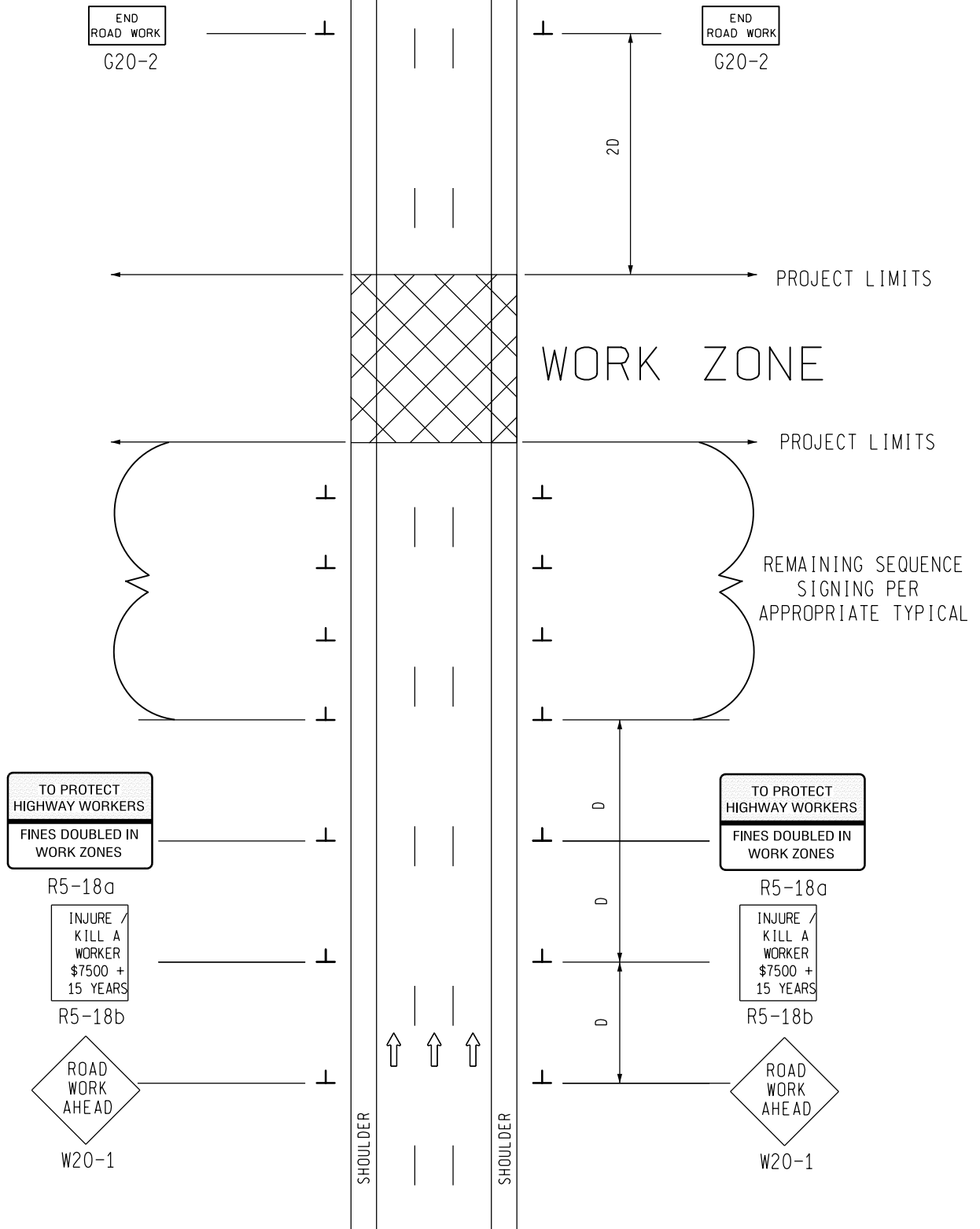
| SPEED* MPH | LENGTH FEET |
|---------------|----------------|
| 20 | 33 |
| 25 | 50 |
| 30 | 83 |
| 35 | 132 |
| 40 | 181 |
| 45 | 230 |
| 50 | 279 |
| 55 | 329 |
| 60 | 411 |
| 65 | 476 |
| 70 | 542 |

* 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 | | |
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| FILE: K:/DGN/TSR/STDS/ENGLISH/MNTTRF/M0020a.dgn REV. 08/21/2006 | | | |

SIGN PLACEMENT IS THE SAME FOR BOTH DIRECTIONS



SIGN = 136 ft± - TYPE B
 FOR ONE DIRECTION OF TRAFFIC
 W20-1 QUANTITY INCLUDED WITH
 APPROPRIATE TYPICAL FOR
 SEQUENCE SIGNING

MDOT
 Michigan Department of Transportation
 TRAFFIC AND SAFETY
 MAINTAINING TRAFFIC
 TYPICAL

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

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

OCTOBER 2011
 PLAN DATE:

M0070a

SHEET
 1 OF 2

NOT TO SCALE


FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0070a.dgn REV. 10/13/2011

NOTES

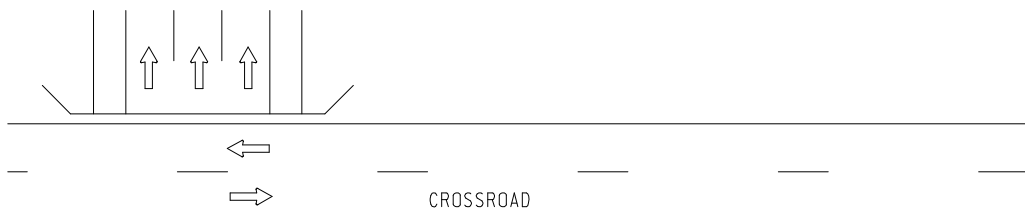
- 30. THE APPROPRIATE ADVANCE SIGNING SEQUENCE(S), (M0030a THROUGH M0080a) SHALL BE USED ON ALL PROJECTS.
- 32. THESE SIGNS SHALL BE LEFT IN PLACE AT THEIR PRESCRIBED LOCATIONS FOR THE DURATION OF THE PROJECT AND UNTIL ALL TEMPORARY TRAFFIC CONTROL HAS BEEN REMOVED.
- 35. THESE SIGNS ARE INTENDED TO BE USED WITHIN THE LIMITS OF THE TEMPORARY SEQUENCE SIGNING AS IS SHOWN ON 1 OF 2. THESE SIGNS ARE NOT TO BE INTERMINGLED WITH ANY OTHER TEMPORARY SEQUENCE SIGNING EXCEPT AS SHOWN.

SIGN SIZES

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

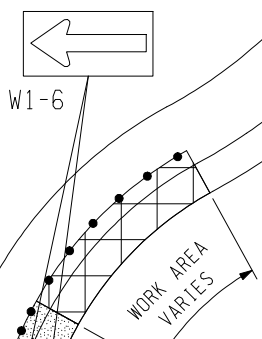
| | | | |
|--|---|--------------|--------|
|  Michigan Department of Transportation TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL | TYPICAL ADVANCE SIGNING TREATMENT FOR LONG, INTERMEDIATE AND SHORT TERM STATIONARY WORK ZONE OPERATIONS OF LESS THAN TWO MILES IN LENGTH WHERE TRAFFIC CONTROL DEVICES MAY REMAIN AT END OF WORK DAY ON A DIVIDED ROADWAY. | | |
| | DRAWN BY: CON:AE:djf | OCTOBER 2011 | SHEET |
| CHECKED BY: BMM:CRB | PLAN DATE: | M0070a | 2 OF 2 |
| FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0070a.dgn REV. 10/13/2011 | | | |

NOT TO SCALE



CROSSROAD

SHOULDER



W1-6

END ROAD WORK

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

KEY

- • • CHANNELIZING DEVICES
- ☀ TYPE A WARNING FLASHER (REQUIRED)
- ➡ TRAFFIC FLOW

SIGN = 116 ft2 - TYPE B

WORK ZONE BEGINS
R5-18c

W1-4L

TRAFFIC SHIFT AHEAD

W20-5
(Modified)
ON RAMP
(SEE SHEET 2 OF 2)

RAMP NARROWS
W5-4

EXIT
XX
MPH
W13-2

RAMP WORK AHEAD
W20-1
(MODIFIED)

NOT TO SCALE



TRAFFIC AND SAFETY
DRAWN BY: AKS
CHECKED BY:
FILE:

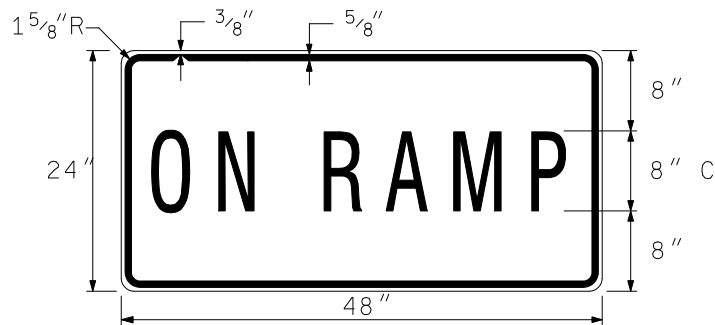
TYPICAL TEMPORARY TRAFFIC CONTROL FOR A TRAFFIC SHIFT ON AN EXIT RAMP USING AN ADVISORY SPEED

PLAN DATE: M0950aMOD SHEET 1 OF 2
REV. 07/16/2007

NOTES

1. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
 $1/3 L$ = MINIMUM LENGTH OF TAPER
 B = LENGTH OF LONGITUDINAL BUFFER
 SEE M0020a FOR "D," "L," AND "B" VALUES
2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.
3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
- 4E. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES SHOULD BE EQUAL IN FEET TO THE POSTED SPEED IN MILES PER HOUR ON TAPER(S) AND TWICE THE POSTED SPEED IN THE PARALLEL AREA(S).
5. FOR OVERNIGHT CLOSURES, CHANNELIZING DEVICES SHALL BE LIGHTED PLASTIC DRUMS.
6. 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 2005 EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.
8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.
29. THE TYPE OF REFLECTIVE SHEETING USED FOR THE "ON RAMP" PLAQUE SHALL BE THE SAME AS THE TYPE USED FOR THE PARENT SIGN.

SIGN DETAIL




COLORS

LEGEND AND BORDER - BLACK (NON-REFLECTORIZED)
 BACKGROUND - ORANGE (REFLECTORIZED)

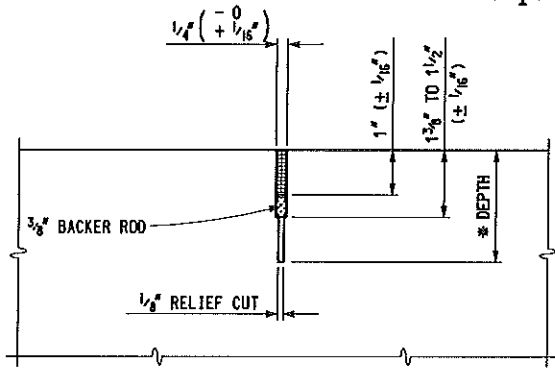
SIGN SIZES

| | |
|-------------------|-------------|
| DIAMOND WARNING | - 48" x 48" |
| W13-2 WARNING | - 48" x 60" |
| PLAQUE | - 48" x 24" |
| R5-18c REGULATORY | - 48" x 48" |

NOT TO SCALE

| | | | |
|---|---|-----------------|--------------|
|  TRAFFIC AND SAFETY | TYPICAL TEMPORARY TRAFFIC CONTROL FOR A TRAFFIC SHIFT ON AN EXIT RAMP USING AN ADVISORY SPEED | | |
| DRAWN BY: AKS | PLAN DATE: _____ | M0950aMOD | SHEET 2 OF 2 |
| CHECKED BY: _____ | | | |
| FILE: _____ | | REV. 07/16/2007 | |

SYMBOL (Cp) AND (C3p)



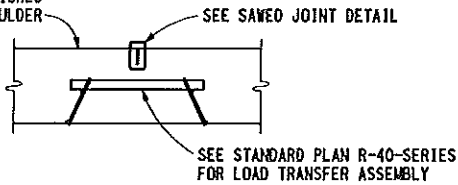
| SYMBOL | LOAD TRANSFER | JOINT USE |
|--------|---------------|-----------|
| (Cp) | YES | PAVEMENT |
| (C3p) | NO | SHOULDER |

SAWED JOINT DETAIL

SAWED JOINT SEALED WITH LOW MODULUS HOT-POURED RUBBER-ASPHALT TYPE JOINT SEALING COMPOUND.

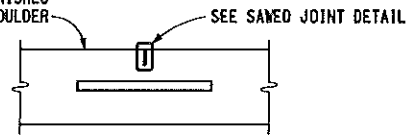
* DEPTH OF RELIEF CUT FOR JOINT (Cp) AND (C3p) SHALL BE $\frac{1}{4}$ THE SLAB THICKNESS FOR PAVEMENTS LESS THAN OR EQUAL TO 7" IN THICKNESS AND $\frac{1}{3}$ THE SLAB THICKNESS FOR PAVEMENTS GREATER THAN 7" THICK.

SURFACE OF FINISHED PAVEMENT OR SHOULDER



LOAD TRANSFER ASSEMBLY METHOD

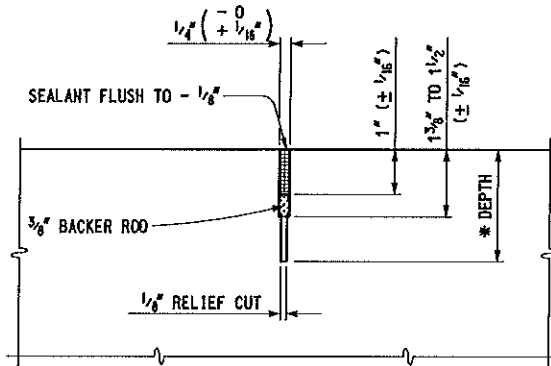
SURFACE OF FINISHED PAVEMENT OR SHOULDER



DOWEL BAR INSERTER METHOD

TRANSVERSE CONTRACTION JOINT

SYMBOL (W)

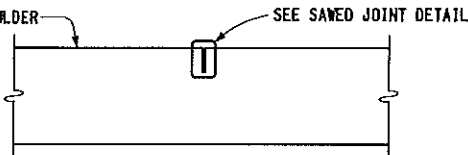


SAWED JOINT DETAIL

SAWED JOINT SEALED WITH LOW MODULUS HOT-POURED RUBBER-ASPHALT TYPE JOINT SEALING COMPOUND.

* DEPTH OF RELIEF CUT FOR JOINT $\frac{1}{4}$ THE SLAB THICKNESS.

SURFACE OF FINISHED SHOULDER



TRANSVERSE AND INTERSECTION PLANE OF WEAKNESS JOINTS



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: *Muel A. Van Pelt*
ENGINEER OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**TRANSVERSE PAVEMENT JOINTS
(PLAIN CONCRETE PAVEMENT)**

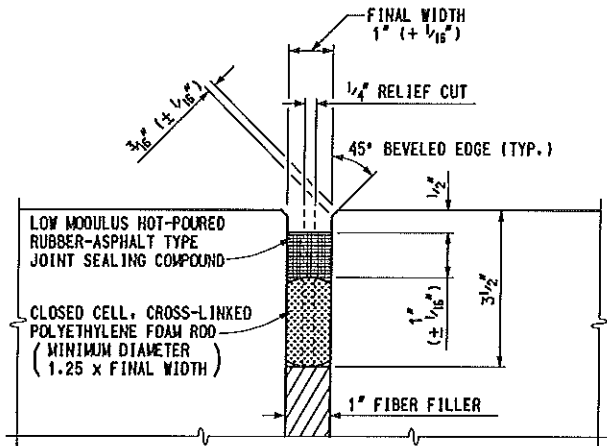
9-10-2010
F.H.W.A. APPROVAL

8-9-2010
PLAN DATE

R-39-I

SHEET
1 OF 4

SYMBOL (E2), (E3) AND (E4)



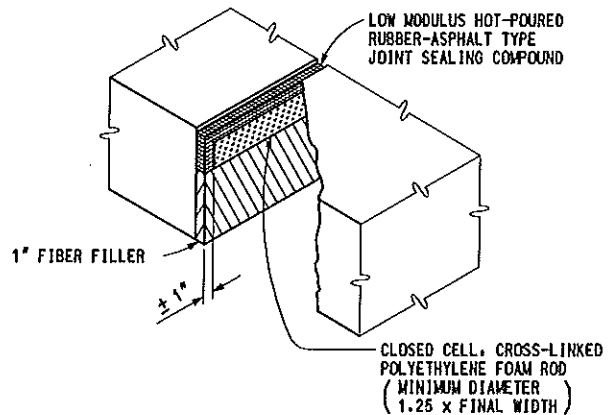
SAWED JOINT DETAIL

SAWED JOINT SEALED WITH LOW MODULUS HOT-POURED RUBBER-ASPHALT TYPE JOINT SEALING COMPOUND.

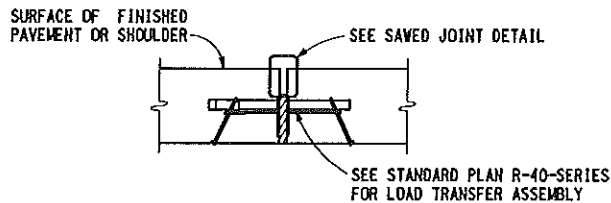
NOTE:

THE FINAL WIDTH OF THE GROOVE SHALL BE $1" + \frac{1}{16}"$ PLUS ANY INCREASE OR MINUS ANY DECREASE IN THE WIDTH OF THE RELIEF CUT. THE FINAL SAW CUT SHALL BE TO THE TOP OF THE FIBER FILLER WITH A MINIMUM DEPTH AS SHOWN AND SHALL BE CENTERED OVER THE FIBER FILLER WITH A HORIZONTAL TOLERANCE OF $\frac{1}{4}"$. FIBER FILLER FOR EXPANSION JOINTS IN CONCRETE SHOULDERS SHALL BE FREE OF HOLES OR OTHER DEFECTS AND TRIMMED TO FIT SHOULDER CONFIGURATIONS.

| SYMBOL | LOAD TRANSFER ASSEMBLY | JOINT USE |
|--------|------------------------|---------------------|
| (E2) | YES | PAVEMENT |
| (E3) | NO | PAVEMENT & SHOULDER |
| (E4) | NO | SHOULDER |



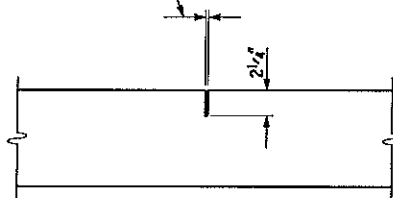
OUTSIDE EDGE TREATMENT



TRANSVERSE EXPANSION JOINT

SYMBOL (U)

$\frac{1}{8}"$ SAWED JOINT OR A FORMED JOINT MADE BY PLACING $\frac{1}{8}"$ HARDBOARD OR OTHER APPROVED MATERIAL FLUSH WITH THE SURFACE OF THE CONCRETE BASE COURSE AND TRUE TO POSITION AND LINE BEFORE THE CONCRETE HAS SET



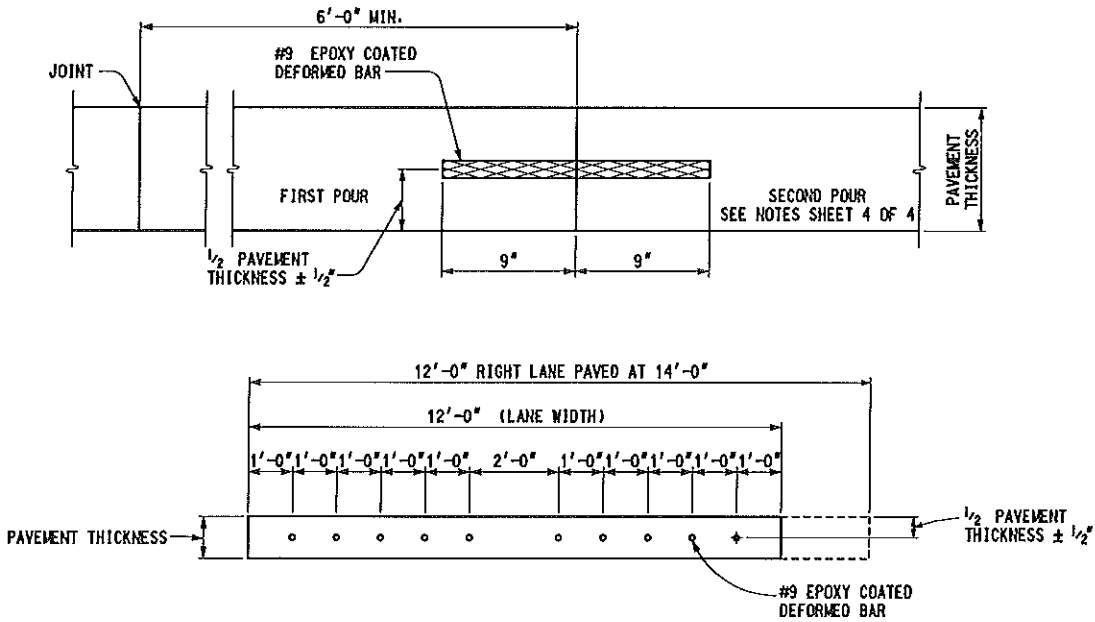
TRANSVERSE PLANE OF WEAKNESS JOINTS IN CONCRETE BASE COURSE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

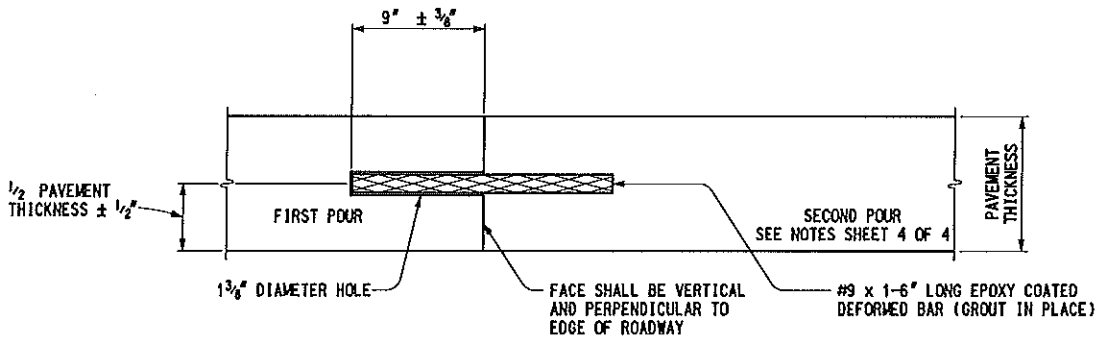
**TRANSVERSE PAVEMENT JOINTS
(PLAIN CONCRETE PAVEMENT)**

| | | | |
|--------------------------------|-----------------------|---------------|-----------------|
| 9-10-2010 F.H.W.A. APPROVAL | 8-9-2010 PLAN DATE | R-39-I | SHEET 2 OF 4 |
|--------------------------------|-----------------------|---------------|-----------------|

SYMBOL (H)



**DEFORMED BAR SPACING
TRANSVERSE END OF POUR JOINT (SPLIT HEADER METHOD)**



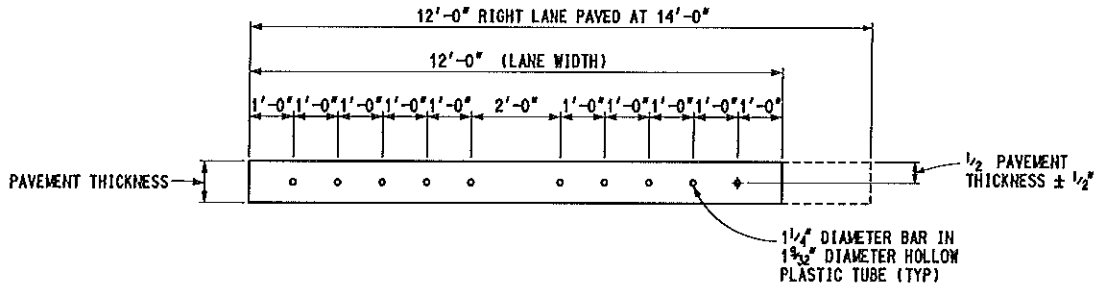
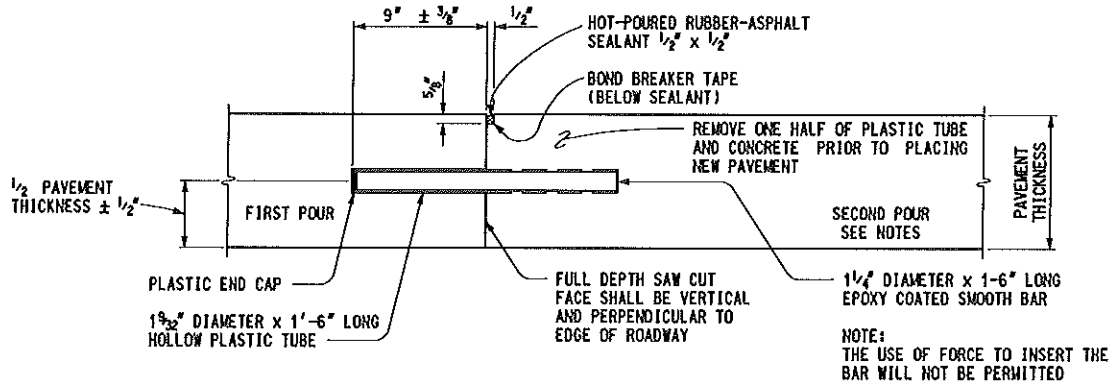
**DEFORMED BAR SPACING
NOTE: THE HOLE SPACING MAY BE ADJUSTED 1" HORIZONTALLY, RAISED 1/2", OR LOWERED 1" FROM THE ABOVE LOCATIONS TO AVOID DRILLING INTO THE REINFORCEMENT.
TRANSVERSE END OF POUR JOINT (DRILLED IN METHOD)**

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**TRANSVERSE PAVEMENT JOINTS
(PLAIN CONCRETE PAVEMENT)**

| | | | |
|--------------------------------|-----------------------|---------------|-----------------|
| 9-10-2010 F.H.W.A. APPROVAL | 8-9-2010 PLAN DATE | R-39-I | SHEET 3 OF 4 |
|--------------------------------|-----------------------|---------------|-----------------|

SYMBOL (H)



**DEFORMED BAR SPACING
TRANSVERSE END OF POUR JOINT (PLASTIC TUBE METHOD)**

NOTES:

LOAD TRANSFER ASSEMBLIES ARE DETAILED ON THE CURRENT STANDARD PLAN R-40-SERIES.

TRANSVERSE JOINTS SHALL BE SPACED ACCORDING TO THE CURRENT STANDARD PLAN R-43P-SERIES.

A TRANSVERSE END OF POUR JOINT (DRILLED IN METHOD) SYMBOL (H), SHALL BE CONSTRUCTED WHEN IT IS ANTICIPATED THAT THE SECOND POUR WILL BE DELAYED 7 DAYS OR LONGER.

A TRANSVERSE END OF POUR JOINT (SPLIT HEADER METHOD) OR (PLASTIC TUBE METHOD) SHALL BE USED AT THE END OF THE DAY'S POUR OR WHEN THERE IS AN UNAVOIDABLE INTERRUPTION OF THE WORK FOR MORE THAN ONE-HALF HOUR AND LESS THAN 7 DAYS. THE JOINT SHALL BE CONSTRUCTED ACCORDING TO TRANSVERSE END OF POUR JOINT (SPLIT HEADER METHOD) OR (PLASTIC TUBE METHOD), SYMBOL (H).

NEOPRENE JOINT SEAL CROSS-SECTION SHALL BE APPROVED BY THE ENGINEER.

THE EXPANSION JOINT MATERIAL IN THE SHOULDERS SHALL BE SUPPORTED BY ONE OF THE FOLLOWING METHODS:

1. A CONTINUOUS SUPPORT WIRE, AS SPECIFIED FOR EXPANSION LOAD TRANSFERS ASSEMBLIES, AS DETAILED ON STANDARD PLAN R-40-SERIES, SHALL BE USED ON EACH SIDE OF EXPANSION MATERIAL. THIS WIRE SHALL BE EQUIPPED WITH STAKES AND STAKE POCKETS TO RIGIDLY HOLD THE EXPANSION MATERIAL IN PLACE DURING CONCRETE PLACEMENT. STAKES SHALL BE AS SPECIFIED ON STANDARD PLAN R-40-SERIES, SPACED NOT MORE THAN 2'-0" APART.
2. "U" OR "J" SHAPE STAPLES OF #8 WIRE (0.319" NOMINAL DIAMETER) SHALL BE SPACED ON 2'-0" CENTERS EACH SIDE OF THE EXPANSION MATERIAL. EACH VERTICAL LEG OF THE STAPLE SHALL BE AT LEAST 1'-3" LONG.
3. OTHER EQUIVALENT METHODS MAY BE USED WHEN APPROVED BY THE ENGINEER.

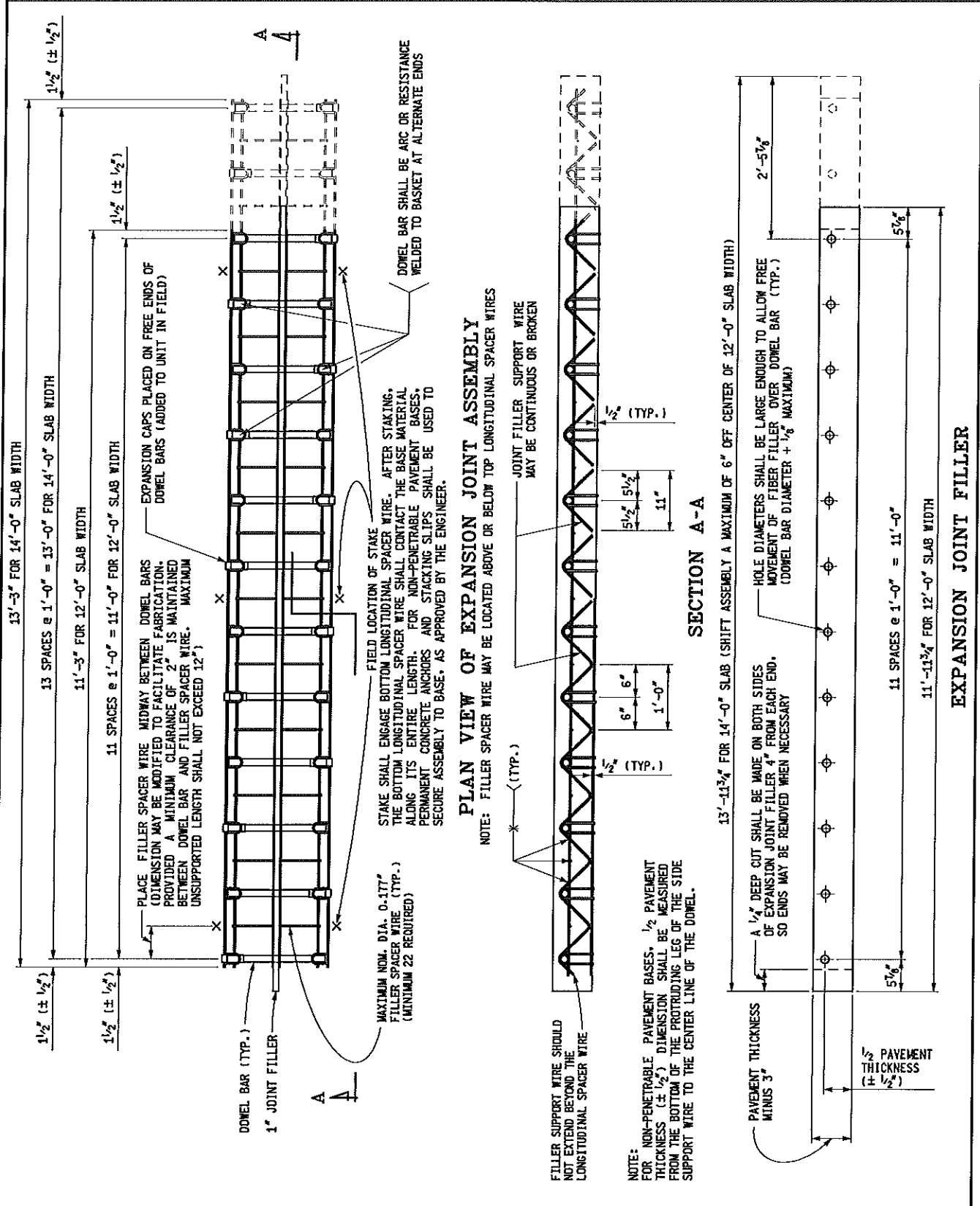
JOINTS SHALL NOT BE SEALED IN CONCRETE BASE COURSE.

WHEN CONCRETE SHOULDERS ARE CAST SEPARATELY FROM MAINLINE CONCRETE PAVEMENT, A KEYWAY MAY BE USED TO FACILITATE THE PLACING OF LAKE TIES. WHEN A KEYWAY GROOVE IS USED, IT SHALL BE CONTINUOUS AND UNIFORM.

THE LOCATION OF TRANSVERSE JOINTS IN CONCRETE SHOULDERS SHALL MATCH THE LOCATION OF ADJACENT TRANSVERSE PAVEMENT JOINTS. CORRESPONDING TRANSVERSE CONCRETE SHOULDER AND PAVEMENT JOINTS SHALL BE (C3P) SHOULDER WITH (Cp) PAVEMENT, (E4) SHOULDER WITH (E2) PAVEMENT, AND (E3) BEING THE SAME IN BOTH SHOULDER AND PAVEMENT.

DEFORMED BARS FOR TRANSVERSE END OF POUR JOINTS (DRILLED IN METHOD) 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 DWEL BARS AND TIE BARS FOR FULL-DEPTH PAVEMENT REPAIRS.

| | | | |
|--|-----------------------|---------------|-----------------|
| MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR | | | |
| TRANSVERSE PAVEMENT JOINTS (PLAIN CONCRETE PAVEMENT) | | | |
| 9-10-2010 F.H.W.A. APPROVAL | 8-9-2010 PLAN DATE | R-39-I | SHEET 4 OF 4 |



MDOT
 Michigan Department of Transportation

PREPARED BY
 DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
 Kirk T. Stoude

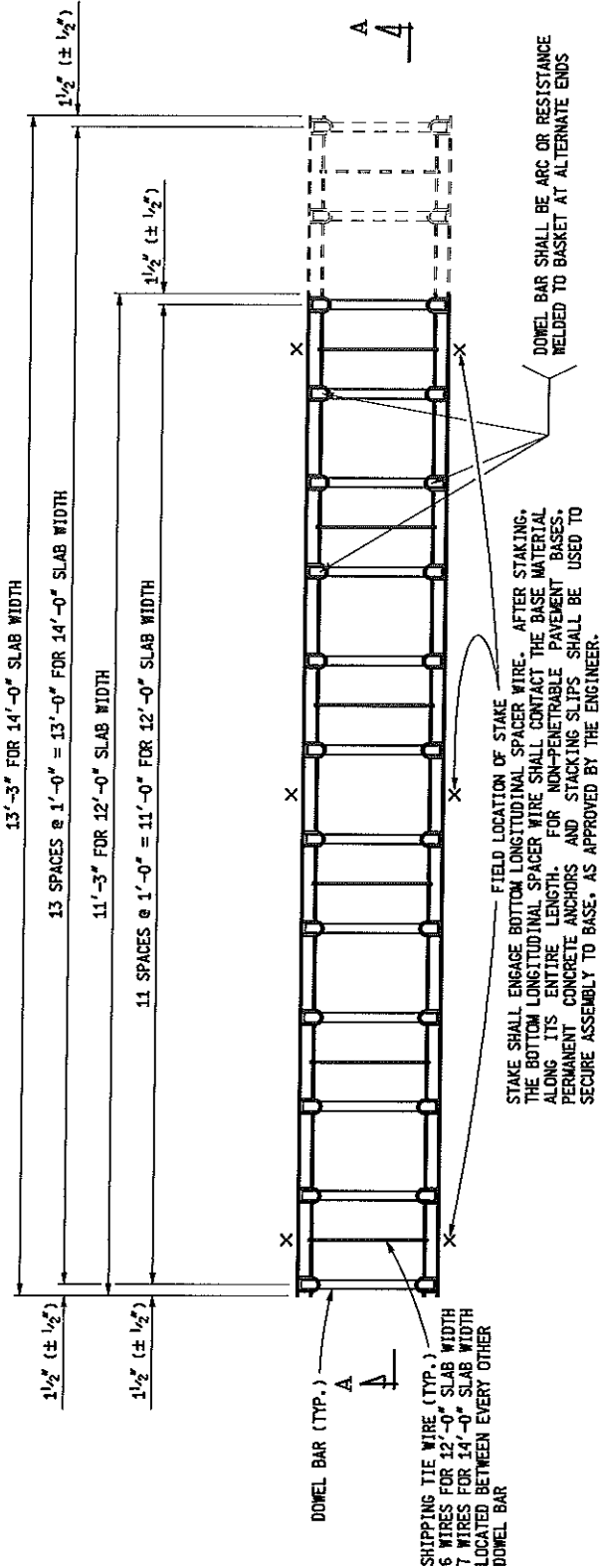
APPROVED BY: *John C. Friend*
 ENGINEER OF DELIVERY

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

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

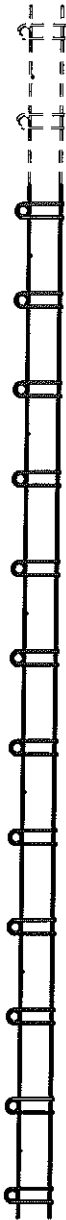
**LOAD TRANSFER ASSEMBLIES
 FOR TRANSVERSE JOINTS**

| | | | |
|--------------------------------|------------------------|--------|-----------------|
| 9-10-2010 F.H.W.A. APPROVAL | 7-19-2010 PLAN DATE | R-40-H | SHEET 1 OF 4 |
|--------------------------------|------------------------|--------|-----------------|



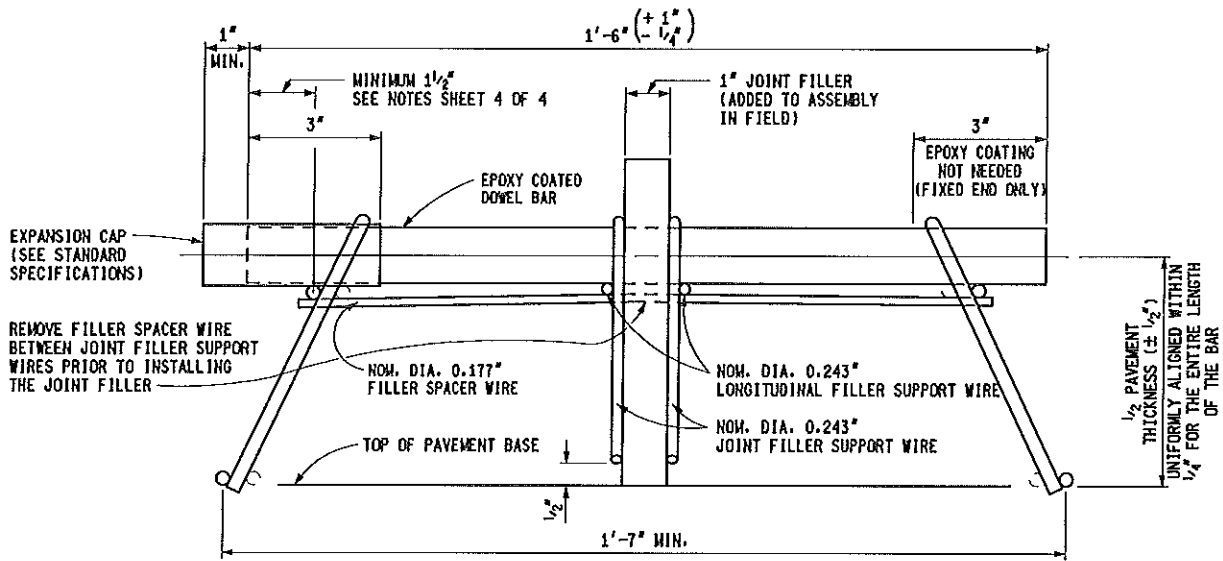
PLAN VIEW OF CONTRACTION JOINT ASSEMBLY

NOTE: SHIPPING TIE WIRES MAY BE LOCATED ABOVE OR BELOW TOP LONGITUDINAL SPACING WIRES.



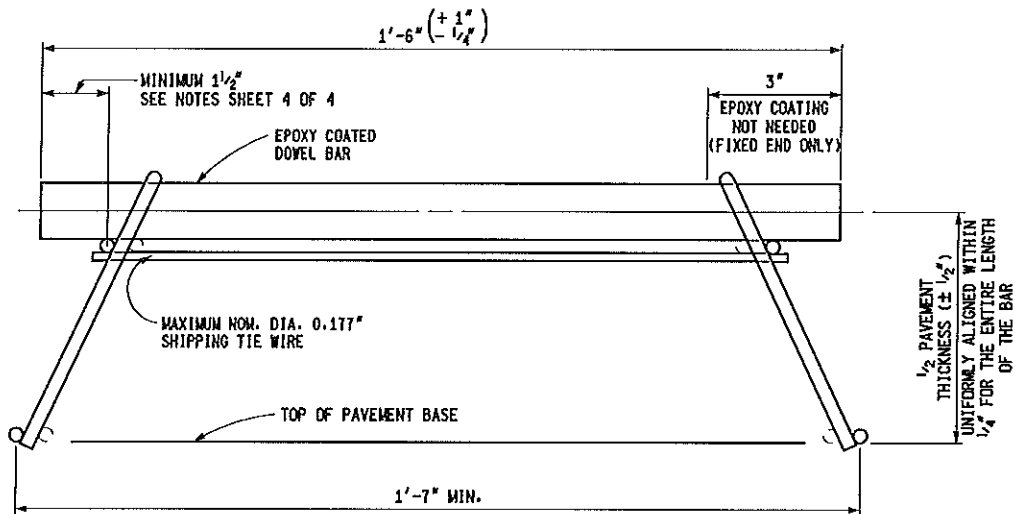
SECTION A-A

| | | | |
|--|------------------------|---------------|-----------------|
| MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR LOAD TRANSFER ASSEMBLIES FOR TRANSVERSE JOINTS | | | |
| 9-10-2010 F.H.W.A. APPROVAL | 7-19-2010 PLAN DATE | R-40-H | SHEET 2 OF 4 |



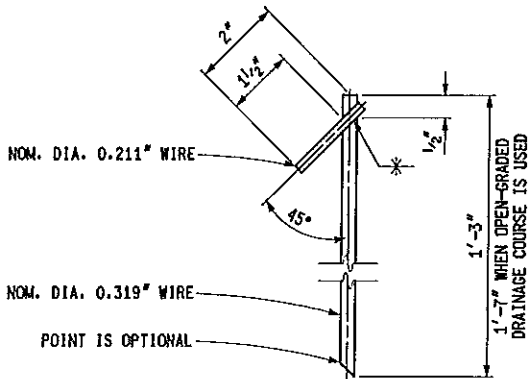
END VIEW OF EXPANSION JOINT ASSEMBLY

NOTE: FILLER SPACER WIRE MAY BE LOCATED ABOVE OR BELOW TOP LONGITUDINAL SPACER WIRES



END VIEW OF CONTRACTION JOINT ASSEMBLY

NOTE: SHIPPING TIE WIRE MAY BE LOCATED ABOVE OR BELOW TOP LONGITUDINAL SPACER WIRES

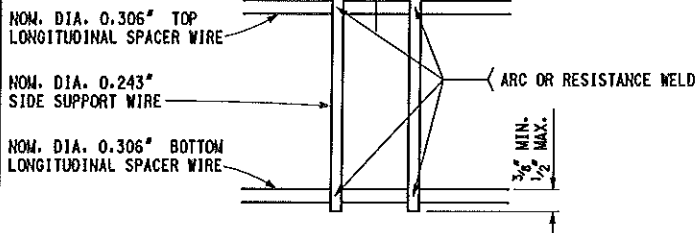


STAKE DETAIL

A SINGLE WIRE MAY BE USED IN LIEU OF STAKE DETAIL SPECIFIED PROVIDED A NOM. DIA. 0.319" WIRE IS USED AND BENT INTO A HOOK AT TOP END TO CONFORM TO DETAIL

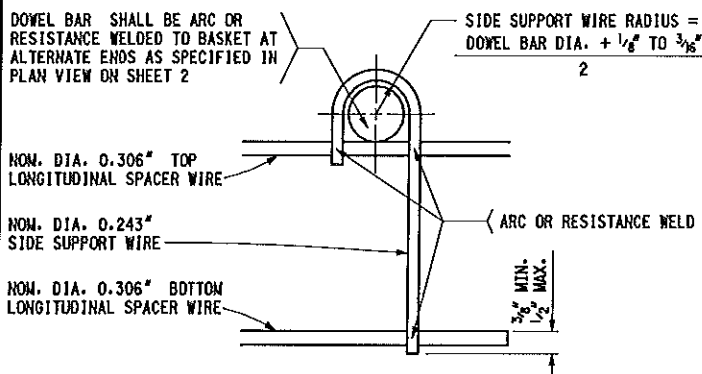
| | | | |
|--|------------------------|--------|-----------------|
| MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR | | | |
| LOAD TRANSFER ASSEMBLIES FOR TRANSVERSE JOINTS | | | |
| 9-10-2010 F.H.W.A. APPROVAL | 7-19-2010 PLAN DATE | R-40-H | SHEET 3 OF 4 |

DOWEL BAR SHALL BE ARC OR RESISTANCE WELDED TO BASKET AT ALTERNATE ENDS AS SPECIFIED IN PLAN VIEW ON SHEET 2



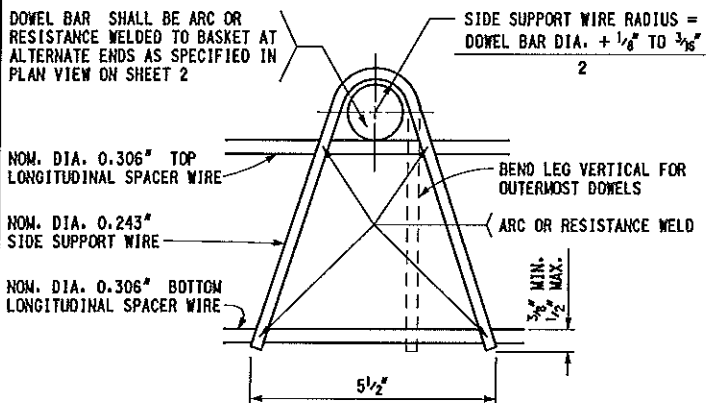
**SIDE SUPPORT WIRE DETAIL
U - LEG OPTION**

DOWEL BAR SHALL BE ARC OR RESISTANCE WELDED TO BASKET AT ALTERNATE ENDS AS SPECIFIED IN PLAN VIEW ON SHEET 2



**SIDE SUPPORT WIRE DETAIL
J - LEG OPTION**

DOWEL BAR SHALL BE ARC OR RESISTANCE WELDED TO BASKET AT ALTERNATE ENDS AS SPECIFIED IN PLAN VIEW ON SHEET 2



**SIDE SUPPORT WIRE DETAIL
V - LEG OPTION**

NOTES:

LOAD TRANSFER ASSEMBLIES SHALL BE PLACED AT RIGHT ANGLES TO THE PAVEMENT CENTERLINE.

THE SIDE SUPPORT WIRE (U-LEG, J-LEG OR V-LEG) MAY BE INSTALLED ON EITHER THE INSIDE OR THE OUTSIDE OF THE LONGITUDINAL SPACER WIRES. THE DIMENSION FROM THE END OF THE DOWEL BAR TO THE CENTER OF THE TOP LONGITUDINAL SPACER WIRE SHALL BE A MINIMUM OF 1 1/2". THIS DIMENSION APPLIES TO SIDE SUPPORT WIRES INSTALLED ON EITHER THE INSIDE OR THE OUTSIDE OF THE LONGITUDINAL SPACER WIRES.

WIRES:

ALL WIRES SPECIFIED (EXCEPT SHIPPING TIE WIRES) ARE MINIMUM NOMINAL SIZES ALLOWED. (DO NOT EXCEED THE MAXIMUM NOMINAL DIAMETER OF 0.177" FOR SHIPPING TIE WIRES.)

ALL WIRES SHALL CONFORM TO THE CURRENT SPECIFICATIONS FOR CARBON STEEL WIRE FOR GENERAL USE, A.S.T.M. DESIGNATION A-853, GRADE 1008 OR GREATER. UNLESS OTHERWISE SPECIFIED, MINIMUM TENSILE STRENGTH REQUIREMENTS SHALL BE 60 ksi.

ALL WIRE INTERSECTIONS ARE TO BE ARC OR RESISTANCE WELDED.

STAKES TYPICALLY APPLIED AT WORKING ENDS OF DOWELS WITH SUFFICIENT INSTALLATIONS TO PREVENT UNIT FROM OVERTURNING UNDER LOAD.

DO NOT CUT FILLER SPACER WIRES AFTER THE LOAD TRANSFER ASSEMBLY IS SET IN PLACE.

DOWEL BARS:

DOWEL BARS ARE TO BE ACCORDING TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.

EPOXY COATED DOWEL BARS ARE TO BE FACTORY COATED WITH A VISIBLE COATING OF AN APPROVED BOND RELEASE AGENT, UNIFORMLY APPLIED BY DIPPING AND WITHOUT EXCESSIVE DRIPS OR THICKNESS IN SUCH A THICKNESS THAT ITS PRESENCE CAN BE READILY IDENTIFIED.

METAL EXPANSION CAPS MUST BE ENTIRELY CLOSED AT ENDS BY CRIMPING. PLASTIC CAPS MUST HAVE A POSITIVE STOP. DO NOT DRIVE CAPS BEYOND THEIR STOP. EXPANSION CAPS MUST HAVE A SUITABLE STOP TO ENSURE THAT THE END OF THE CAP MAINTAINS A DISTANCE OF 1" (EXPANSION) FROM THE END OF THE DOWEL DURING CONCRETE PLACEMENT.

DOWEL BARS SHALL BE COATED WITH EPOXY COATING ACCORDING TO AASHTO SPECIFICATION M 284. CUT ENDS ARE NOT REQUIRED TO BE COATED.

| DOWEL BAR DIAMETER | PAVEMENT THICKNESS |
|--------------------|--------------------|
| 1" | 6" - LESS THAN 8" |
| 1 1/4" | 8" - 10" |
| 1 1/2" | GREATER THAN 10" |

DOWEL BARS SHALL BE ALIGNED PARALLEL TO EACH OTHER IN THE ASSEMBLY ON 1'-0" (± 1/2") CENTERS.

AFTER THE LOAD TRANSFER ASSEMBLY IS SET IN PLACE, DOWEL BARS SHALL REMAIN ALIGNED (PARALLEL) WITH EACH OTHER IN THE VERTICAL AND HORIZONTAL PLANES OF THE PAVEMENT TO WITHIN 1/4" FOR THE ENTIRE LENGTH OF THE BAR.

DOWEL BARS SHALL BE PLACED AT MID DEPTH OF THE SLAB UNIFORMLY ALIGNED WITHIN 1/4" FOR THE ENTIRE LENGTH OF THE BAR.

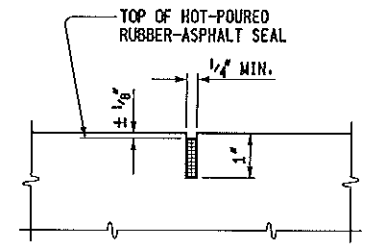
FOR PAVEMENTS WITH VARIABLE THICKNESS TRANSVERSLY ACROSS THE SLAB, THE TOP AND BOTTOM SURFACES OF THE DOWEL BAR SHALL BE WITHIN THE MIDDLE 1/3 OF THE PAVEMENT THICKNESS, AS APPROVED BY THE ENGINEER.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

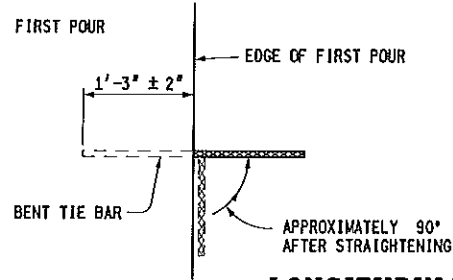
**LOAD TRANSFER ASSEMBLIES
FOR TRANSVERSE JOINTS**

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|--------------------------------|------------------------|--------|-----------------|
| 9-10-2010 F.H.W.A. APPROVAL | 7-19-2010 PLAN DATE | R-40-H | SHEET 4 OF 4 |
|--------------------------------|------------------------|--------|-----------------|

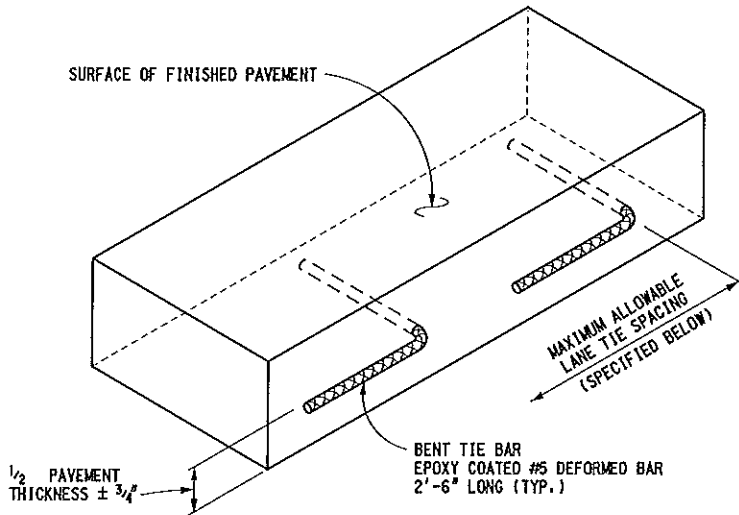
SYMBOL (B)



SAWED JOINT SEALED WITH HOT - POURED RUBBER - ASPHALT



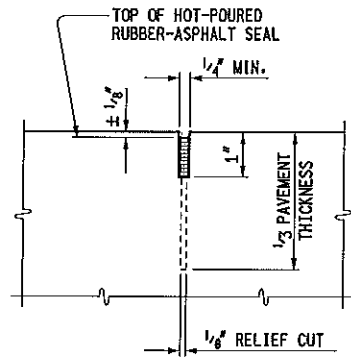
SURFACE OF FINISHED PAVEMENT



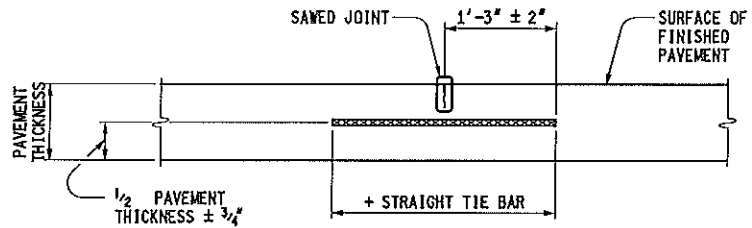
LONGITUDINAL BULKHEAD JOINT - SYMBOL (B)

ALL SYMBOL (B) JOINTS SHALL BE SAWED AND SEALED EXCEPT JOINTS WITHOUT LANE TIES AND JOINTS ADJACENT TO VERTICAL FACES WHICH WOULD PROHIBIT SAWING.

SYMBOL (D) AND (S)



SAWED JOINT SEALED WITH HOT - POURED RUBBER - ASPHALT



+ EPOXY COATED #5 DEFORMED BAR 2'-6" LONG FOR SYMBOL (D)
EPOXY COATED #5 SMOOTH BAR 2'-6" LONG FOR SYMBOL (S)
(MAXIMUM ALLOWABLE LANE TIE SPACING SPECIFIED BELOW)

LONGITUDINAL LANE TIE JOINT - SYMBOL (D)
LONGITUDINAL SMOOTH LANE TIE JOINT - SYMBOL (S)

SYMBOL (D) AND SYMBOL (S) TIE BARS SHALL BE PLACED AT THE PROPER SPACING LONGITUDINALLY, AND TRANSVERSELY AT 90° WITH THE JOINT.

| MAXIMUM ALLOWABLE LANE TIE SPACING SYMBOLS (B), (D), (L2), AND (S) | | * TOTAL DISTANCE OF TIED JOINT FROM NEAREST FREE EDGE |
|--|-----------------------------|---|
| (B) GRADE 40 | (D), (L2), AND (S) GRADE 60 | |
| 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



PREPARED BY DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: M.K.P.

DEPARTMENT DIRECTOR
Kirk T. Stuedle

APPROVED BY: *Randy Van Pelt*
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

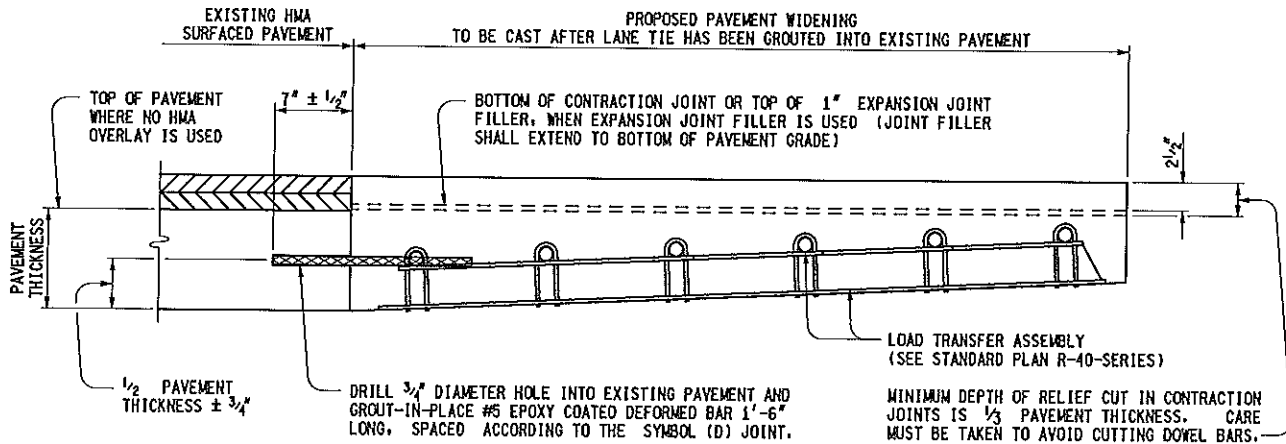
9-30-2014
F.H.W.A. APPROVAL

4-22-2013
PLAN DATE

R-41-H

SHEET 1 OF 2

SYMBOL (L2)



NOTE:
 SYMBOL (L2) JOINT USED FOR WIDENING CONCRETE PAVEMENTS WITHOUT HMA OVERLAYS SHALL BE SAWED 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)

THE FIRST SLAB SHALL BE EDGED WITH AN EDGER HAVING A $\frac{3}{4}$ " LIP AND A RADIUS OF $\frac{1}{8}$ " TO $\frac{1}{4}$ "

EDGING TOOL SHALL BE 6" x 12" AND SHALL HAVE A 1" LIP WITH A RADIUS OF $\frac{1}{8}$ " TO $\frac{1}{4}$ "



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 SAWED 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 GROUTED 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.

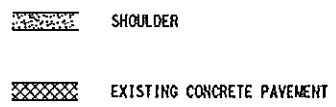
MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

LONGITUDINAL PAVEMENT JOINTS

| | | | |
|--------------------------------|------------------------|---------------|-----------------|
| 9-30-2014 F.H.W.A. APPROVAL | 4-22-2013 PLAN DATE | R-41-H | SHEET 2 OF 2 |
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JOINT LEGEND (ALL SHEETS)

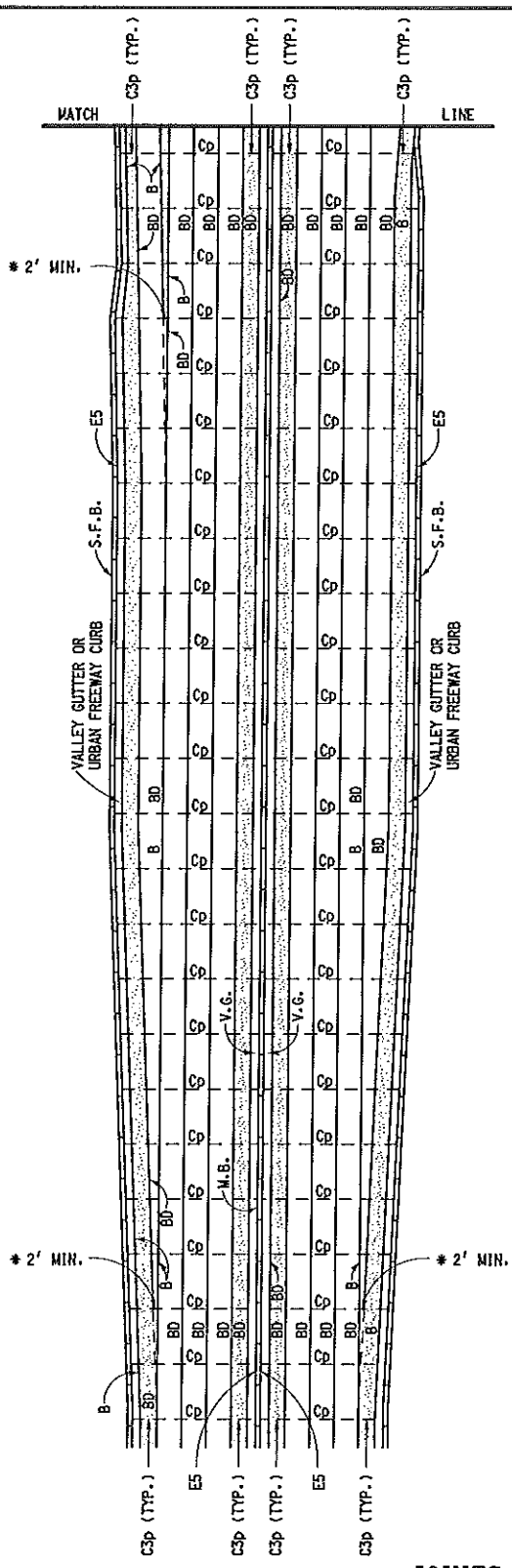
- B LONGITUDINAL BULKHEAD JOINT.
- B1 LONGITUDINAL BULKHEAD JOINT, EXCEPT OMIT SEALS AND LANE TIES, APPLY TWO ADDITIONAL COATS OF CURING COMPOUND, AS A BOND BREAKER, AT THE RATE OF 1 GALLON PER 100 SFT PER COAT.
- B0 OPTIONAL B OR D JOINT.
- Cp TRANSVERSE CONTRACTION JOINT WITH LOAD TRANSFER DEVICE.
- C3p TRANSVERSE CONTRACTION JOINT WITHOUT LOAD TRANSFER DEVICE. (SHOULDERS)
- D LONGITUDINAL LANE TIE JOINT.
- W PLANE OF WEAKNESS JOINT.
- E2 1" TRANSVERSE EXPANSION JOINT WITH LOAD TRANSFER DEVICE.
- E3 1" TRANSVERSE EXPANSION JOINT WITHOUT LOAD TRANSFER DEVICE.
- E4 1" TRANSVERSE EXPANSION JOINT WITHOUT LOAD TRANSFER DEVICE. (SHOULDERS)
- E5 1" LONGITUDINAL SEALED EXPANSION JOINT (SEE STANDARD PLAN R-49-SERIES)
- L2 LONGITUDINAL BULKHEAD JOINT USING EPOXY ANCHORED LANE TIES.
- U TRANSVERSE PLANE OF WEAKNESS JOINT FOR CONCRETE BASE COURSE.



- C. & G. = CURB & GUTTER
- E.O.M. = EDGE OF METAL
- F.O.B. = FACE OF BARRIER
- M.B. = MEDIAN BARRIER
- S.F.B. = SINGLE FACE BARRIER
- V.G. = VALLEY GUTTER

* END GORE AND RAMP TAPERS SO THAT THE LAST SECTION ENDS WITH A MINIMUM 2'-0" CUT-OFF AND IT ALIGNS WITH A TRANSVERSE PAVEMENT JOINT. EXPANSION JOINTS SHALL BE PLACED AT THE END OF PAVED GORES AS SPECIFIED ON THIS PLAN.

SEE STANDARD PLAN R-43-SERIES FOR JOINT SPACING AND STANDARD PLAN R-39-SERIES FOR CONTRACTION JOINT DESIGNS.



JOINTS IN URBAN FREEWAY
12', 14', OR 16' JOINT SPACING FOR JOINTED PLAIN CONCRETE PAVEMENT



PREPARED BY
DESIGN DIVISION
DRAWN BY: B.L.T.
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MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

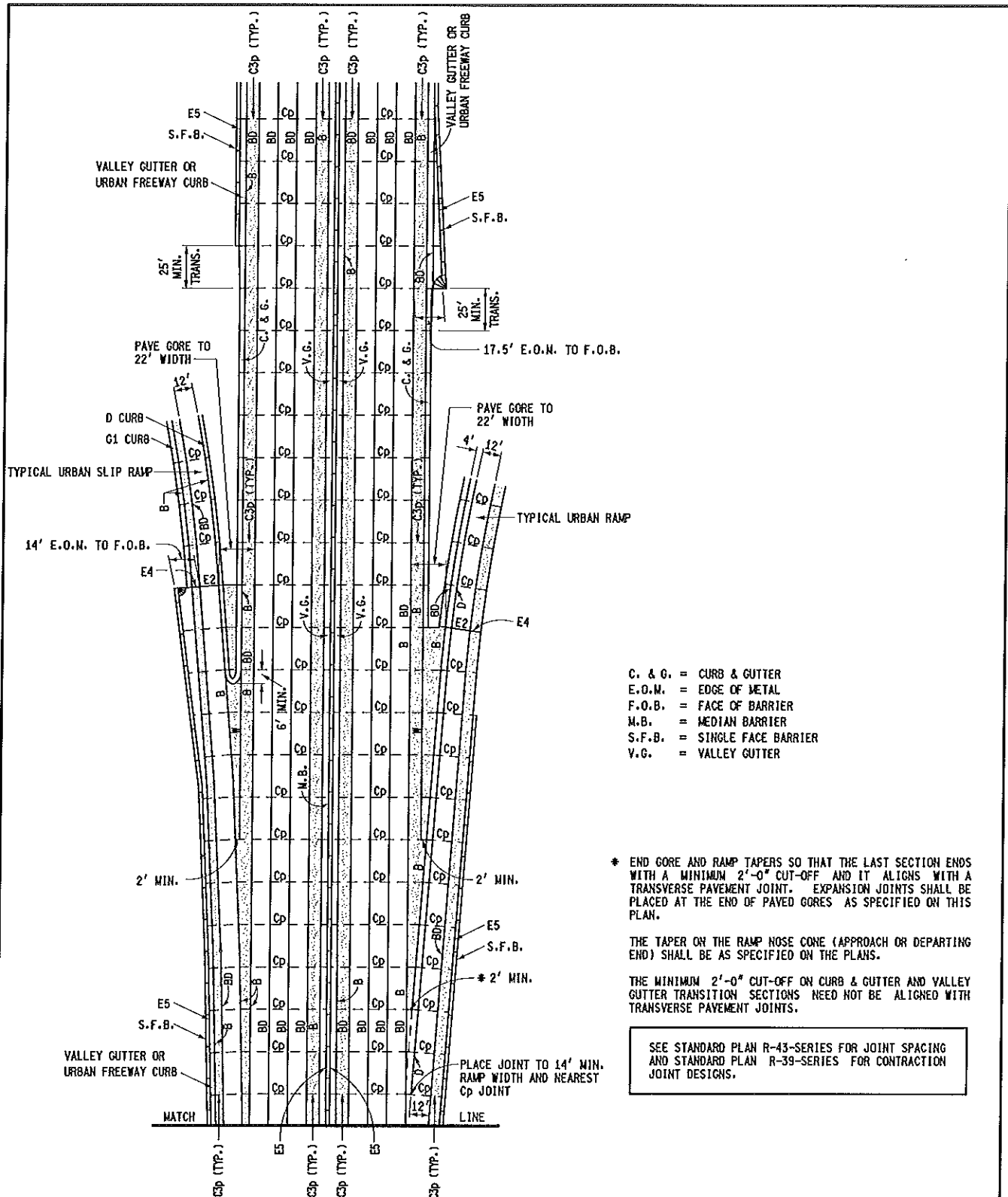
TYPICAL JOINT LAYOUTS FOR CONCRETE PAVEMENT

1-25-2013
F.H.W.A. APPROVAL

12-6-2010
PLAN DATE

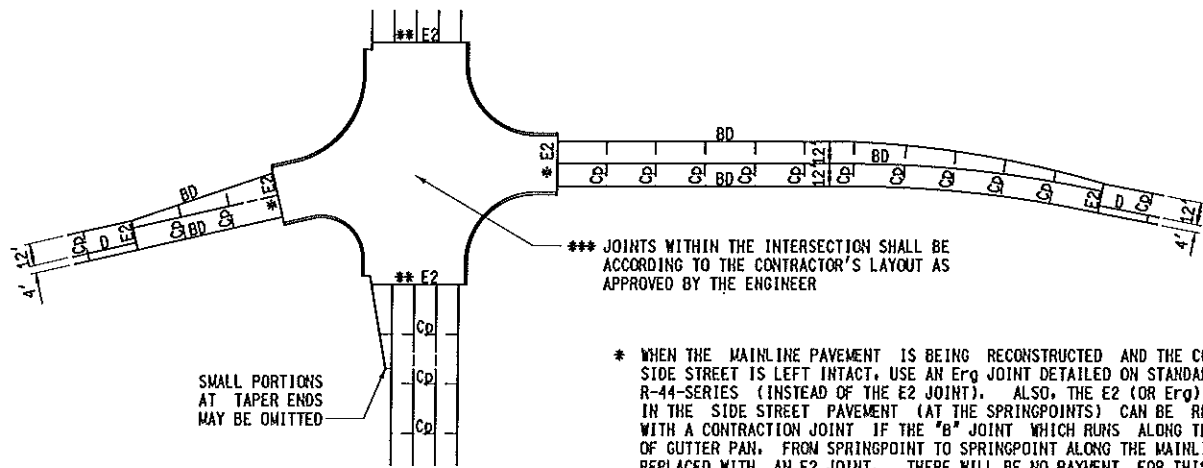
R-42-F

SHEET
1 OF 6



JOINTS IN URBAN FREEWAY
 12', 14', OR 16' JOINT SPACING FOR JOINTED PLAIN CONCRETE PAVEMENT

| | |
|--|------------------------|
| MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR | |
| TYPICAL JOINT LAYOUTS FOR CONCRETE PAVEMENT | |
| 1-25-2013 F.H.W.A. APPROVAL | 12-6-2010 PLAN DATE |
| R-42-F | SHEET 2 OF 6 |



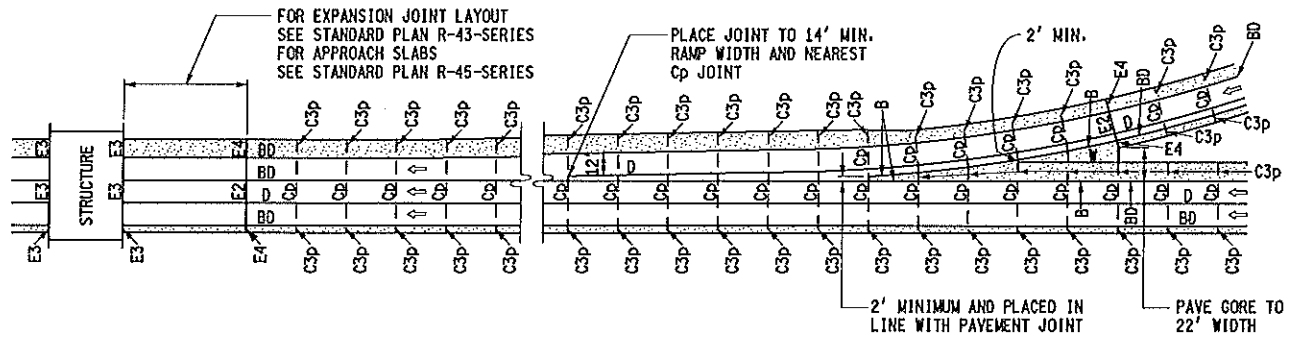
SMALL PORTIONS AT TAPER ENDS MAY BE OMITTED

*** JOINTS WITHIN THE INTERSECTION SHALL BE ACCORDING TO THE CONTRACTOR'S LAYOUT AS APPROVED BY THE ENGINEER

* WHEN THE MAINLINE PAVEMENT IS BEING RECONSTRUCTED AND THE CONCRETE SIDE STREET IS LEFT INTACT, USE AN Erg JOINT DETAILED ON STANDARD PLAN R-44-SERIES (INSTEAD OF THE E2 JOINT). ALSO, THE E2 (OR Erg) JOINTS IN THE SIDE STREET PAVEMENT (AT THE SPRINGPOINTS) CAN BE REPLACED WITH A CONTRACTION JOINT IF THE "B" JOINT WHICH RUNS ALONG THE EDGE OF GUTTER PAN, FROM SPRINGPOINT TO SPRINGPOINT ALONG THE MAINLINE, IS REPLACED WITH AN E2 JOINT. THERE WILL BE NO PAYMENT FOR THIS EXTRA LENGTH OF E2 JOINT WHEN IT IS MOVED FROM THE SPRING POINT TO THE EDGE OF GUTTER PAN.

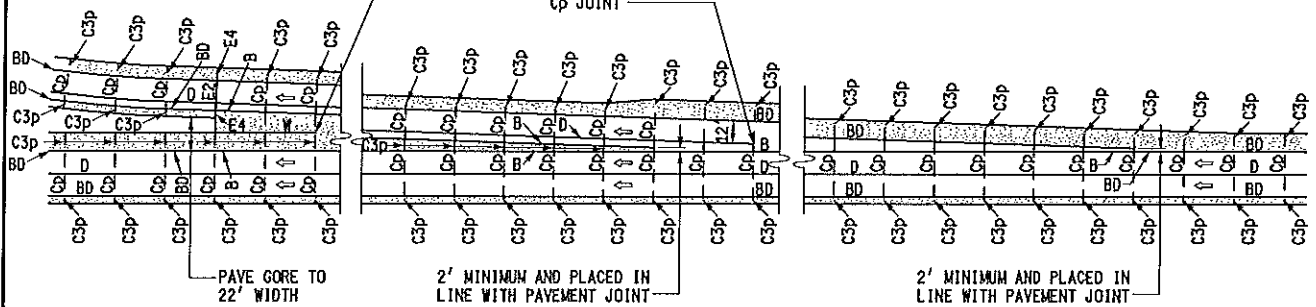
** THE E2 JOINTS IN THE MAINLINE PAVEMENT (AT THE SPRINGPOINTS) CAN BE REPLACED WITH A CONTRACTION JOINT IF THE MAINLINE IS BEING PAVED THROUGH THE INTERSECTION IN THE SAME OPERATION AS THE NON-INTERSECTION MAINLINE.

*** THE LONGITUDINAL JOINTS IN THE SIDE STREET PORTION OF THE INTERSECTION (SPRINGPOINT TO MAINLINE GUTTER PAN LINE) SHALL BE SYMBOL (S) JOINTS. WHEN THE E2 JOINT IS MOVED TO THE GUTTER PAN LINE SYMBOL "B" OR "D" JOINTS ARE TO BE USED.



STOP AT FURTHEST C3p JOINT WITH AT LEAST 2' MIN. WIDTH

PLACE JOINT TO 14' MIN. RAMP WIDTH AND NEAREST Cp JOINT



PAVE GORE TO 22' WIDTH

2' MINIMUM AND PLACED IN LINE WITH PAVEMENT JOINT

2' MINIMUM AND PLACED IN LINE WITH PAVEMENT JOINT

JOINTS IN RURAL FREEWAY

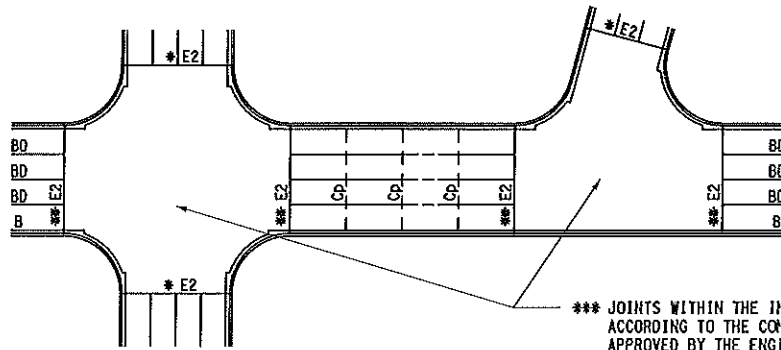
12', 14', OR 16' JOINT SPACING FOR JOINTED PLAIN CONCRETE PAVEMENT

SEE STANDARD PLAN R-43-SERIES FOR JOINT SPACING AND STANDARD PLAN R-39-SERIES FOR CONTRACTION JOINT DESIGNS.

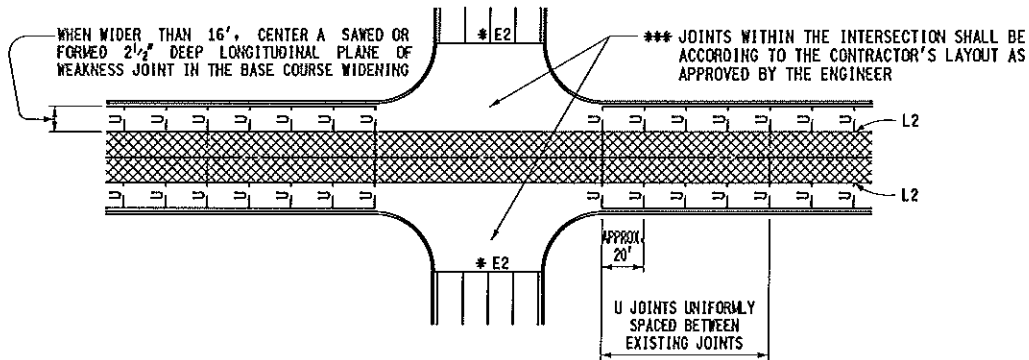
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**TYPICAL JOINT LAYOUTS
FOR CONCRETE PAVEMENT**

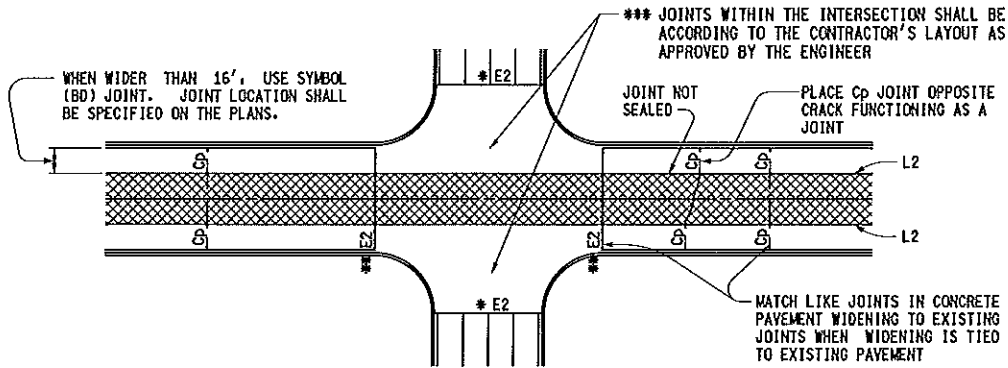
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| 1-25-2013 F.H.W.A. APPROVAL | 12-6-2010 PLAN DATE | R-42-F | SHEET 3 OF 6 |
|--------------------------------|------------------------|---------------|-----------------|



JOINTS AT INTERSECTIONS



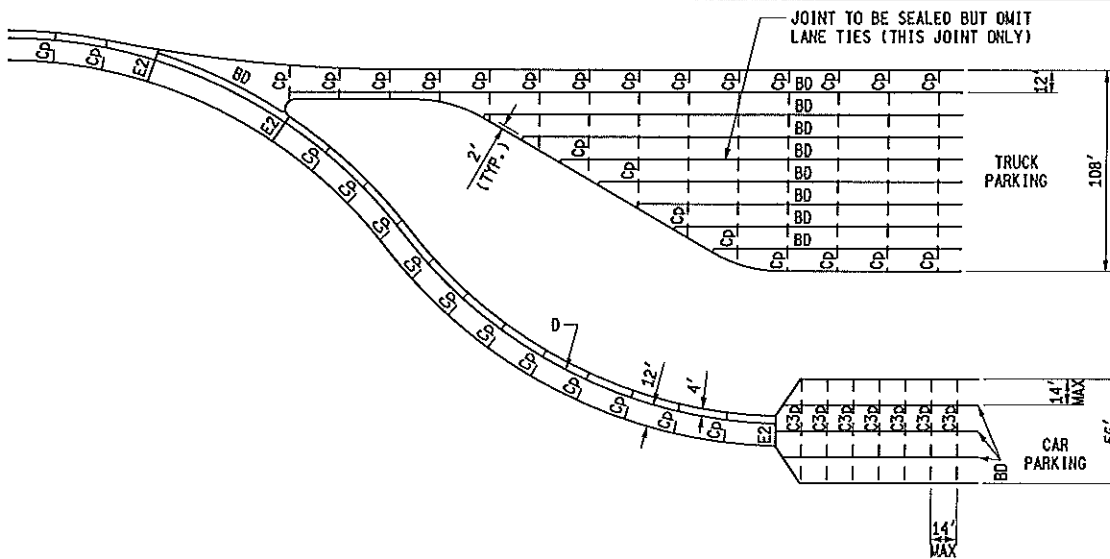
JOINTS FOR CONCRETE BASE COURSE WIDENING



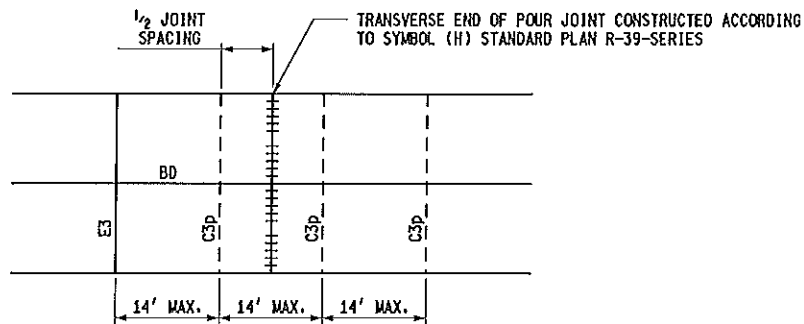
JOINTS FOR CONCRETE PAVEMENT WIDENING

- * WHEN THE MAINLINE PAVEMENT IS BEING RECONSTRUCTED AND THE CONCRETE SIDE STREET IS LEFT INTACT, USE AN Erg JOINT DETAILED ON STANDARD PLAN R-44-SERIES (INSTEAD OF THE E2 JOINT). ALSO, THE E2 (OR Erg) JOINTS IN THE SIDE STREET PAVEMENT (AT THE SPRINGPOINTS) CAN BE REPLACED WITH A CONTRACTION JOINT IF THE "B" JOINT WHICH RUNS ALONG THE EDGE OF GUTTER PAN, FROM SPRINGPOINT TO SPRINGPOINT ALONG THE MAINLINE, IS REPLACED WITH AN E2 JOINT. THERE WILL BE NO PAYMENT FOR THIS EXTRA LENGTH OF E2 JOINT WHEN IT IS MOVED FROM THE SPRING POINT TO THE EDGE OF GUTTER PAN.
- ** THE E2 JOINTS IN THE MAINLINE PAVEMENT (AT THE SPRINGPOINTS) CAN BE REPLACED WITH A CONTRACTION JOINT IF THE MAINLINE IS BEING PAVED THROUGH THE INTERSECTION IN THE SAME OPERATION AS THE NON-INTERSECTION MAINLINE.
- *** THE LONGITUDINAL JOINTS IN THE SIDE STREET PORTION OF THE INTERSECTION (SPRINGPOINT TO MAINLINE GUTTER PAN LINE) SHALL BE SYMBOL (S) JOINTS. WHEN THE E2 JOINT IS MOVED TO THE GUTTER PAN LINE SYMBOL "B" OR "D" JOINTS ARE TO BE USED.

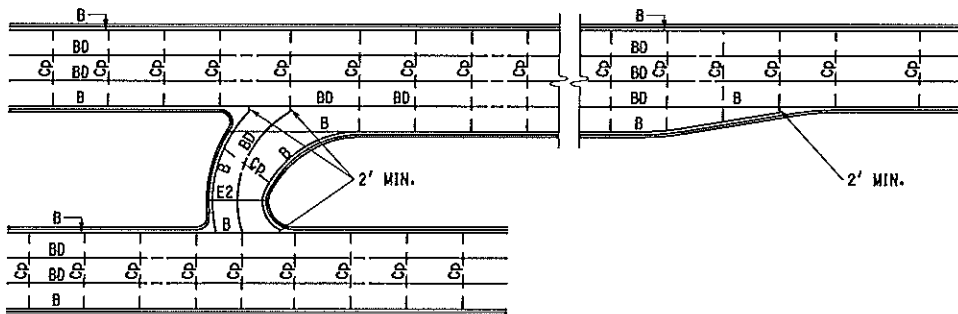
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| MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR | | | |
| TYPICAL JOINT LAYOUTS FOR CONCRETE PAVEMENT | | | |
| 1-25-2013 F.H.W.A. APPROVAL | 12-6-2010 PLAN DATE | R-42-F | SHEET 4 OF 6 |



CONCRETE PARKING AREAS AND APPROACHES
 (JOINT SPACING AS SPECIFIED IN TABLE ON R-43-SERIES)



LOCATION OF TRANSVERSE END OF POUR JOINT



JOINTS FOR CONCRETE PAVEMENT CROSSOVER

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**TYPICAL JOINT LAYOUTS
 FOR CONCRETE PAVEMENT**

NOTES:

TRANSVERSE JOINT SPACING IN CONCRETE PAVEMENT AND CONCRETE SHOULDERS SHALL BE AS SPECIFIED IN THE PROPOSAL OR ON THE PLANS AND CONSTRUCTED ACCORDING TO STANDARD PLAN R-43-SERIES AND THIS PLAN, OR AS DIRECTED BY THE ENGINEER. THE PLACEMENT OF JOINTS IN CURB, CURB AND GUTTER OR VALLEY GUTTER SHALL BE PLACED AS SPECIFIED ON STANDARD PLAN R-30-SERIES AND R-33-SERIES. PAVEMENTS NOT CAST INTEGRALLY WITH CURB, CURB AND GUTTER, VALLEY GUTTER OR CONCRETE SHOULDER SHALL BE CONNECTED WITH A LONGITUDINAL SYMBOL (B) JOINT.

JOINTS SHALL BE CONSTRUCTED ACCORDING TO CURRENT STANDARD PLANS R-39-SERIES AND R-41-SERIES.

RAMP JOINTS SHALL BE ORIENTED 90 DEGREES TO THE ALIGNMENT EDGE OF THE RAMP UNTIL THE 2' POINT OF THE GORE. THEN, AS THE RAMP MERGES WITH THE MAINLINE, THE JOINTS SHALL BE ALIGNED 90 DEGREES TO THE MAINLINE.

BASE COURSES SHALL BE NONREINFORCED UNLESS OTHERWISE SPECIFIED ON THE PLANS.

THE LOCATION OF SYMBOLS (E2), (E3) OR (Cp) JOINTS SHALL BE ADJUSTED TO AVOID CONFLICTS WITH MANHOLES, CATCH BASINS, MONUMENT BOXES, WATER SHUT-OFFS, OR OTHER RIGID STRUCTURES. EITHER THE JOINT SHALL BE LOCATED TO INTERSECT AT THE MID POINT OF THE STRUCTURE OR THE STRUCTURE SHALL BE LOCATED IN THE CENTER OF THE PAVEMENT SLAB. SEE R-37-SERIES FOR ISOLATION JOINT DETAILS.

THE CONCRETE PAVEMENT IN THE TRUCK AND PASSENGER CAR PARKING AREAS OF REST AREAS SHALL BE TEXTURED ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

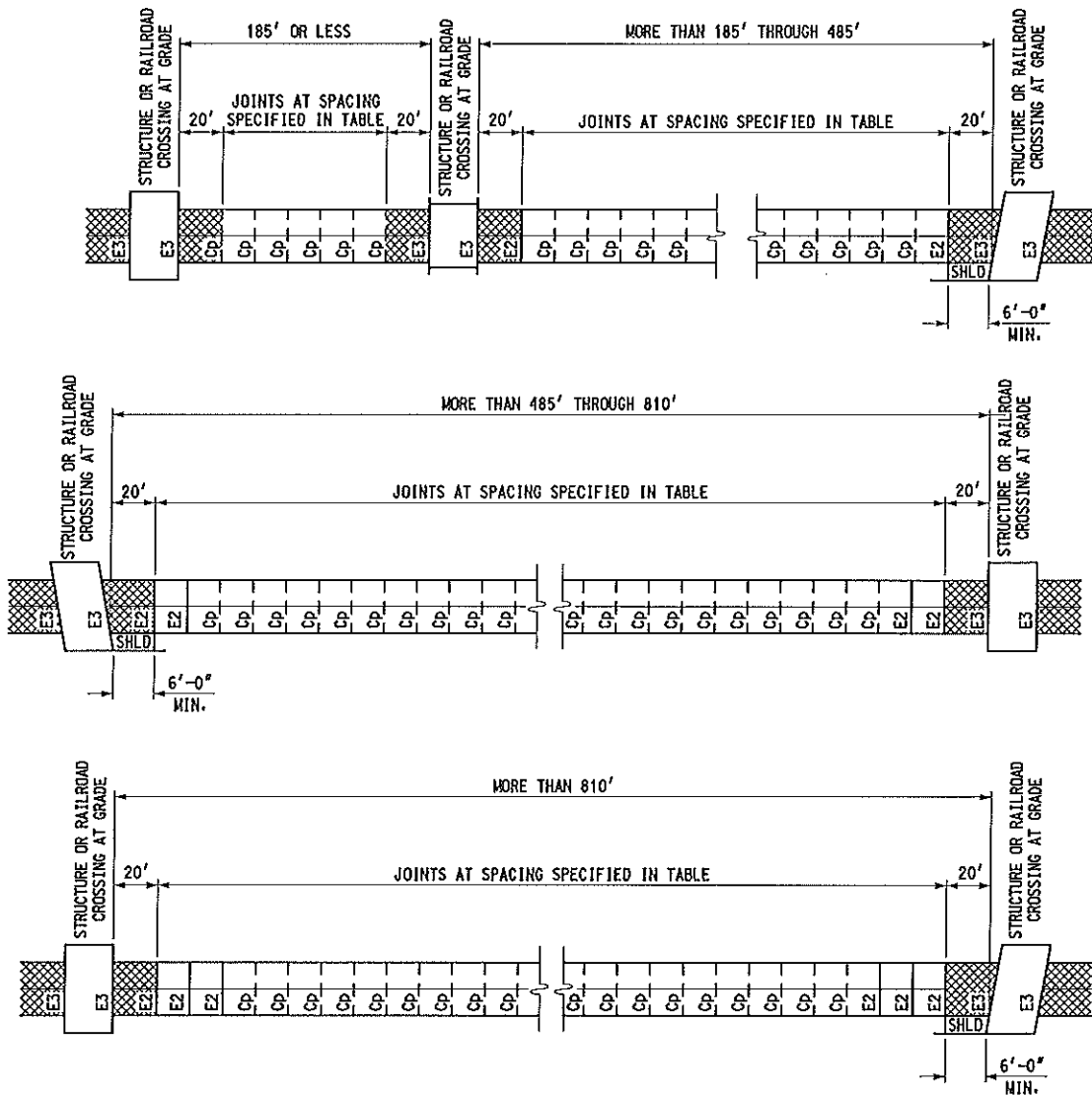
**TYPICAL JOINT LAYOUTS
FOR CONCRETE PAVEMENT**

1-25-2013
F.H.W.A. APPROVAL

12-6-2010
PLAN DATE

R-42-F

SHEET
6 OF 6



PLAN VIEW SHOWING TRANSVERSE JOINT LOCATIONS

JOINT LEGEND
 ACCORDING TO STANDARD PLAN R-39-SERIES

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

- (E2) 1" TRANSVERSE EXPANSION JOINT WITH LOAD TRANSFER ASSEMBLY
- (E3) 1" TRANSVERSE EXPANSION JOINT WITHOUT LOAD TRANSFER ASSEMBLY
- (Cp) TRANSVERSE CONTRACTION JOINT
- REINFORCED CONCRETE PAVEMENT ADJACENT TO BRIDGE REFERENCE LINE OR SLEEPER SLAB

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



PREPARED BY
 DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
 Kirk T. Steudle

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

APPROVED BY: *Paul A. Van Paulklee*
 DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

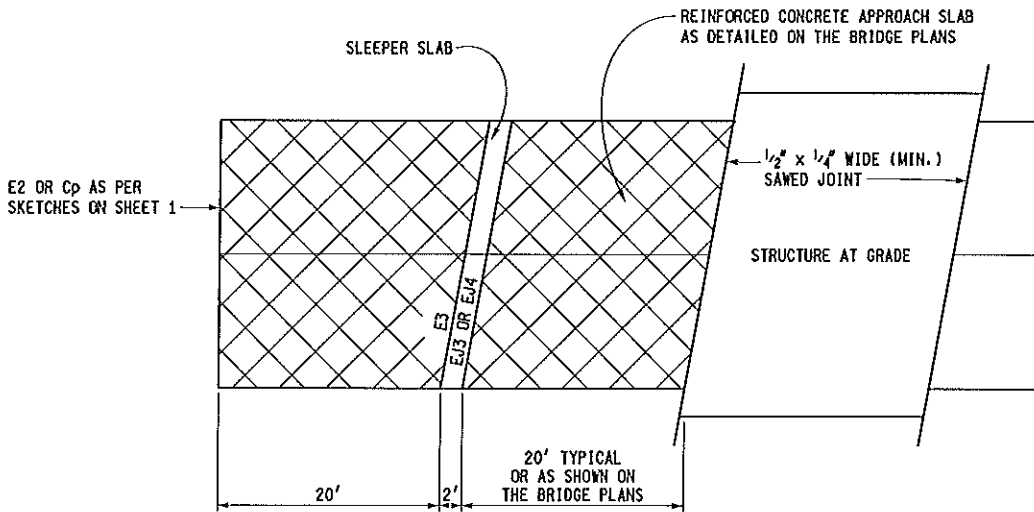
LOCATION OF TRANSVERSE JOINTS
 IN PLAIN CONCRETE PAVEMENT

1-25-2013
 F.H.W.A. APPROVAL

2-8-2012
 PLAN DATE

R-43-I

SHEET
 1 OF 2



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

NOTES:

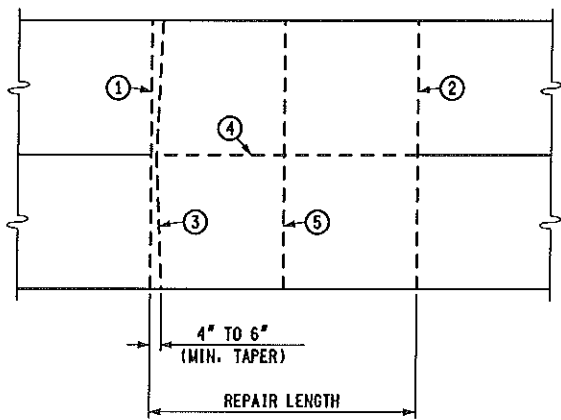
UNLESS OTHERWISE SPECIFIED ON THE PLANS OR DIRECTED BY THE ENGINEER, TRANSVERSE JOINTS SHALL BE PLACED AS SPECIFIED ON THIS STANDARD PLAN AND ON CURRENT STANDARD PLAN R-42-SERIES.

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

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

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

| | | | |
|--|-----------------------|---------------|-----------------|
| MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR LOCATION OF TRANSVERSE JOINTS IN PLAIN CONCRETE PAVEMENT | | | |
| 1-25-2013 F.H.W.A. APPROVAL | 2-8-2012 PLAN DATE | R-43-I | SHEET 2 OF 2 |

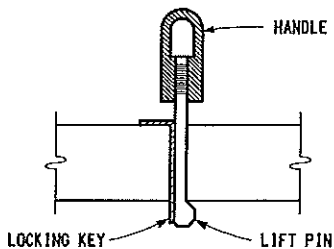


PLAN OF SAWING DIAGRAM

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.

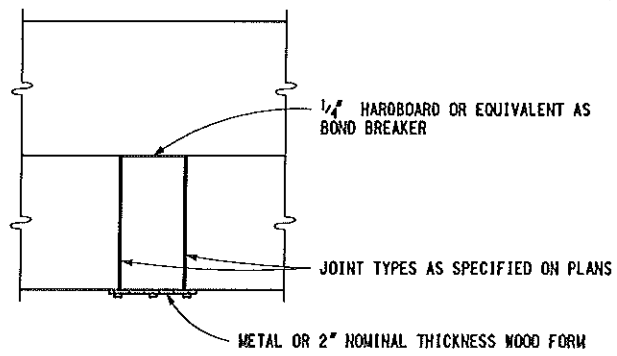
- ① & ② THESE SAW CUTS SHALL BE FULL DEPTH AND PERPENDICULAR TO THE EDGE OF THE ROADWAY, WITHIN A TOLERANCE OF 1". NO OVERCUTTING INTO ADJACENT LANES SHALL BE MADE UNLESS THE OVERCUT IS WITHIN THE LIMITS OF A SUBSEQUENT REPAIR TO THE ADJACENT LANE. SHOULDER OVERCUTS WILL BE ALLOWED.
- ③ THIS FULL DEPTH 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.

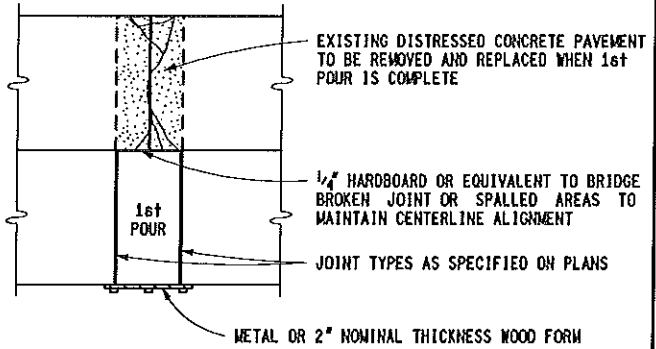


SCHEMATIC OF TYPICAL LIFT PIN ASSEMBLY

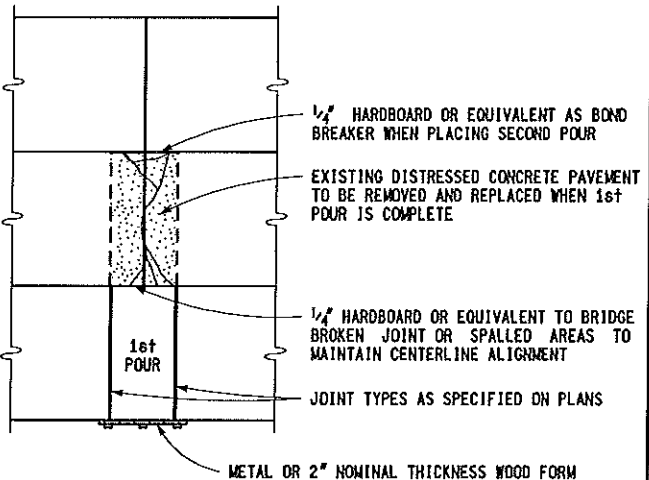
SAWING DIAGRAM & LIFT PIN FOR REMOVING OLD SLAB



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. Stoude

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

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

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

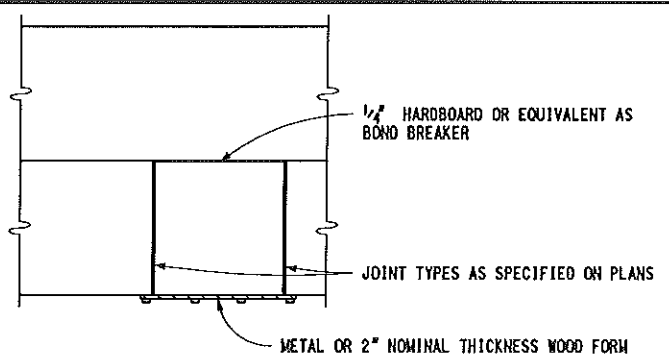
CONCRETE PAVEMENT REPAIR

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

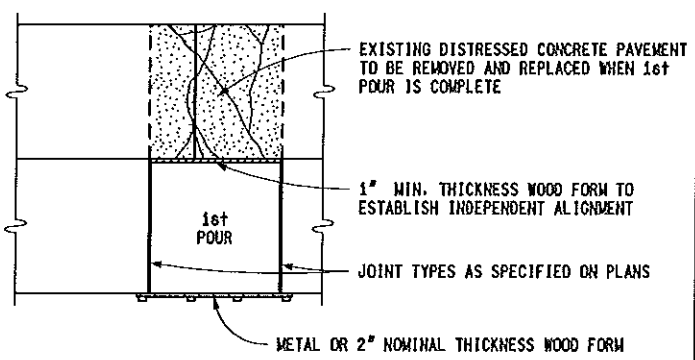
8-9-2010 PLAN DATE

R-44-F

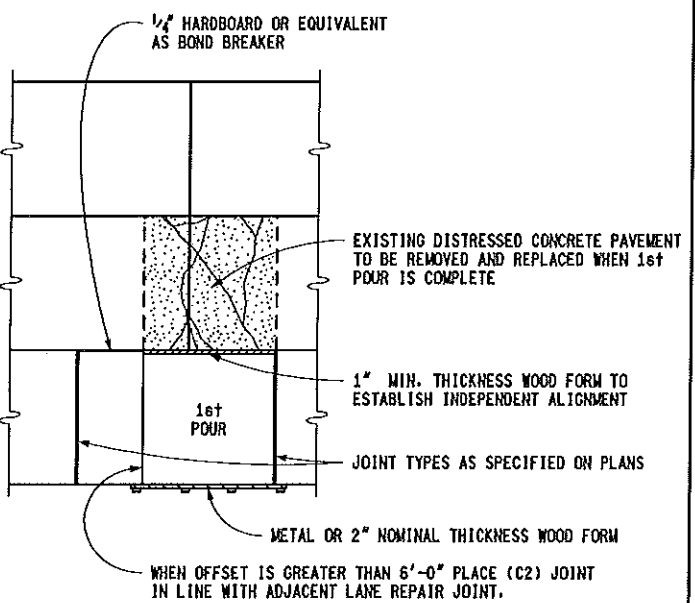
SHEET 1 OF 6



**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)**

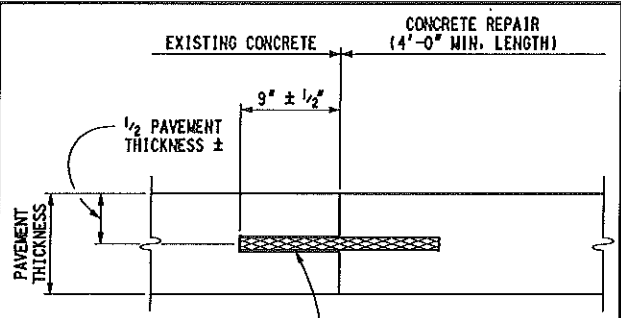
FORMING NOTES:

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.

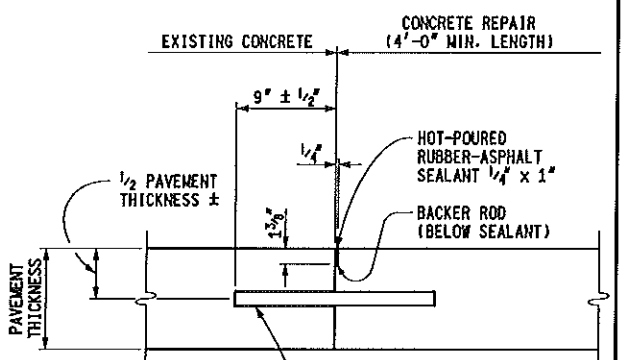
ADJACENT LANE REPAIRS MAY BE CAST INTEGRALLY, WHEN APPROVED BY THE ENGINEER.

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



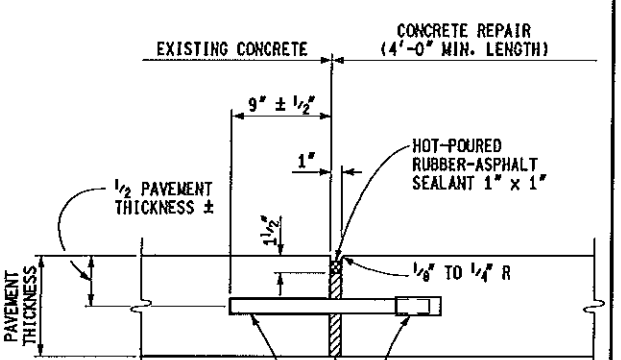
* DRILL 1 3/8" DIAMETER HOLE INTO EXISTING CONCRETE PAVEMENT AND GROUT-IN-PLACE #9 x 1'-6" LONG EPOXY COATED DEFORMED BARS

TIED JOINT, Trg



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

CONTRACTION JOINT, Crg



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

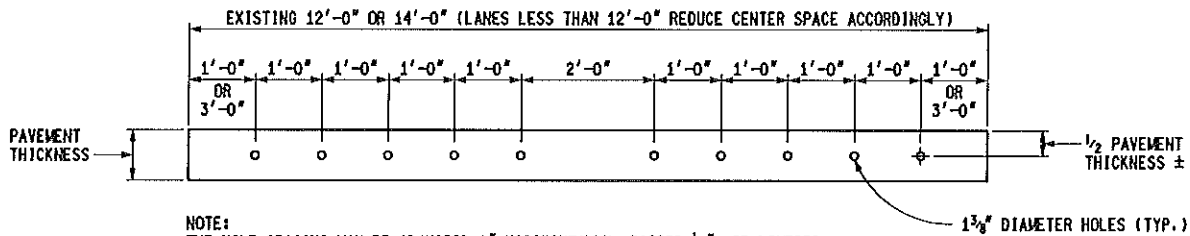
EXPANSION JOINT, Erg

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

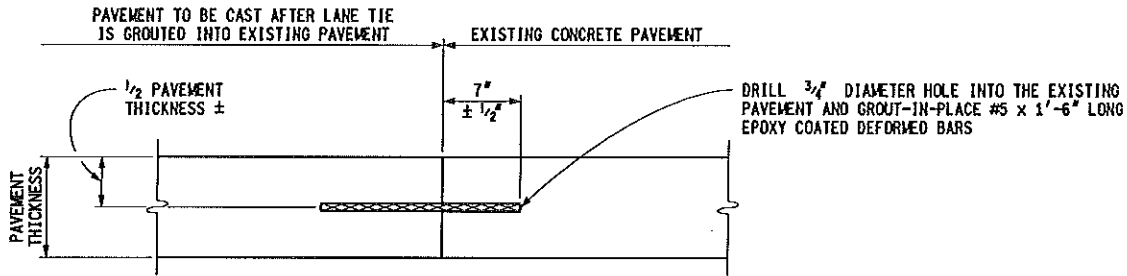
**CAST-IN-PLACE REPAIR JOINTS USING
GROUTED DOWEL OR DEFORMED BARS**

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

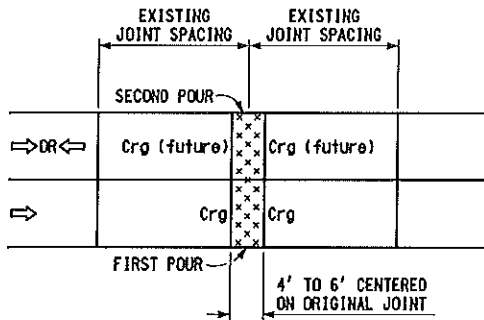
CONCRETE PAVEMENT REPAIR



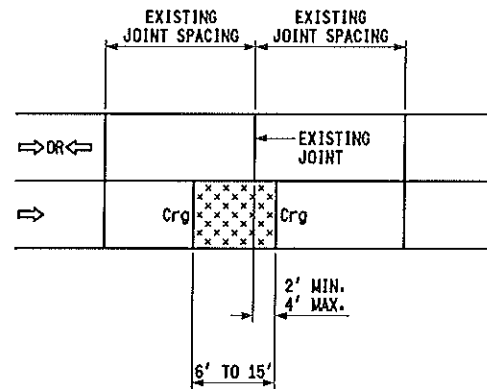
DOWEL OR DEFORMED BAR SPACING FOR CONCRETE REPAIRS



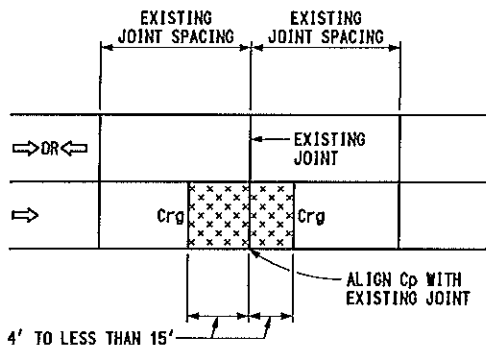
EPOXY ANCHORED LANE TIE



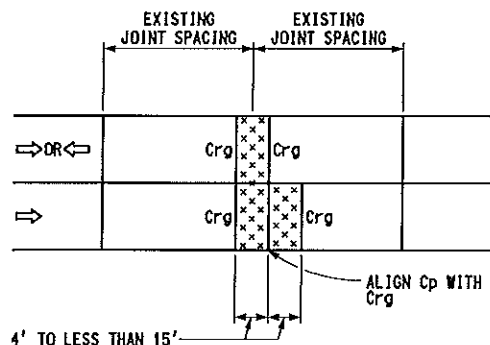
SINGLE LANE OR FULL WIDTH REPAIR



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

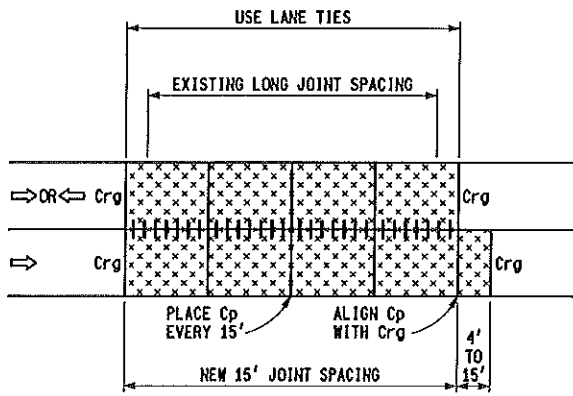
CONCRETE PAVEMENT REPAIR

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

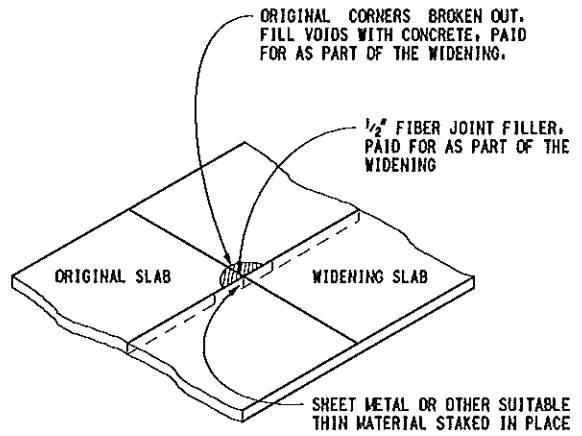
8-9-2010
PLAN DATE

R-44-F

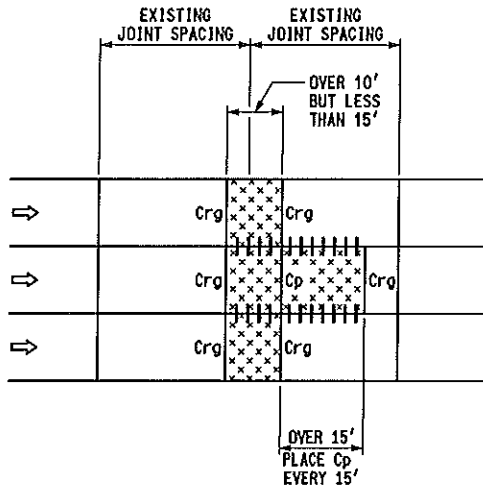
SHEET
3 OF 6



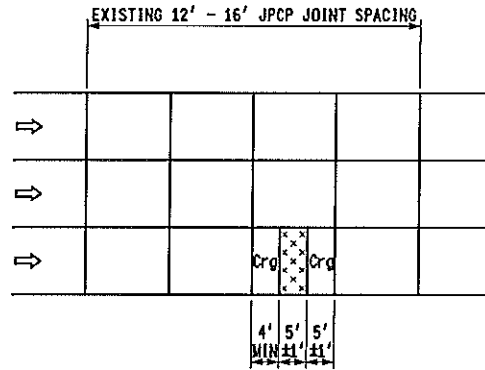
**LONG REPAIR SHOWING
Cp JOINT ALIGNMENTS AND LANE TIES**



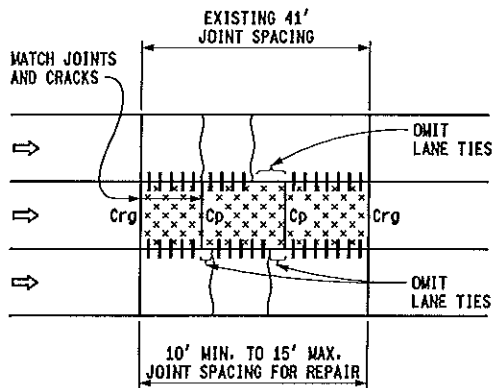
JOINT PATCH ADJACENT TO WIDENING SLAB



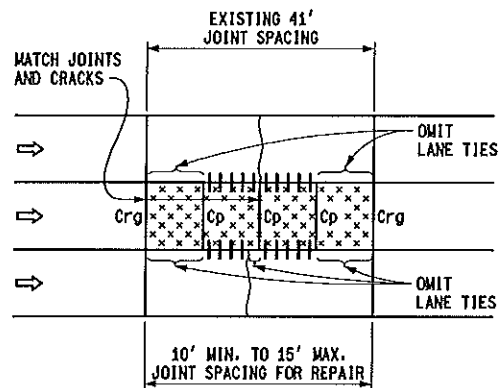
**FULL WIDTH MULTI-LANE REPAIRS
WITH OFFSET IN ONE LANE**



**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

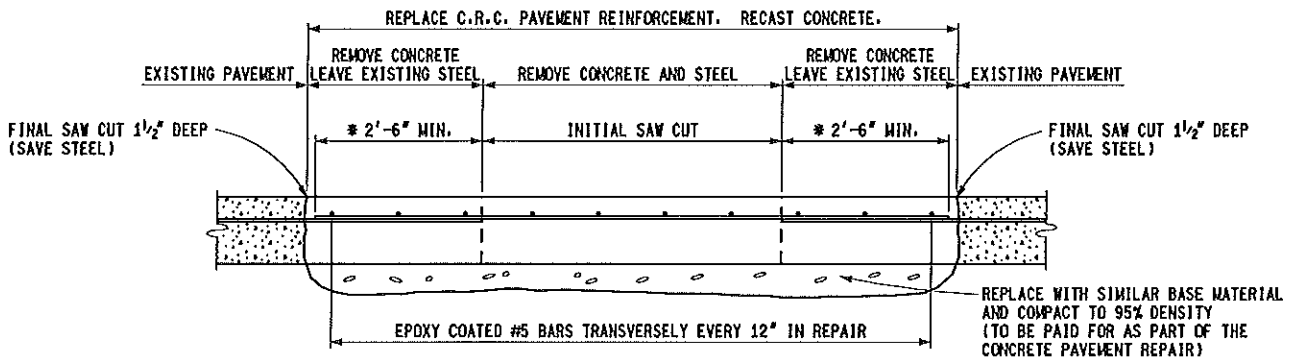
CONCRETE PAVEMENT REPAIR

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

8-9-2010
PLAN DATE

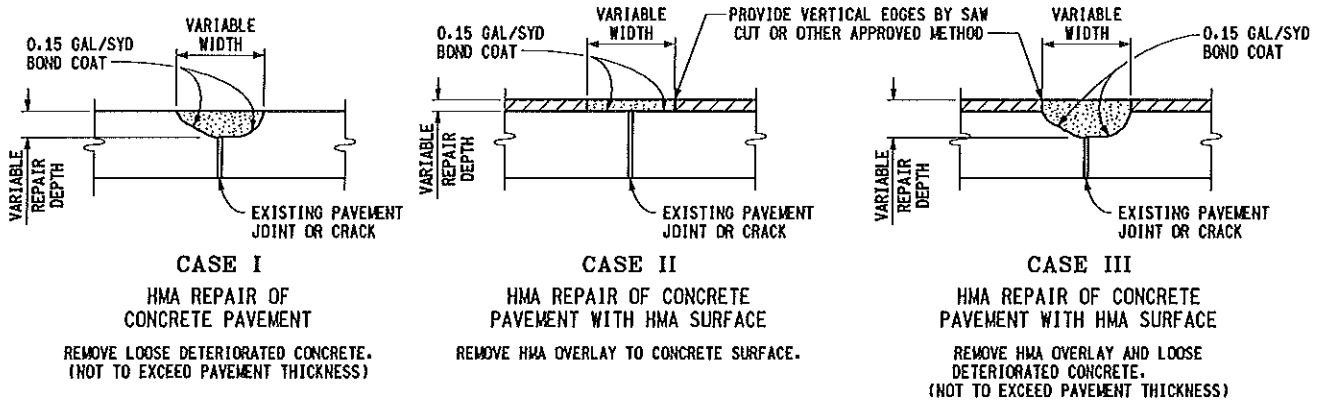
R-44-F

SHEET
4 OF 6



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

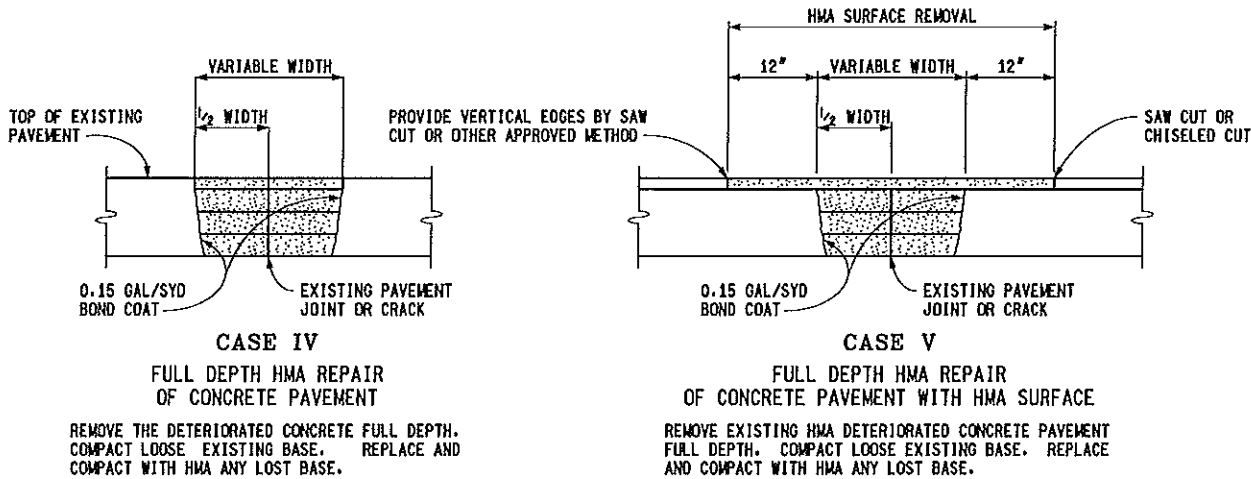
REPAIRING CONTINUOUSLY REINFORCED CONCRETE



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

SURFACE REPAIR FOR JOINT OR CRACK (TRANSVERSE OR LONGITUDINAL)

DETAIL 7



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

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

DETAIL 8

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

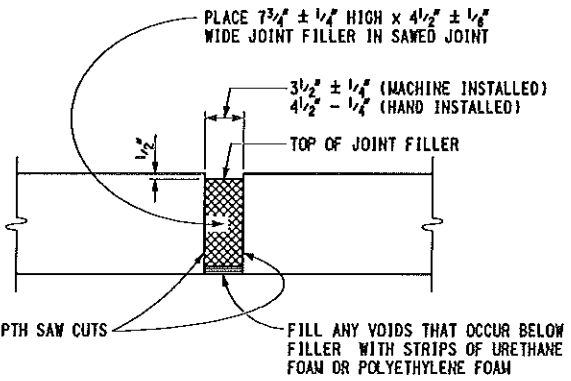
CONCRETE PAVEMENT REPAIR

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

8-9-2010
PLAN DATE

R-44-F

SHEET
5 OF 6



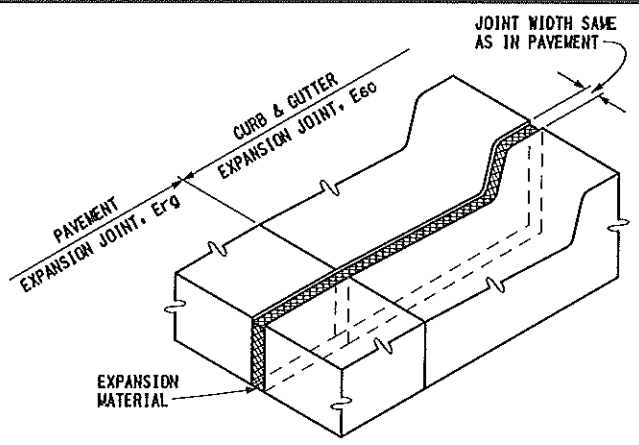
FULL DEPTH SAW CUTS

FILL ANY VOIDS THAT OCCUR BELOW FILLER WITH STRIPS OF URETHANE FOAM OR POLYETHYLENE FOAM

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, Esg

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-33P-SERIES.

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

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

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

THE SAME TYPE JOINT SHALL EXTEND ACROSS ADJACENT LANE REPAIRS.

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

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

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

EXPANSION JOINT FILLER SHALL EXTEND THE FULL DEPTH OF THE REPAIR AND BE FLUSH WITH THE EXISTING PAVEMENT SURFACE. PRIOR TO SEALING, THE JOINT FIBER FILLER AT THE PAVEMENT SURFACE SHALL BE REMOVED BY CUTTING 1" WIDE AND 1 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, RAMPS, OR SHOULDERS.

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

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

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

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

ALL REPAIRS WILL BE JOINTED PLAIN CONCRETE PAVEMENT.

| | | | |
|--|-----------------------|--------|-----------------|
| 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 6 OF 6 |

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.

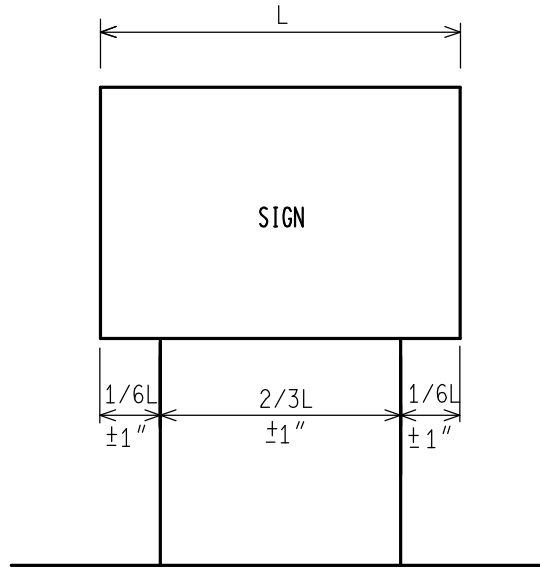
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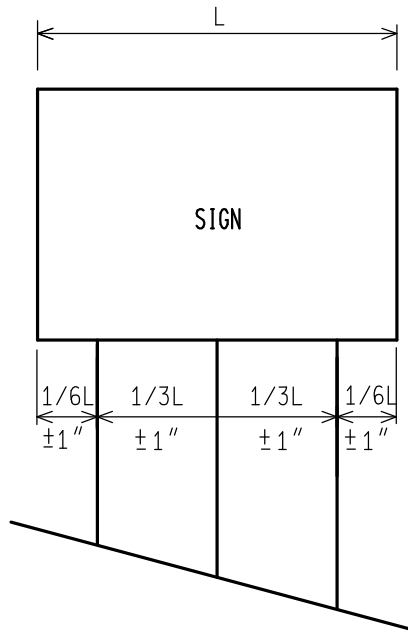
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|---|---|--|------------------|--|
|  MICHIGAN DEPARTMENT OF TRANSPORTATION PREPARED BY TRAFFIC AND SAFETY SUPPORT AREA DRAWN BY: CON/ECH CHECKED BY: AUG | _____ ENGINEER OF DELIVERY _____ ENGINEER OF DEVELOPMENT PENDING _____ FHWA APPROVAL DATE | MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR GROUND DRIVEN SIGN SUPPORTS FOR TEMP SIGNS | | |
| | 8/2006 | WZD-100-A | SHEET 1 of 11 | |
| | PLAN DATE | | | |

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

2 POST SIGN SUPPORT SPACING



3 POST SIGN SUPPORT SPACING



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

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

PENDING
FHWA APPROVAL DATE

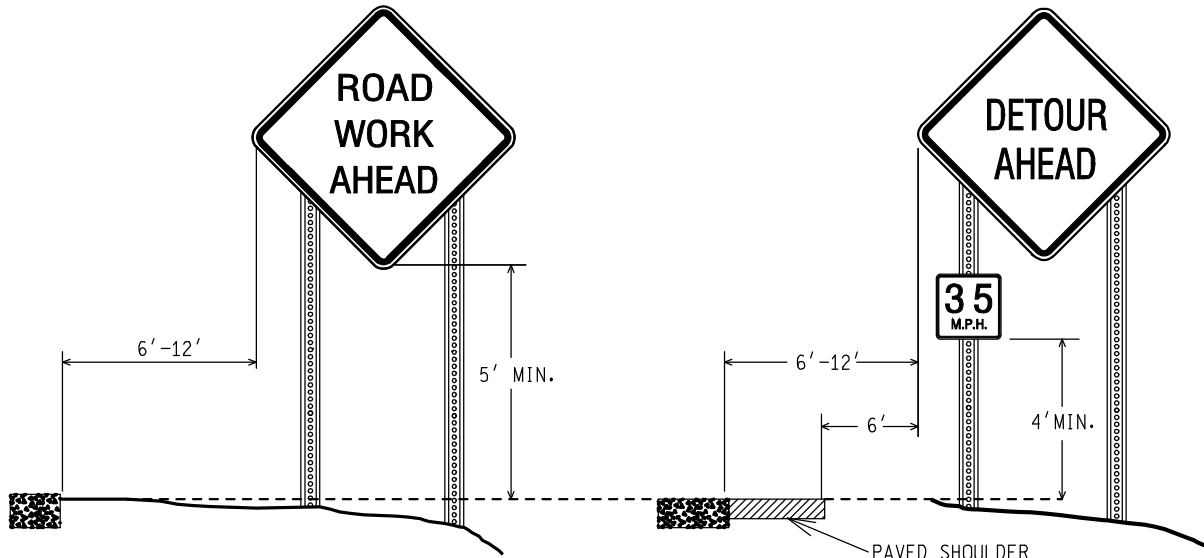
8/2006
PLAN DATE

WZD-100-A

SHEET
2 of 11

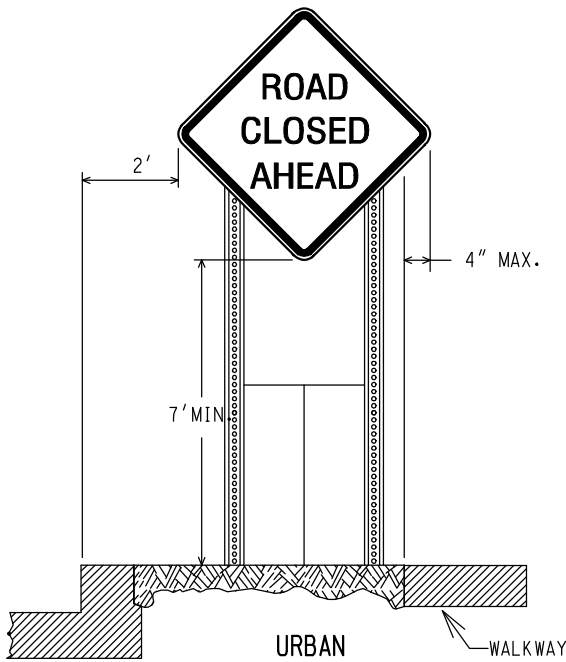
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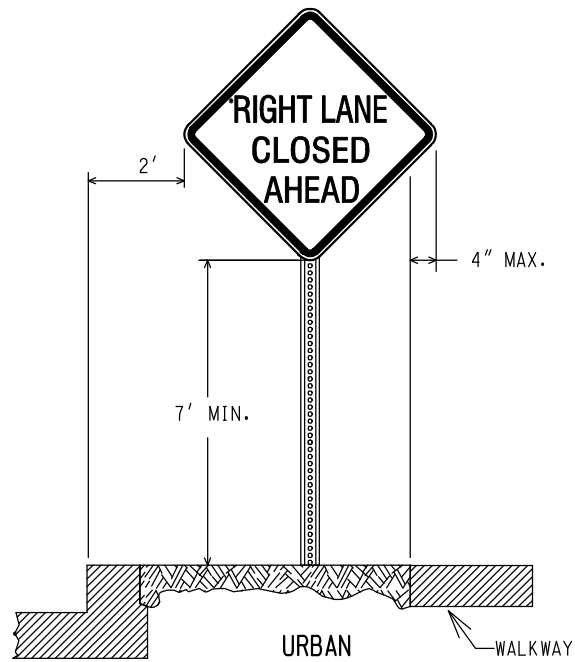
RURAL

RURAL WITH ADVISORY SPEED PLATE



URBAN

WALKWAY



URBAN

WALKWAY

(CURBED AREAS OR WHERE WALKWAYS ARE PRESENT)

(CURBED AREAS OR WHERE WALKWAYS ARE PRESENT)

BOTTOM HEIGHT AND OFFSET

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

PENDING
FHWA APPROVAL DATE

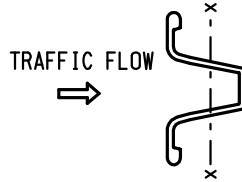
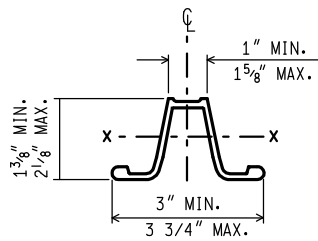
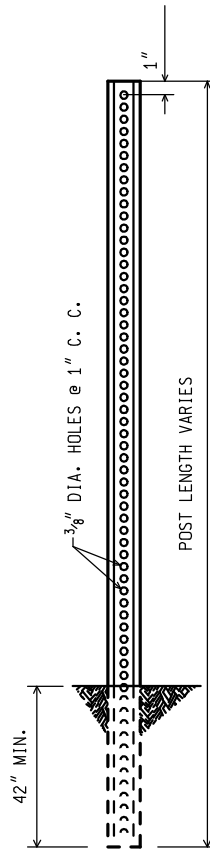
8/2006

PLAN DATE

WZD-100-A

SHEET
3 of 11

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

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

MOUNT SIGN ON OPEN FACE OF
 U - CHANNEL STEEL POST

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

PENDING

 FHWA APPROVAL DATE

8/2006

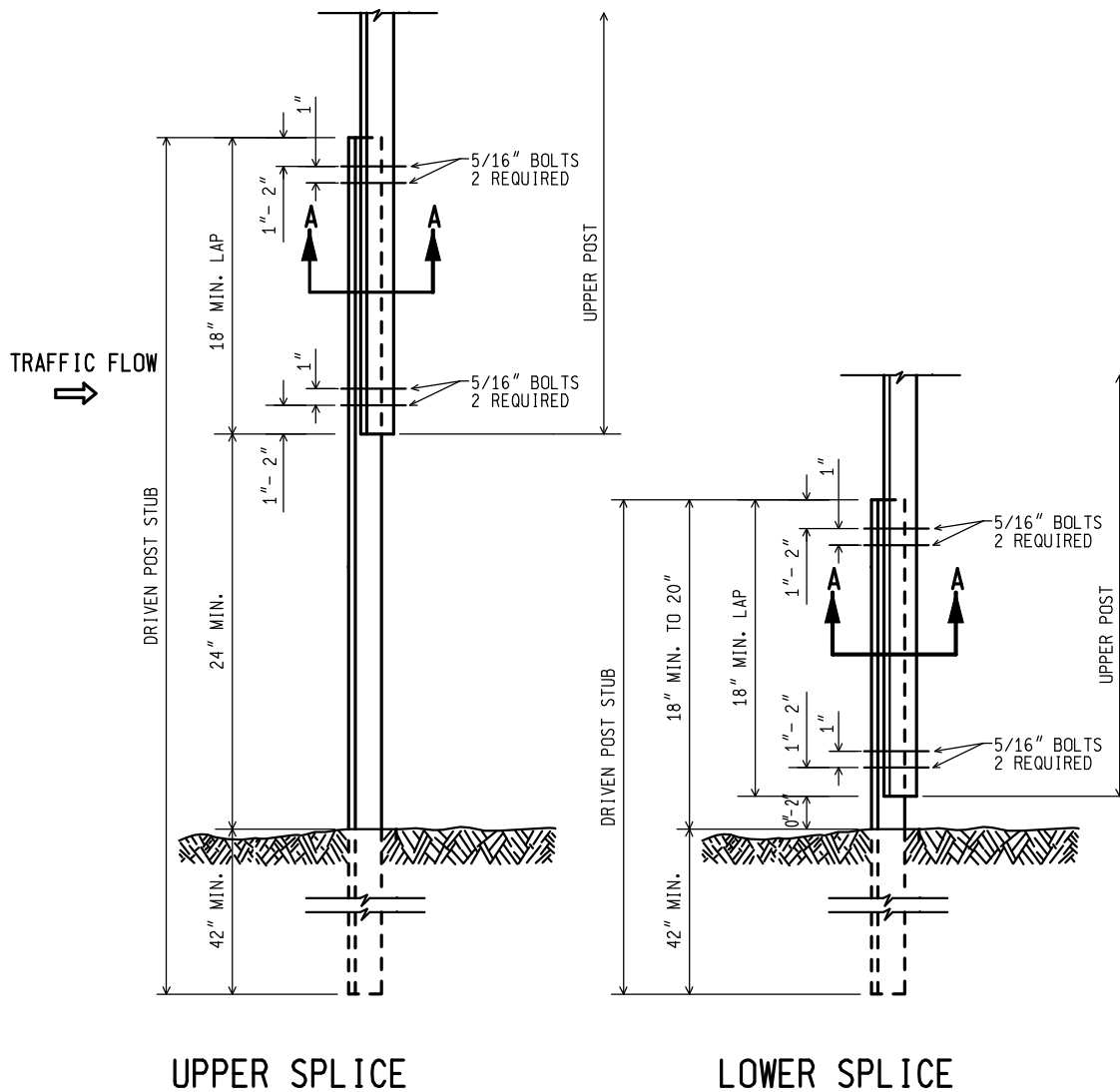
 PLAN DATE

WZD-100-A

SHEET
 4 of 11

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**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
FHWA APPROVAL DATE

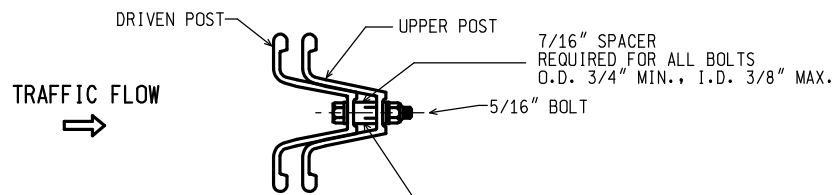
8/2006
PLAN DATE

WZD-100-A

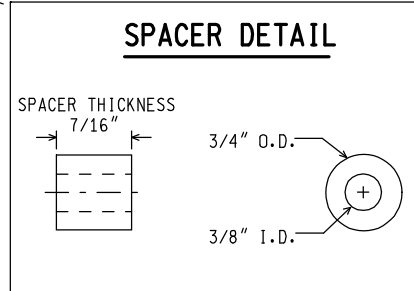
SHEET
5 of 11

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SECTION A-A



NOTES:

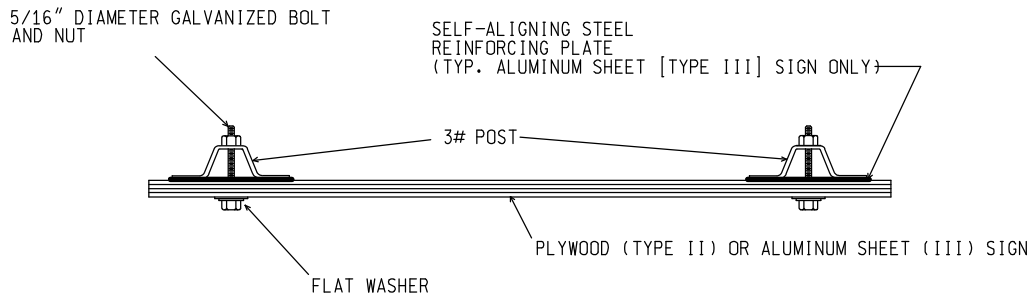
1. THE SPACER THICKNESS SHALL BE 1/16" LESS THAN THE GAP BETWEEN THE POST WHEN POSITIONED IN THE UNBOLTED CONFIGURATION.
2. THE EXTERIOR BOLT (CLOSEST TO LAP), SPACER, WASHER, AND NUT SHALL BE INSTALLED IN A PREPUNCHED HOLE 1" to 2" FROM THE END OF THE LAP.
3. THE INTERIOR BOLT (FARTHEST FROM LAP), SPACER,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

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

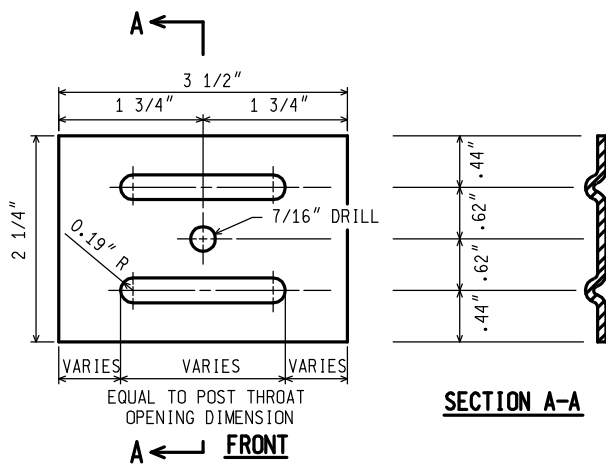
NOT TO SCALE

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

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SIGN TO 3 lb. POST CONNECTION



NOTES: (FOR STEEL SIGN REINF' PLATE)

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

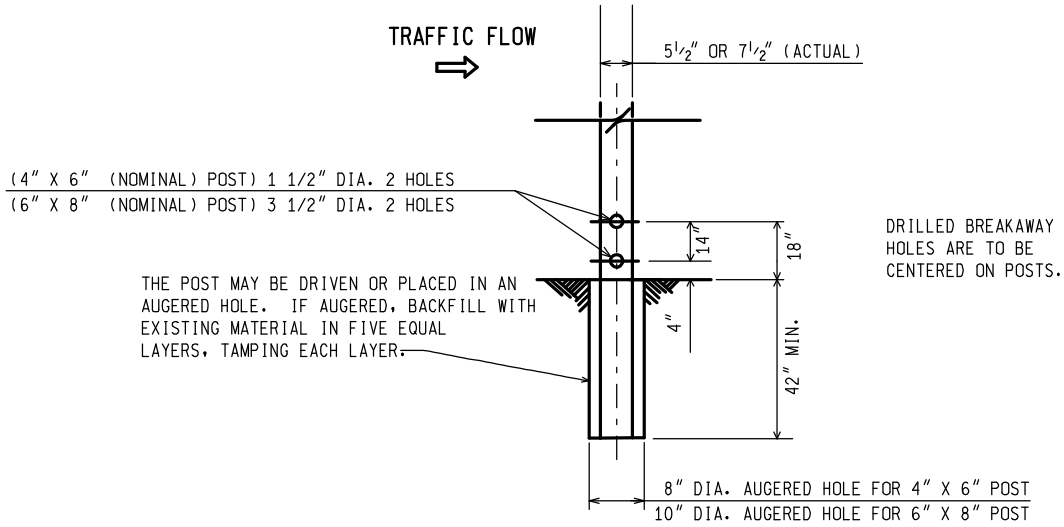
STEEL SIGN REINFORCING PLATE
REQUIRED FOR TYPE III SIGNS ONLY

3 lb. U - CHANNEL STEEL POST SIGN CONNECTION

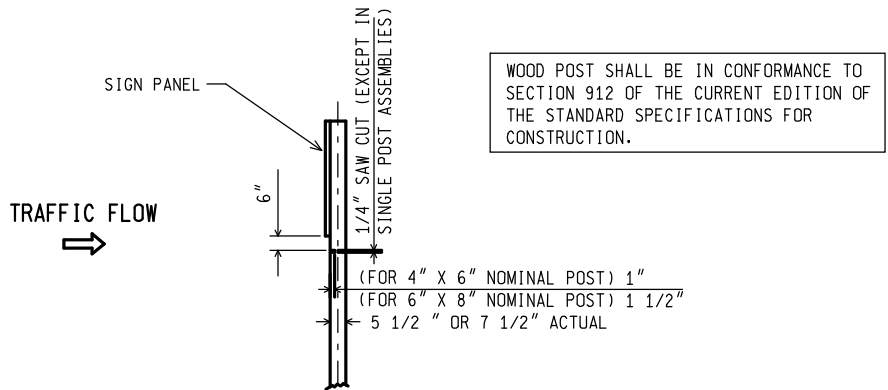
NOT TO SCALE

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| 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

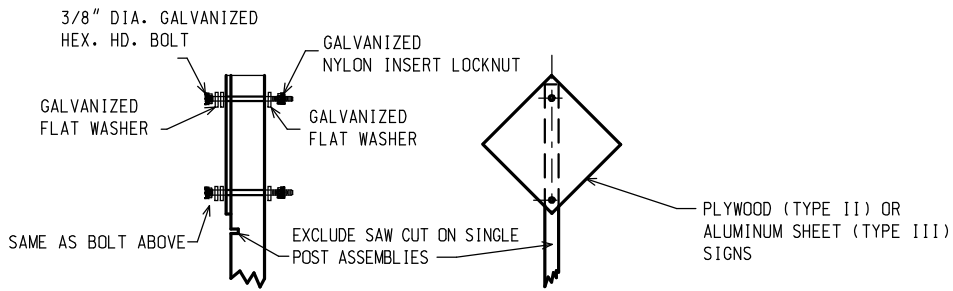
8/2006
 PLAN DATE

WZD-100-A

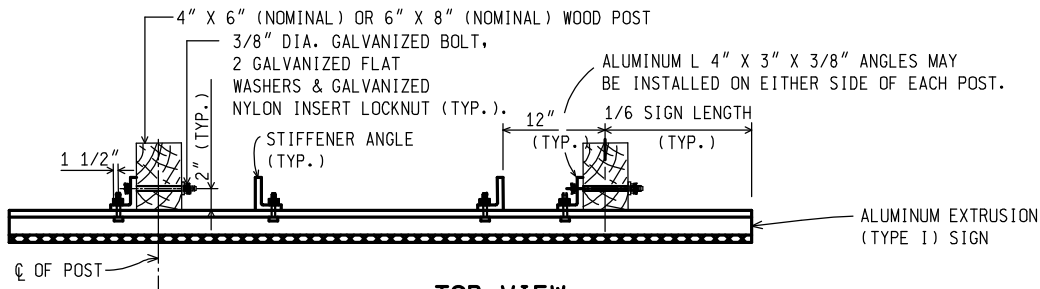
SHEET
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File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH

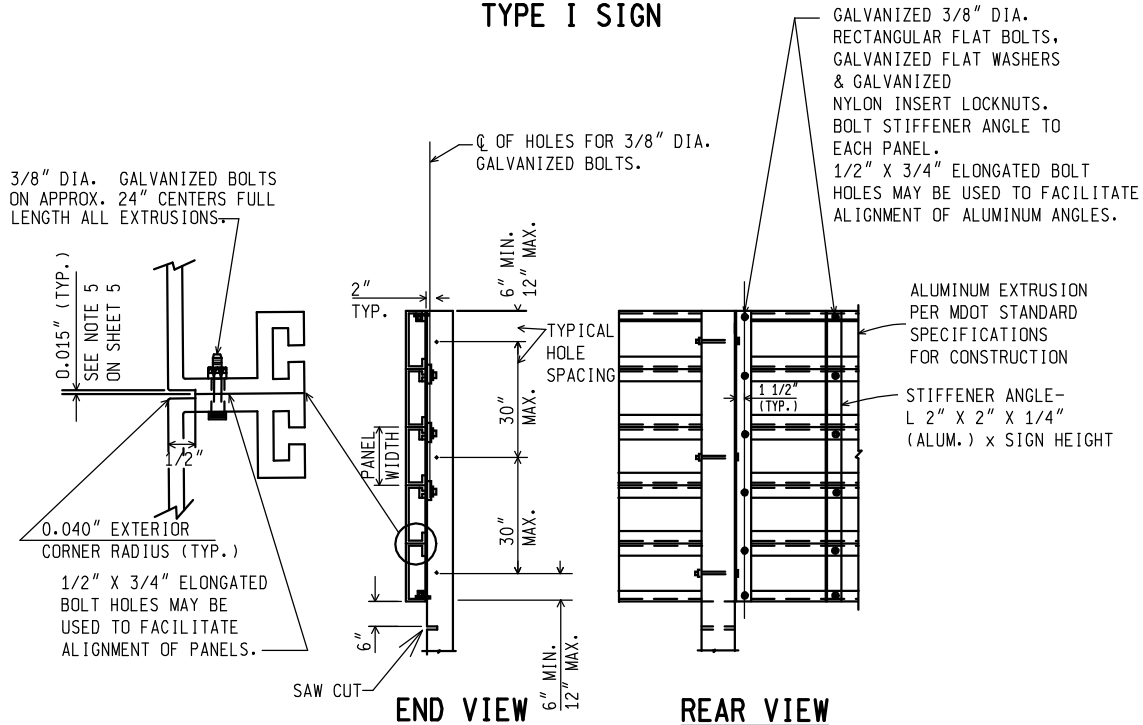
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TYPE II AND TYPE III SIGNS



**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

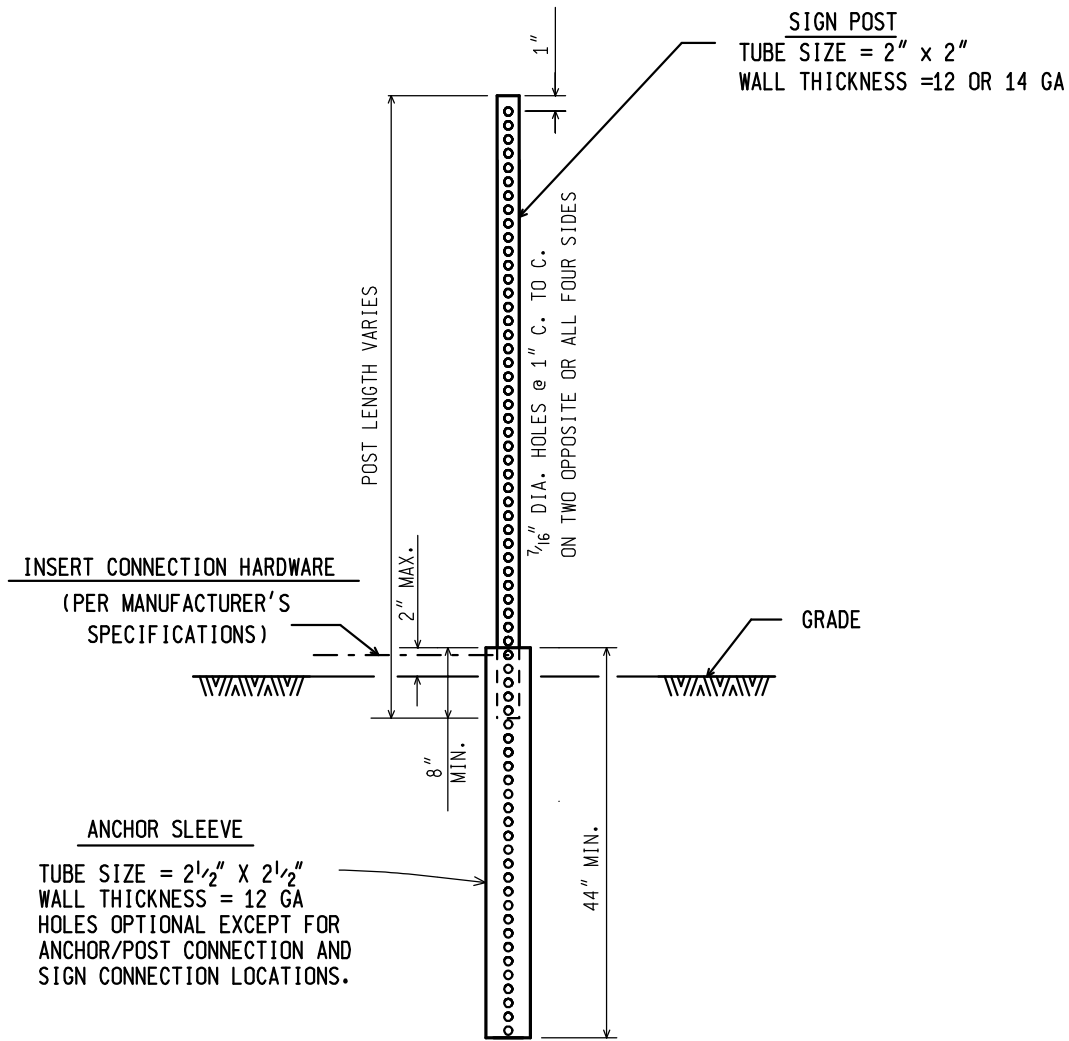
WZD-100-A

SHEET
9 of 11

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PLAN DATE

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SQUARE TUBULAR STEEL POST

NOT TO SCALE

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| | FHWA APPROVAL DATE | | | |

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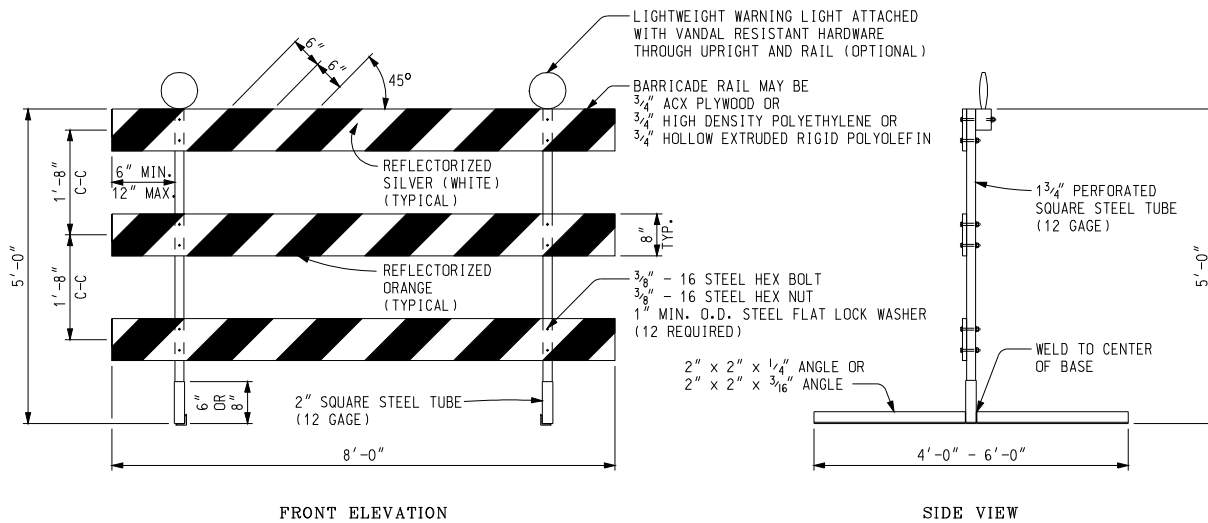
GENERAL NOTES:

1. A MAXIMUM OF TWO POSTS WITHIN A 7 FOOT PATH IS PERMITTED.
2. ALL SIGN POSTS SHALL COMPLY WITH NCHRP 350.
3. ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 42".
4. BRACING OF POST IS NOT PERMITTED.
5. SIGN SHALL BE LEVEL, AND UPRIGHT FOR THE DURATION OF INSTALLATION.
6. ERECT POSTS SO THE SIGN FACE AND SUPPORTS DO NOT VARY FROM PLUMB BY MORE THAN 3/16" IN 3'. PROVIDE A CENTER-TO-CENTER DISTANCE BETWEEN POSTS WITHIN 2 PERCENT OF PLAN DISTANCE.
7. NO MORE THAN ONE SPLICE PER POST, AS SHOWN, WILL BE PERMITTED.
8. POST TYPES SHALL NOT BE MIXED WITHIN A SIGN SUPPORT INSTALLATION.
9. NO VERTICAL JOINTS ARE PERMITTED IN SIGN. NO 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

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

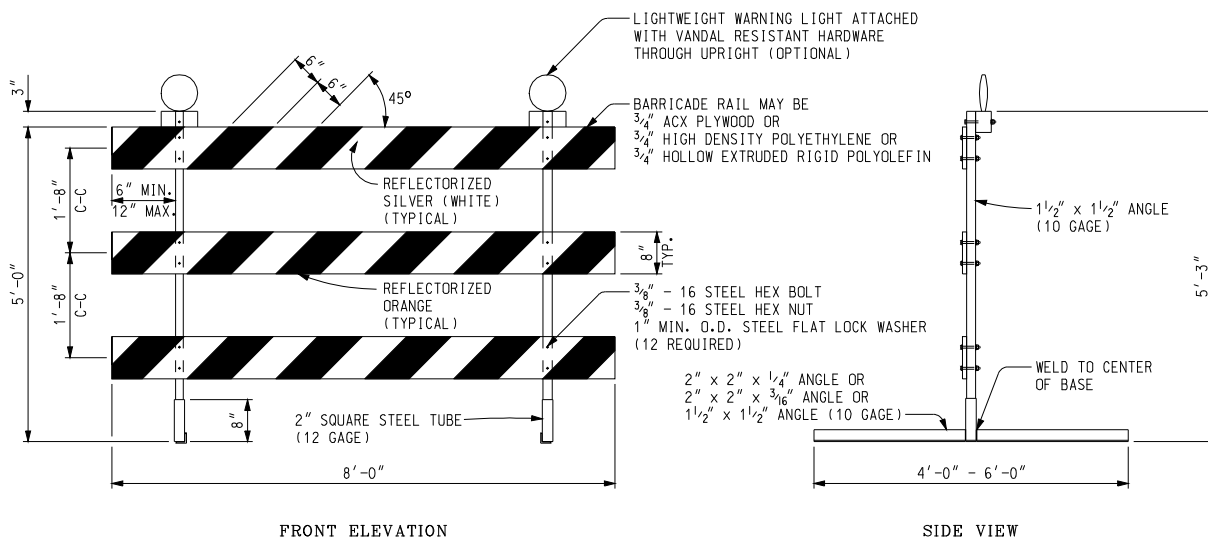
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FRONT ELEVATION

SIDE VIEW

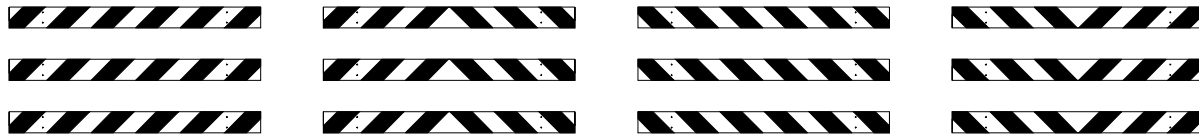
PERFORATED SQUARE STEEL TUBE OPTION



FRONT ELEVATION

SIDE VIEW

ANGLE IRON OPTION



LEFT DIRECTIONAL

BI-DIRECTIONAL

RIGHT DIRECTIONAL

CLOSURES

BARRICADE RAIL SHEETING OPTIONS
TYPE III BARRICADES

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

NOT TO SCALE

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Rev. 09/22/09 PJ



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: ECH

CHECKED BY: MWB

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

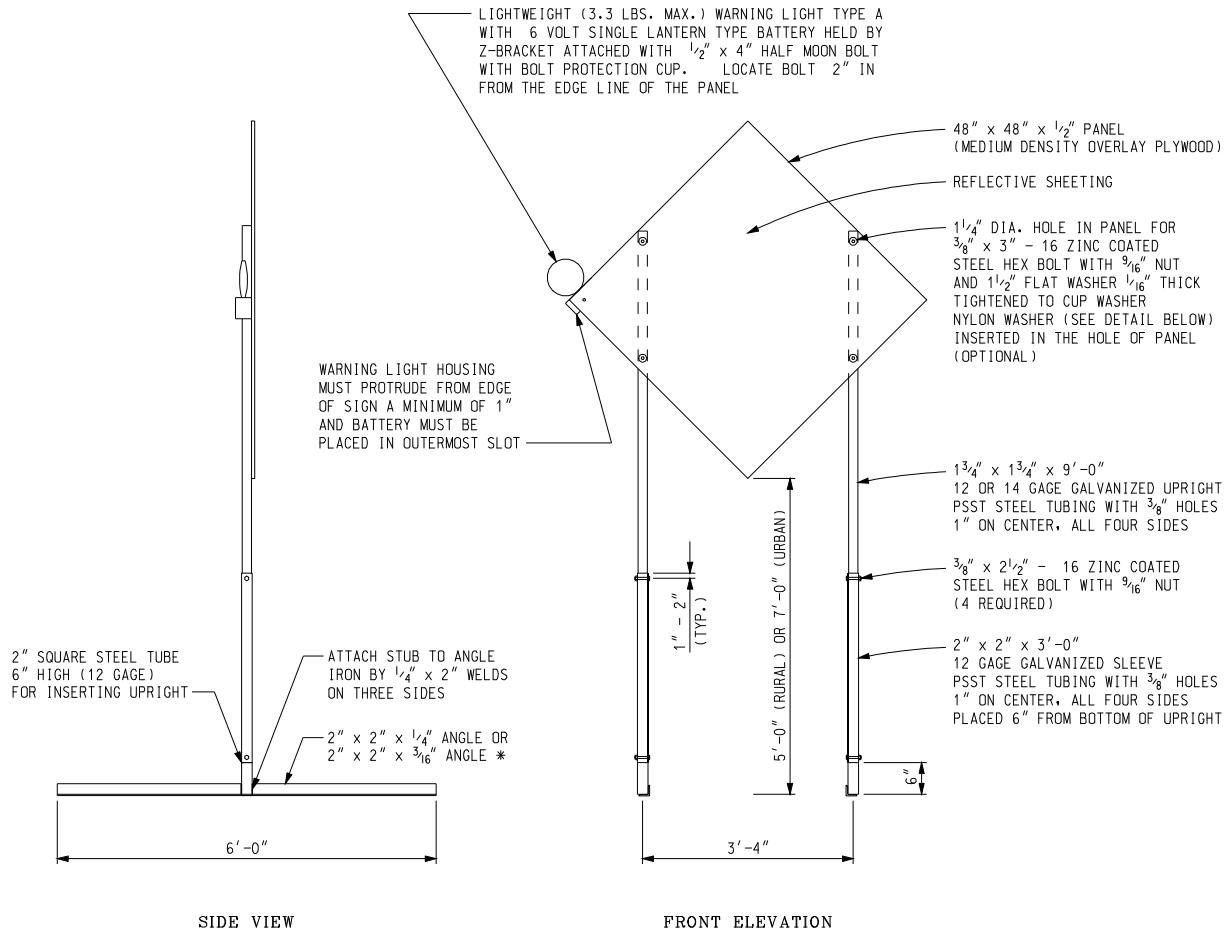
Temporary
Traffic Control Devices

9/22/09
PLAN DATE

WZD-125-E

SHEET
1 of 3

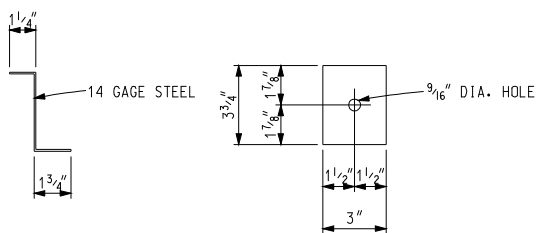
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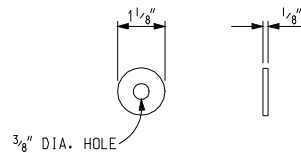
TEMPORARY SIGN SUPPORT

(WARNING LIGHT PLACED ON SIDE CLOSEST TO TRAFFIC)

- * SIGN STAND IS BALLASTED WITH FOUR OR MORE 35 LB SANDBAGS. A MINIMUM OF ONE ON EACH END.
- UPRIGHTS SHALL NOT EXTEND ABOVE THE SIGN PANEL.



Z-BRACKET DETAIL



OPTIONAL NYLON WASHER

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

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

9/22/09
PLAN DATE

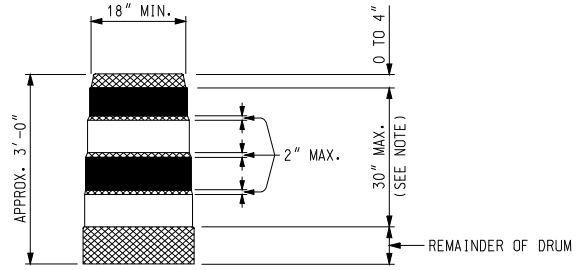
WZD-125-E

SHEET
2 of 3

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

SYMBOLS TO BE USED ON PLANS



- 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

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

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