2013

Pavement Marking Training Handbook

March & April 2013

BUREAU OF TRAFFIC OPERATIONS

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14	FDM 11-26 Attachment 35.1 and 35.2 February Transmittal
18	Conventional Paint Troubleshooting Guide
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20	Epoxy Troubleshooting Guide
21	Preformed Thermoplastic Troubleshooting Guide
22	Preformed Tape Troubleshooting Guide
23	Reflective Glass Bead Troubleshooting Guide
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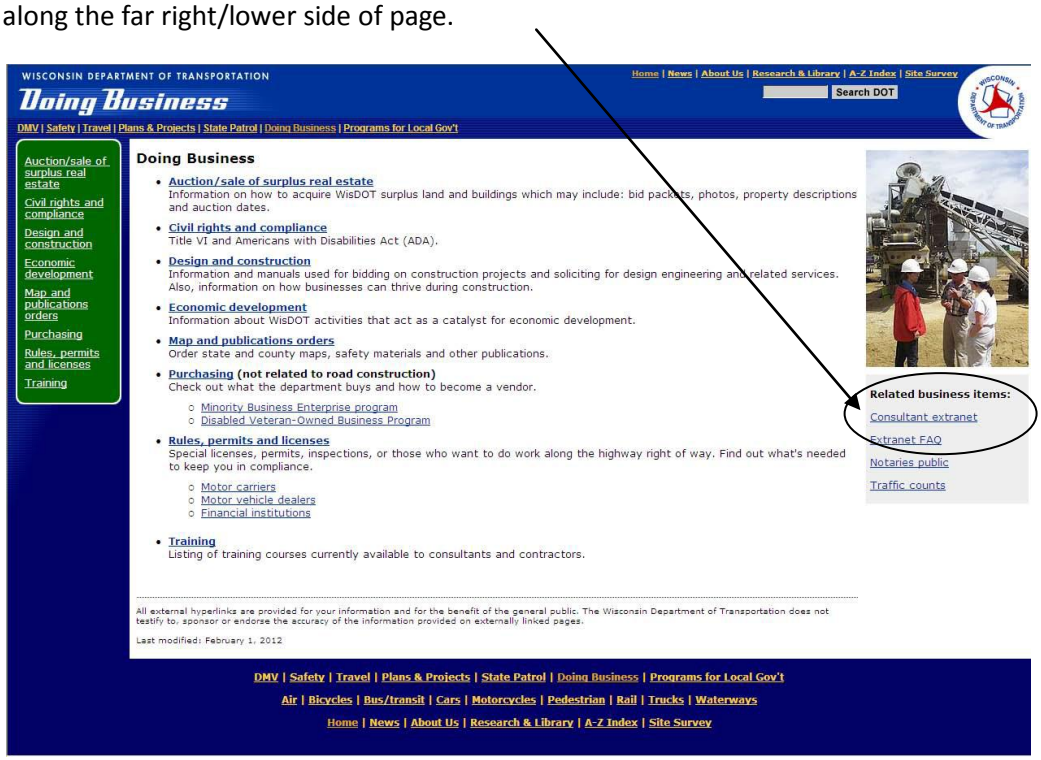
WisDOT Extranet (Web) Access

Use these quick 4-step instructions for creating an ID/password and gain access to WisDOT's extranet web system. (See FAQs)

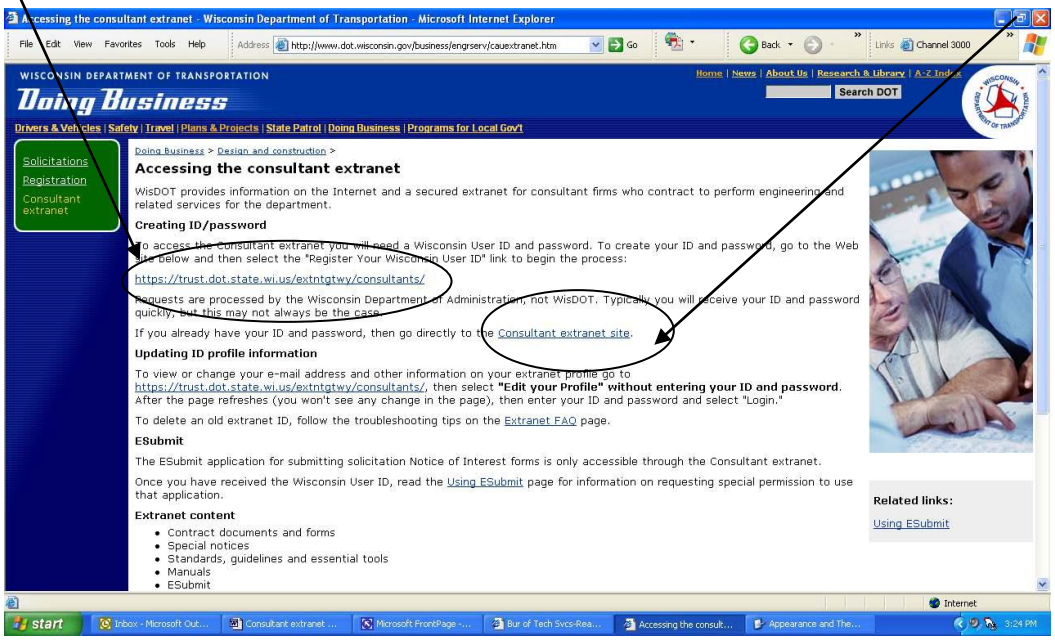
- -

#1: From the Wisconsin Department of Transportation home page of www.dot.wisconsin.gov, click the '**Doing Business**' link found under the Main Topics grouping near center/top of page.

#2: From the Doing Business page at www.dot.wisconsin.gov/business, click '**Consultant extranet**' link found along the far right/lower side of page.

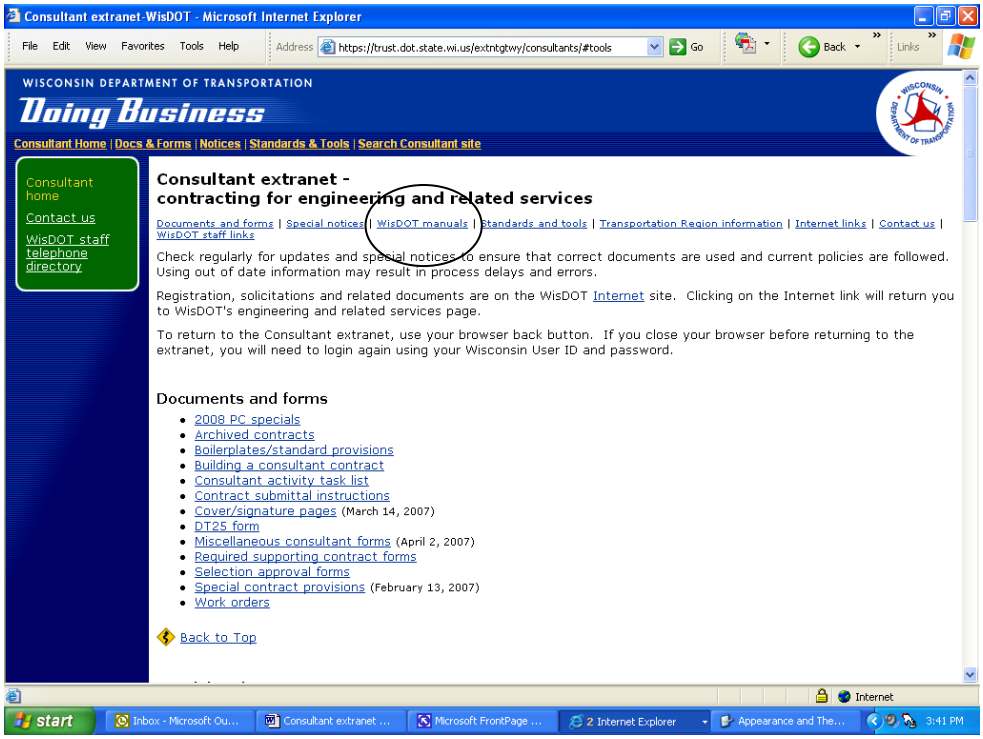


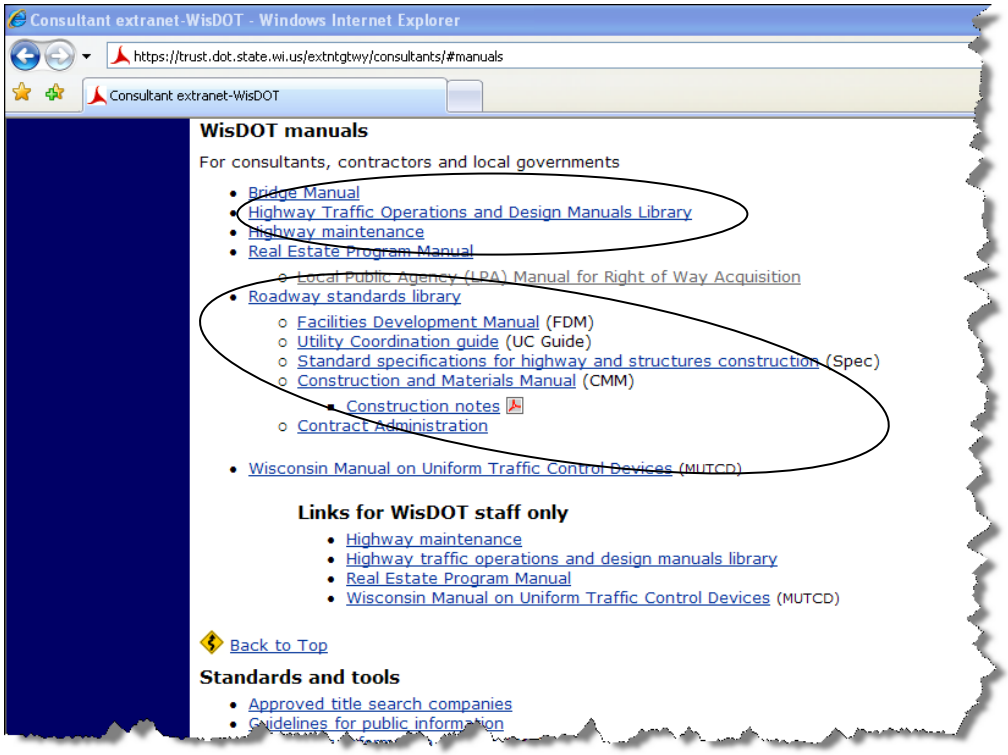
#3: From the Doing Business/Accessing the consultant extranet page at www.dot.wisconsin.gov/business/engrserv/cauextranet.htm, follow the instructions for Creating ID/password. Or, if you already have an ID/password, go directly to '**Consultant extranet site**.'

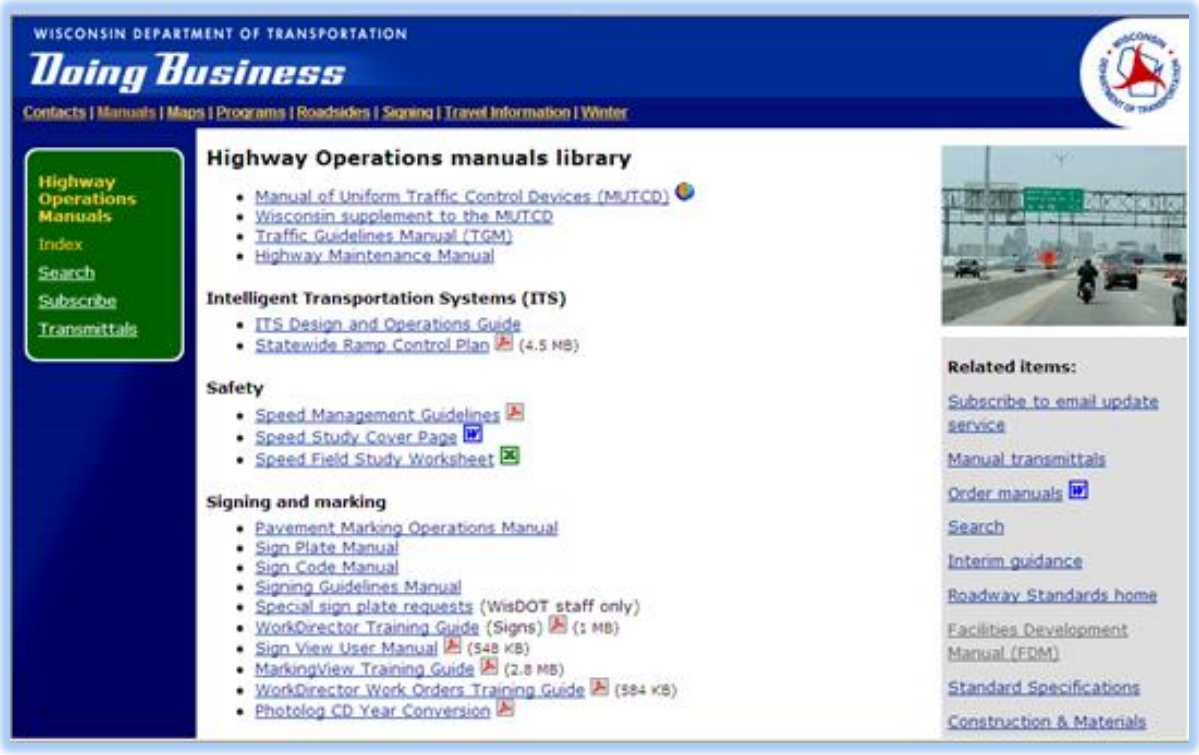


#4: At the Consultant extranet page, proceed to '**Register for a Wisconsin User ID**'. Or, if you are already registered, simply complete the log in here by entering your User ID and Password.

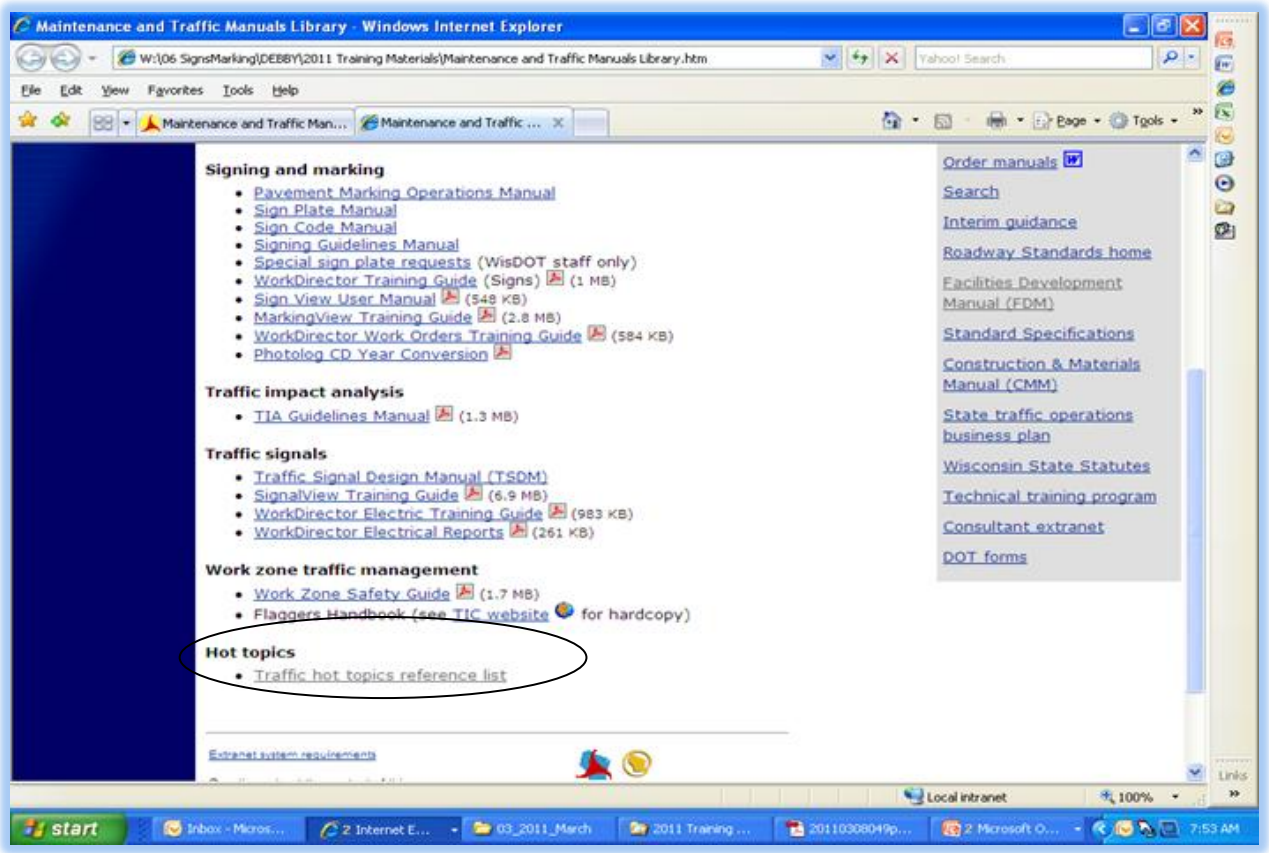
Once logged in then, from the Consultant extranet - contracting for engineering and related services page, click on topic/area tab along top of '**WisDOT manuals**' (this takes you about half-way down page), where you will find a link to both the Roadway Standards Library and the Highway Traffic Operations and Designs Manual Library.







Scroll Down to the bottom



WISCONSIN DEPARTMENT OF TRANSPORTATION

Doing Business

Contacts | Manuals | Maps | Programs| Roadsides | Signing | Travel Information | Winter

Traffic hot topics reference list

Extranet customers! - How to turn off security alert popups (for Internet Explorer)

Pavement marking | Regulatory/warning signs |Traffic management | Traffic safety/speed | Other useful links

Pavement marking

Topic	References
Approved products list	Atwood Systems
No passing zones	STSP 648-005 Locating NPZs NPZ 2006 Winter Training, Book 1 (973 KB) NPZ 2006 Winter Training, Book 2 (7.3 MB) NPZ 2006 Winter Training, Book 3 (23.7 MB)
Raised Pavement Marking (RPM)	Raised Pavement Marking placement detail
Special Provisions	Grooved Long line Contrast Preformed Plastic Tape Word | PDF Grooved Preformed Plastic Tape Word | PDF Grooved Preformed Plastic Special Marking Word | PDF Grooved Preformed Thermoplastic Special Marking Word | PDF Grooved Contrast Preformed Thermoplastic Special Marking Word | PDF Grooved Preformed Thermoplastic Long Line Word | PDF Grooved Contrast Preformed Thermoplastic Long Line Word | PDF

Pavement Marking Standards Hyperlinks

Found in 2013 Pavement Marking Training 2013

•Manual on Uniform Traffic Control Devices (MUTCD) http://mutcd.fhwa.dot.gov/

- **Wisconsin Manual on Uniform Traffic Control Devices (WMUTCD) http://www.dot.wisconsin.gov/business/engrserv/wmutcd.htm**

•Traffic Guidelines Policies in Chapter 3

http://dotnet/dtid_bho/extranet/manuals/tgm/index.shtm

- **Hot Topics/ Pavement Marking Grooving Specials http://dotnet/dtid_bho/extranet/manuals/hottopics/index.shtm**

•Facilities Development Manual Chapter 11 http://roadwaystandards.dot.wi.gov/standards/fdm/index.htm

•Wisconsin Standard Specifications Sections 646-649 Marking,

633 Delineators http://roadwaystandards.dot.wi.gov/standards/stndspec/index.htm

- **Construction and Materials Manual http://roadwaystandards.dot.wi.gov/standards/cmm/index.htm**

•Standard Special Provisions

http://on.dot.wi.gov/consultants/stsp/index.shtm

•Wisconsin Statutes

http://www.legis.state.wi.us/rsb/stats.html

- **Approved Products Lists http://www.dot.wisconsin.gov/business/engrserv/ap2013.htm STATE system**
- http://www.dot.state.wi.us/business/engrserv/ap2013.htm **Outside state system**

•Pavement Marking Operations Manual http://dotnet/dtid_bho/extranet/manuals/pmo/index.shtm

State of Wisconsin

Department of Transportation

Traffic Guidelines Manual

ORIGINATOR Director, Bureau of Traffic Operations	3-3-1
CHAPTER 3	Markings
SECTION 3	Roundabouts
SUBJECT 1	Markings for Roundabouts

A. Purpose

This guidance establishes maintenance guidance for roundabout markings.

The Manual On Uniform Traffic Control Devices (MUTCD) 2009 Edition, Section 3C.01 and FDM 11-26-35, Signing and Pavement Marking also address markings for roundabouts and *should* be used in conjunction with this guidance.

B. Pavement Marking Maintenance Policy

1. Interchanges of state trunk highway approaches to local roads

The department will maintain:

- Edge lines along the exit ramp to the ramp termini.
- Crosswalks markings at Regional discretion as per TGM 3-2-18
- Special markings located on the exit ramp to the ramp termini.
- Edge lines beginning at the on-ramp taper point (if present) on the approach to the roundabout along the local maintained road.
- Dotted edge lines extensions at the roundabout perimeter at each approach leg to the roundabout.
- Special marking within the roundabout and on the ramp, state, approaches,
- Lane line markings within the roundabout.
- 8-inch markings at the splitter island within the roundabout.
- 8-inch markings and chevrons at the splitter island on the local approach.
- Lane separation markings
- Spiral crosshatch markings. Refer to Figure 1
- All markings between roundabouts.
- All markings within the roundabouts from the beginning of the gore point of the painted splitter island or ramp gore. Refer to Figures 1,2a and b.
- Bike lane markings in the approach as shown in Figure 35.6 in FDM 11-26-35.2.4.

The department will not maintain:

- Shared use path markings
- Bike lane symbols

Refer to Figures 1, 2a and b for maintenance guidance.

2. On connecting (non interchange) state highways- The local jurisdiction will maintain the markings.

3. On county highway and/or local road approaches, it is recommended developing a maintenance agreement no later than the time of design study report (DSR). This will ensure that the county or local unit of government will clearly have knowledge of what they are to maintain. This is important for when local jurisdictions decide to add bike lane and special markings. The Regional Signing/Marking Engineer will need to work with the Regional Bike and Ped Coordinator to determine maintenance responsibilities by the time of the DSR.

Consider using the crosswalk permit, DT2136, found in TGM 3-2-18 Crosswalks. Use the permit DT2500 for bike lane symbols.

Figure 1

Spiral Crosshatch Markings

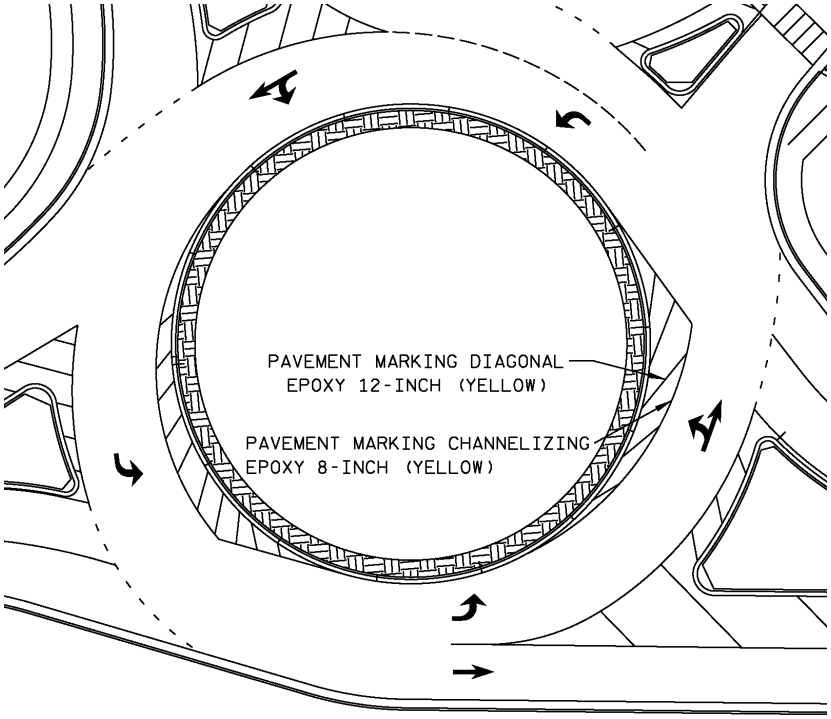


Figure 2a

Roundabout Marking at Interchange Ramp

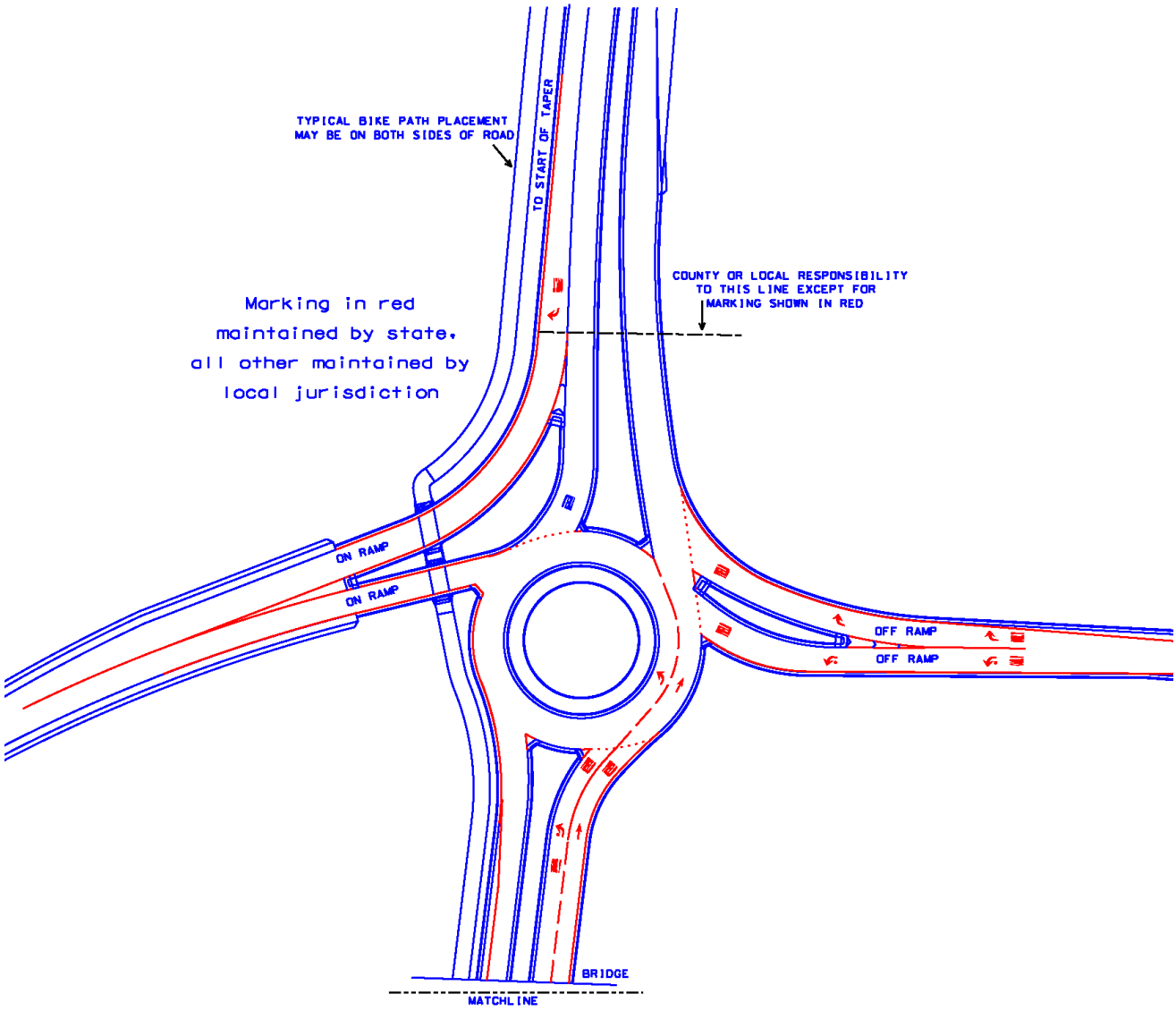
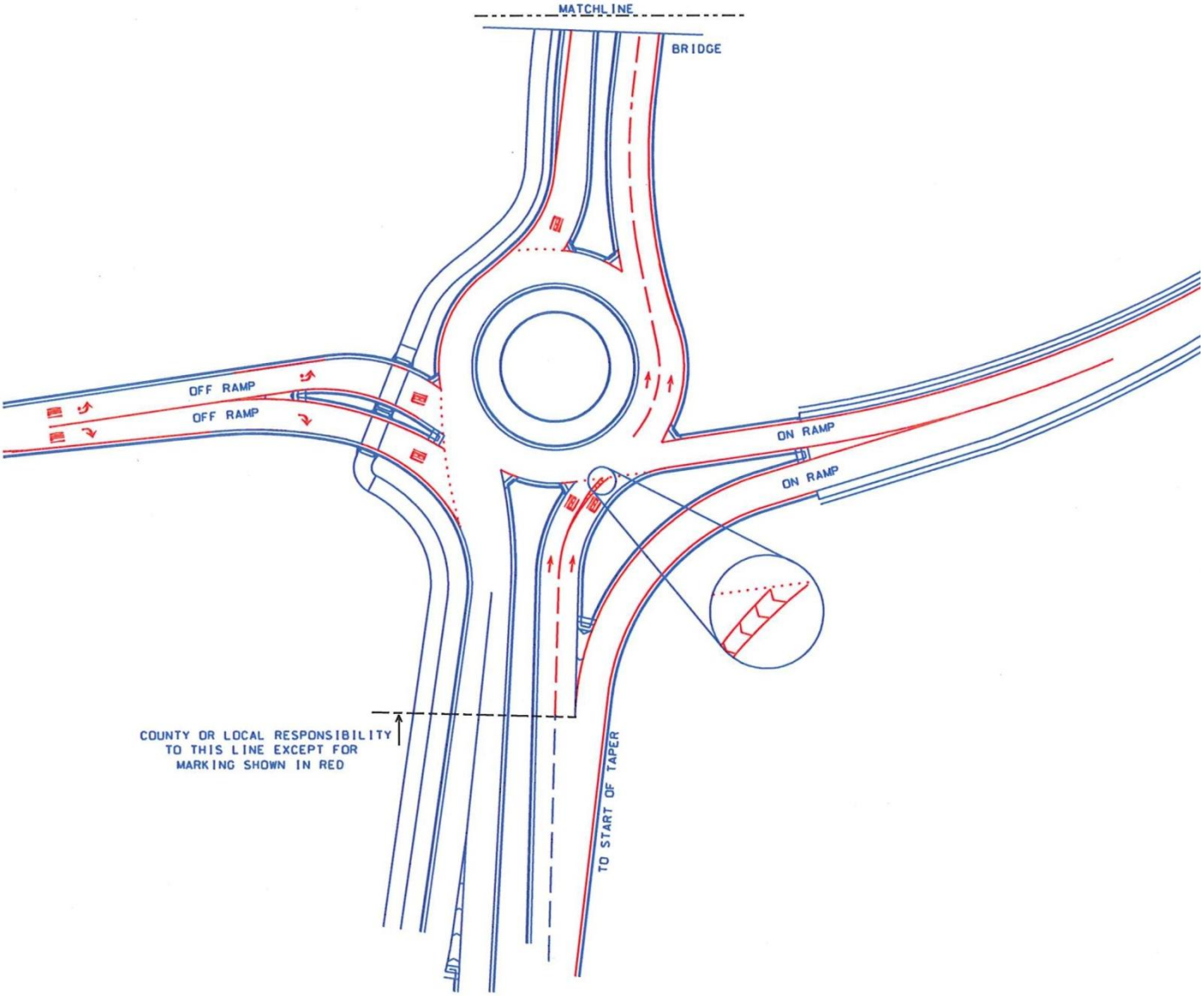


Figure 2b (continued)

Roundabout Marking at Interchange Ramp



35.2 Pavement Marking

Pavement marking is needed on single and multilane roundabouts. The more complex the roundabout and the higher the volume, the greater the need for proper pavement marking. Pavement marking must be closely evaluated when designing a roundabout. Pavement marking is part of a "whole system" to consider, meaning that various design concepts from geometric design, to signing, and pavement marking should complement each other.

Typical pavement marking for roundabouts consists of delineating the entries, exits, bike lane accommodations (only on approaches and exits), and marking the circulatory roadway. Single lane roundabouts need no lane arrows or circulatory roadway pavement marking, except for edge line marking. Attachment 35.1 shows various combinations of common roundabout lane configurations, including full and partial right-turn bypass situations. In order for roundabout markings to be effective and sustainable, they must:

- Be integrated with and preferably designed at the same time as the roundabout geometry
- Be configured to guide proper usage of the roundabout
- Help the motorist identify the correct lane as early as possible by the use of lane arrows on multilane approaches and circulatory roadways
- Be designed and implemented collaboratively between Regional Traffic Operations and project development staff with expertise in roundabouts and knowledge of maintenance considerations
- Use grooved in skid resistant durable materials
    - Preformed thermoplastic for truck traffic and interior roundabout especially for arrows, words, crosswalks and lines 8-inches or wider
    - Preformed plastic may be used for channelizing 8 inch line approach marking.
- Special provisions for such markings can be found at:

  https://trust.dot.state.wi.us/extntgtwy/dtid_bho/extranet/manuals/hottopics/index.shtm in the pavement marking section

Markings not covered in this policy shall follow practices established by standard detail drawings or require the approval of the Regional Traffic Engineer in collaboration with others who have knowledge of the design of roundabouts. On connecting highways, (local jurisdiction), coordinate pavement marking with the Regional Traffic Engineer and the local agency to maintain consistency on the facility.

It is just as important to make sure field layout and pavement marking application on the circulatory pavement is located and positioned correctly. A pavement marking layout detail showing the exact locations is required on all multilane roundabouts. Consider wheel tracking when developing the pavement marking layout detail.

Proper pavement marking within the circulatory roadway will help prevent left turns from the outer lane and thus reduce exit crashes. Complex lane configurations should be reviewed by an experienced roundabout designer and the Regional Traffic Engineer.

35.2.1 Approach Markings

1. Centerline marking on the approach to the splitter island may require a minimum of 500-foot segment no passing barrier line as shown in SDD 15C18 "Median Island Marking". Refer to Attachment 35.1 item Z.
2. Lane lines on the approach shall be 4 inches wide. The markings are at the standard spacing of 12.5-ft segment, 37.5-ft gap, unless an even segment of 12-ft segment, 12-ft gap is needed. Start when flare widens to 9.5 feet for each lane. Match the width of line extended. Refer to items *T* and *Da* in Attachment 35.1.
3. A lane line on the approach **shall be 4 inches wide** when it separates two through lanes. The line shall be solid for a length of 50 feet in advance of the Point of Curve (P.C.) or as far as possible in advance of the P.C. to allow minimum marked lane widths of 9.5 feet, whichever is shorter. Refer to items *B* and *I* in Attachment 35.1.
4. When an approach lane is a turn only lane, the channelizing line **shall be 8-inches wide and solid**. A R3-8 series Lane Control sign **shall** be placed for this type of approach. Refer to FDM 35.1.1. The line

shall be solid for a length of 50 feet in advance of the P.C., or as far as possible in advance of the P.C. to allow minimum marked lane widths of 9.5 feet, whichever is shorter. Refer to item *B* in Attachment 35.1.

5. When the left approach lane is a dropped lane/ exclusive turn lane, the approach dotted marking **shall be 8-inches wide with 3-ft segment, 9-ft gap.** Consult with the Regional Traffic Engineer on the start of this marking. Refer to item *Db* in Attachment 35.1.
6. The painted median splitter island marking on the approach **shall be double yellow with 12-inch yellow diagonal marking**. The diagonal marking is optional if the island is less than 6-ft wide. When required, the diagonals shall be spaced every 25-ft if the length is longer than 50-ft; spaced every 10-ft if the length is 50-ft or less. Refer to items *J* and *K* in Attachment 35.1.
7. Lane separation markings (truck gores) **shall be outlined by 8-inch white lines**. Refer to item V in attachment 35.1. When the separation is greater than 6-ft, **12-inch white chevrons shall be placed and spaced every 25-ft if the length is longer than 50-ft; spaced every 10-ft if the length is 50-ft or less**. The chevrons are optional when the painted island is less than 6-ft in width. The point of the chevron shall 'point' upstream. Refer to item *U* in Attachment 35.1.
8. The edge line marking on the circle end of the splitter island will be white. Refer to Attachment 35.1 which shows the breakpoint from 8-inch white to 4-Inch yellow markings 5 feet in advance of the curb/splitter island P.C (items *M* and *N* of the *Special Case* in Attachment 35.1). Refer to TGM 3-10-1 and consult the Regional Traffic Engineer for further placement guidance of the yellow edge line upstream of the roundabout.

   When the yellow edge line marking is used to narrow the width of an entry or exit, 12-inch yellow diagonal markings should be placed. When used, the diagonals shall be spaced every 25-ft if the length is longer than 50-ft; spaced every 10-ft if the length is 50-ft or less. Refer to item *QQ* of the *Special Case* in Attachment 35.1.
9. When two or more lanes approach a roundabout, lane use arrows shall be marked in each lane to denote proper lane usage. Full complement of signing **shall be installed** as shown in Figure 35.1, Regulatory Signs. Refer to item *W* in Attachment 35.1. **Lane use arrows should not be used on single-lane approaches**. Left turn arrows **with the oval (Type 2R or Type 3R) shall only be placed in the left most lane.** Refer to SDD 15C 7-d for typical detail of a dot with left pavement marking arrow. **The fish-hook arrow shall not be used**.

   In addition to approach lane lines, appropriate lane arrows encourage balanced lane use, which improves capacity and safety. Left turn arrows are important on multilane approaches, since traffic otherwise has a bias towards the right-most lane. Place arrows to show the movements for each lane, and to indicate permitted dual right or left turns. Place the arrows at or just before the point where the channelizing or lane line begins or when the road widens to allow minimum lane widths of 9.5 feet. This is intended as a visual cue to the motorist to select an appropriate lane for entering the roundabout. Refer to SDD 15C 8-14e and Regional Traffic Engineer for guidance for multiple sets of arrows.
10. Crosswalk markings should be placed such that vehicles approaching the roundabout are not likely to stop on the crosswalk. A distance of 20 to 25 feet per stored vehicle back from the yield point is typically appropriate. Refer to items *Ha* and *Hb* in Attachment 35.1 as well as crosswalk policy in TGM 3-2-18.
11. The word, "YIELD" placed prior to the dotted edge line extension is encouraged as an educational tool initially as part of a project. It should typically be used on multilane approaches when necessary as a tool for enforcement or where there are unusual geometrics, visibility problems, or crashes caused by motorists failing to yield. An example is an approach with a high volume of through traffic that was not required to stop or yield prior to the construction of the roundabout, especially where there is no side road leg 90 degrees to the right. When used on a multilane approach, the "YIELD" word should be placed in each approach lane. After initial placement, this marking should only be maintained as necessary based upon crash data. Refer to item *S* in Attachment 35.1 and SDD 15C7-12b, Yield Markings.
12. Dotted Edge Line Extensions **shall be 18-inch-wide dotted white at 2-ft segment, 2-ft gap**. Place markings to avoid conflict between the entering vehicle and internal roundabout traffic, this is the point where entering traffic must yield. Refer to item *A* in Attachment 35.1.

Approach and entry pavement markings consist of lane line, channelization marking, dotted edge line extension marking (yield line) and symbol markings. Consider high durability markings on the approaches. Refer to Attachment 35.2 for approved pavement marking materials and their locations at a roundabout. Consult with the

Regional Traffic Engineer before determining final pavement marking materials.

35.2.2 Circulatory Roadway Marking

13. Lane lines within the roundabout shall be 4-inch or 8-inch width, with a 6-ft segment, 3-ft gap marking cycle. These lines shall be the same width as the lines they extend. Lane lines in the circle can have a spiral effect and together with proper lane assignment guide motorists through the roundabout to the appropriate exit eliminating the need to change lanes. Refer to item *C* in Attachment 35.1. For longevity, place the markings to avoid wheel paths of the intersecting traffic.
14. When used, dotted line markings shall be the same width of the lane lines and 1-ft segment, 3-ft gap marking cycle. Refer to item *E* in Attachment 35.1.
15. When two lanes are allowed to proceed around the circle, Lane use arrows **shall** be marked in each lane within the roundabout adjacent to each splitter island to denote proper lane usage. Arrows placed within the circulatory roadway **shall not** include the oval. Refer to item *X* in Attachment 35.1.

35.2.3 Exit Marking

16. Chevron markings at the exit point adjacent to the splitter island shall be 12-inch white with 10-ft spacing where needed or appropriate. Refer to item *O* of the *Special Case* in Attachment 35.1.

    Chevron makings on the exit and/or on the approach should be avoided, if possible, as they do not provide the speed control and directional guidance as curb and gutter. Consult experienced roundabout designers and the Regional Traffic Engineer before implementing.
17. **Do not paint the noses of the splitter island yellow** (where the splitter island meets the circulatory roadway, unless there is a documented crash problem). Yellow nose paint is intended to separate opposing directions of traffic such as the approach nose.

35.2.4 Bicycle Marking

18. When required, bike lane markings should be placed as per Figure 35.6.

Bike lane marking within the circulatory roadway is not permitted on any roundabouts. Refer to Figure 35.6 for Bike Lane markings on roundabout approaches.

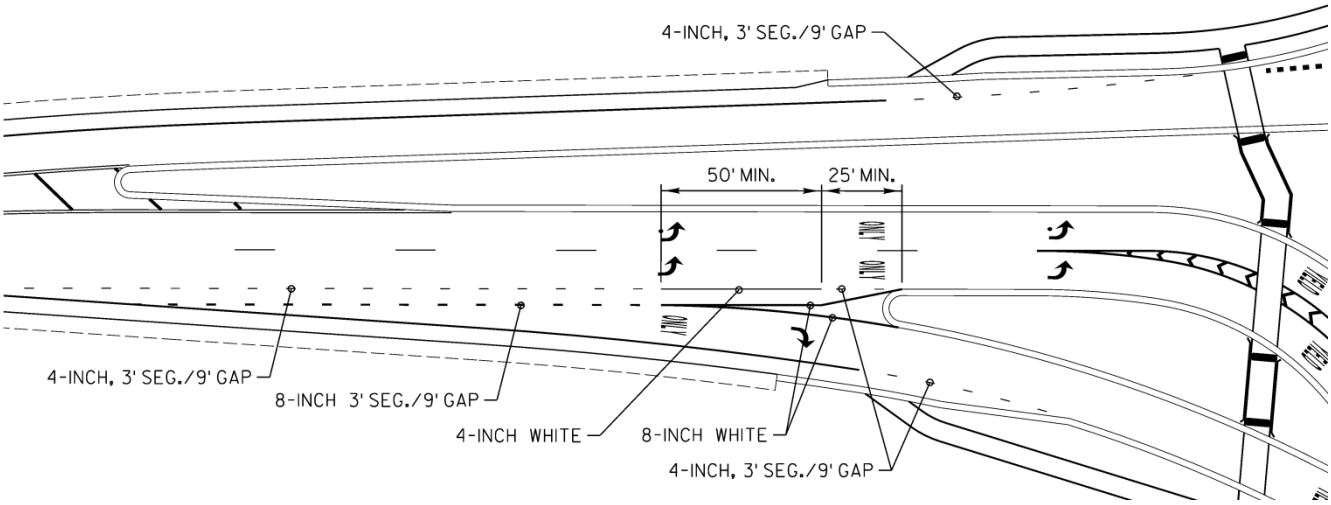


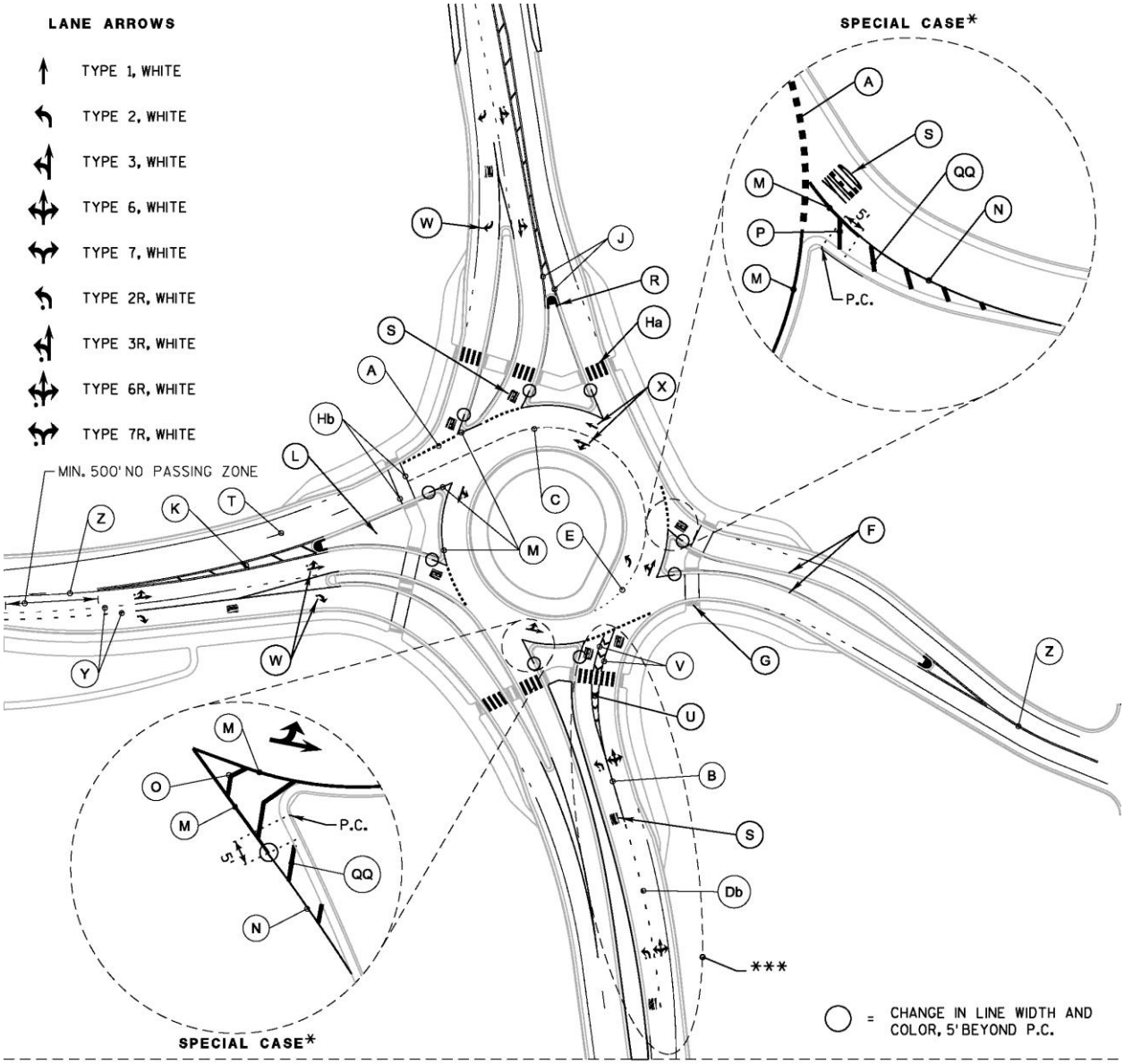
***Figure 35.6* Bike Lane Roundabout Marking**

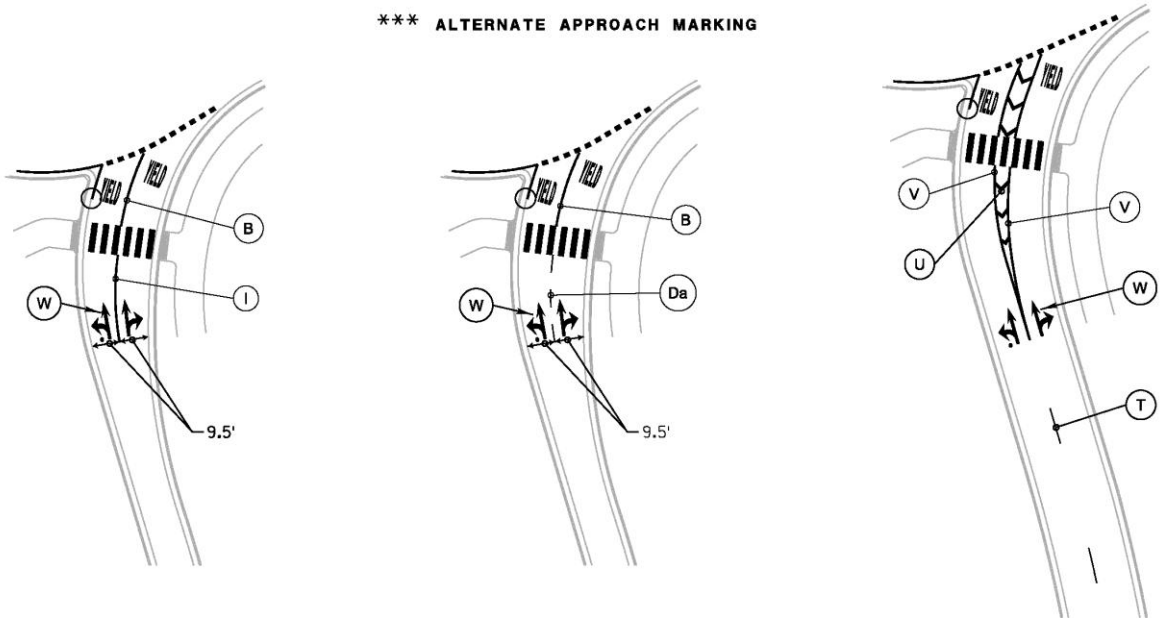
35.2.5 Maintenance of Pavement Marking

For roundabouts on the STH System with county highway approaches and/or local road approaches, it is recommended that early in the design process no later than the time of the design study report, a Maintenance Agreement be developed. By having the Maintenance Agreement developed early in the design process, the county or local unit of government will clearly have knowledge of what they are to maintain. Refer to TGM 3-3-1 for additional roundabout pavement marking guidance and policy.

LIST OF ATTACHMENTS

Attachment 35.1	Example Pavement Markings for Typical Designs
Attachment 35.2	Roundabout Pavement Marking Bid Item and Product Type


LANE ARROWS
TYPE 1, WHITE
TYPE 2, WHITE
TYPE 3, WHITE
TYPE 6, WHITE
TYPE 7, WHITE
TYPE 2R, WHITE
TYPE 3R, WHITE
TYPE 6R, WHITE
TYPE 7R, WHITE
MIN. 500' NO PASSING ZONE
SPECIAL CASE*
YIELD
P.C.
SPECIAL CASE*
*** ALTERNATE APPROACH MARKING
= CHANGE IN LINE WIDTH AND COLOR, 5' BEYOND P.C.


YIELD
9.5'
9.5'

A. Dotted Edge Line Extension, 18-Inch White, 2-ft segment, 2-ft gap
B. Approach Channelizing Line, 4 or 8-Inch White, Contact Regional Traffic Engineer for marking preference
C. Circulatory Lane Line, 4 or 8-Inch White, 6-ft segment, 3-ft gap
D. Approach Lane Line Special, White:
    a. 4 or 8-Inch, even segment : gap ratio (12-segment 12-ft gap MAX.) for symmetrical lane assignment. Begin marking where flare widens to 9.5-ft for each lane.
    b. 8-Inch, 3-ft segment, 9-ft gap for advanced warning of an exclusive turn lane. Begin marking where flare widens to 12-ft for each lane or a minimum of 150-ft before the solid line if no flare is present.
E. Dotted Lane Line (guidance), 4 or 8-Inch White**, 1-ft segment, 3-ft gap
F. Splitter Island Left Edge Line (optional), 4-Inch Yellow. Refer to TGM 3-10-1 and consult the Regional Traffic Engineer for further placement guidance of the yellow edge line upstream of the roundabout.
G. Truncated Domes, aligned to ramp direction, not crosswalk direction
H. Crosswalk, refer to TGM 3-2-18 for further guidance, Contact Regional Traffic Engineer for marking preference
    a. 12 or 24-Inch White, spaced 24-Inches apart, aligned parallel to direction of travel
    b. 6-Inch White
I. Begin solid approach channelizing line where flare widens to 9.5-ft or 50-ft in advance of approach PC, whichever is shorter. This may be extended for certain exclusive lane configurations.
J. 4-Inch Double Yellow
K. Median Diagonal Marking (optional if island is less than 6-ft wide), 12-Inch Yellow
    a. 25-ft C-C spacing, typical
    b. 10-ft C-C spacing if less than 50-ft long
L. Splitter Island
M. * Gore Line, 8-Inch White to 5-ft beyond PC of nose
N. * Left Edge Line, 4-Inch Yellow
O. * Gore Chevrons, 12-Inch White, 10-ft C-C spacing
P. * Diagonals, 12-Inch White, 10-ft spacing. Place only if distance between curb flange and edge line is 3-ft or greater.
QQ. * Diagonals, 12-Inch Yellow, 10-ft spacing. Place only if distance between curb flange and edge line is 3-ft or greater.
R. Curb marking, Yellow
S. Yield word (optional), White
T. Lane line, 4-Inch White, 12.5-ft segment, 37.5-ft gap
U. Truck Gore Chevrons (optional if gore is less than 6-ft wide), 12-Inch White
    a. 25-ft C-C spacing, typical
    b. 10-ft C-C spacing if less than 50-ft long
V. Lane Separation, Truck Gore, 8-Inch White
W. Lane Use Arrows, White: Arrows with the oval shall only be used on the left-most turn lane
X. Lane Use Arrows, White: No ovals shall be used on any arrows within the circulatory roadway
Y. Bike Lane Markings, 4 or 8-Inch 3-ft segment, 9-ft gap
Z. Center line Yellow Marking 4-Inch Double or 4-inch 500-ft segment and 12.5 segment, 37.5-ft gap

* SPECIAL CASE:
- These markings should be used when additional space is needed to accommodate truck movements while still restricting the pavement width for smaller vehicles. It is expected that larger vehicles will have to drive over the markings to complete their maneuver.
- The point of the chevron should always ‘point’ upstream.

** Match width of marking extended

Roundabout Pavement Marking Bid Item and Product Type*

Marking and Code	Bid Item Name	Roadway Surface	Bid Item Number
Dotted Edge Line (Yield Line), *A*	Pavement Marking Grooved Preformed Thermoplastic 18-Inch	All	SPV*
Approach Channelizing Line, *B* Lane Line, *Da & Db,* Bike Lane Markings, *Y*	Pavement Marking Grooved Contrast Preformed Plastic Tape, 4-Inch or 8-Inch Pavement Marking Grooved Preformed Plastic Tape, 4-Inch or 8-Inch Pavement Marking Grooved Contrast Preformed Thermoplastic, 4-Inch or 8-Inch Pavement Marking Grooved Preformed Thermoplastic, 4-Inch or 8-Inch	Concrete Asphalt Concrete Asphalt	SPV* SPV** SPV* SPV*
Circulatory Lane Line, *C* Dotted Lane Line, *E*	Pavement Marking Grooved Contrast Preformed Thermoplastic, 4-Inch or 8-Inch Pavement Marking Grooved Preformed Thermoplastic, 4-Inch or 8-Inch	Concrete Asphalt	SPV* SPV*
Truck Gore, *V*	Pavement Marking Grooved Contrast Preformed Plastic Tape 8-Inch Pavement Marking Grooved Preformed Plastic Tape 8-Inch Pavement Marking Grooved Contrast Preformed Thermoplastic 8-Inch Pavement Marking Grooved Preformed Thermoplastic 8-Inch	Concrete Asphalt Concrete Asphalt	SPV* SPV** SPV* SPV*
Edge Line, *F, J, N,* Center Line, *Z*	Pavement Marking Epoxy 4-Inch	All	646.0106
Crosswalk, *Ha & Hb*	Pavement Marking Grooved Contrast Preformed Thermoplastic Crosswalk 6, 12 or 24-Inch Pavement Marking Grooved Preformed Thermoplastic Crosswalk 6, 12 or 24-Inch	Concrete Asphalt	SPV* SPV*
Median Diagonals, *K*	Pavement Marking Diagonal Epoxy 12-Inch	All	647.0726
Gore Line, *M*	Pavement Marking Grooved Contrast Preformed Thermoplastic 8-Inch Pavement Marking Grooved Preformed Thermoplastic 8-Inch	Concrete Asphalt	SPV* SPV*
Chevron, *O, P, QQ, & U*	Pavement Marking Grooved Contrast Preformed Plastic Diagonal 12-Inch Pavement Marking Grooved Preformed Plastic Diagonal 12-Inch Pavement Marking Grooved Contrast Preformed Thermoplastic Diagonal 12-Inch Pavement Marking Grooved Preformed Thermoplastic Diagonal 12-Inch Pavement Marking Diagonal Epoxy 12- Inch	Concrete Asphalt Concrete Asphalt All	SPV* SPV** SPV* SPV* 647.0726
Arrows & Words, *S, W, & X*	Pavement Marking Grooved Preformed Thermoplastic Arrows Pavement Marking Grooved Contrast Preformed Thermoplastic Arrows, Type 6R & 7R **Excluded**** Pavement Marking Grooved Preformed Thermoplastic Words Pavement Marking Grooved Contrast Preformed Thermoplastic Words	Asphalt Concrete Asphalt Concrete	SPV* SPV* SPV* SPV*
Approach & Exit Lane Line, *T*	Pavement Marking Epoxy 4-Inch	All	646.0106

	Pavement Marking Grooved Wet Reflective Contrast Tape 4-Inch Pavement Marking Grooved Wet Reflective Tape 4-Inch	Concrete Asphalt	646.0841.S 646.0881.S

*** Contact the Regional Traffic Engineer for product and bid item practices.

** Avoid use of Type 6R and 7R Contrast Arrows due to width issues.

**** Refer to WisDOT Hot Topics Pavement Marking Section for SPV information:***
https://trust.dot.state.wi.us/extntgtwy/dtid_bho/extranet/manuals/hottopics/index.shtm

1.1.1 Troubleshooting for Waterborne & Solvent Borne Paint

Table 1.4a and 1.4b are troubleshooting guides for conventional and airless paint application problems.

CONVENTIONAL PAINT APPLICATION TROUBLESHOOTING			
PROBLEM	**CAUSE**	**EFFECT**	**REMEDY**
Excessive Thickness (overall)	• Paint tank pressure too high • Paint gun volume control (if present open too wide • Pump pressure too high • Applicator speed too low	• Buried beads – poor initial nighttime retroreflectivity • Slow drying time – paint tracked by motorists • Paint won't cure properly – shortened life	• Reduce tank pressure • Adjust paint gun volume control • Reduce pump pressure • Increase speed
Excessive Thickness (middle of line)	• Paint tank pressure too high • Paint gun volume control (if present open too wide • Pump pressure too high • Atomizing air pressure off or too low • Material buildup in paint gun tip and/or shroud	• Buried beads – poor initial nighttime retroreflectivity • Slow drying time – paint tracked by motorists • Paint won't cure properly – shortened life	• Reduce tank pressure • Adjust paint gun volume control • Reduce pump pressure • Increase atomizing air pressure • Clean tip and/or shroud
Excessive Thickness (along one side)	• Material buildup in paint gun tip and/or shroud • Clogged hole(s) in paint gun atomizing tip	• Buried beads – poor initial nighttime retroreflectivity • Slow drying time – paint tracked by motorists	• Clean paint tip and/or shroud • Clear clogged hole(s) in paint gun atomizing tip
Insufficient Thickness	• Paint tank pressure too low • Paint gun volume control (if present open too wide • Pump pressure too low • Applicator speed too low • Atomizing pressure too high • Material buildup in paint gun tip and/or shroud • Material buildup in paint filter(s) and/or plumbing	• Poor line quality and/or shortened life • Beads won't adhere and/or poor or no nighttime retroreflectivity	• Increase tank pressure • Adjust paint gun volume control • Increase pump pressure • Decrease speed • Decrease atomizing air pressure • Clean paint gun tip and/or shroud • Clean paint filter(s) and/or plumbing
Wide Paint Line	• Paint gun set too high • Worn or damaged paint gun • Tip and/or shroud	• Line does not meet standards • Line has fuzzy edges	• Lower gun • Repair or replace tip and/or shroud
Narrow Paint Line	• Paint gun too low • Paint gun tip slot not at 90° angle to paint line • Clogged paint gun tip and/or shroud • Low air pressure in paint machine tire.	• Line does not meet standards • Not as visible as a full-width line (day or night)	• Raise paint gun • Reposition paint gun tip • Clean paint gun tip and/or shroud • Inflate tire

Uneven Paint Line (spotty)	• Atomizing air pressure too low • Paint tank pressure too low • Old paint (viscosity too high) • Loose paint gun tip and/or shroud • Insufficient heat • No shroud	• Poor appearance • Line has fuzzy edges • Slow drying time • Paint won't flow smoothly	• Increase atomizing air pressure • Increase material tank pressure • Rotate material stock • Secure paint gun tip and/or shroud • Increase heat (enough to get paint to flow evenly) • Install shroud

Table 1.4a. Conventional paint application troubleshooting guide.

AIRLESS PAINT APPLICATION TROUBLESHOOTING

PROBLEM	CAUSE	EFFECT	REMEDY
Heavy centers	• Inadequate fluid delivery	• Tracking • Erratic wear patterns • "Railroad Tracks" initially	• Increase fluid pressure • Decrease tip size
Light centers	• Inadequate fluid delivery	• Tracking from the edges • Erratic wear patterns • "Railroad Tracking" with time	• Increase tip size • Replace tip
Surging pattern	• Pulsating fluid delivery	• Does not conform to standards • Erratic wear patterns	• Reduce demand • Remove restrictions in supply system • Check supply hose for leaks
"Lop-sided" millage	• Worn tip sides • Clogged tip	• Erratic wear patterns	• Replace tips • Clean tips
Line too wide	• Gun too high • Too wide a fan angle on tip	• Does not meet standards	• Lower gun • Adjust tip size if necessary
Line too narrow	• Gun too low • Too narrow a fan angle on tip	• Poor durability • Does not meet standards	• Change tip size • Decrease speed of application • Verify pressure settings
Applied line too thick	• Too large a tip size • Traveling too slow for tip size • Change in delivery pressure	• Too long a cure time • May cause shape problems • Poor retroreflectivity due to buried heads	• Change tip size • Increase speed to application • Verify pressure settings

Table 1.4b. Airless paint application troubleshooting guide.

1.1.2 Troubleshooting for Epoxy Paint

Table 1.4c is for epoxy application troubleshooting.

EPOXY SPRAY APPLICATION TROUBLESHOOTING			
PROBLEM	**CAUSE**	**EFFECT**	**REMEDY**
Heavy centers	• Inadequate fluid delivery	• Tracking • Erratic wear patterns • "Railroad Tracks" initially	• Increase fluid pressure • Decrease tip size
Light centers	• Inadequate fluid delivery	• Tracking from the edges • Erratic wear patterns • "Railroad Tracking" with time	• Increase tip size • Replace tip
Surging pattern	• Pulsating fluid delivery	• Does not conform to standards • Erratic wear patterns	• Reduce demand • Remove restrictions in supply system • Check supply hose for leaks
"Lop-sided" millage	• Worn tip sides • Clogged tip	• Erratic wear patterns	• Replace tips • Clean tips
Line too wide	• Gun too high • Too wide a fan angle on tip	• Does not meet standards	• Lower gun • Adjust tip size if necessary
Line too narrow	• Gun too low • Too narrow a fan angle on tip	• Poor durability • Does not meet standards	• Change tip size • Decrease speed of application • Verify pressure settings
Applied line too thick	• Too large a tip size • Traveling too slow for tip size • Change in delivery pressure	• Too long a cure time • May cause shape problems • Poor retroreflectivity due to buried heads	• Change tip size • Increase speed to application • Verify pressure settings
Too much hardener	• Displacement pumps not properly synchronized	• Dark or black lines • Takes too long to cure	• Adjust pumps
Too little hardener	• Displacement pumps not properly synchronized	• Poor durability	• Adjust pumps

Table 1.4c. Epoxy spray application troubleshooting guide

1.4.11 Troubleshooting for Preformed Thermoplastic

Table 1.4d shows troubleshooting for preformed thermoplastic.

PREFORMED THERMOPLASTIC APPLICATION TROUBLESHOOTING			
PROBLEM	**CAUSE**	**EFFECT**	**REMEDY**
Bonding/Adhesion	• Surface is not clean	• Poor surface bond – low durability	• Clean with blower to remove surface debris
Bonding/Adhesion	• Moisture in road surface	• Poor surface bond – low durability	• Heat road to remove moisture
Bonding/Adhesion	• Non-conforming existing marking (i.e. tape, paint, etc.)	• Poor surface bond – low durability	• Remove or install before or behind old marking
Bonding/Adhesion	• Deteriorating road surface	• Poor surface bond – low durability	• Resurface
Bonding/Adhesion	• Too little heating	• Poor surface bond – low durability	• Visual signs/temperature should be observed
Bonding/Adhesion	• Deicing chemicals on road surface	• Poor surface bond – low durability	• Power wash area or wait until after rain to install
Bonding/Adhesion	• Dated Material	• Poor surface bond – low durability	• Rotate stock/1 year shelf life
Bonding/Adhesion	• Curing agents on Portland Concrete Cement	• Poor surface bond – low durability	• Blast or power wash
Bonding/Adhesion	• Worn polished aggregates on road surface	• Poor surface bond – low durability	• Grind and blow clean
Bonding/Adhesion	• Lack of sealer	• Poor surface bond – low durability	• Use sealer
Low or No Retroreflectivity	• Too little or too much heat	• Glass beads not embedded enough or sunken into material	• Look for visual signs when heating
Low or No Retroreflectivity	• No surface beads/poor hand casting	• Glass beads too few and unevenly distributed	• Use shaker to apply beads evenly
Low skid resistance	• Too much heat	• Glass beads sunken into material	• Look for visual signs
Low skid resistance	• No surface beads/poor hand casting	• No beads to assist with skid resistance	• Use shaker to apply beads evenly
Smearing and discoloration	• Opened to traffic before marking has cooled down	• Reduced visibility	• Use reflective glass beads or water to cool material down or wait until cool
Discoloration of newly installed marking	• Tracking from new HMA • Oil dripping or other chemical spills	• Reduced visibility	• Use additional reflective beads to protect the new marking
Gaps between individual pieces	• Too little heat • Shelf life exceeded	• Poor adhesion • Poor appearance	• Heat more • Rotate stock

not melted together	• Individual pieces not touching before heating		• Make sure pieces are touching before heating

Table 1.4d. Preformed thermoplastic application troubleshooting guide

1.4.12 Troubleshooting for Preformed Tape

Table 1.4e shows troubleshooting for preformed tape.

PREFORMED TAPE APPLICATION TROUBLESHOOTING			
PROBLEM	**CAUSE**	**EFFECT**	**REMEDY**
Material rolls up or shifts	• Not bonded prior to traffic • Tape crossing traffic • No primer adhesive	• Loss of effectiveness	• Replace material with proper tamping, adhesive and primer
Poor Material adherence	• Moisture in pavement • Dirty surface • No primer • Expired shelf life	• Errant delineation • Loss of Material • No delineation	• Replace material applying properly

Table 1.4e Preformed tape troubleshooting chart

1.1.3 Troubleshooting for Reflective Glass Beads

Table 1.5a is a troubleshooting guide for bead application problems.

REFLECTIVE BEAD APPLICATION TROUBLESHOOTING			
PROBLEM	**CAUSE**	**EFFECT**	**REMEDY**
Beads on one side	• Bead gun out of alignment • Clogged bead gun	• Poor night visibility	• Adjust alignment of gun cap • Rebuild gun
Excessive bead use	• Worn gun needle, seat and orifice • Excessive glass bead pressure	• Supply problems	• Rebuild gun • Decrease pressure
Beads in middle of line	• Bead tank pressure too low • Bead gun “off” and “on” control screw not adjusted • Bead gun cap out of alignment • Too big of a bead gun tip	• Poor night visibility	• Increase pressure • Adjust control screw • Align cap deflector • Change to a smaller tip
All beads buried	• Bead gun too close to paint • Bead gun angle too shallow • Excessive paint millage	• Poor night visibility	• Re-align bead gun • Adjust angle of bead gun • Check wet millage thickness
All beads on top of line	• Bead gun too far from paint gun	• Loss of durability • Initial very bright line	• Re-align bead gun
Pulsed bead application	• Bead tank pressure inadequate	• Violates standards • Loss of effectiveness	• Raise tank pressure • Rebuild applicator to increase pressure
Excessive amount of beads on road beside line	• Too much overlap of bead pattern on line pattern	• Loss of reflectivity	• Move bead gun closer to roadway

Table 1.5a. Reflective bead troubleshooting chart

DT 2130 PAVEMENT MARKING DAILY ACTIVITY REPORT (Long Line)

An electronic version of this form can be obtained at \\dotforms\n2public\BMS\FORMS\dt2130.xls.

NOTE: RED OUTLINED CELLS WILL SELF POPULATE WHEN INFORMATION IS ENTERED

PAVEMENT MARKING DAILY REPORT - Long Line

Wisconsin Department of Transportation
DT2130 5/2012

DATE: (mm/dd/yyyy) | PROJECT ID: | REGION: | CONTRACTOR: | FOREMAN:

1st HIGHWAY ☐ EPOXY ☐ WATERBORNE ☐ TAPE ☐

HWY #	REF. #	COUNTY:	Left Counter (ft.)	Right Counter (ft.)	Counters sub-total (ft.)	RATE OF APPLICATION Paint (gal)	Beads (lbs)
ITEM (X one)		FROM:			0	Beginning	
# YELLOW						Ending	
# WHITE						Used	0.0
REMOVALS (LF)		TO:	Paint Miles 0.0	Paint Miles 0.0	Sub-total Miles 0.0	Coverage Rate (gal. per mi.) #DIV/0!	#DIV/0! (lbs. per gal.)

2nd HIGHWAY ☐ EPOXY ☐ WATERBORNE ☐ TAPE ☐

HWY #	REF. #	COUNTY:	Left Counter (ft.)	Right Counter (ft.)	Counters sub-total (ft.)	RATE OF APPLICATION Paint (gal)	Beads (lbs)
ITEM (X one)		FROM:			0	Beginning	
# YELLOW						Ending	
# WHITE						Used	0.0
REMOVALS (LF)		TO:	Paint Miles 0.0	Paint Miles 0.0	Sub-total Miles 0.0	Coverage Rate (gal. per mi.) #DIV/0!	#DIV/0! (lbs. per gal.)

3rd HIGHWAY ☐ EPOXY ☐ WATERBORNE ☐ TAPE ☐

HWY #	REF. #	COUNTY:	Left Counter (ft.)	Right Counter (ft.)	Counters sub-total (ft.)	RATE OF APPLICATION Paint (gal)	Beads (lbs)
ITEM (X one)		FROM:			0	Beginning	
# YELLOW						Ending	
# WHITE						Used	0.0
REMOVALS (LF)		TO:	Paint Miles 0.0	Paint Miles 0.0	Sub-total Miles 0.0	Coverage Rate (gal. per mi.) #DIV/0!	#DIV/0! (lbs. per gal.)

Personnel

Labor Classification	# Workers	# Hours / Worker
General Laborer:		
Grinder:		
Other:		
Pavement Marking Operator:		
Pavement Marking Truck Driver:		
Pilot Vehicle Driver:		
Shadow Vehicle Driver:		
Totals:	0	0.0

Equipment

Equipment Type	# Vehicles	# Hours / Vehicle
Grinder:		
Other:		
Pavement Marking Vehicle:		
Pilot Vehicle:		
Shadow Vehicle:		
Single / Two Axle Truck:		
Three Axle Truck:		
Totals:	0	0.0

(WisDOT) Contact Person

Name:
City:
Phone #:
Cell #:
Email:

Instructions:
Fill out form electronically and then email to the WisDOT contact person above.

WEATHER: (Start entries in box below) COMMENTS: (Start entries in box below)

DT 2131 PAVEMENT MARKING DAILY ACTIVITY REPORT (Special Marking)

An electronic version of this form can be obtained at \\dotforms\n2public\BMS\FORMS\dt2131.xls.

PAVEMENT MARKING DAILY REPORT - Special / Provision Marking

Wisconsin Department of Transportation
DT2131 5/2012

NOTE: RED OUTLINED CELLS WILL SELF POPULATE WHEN INFORMATION IS ENTERED

DATE: (mm/dd/yyyy)	PROJECT ID:	REGION:	CONTRACTOR:	FOREMAN:

				Item Bid #:	647.0566	647.0110	647.0156	647.0166	647.0176	647.0186	647.0356	647.0726		647.0746	
					Pavement Marking Stop Line Epoxy 18 Inch White	Pavement Marking Railroad Crossing Epoxy White	Pavement Marking Arrows Type 1 Epoxy White	Pavement Marking Arrows Type 2 Epoxy White	Pavement Marking Arrows Type 3 Epoxy White	Pavement Marking Arrows Type 4 Epoxy White	Pavement Marking Words Epoxy White	Pavement Marking Diagonal Epoxy Yellow	Pavement Marking Diagonal 12 Inch White	Pavement Marking Diagonal Epoxy 24 Inch White	Other
HWY	LOCATION	COUNTY	Ref. #	Dir.	LF	Each	Each	Each	Each	Each	Each	LF	LF	LF	
				Totals:	0	0	0	0	0	0	0	0	0	0	0

Personnel			Equipment		
Labor Classification	# Workers	# Hours / Worker	Equipment Type	# Vehicles	# Hours
General Laborer:			Grinder:		
Grinder:			Other:		
Other:			Pavement Marking Vehicle:		
Pavement Marking Operator:			Pilot Vehicle:		
Pavement Marking Truck Driver:			Shadow Vehicle:		
Pilot Vehicle Driver:			Single / Two Axle Truck:		
Shadow Vehicle Driver:			Three Axle Truck:		
Totals:	0	0.0	Totals:	0	0.0

WEATHER: (Start entries in box below)

COMMENTS: (Start entries in box below)

(WisDOT) Contact Person	
Name:	
City:	
Phone #:	
Cell #:	
Email:	

Instructions:

Fill out form electronically and then email to the WisDOT contact person above.

Traffic guidelines manual

Chapter 3 - Markings

Subject no.	Subject title	Effective date	Supersede date
Section 2 - Applications			
3-2-1	Yellow centerline pavement markings	Apr 2009	
3-2-2	No passing zone standards	Feb 2013	Mar 2011
3-2-4	White lane line pavement markings	Apr 2009	
3-2-5	Interchange ramps	July 2012	May 2011
3-2-6	Edgelines	Feb 2007	Dec 2004
3-2-16	Stop lines	Dec 1999	
3-2-18	Crosswalks	Mar 2011	Sep 2009
3-2-19	Parking spaces	Mar 2011	Feb 2008
3-2-20	Arrows and words	Mar 2011	June 2005
3-2-21	Aerial enforcement bars	Mar 2011	Apr 2001
3-2-23	Island Marking	Mar 2011	Jan 2001
3-2-23.1	Curb ramp markings	Mar 2011	Feb 2008
Section 3 - Roundabouts			
3-3-1	Marking for roundabouts	Jan 2013	July 2012
Section 6 - Delineation			
3-6-1	Delineators	Mar 2011	June 2005
Section 10 - Program			
3-10-1	Pavement marking policy	Mar 2011	Apr 2009
Section 15 - Comprehensive Policy			
3-15-10	Push Over Markings	Mar 2011	Apr 2008

State of Wisconsin

Department of Transportation

Traffic Guidelines Manual

ORIGINATOR State Traffic Engineer	3-10-1
CHAPTER 3	Markings
SECTION 10	Program DTK 2/1/13
SUBJECT 1	Pavement Marking Policy

Required Permanent Pavement Marking For Newly Paved or Resurfaced Roads

Roadway Type	Surface Type	Edge Lines	Center lines	Lane Lines, 2' and 3' segments
Freeway	Concrete	Epoxy	N/A	380AW-5 Tape grooved
Freeway	Asphalt	Epoxy	N/A	380AW or 380AW-5 Tape grooved*
Freeway	Open-graded Asphalt	Epoxy on scarification	N/A	380AW Tape grooved*
Expressway	Concrete	Epoxy	N/A	380AW-5 Tape grooved
Expressway	Asphalt	Epoxy	N/A	380AW or 380AW-5 Tape grooved*
Expressway	Open-graded Asphalt	Epoxy on scarification	N/A	380AW Tape grooved*
Multilane Divided	Concrete	Epoxy	N/A	380AW-5 Tape grooved
Multilane Divided	Asphalt	Epoxy	N/A	380AW or 380AW-5 Tape grooved*

Required Permanent Pavement Marking For Newly Paved Or Resurfaced Roads Continued

Roadway Type	Surface Type	Edge Lines	Centerlines	Lane Lines, 2' and 3' segments
Multilane Divided	Open-graded Asphalt	Epoxy on scarification	N/A	380AW or 380AW-5 Tape grooved*
Multilane Divided	HMA Warranty	Epoxy	Epoxy	Epoxy
More than Four-lane Undivided	Concrete	Epoxy	Epoxy	Epoxy
More than Four-lane Undivided	Asphalt or HMA Warranty	Epoxy	Epoxy	Epoxy
More than Four-lane Undivided	Open-graded Asphalt	Epoxy on scarification	Epoxy on scarification	Epoxy on scarification
More than Four-lane Undivided	Seal Coat	Waterborne Paint	Waterborne Paint	Waterborne Paint
Four-lane Undivided	Concrete	Epoxy	Epoxy	Epoxy
Four-lane Undivided	Asphalt or HMA Warranty	Epoxy	Epoxy	Epoxy
Four-lane Undivided	Open-graded Asphalt	Epoxy on scarification	Epoxy on scarification	Epoxy on scarification
Four-lane Undivided	Seal Coat	Waterborne Paint	Waterborne Paint	Waterborne Paint
Two-lane	Concrete	Epoxy	Epoxy	N/A
Two-lane	Asphalt or HMA Warranty	Epoxy	Epoxy	N/A
Two-lane	Open-graded Asphalt	Epoxy on scarification	Epoxy on scarification	N/A
Two-lane	Seal Coat	Waterborne Paint	Waterborne Paint	N/A

For roadway or surface types not listed, consult the Regional Traffic Section.

**** Tape placement requires a minimum of five calendar days wait period prior to grooving asphalt pavement. Add calendar days to engineering estimate.***

Selection of Materials for Special Marking on New or Existing Pavement

Special markings include stop and yield lines, arrows, parking spaces, crosswalks, some channelizing lines, chevrons, diagonals, handicap ramps and word and symbol markings. Special provisions are available from BTO Hot Topics Website http://dotnet/dtid_bho/extranet/manuals/hottopics/index.shtm for grooved preformed plastic and preformed thermoplastic. ~~Specify preformed plastic or preformed thermoplastic in roundabouts, except specify preformed thermoplastic for the dotted edge line extension.~~ Refer to FDM 11-26 Attachment 35.2. for product matrix

Remaining Pavement Surface Life	Special Marking Material
≤ 1 year	Waterborne Paint
≤ 2 years	High Build Waterborne
2 years to 6 years	Epoxy
≥ 6 years	Preformed Plastic or Preformed Thermoplastic

STSP'S Revised June 15, 2012

SPECIAL PROVISIONS

1. Pavement Marking Late Season, Item 646.0900.S.

A Description

This special provision describes providing and maintaining late season pavement marking as specified in standard spec 646.3.1.4.

B Materials

Use any pavement marking material from the department's approved products list.

C Construction

Provide and maintain late season marking conforming to standard spec 646.3.1.

D Measurement

The department will measure Pavement Marking Late Season by the linear foot of 4-inch wide line acceptably completed. The department will not measure work required because of delays that are not the department's responsibility under standard spec 108.10.3.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
646.0900.S	Pavement Marking Late Season	LF

Payment for Pavement Marking Late Season is full compensation for providing, maintaining, and removing late season temporary marking; and for resealing areas of protective surface treatment on structures as required in 646.3.1.1. All costs for late season marking required because of delays that are not the department's responsibility under standard spec 108.10.3 are incidental to the contract.

646-010 (20110615)

2. Pavement Marking Grooved Wet Reflective Tape 4-Inch, Item 646.0881.S; 8-Inch, Item 646.0883.S.

A Description

This special provision describes furnishing, grooving and installing preformed wet reflective pavement marking tape for grooved applications as shown on the plans, according to standard spec 646, and as hereinafter provided.

B Materials

Furnish grooved wet reflective pavement marking tape and adhesive material per manufacturer's recommendations, if required, from the department's approved products list.

Furnish a copy of the manufacturer's recommendations to the engineer before preparing the pavement marking grooves.

C Construction

C.1 General

For quality assurance, provide the project engineer and the region's Marking Section evidence of manufacturer training in the proper placement and installation of pavement marking tape.

Plane the grooved lines according to details in the plan and per manufacturer's recommendations. Use grooving equipment with a free-floating, independent cutting head. Plane a minimum number of passes to create a grooved surface per manufacturer's recommendations.

C.2 Groove Depth

Cut the groove to a depth of 120 mils ± 10 mils from the pavement surface or, if tined, from the high point of the tined surface. To measure the depth, the contractor may use a depth plate placed in the groove and a straightedge placed across the plate and groove, or the contractor may use a straightedge placed perpendicular to the groove. The department may periodically check groove depths.

C.3 Groove Width – Longitudinal Markings

Cut the groove one-inch wider than the width of the tape.

C.4 Groove Position

Position the groove edge according to plan details. Groove a minimum of 4 inches, but not greater than, 12 inches from both ends of the tape segment. Achieve straight alignment with the grooving equipment.

C.5 Groove Cleaning

C.5.1 Concrete

Cooling the cutting head with water may be necessary for some applications and equipment. If cooling water is necessary, flush the groove immediately with high-pressure water after cutting to remove any build-up of cement dust and water slurry. If this is not done, the slurry may harden in the groove.

If water is used in the grooving process, allow the groove to dry a minimum of 24 hours after groove cleaning, and prior to pavement marking application. The groove surface shall be clean and dry before applying the adhesive, and pavement marking tape. Use a high-pressure air blower with at least 185

ft^3/min air flow and 120 psi air pressure to clean the groove; use of the air blower does not decrease the amount of time required for the groove to dry.

C.5.2 New Asphalt

Groove pavement five or more days after paving.

Use a high-pressure air blower with at least 185 ft^3/min air flow and 120 psi air pressure to clean the groove.

C.5.3 Existing Asphalt

Check for structural integrity in supporting grooving operations. If the structural integrity of the asphalt pavement is inadequate to support grooving operations, immediately notify the engineer.

Use a high-pressure air blower with at least 185 ft^3/min air flow and 120 psi air pressure to clean the groove.

C.6 Tape Application

Apply the wet reflective pavement marking tape when both the air and surface temperature are 40 degrees F and rising.

Apply tape in the groove as per manufacturer's recommendations. If manufacturer's recommendations require surface preparation adhesive

1) For the Southeast Region and the ozone non-attainment Northeast Region counties of Sheboygan, Manitowoc, and Kewaunee:
   - Apply SPA-60 during May 1 to September 30, both dates inclusive due to Volatile Organic Compound Limitations.
   - Apply P-50 during October 1 to April 30, both dates inclusive.
2) For the remainder counties:
   - Apply either adhesive.

Refer to the manufacturer's instructions for determining when the surface preparation adhesive is set.

Tamp the wet reflective pavement marking tape with a tamper cart roller, with a minimum of a 200-lb load, cut to fit the groove. Tamp a minimum of three complete cycles (6 passes) with grooved modified tamper roller cart.

D Measurement

The department will measure Pavement Marking Grooved Wet Reflective Tape (Width) for grooved applications in length by the linear foot of tape placed according to the contract and accepted.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
646.0881.S	Pavement Marking Grooved Wet Reflective Tape 4-Inch	LF
646.0883.S	Pavement Marking Grooved Wet Reflective Tape 8-Inch	LF

Payment is full compensation for cleaning and preparing the pavement surface; furnishing and installing the material; and for removing temporary pavement marking, if necessary.

646-018 (20120615)

3. Pavement Marking Grooved Wet Reflective Contrast Tape 4-Inch, Item 646.0841.S; 8-Inch, Item 646.0843.S.

A Description

This special provision describes furnishing, grooving and installing preformed wet reflective pavement marking contrast tape for grooved applications as shown on the plans, according to standard spec 646, and as hereinafter provided.

B Materials

Furnish wet reflective pavement marking contrast tape and adhesive material, per manufacturer's recommendation if required, from the department's approved products list.

Furnish a copy of the manufacturer's recommendations to the engineer before preparing the pavement marking grooves.

C Construction

C.1 General

For quality assurance, provide the project engineer and the region's Marking Section evidence of manufacturer training in the proper placement and installation of pavement marking contrast tape.

Plane the grooved lines according to details in the plan and per manufacturer's recommendations. Use grooving equipment with a free-floating, independent cutting head. Plane a minimum number of passes to create a grooved surface per manufacturer's recommendations.

C.2 Groove Depth

Cut the groove to a depth of 120 mils ± 10 mils from the pavement surface or, if tined, from the high point of the tined surface. To measure the depth, the contractor may use a depth plate placed in the groove and a straightedge placed across the plate and groove, or the contractor may use a straightedge placed perpendicular to the groove. The department may periodically check groove depths.

C.3 Groove Width – Longitudinal Markings

Cut the groove one-inch wider than the width of the tape.

C.4 Groove Position

Position the groove edge according to plan details. Groove a minimum of 4 inches, but not greater than, 12 inches from both ends of the tape segment. Achieve straight alignment with the grooving equipment.

C.5 Groove Cleaning

C.5.1 Concrete

Cooling the cutting head with water may be necessary for some applications and equipment. If cooling water is necessary, flush the groove immediately with high-pressure water after cutting to remove any build-up of cement dust and water slurry. If this is not done, the slurry may harden in the groove.

If water is used in the grooving process, allow the groove to dry a minimum of 24 hours after groove cleaning, and prior to pavement marking application. The groove surface shall be clean and dry before applying the adhesive, and the pavement marking tape. Use a high-pressure air blower with at least 185 ft^3/min air flow and 120 psi air pressure to clean the groove; use of the air blower does not decrease the amount of time required for the groove to dry.

C.5.2 New Asphalt

Groove pavement five or more days after paving.

Use a high-pressure air blower with at least 185 ft^3/min air flow and 90 psi air pressure to clean the groove.

C.5.3 Existing Asphalt

Check for structural integrity in supporting grooving operations. If the structural integrity of the asphalt pavement is inadequate to support grooving operations, immediately notify the engineer.

Use a high-pressure air blower with at least 185 ft^3/min air flow and 90 psi air pressure to clean the groove.

C.6 Tape Application

Apply the tape when both the air and surface temperature are 40 degrees F and rising.

Apply tape in the groove as per manufacturer's recommendations. If manufacturer's recommendations require surface preparation adhesive

1) For the Southeast Region and the ozone non-attainment Northeast Region counties of Sheboygan, Manitowoc, and Kewaunee:
- Apply SPA-60 during May 1 to September 30, both dates inclusive due to Volatile Organic Compound Limitations..
    - Apply P-50 during October 1 to April 30, both dates inclusive. –

2) For the remainder counties:
    - Apply either adhesive.

Refer to the manufacturer's instructions for determining when the surface preparation adhesive is set.

Tamp the wet reflective pavement marking contrast tape with a tamper cart roller, with a minimum of a 200-lb load, cut to fit the groove. Tamp a minimum of three complete cycles (6 passes) with grooved modified tamper roller cart.

D Measurement

The department will measure Pavement Marking Grooved Wet Reflective Contrast Tape (Width) for grooved applications in length by the linear foot of tape placed according to the contract and accepted.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
646.0841.S	Pavement Marking Grooved Wet Reflective Contrast Tape 4-Inch	LF
646.0843.S	Pavement Marking Grooved Wet Reflective Contrast Tape 8-Inch	LF

Payment is full compensation for cleaning and preparing the pavement surface; furnishing and installing the material; and for removing temporary pavement marking, if necessary.

646-022 (20120615)

4. Pavement Marking Paint High Build, 4-Inch, Item 646.0101.S; 8-Inch, Item 646.0121.S.

A Description

This special provision describes furnishing and installing a high build fast dry waterborne pavement marking material on the final pavement surface, as shown in the plans, according to standard spec 646, and as hereinafter provided.

B Materials

Furnish high build fast dry waterborne pavement marking material from the department's approved products list.

C Construction

Apply high build fast dry waterborne pavement marking material uniformly across the line at or exceeding 20-mil wet thickness (22 gallons per mile) of continuous 4-inch line. Apply glass spheres uniformly across the width of the line at or exceeding a rate of 10 lbs per gallon of paint.

D Measurement

The department will measure the Pavement Marking Paint High Build (Inch) in length by the linear foot of line acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
646.0101.S	Pavement Marking Paint High Build 4-Inch	LF
646.0121.S	Pavement Marking Paint High Build 8-Inch	LF

Payment is full compensation for cleaning and preparing the pavement surface; and for furnishing and installing the material.

646-030 (20080902)

5. Pavement Marking Warranty Bars Epoxy 6-Inch, Item 647.8106.S.

This special provision describes providing warranty bar marks on warranty projects. Conform to standard spec 647 and as the plan details show.

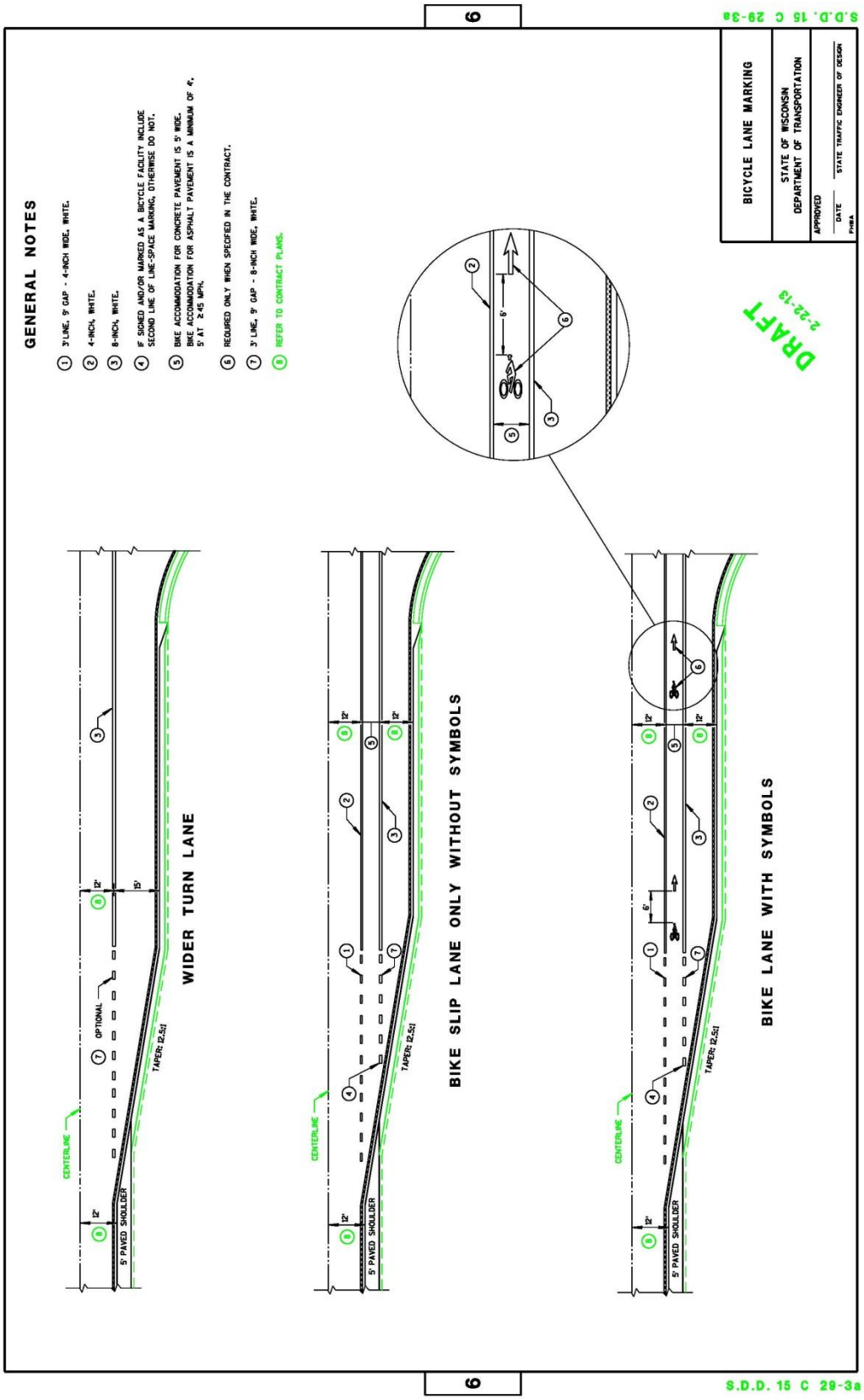
Add the following pavement marking bid item to standard spec 647.5(1):

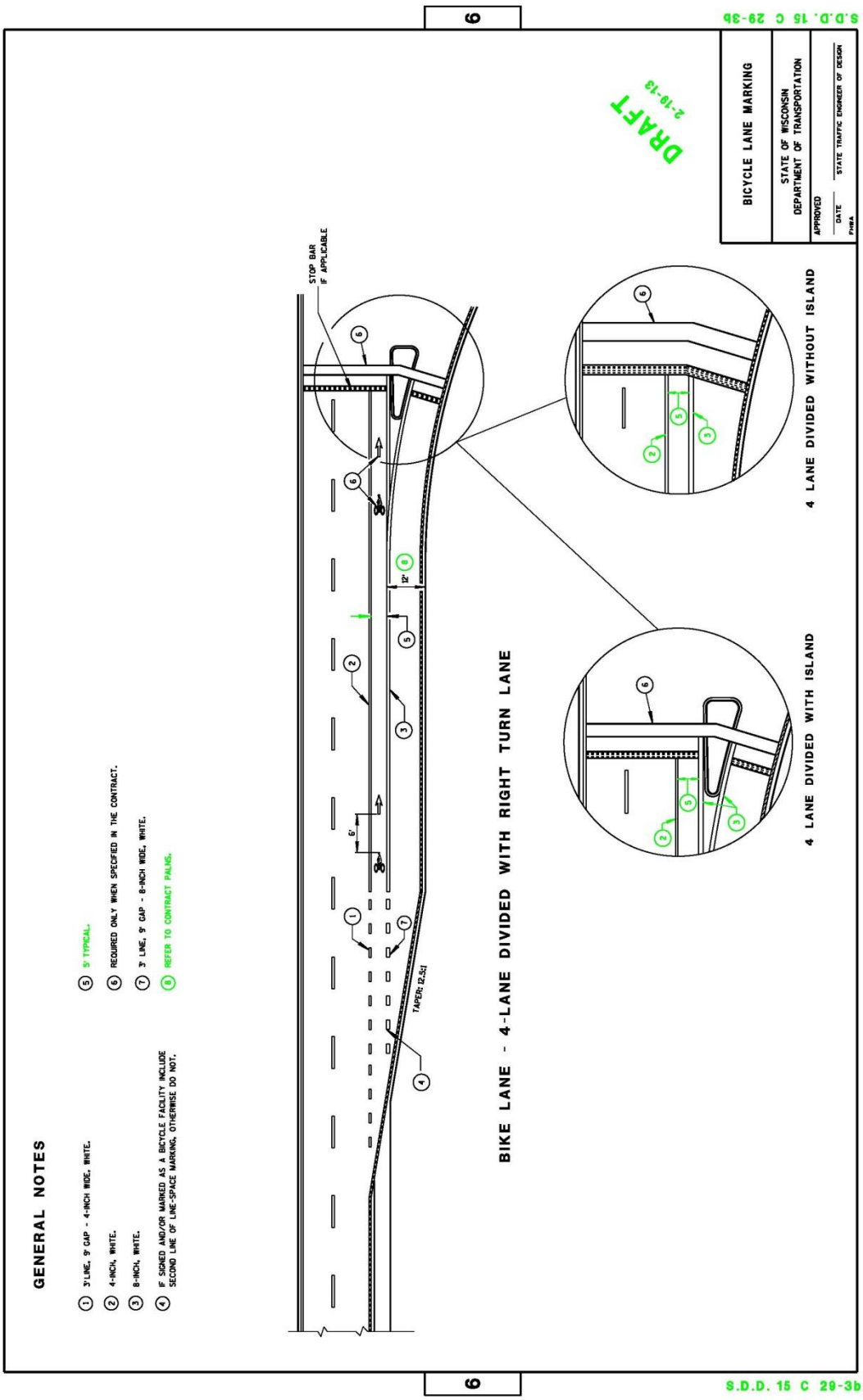
ITEM NUMBER	DESCRIPTION	UNIT
647.8106.S	Pavement Marking Warranty Bars Epoxy 6-Inch	Each

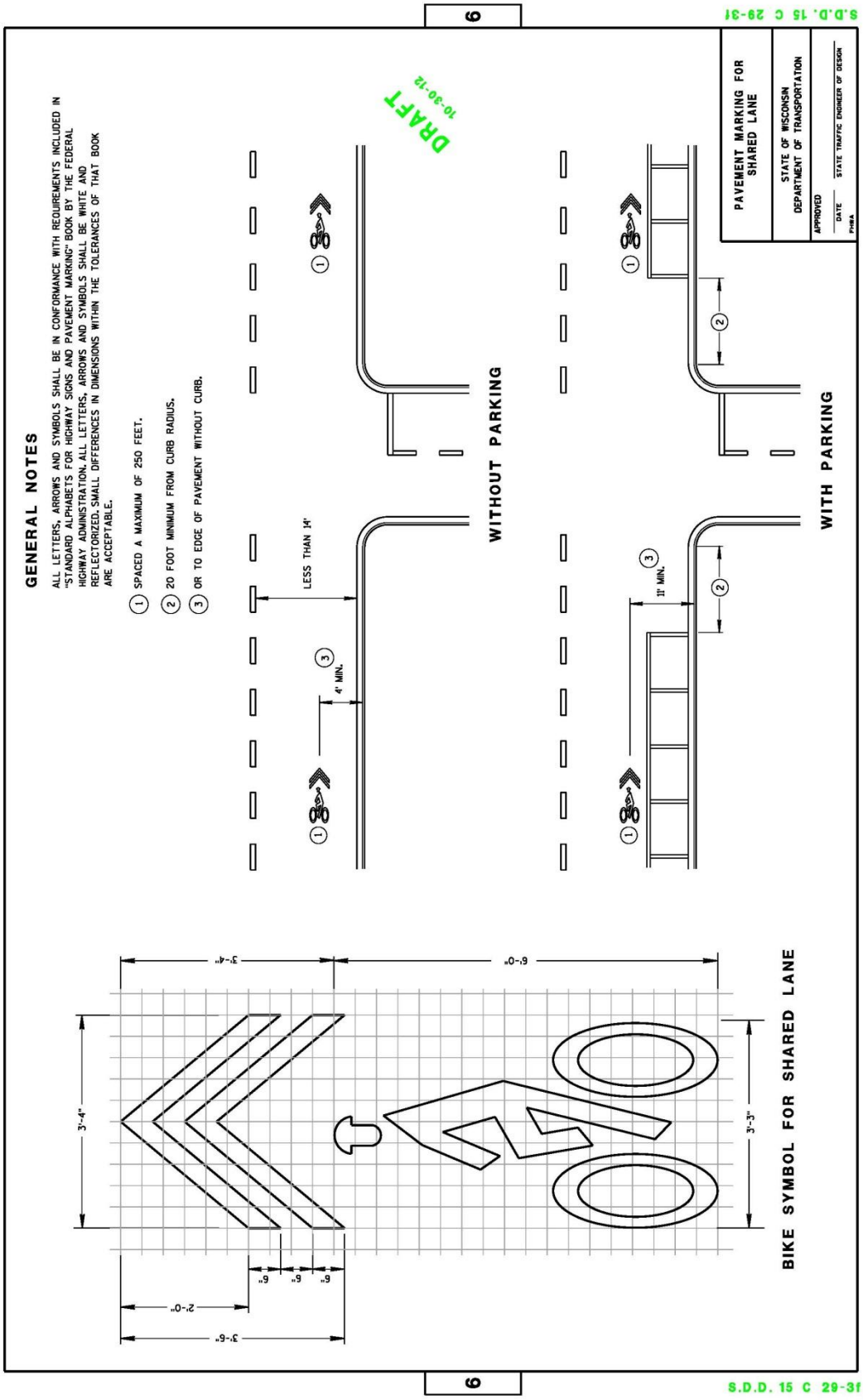
647-005 (21110615)

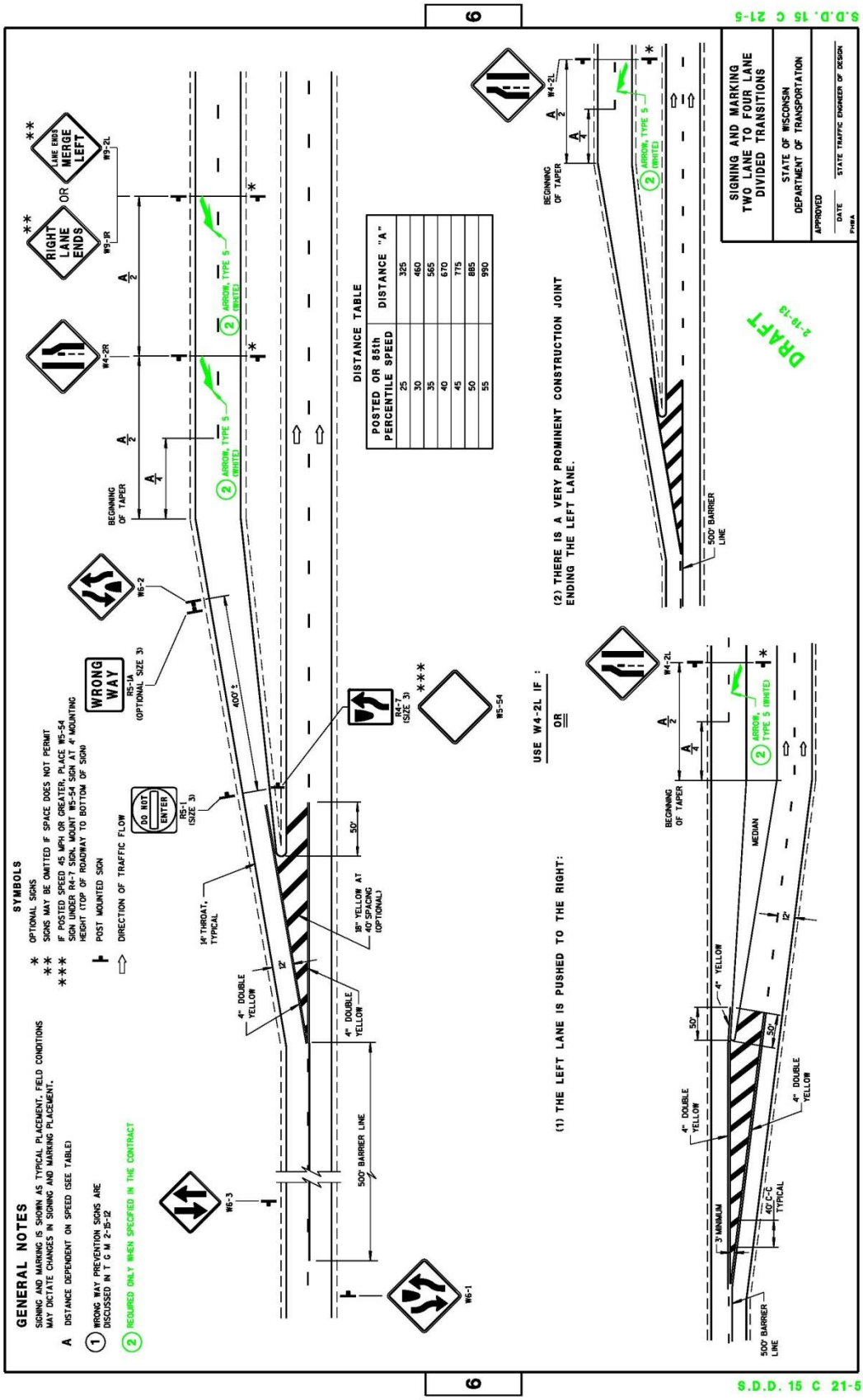
6. Locating No-Passing Zones, Item 648.0100.

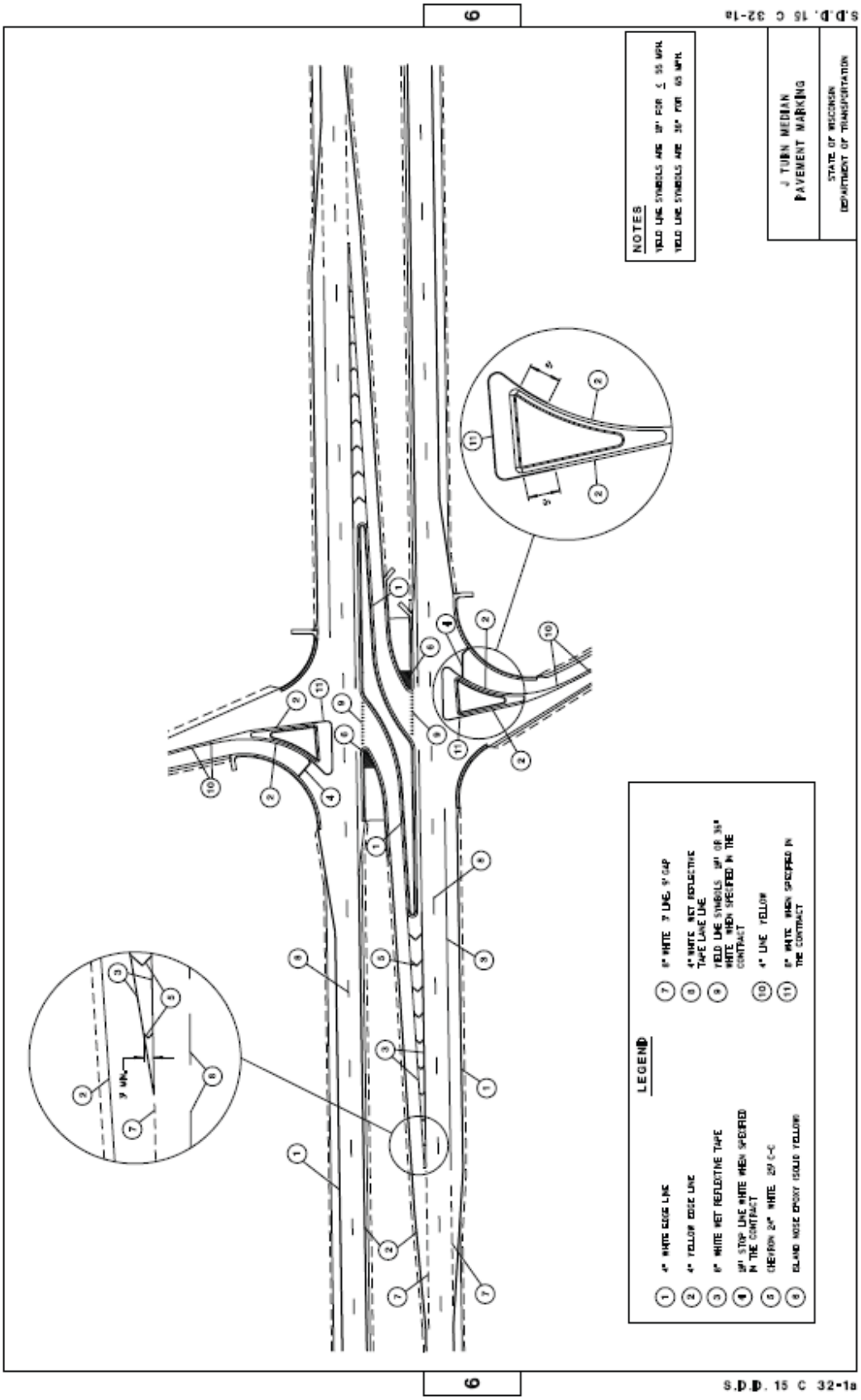
For this project, the spotting sight distance in areas with a 55 mph posted speed limit is Choose an item..648-005 (20060512)

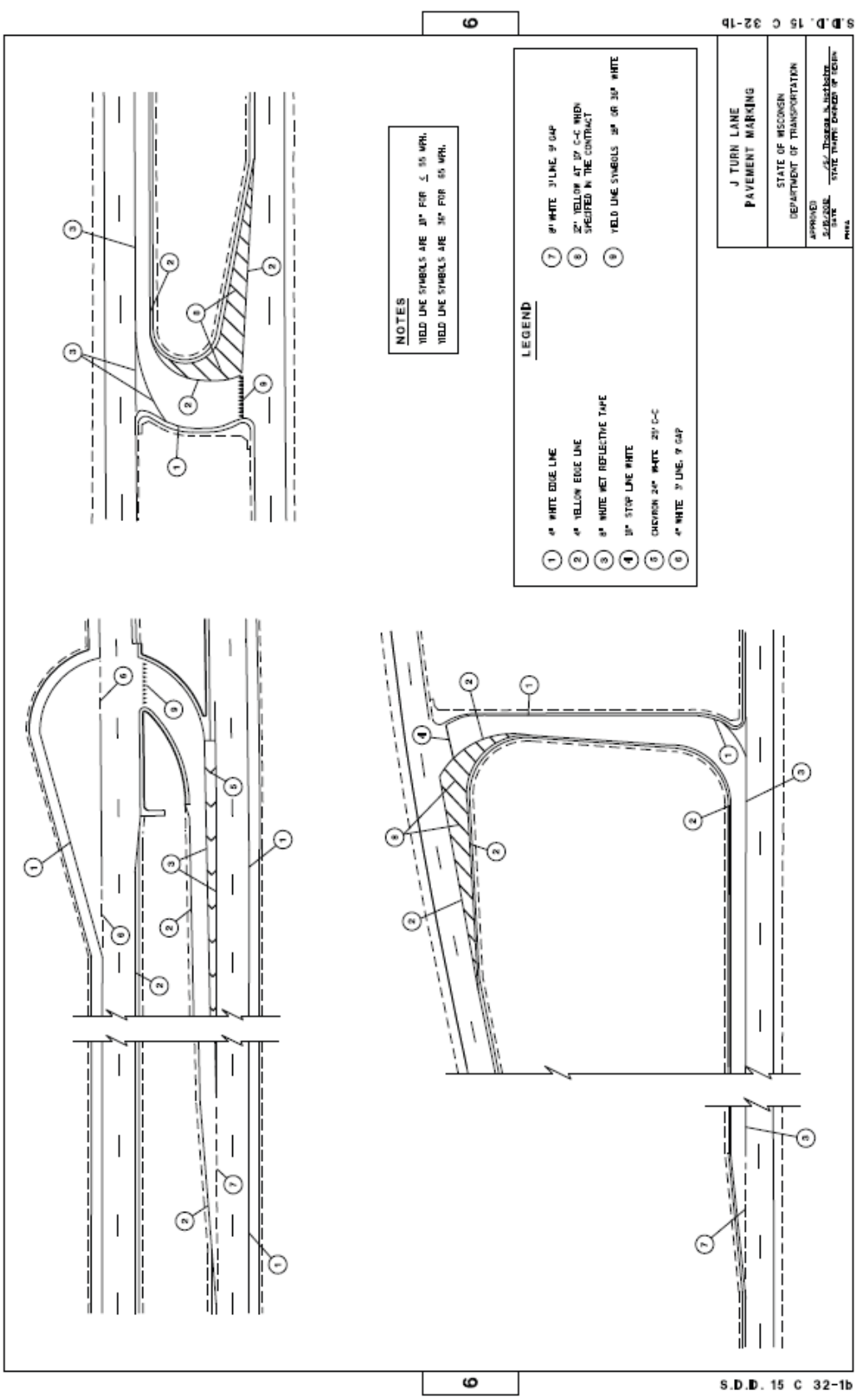

S.D.D. 15 C 29-3a
GENERAL NOTES
1 3' LINE, 9' GAP - 4-INCH WIDE, WHITE.
2 4-INCH, WHITE.
3 8-INCH, WHITE.
4 IF SIGNED AND/OR MARKED AS A BICYCLE FACILITY INCLUDE SECOND LINE OF LINE-SPACE MARKING, OTHERWISE DO NOT.
5 BIKE ACCOMMODATION FOR CONCRETE PAVEMENT IS 5' WIDE. BIKE ACCOMMODATION FOR ASPHALT PAVEMENT IS A MINIMUM OF 4', 5' AT ≥45 MPH.
6 REQUIRED ONLY WHEN SPECIFIED IN THE CONTRACT.
7 3' LINE, 9' GAP - 8-INCH WIDE, WHITE.
8 REFER TO CONTRACT PLANS.
BICYCLE LANE MARKING
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
APPROVED
DATE
STATE TRAFFIC ENGINEER OF DESIGN
DRAFT
2-22-13
WIDER TURN LANE
BIKE SLIP LANE ONLY WITHOUT SYMBOLS
BIKE LANE WITH SYMBOLS
CENTERLINE
5' PAVED SHOULDER
OPTIONAL
TAPER 12.5:1
12'
15'
6'
S.D.D. 15 C 29-3a


S.D.D. 15 C 29-3b
BICYCLE LANE MARKING
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
APPROVED
DATE
FHWA
STATE TRAFFIC ENGINEER OF DESIGN
DRAFT
2-19-13
STOP BAR
IF APPLICABLE
4 LANE DIVIDED WITHOUT ISLAND
4 LANE DIVIDED WITH ISLAND
BIKE LANE - 4-LANE DIVIDED WITH RIGHT TURN LANE
TAPER 12:1
12'
6'
GENERAL NOTES
1 3' LINE, 9' GAP - 4-INCH WIDE, WHITE.
2 4-INCH, WHITE.
3 8-INCH, WHITE.
4 IF SIGNED AND/OR MARKED AS A BICYCLE FACILITY INCLUDE SECOND LINE OF LINE-SPACE MARKING, OTHERWISE DO NOT.
5 5' TYPICAL.
6 REQUIRED ONLY WHEN SPECIFIED IN THE CONTRACT.
7 3' LINE, 9' GAP - 8-INCH WIDE, WHITE.
8 REFER TO CONTRACT PLANS.
S.D.D. 15 C 29-3b


S.D.D. 15 C 29-3f
9
DRAFT
10-30-12
GENERAL NOTES
ALL LETTERS, ARROWS AND SYMBOLS SHALL BE IN CONFORMANCE WITH REQUIREMENTS INCLUDED IN "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKING" BOOK BY THE FEDERAL HIGHWAY ADMINISTRATION. ALL LETTERS, ARROWS AND SYMBOLS SHALL BE WHITE AND REFLECTORIZED. SMALL DIFFERENCES IN DIMENSIONS WITHIN THE TOLERANCES OF THAT BOOK ARE ACCEPTABLE.
1 SPACED A MAXIMUM OF 250 FEET.
2 20 FOOT MINIMUM FROM CURB RADIUS.
3 OR TO EDGE OF PAVEMENT WITHOUT CURB.
LESS THAN 14'
4' MIN.
WITHOUT PARKING
11' MIN.
WITH PARKING
PAVEMENT MARKING FOR SHARED LANE
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
APPROVED
DATE
STATE TRAFFIC ENGINEER OF DESIGN
FHWA
3'-4"
6'-0"
3'-3"
3'-4"
2'-0"
3'-6"
6"
6"
6"
BIKE SYMBOL FOR SHARED LANE
9
S.D.D. 15 C 29-3f


S.D.D. 15 C 21-5
SIGNING AND MARKING
TWO LANE TO FOUR LANE
DIVIDED TRANSITIONS
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
APPROVED
DATE
STATE TRAFFIC ENGINEER OF DESIGN
DRAFT
2-19-13
GENERAL NOTES
SIGNING AND MARKING IS SHOWN AS TYPICAL PLACEMENT. FIELD CONDITIONS MAY DICTATE CHANGES IN SIGNING AND MARKING PLACEMENT.
A DISTANCE DEPENDENT ON SPEED (SEE TABLE)
1 WRONG WAY PREVENTION SIGNS ARE DISCUSSED IN T G M 2-5-12
2 REQUIRED ONLY WHEN SPECIFIED IN THE CONTRACT
SYMBOLS
* OPTIONAL SIGNS
** SIGNS MAY BE OMITTED IF SPACE DOES NOT PERMIT
*** IF POSTED SPEED 45 MPH OR GREATER, PLACE W5-54 SIGN UNDER R4-7 SIGN. MOUNT W5-54 SIGN AT 4' MOUNTING HEIGHT (TOP OF ROADWAY TO BOTTOM OF SIGN)
POST MOUNTED SIGN
DIRECTION OF TRAFFIC FLOW
DISTANCE TABLE
POSTED OR 85th PERCENTILE SPEED
DISTANCE "A"
25 325
30 460
35 565
40 670
45 775
50 885
55 990
USE W4-2L IF :
(1) THE LEFT LANE IS PUSHED TO THE RIGHT:
OR
(2) THERE IS A VERY PROMINENT CONSTRUCTION JOINT ENDING THE LEFT LANE.
RIGHT LANE ENDS
OR
LANE ENDS MERGE LEFT
W4-2R
W9-1R
W9-2L
W6-2
W6-3
W6-1
W5-54
W4-2L
WRONG WAY
R5-1A (OPTIONAL SIZE 3)
DO NOT ENTER
R5-1 (SIZE 3)
R4-7 (SIZE 3)
BEGINNING OF TAPER
A/2
A/4
400' ±
50'
12'
14' THROAT, TYPICAL
18" YELLOW AT 40' SPACING (OPTIONAL)
4" DOUBLE YELLOW
500' BARRIER LINE
ARROW, TYPE 5 (OMITTED)
MEDIAN
4" YELLOW
3' MINIMUM
40' C-C TYPICAL
6
S.D.D. 15 C 21-5


S.D.D. 15 C 32-1a
6
NOTES
YELLOW LINE SYMBOLS ARE 18" FOR ≤ 55 MPH
YELLOW LINE SYMBOLS ARE 36" FOR 65 MPH
J TURN MEDIAN
PAVEMENT MARKING
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
LEGEND
1 4" WHITE EDGE LINE
2 4" YELLOW EDGE LINE
3 6" WHITE WET REFLECTIVE TAPE
4 18" STOP LINE WHITE WHEN SPECIFIED IN THE CONTRACT
5 CHEVRON 24" WHITE 25' C-C
6 BLAND NOSE EPOXY (SOLID YELLOW)
7 6" WHITE 3' LINE, 9' GAP
8 4" WHITE WET REFLECTIVE TAPE LANE LINE
9 YELLOW LINE SYMBOLS 18" OR 36" WHITE WHEN SPECIFIED IN THE CONTRACT
10 4" LINE YELLOW
11 6" WHITE WHEN SPECIFIED IN THE CONTRACT
9' MIN.
S.D.D. 15 C 32-1a
6


S.D.D. 15 C 32-1b
J TURN LANE
PAVEMENT MARKING
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
APPROVED
3/18/2008
DATE
STATE TRAFFIC ENGINEER OF RECORD
NOTES
YIELD LINE SYMBOLS ARE 18" FOR ≤ 55 MPH.
YIELD LINE SYMBOLS ARE 36" FOR 60 MPH.
LEGEND
1 4" WHITE EDGE LINE
2 4" YELLOW EDGE LINE
3 8" WHITE WET REFLECTIVE TAPE
4 18" STOP LINE WHITE
5 CHEVRON 24" WHITE 20' C-C
6 4" WHITE 3' LINE, 9' GAP
7 8" WHITE 3' LINE, 9' GAP
8 12" YELLOW AT 20' C-C WHEN SPECIFIED IN THE CONTRACT
9 YIELD LINE SYMBOLS 18" OR 36" WHITE
S.D.D. 15 C 32-1b

Back to Qualified Product Lists

2013

QUALIFIED PAVEMENT MARKING MATERIALS LIST

Last Update 11/13/2012

Materials from the companies listed herein are pre-qualified for use on Wisconsin Department of Transportation projects in accordance with all applicable specifications and/ or Policy Memoranda. These materials have been inspected, tested, or evaluated for use.
All materials used are subject to inspection and testing and possible rejection for use in accordance with the Standard Specifications.
Some pre-qualified materials require submittal of Certified Report of Test and Analysis be provided for materials used.

The below listed materials are generally used in permanent highway traffic delineation applications.
Solventborne and waterborne paints are also used for temporary pavement marking applications.

- Epoxy Pavement Marking Materials
- Flexible Delineator Post - Permanent
- Pavement Marking Wet Reflective Tape
- Pavement Marking Grooved Wet Reflective Tape
- Pavement Marking Grooved Wet Reflective Contrast Tape
- Preformed Plastic Marking Materials
- Preformed Thermoplastic Marking Material
- Temporary Pavement Marking Tape
- Solventborne Paints
- Waterborne Paints

Pavement Marking Grooved Wet Reflective Tape

Bid Item 648.0881.8 (4"), 648.0883.8 (8")for grooving into asphalt and concrete

Date edited: 6/13/2012

Companion of STSP 648-018 and Traffic Guidelines Manual 3-10-1

Product	Manufacturer
Stamark Wet Reflective Tape A380AW	3M Traffic Control Materials Division 3M Center, Building 225-5S-08
Adhesive	P. O. Box 33225
3M Brand P-60 or SPA-80	St. Paul, MN 55133-3225
Training	www.3m.com/tcm
3M Traffic Control Materials Division 1-800-553-1380	

Please note for 2012:

Temporary marking is required when a lane is open to traffic during the 5 day wait period.

Existing Asphalt

Ensure the existing pavement can hold a groove

New Asphalt - choice between inlay or grooving
A) Inlay tape when the coarse mix is between 130 and 170 degrees Fahrenheit, fine mix between 120 and 150 degrees Fahrenheit.
B) Groove after waiting a minimum of five days following paving
Air and surface temperature requirement of 40 degrees Fahrenheit and rising.
120 mils +/- 10 mils groove
Lane open to traffic - temporary marking bid item required.
Lane closed to traffic - temporary marking not required

Rules to follow for the 2012 Construction Season:
New Marking:
Place Series A380AW for entire lane line (12 1/2 feet typical).

Wait time for asphalt grooving decreased to 5 days.

Existing Sprayed Marking or A380I-ES(non wet reflective tape):
Place 2 foot supplemental segment A380AW Tape.

Note: SMA pavements require grooving

For the Southeast Region and the ozone non-attainment Northeast Region counties of Sheboygan, Manitowoc, and Kewaunee:
Apply SPA-80 adhesive between May 1 and September 30, both dates inclusive. Apply P-60 during October 1 and April 30, both dates inclusive

For the remainder counties: use either adhesive

Contact Information:
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Bureau of Traffic Operations
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Deborah.Kozol@dot.wi.gov

Pavement Marking Grooved Wet Reflective Contrast Tape

Bid Item 646.0841.S (4"), 646.0843.S (8")for grooving into concrete and asphalt

Date edited:6/13/2012

Companion of STSP 646-022 and Traffic Guidelines Manual 3-10-1

Please note for 2012:

Temporary marking is required when a lane is open to traffic during the 5 day wait period.

Product
Stamark Wet Reflective Tape A380AW-5

Adhesive
3M Brand P-50 or SPA-60

Training
3M Traffic Control Materials Division
1-800-553-1380

Manufacturer
3M Traffic Control Materials Division
3M Center, Building 225-5S-08
P. O. Box 33225
St. Paul, MN 55133-3225
www.3m.com/tcm

Existing Asphalt
Ensure the existing pavement can hold a groove

New Asphalt - choice between inlay or grooving
A) Inlay tape when the coarse mix is between 130 and 170 degrees Fahrenheit, fine mix between 120 and 150 degrees Fahrenheit.
B) Groove after waiting a minimum of five days following asphalt paving
Air and surface temperature requirement of 40 degrees Fahrenheit and rising.
120 mils +/- 10 mils groove
Lane open to traffic - temporary marking bid item is required.
Lane closed to traffic - temporary marking not required

Rules to follow for the 2012 Construction Season:
New Marking:
Place Series A380AW -5 for entire lane line (12 1/2 feet typical).

Wait time for asphalt grooving decreased to 5 days.

Existing Sprayed Marking or A380I-5ES(non wet reflective tape):
Place 2 foot supplemental segment A380AW-5 Tape.

Note: SMA pavements require grooving

For the Southeast Region and the ozone non-attainment Northeast Region counties of Sheboygan, Manitowoc, and Kewaunee:
Apply SPA-60 adhesive between May 1 and September 30, both dates inclusive. Apply P-50 during October 1 and April 30, both dates inclusive

For the remainder counties: use either adhesive

Contact Information:
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Preformed Plastic (Tape) Marking Materials

See notes below

For 646.xxxx and Roundabout SPV bid numbers
For Long Line Marking

Date edited: 6/13/2012

Companion of Hot Topics Preformed Plastic Specials http://dotnet/dtid_bho/extranet/manuals/hottopics/index.shtm

Product
Stamark Tape A380I-ES
Stamark Tape A380I-5ES

Manufacturer
3M Traffic Control Materials Division
3M Center, Building 225-5S-08
P. O. Box 33225
St. Paul, MN 55133-3225
www.3m.com/tcm

Training
3M Traffic Control Materials Division
1-800-553-1380

Adhesive- 3M Brand P-50 or SPA-60

Deltaline XRP
Deltaline XRP-HCL
Deltaline XRP- R
Deltaline XRP-R-HCL

Brite-Line Technologies, LLC.

10660 E.51st Ave.
Denver, CO 80239
Phone: 888-201-6448
www.brite-line.com

Adhesive- Brite-Line C20 or D20 Contact Adhesive

Swarco Director 60

Swarco Industries, Inc.
270 Rutherford Lane
TN 38402 Columbia / USA
Phone: 001-931-388-5900
Fax: 001-931-388-4039

E-Mail:
office.industries@swarco.com

Swarco Contact Cement Adhesive or Primer Sealer

Note: SMA pavements require grooving

Contact Information:
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Deborah.Kozol@dot.wi.gov

Avoid use of the listed adhesives, except for SPA-60, no matter the container size, between May 1 and September 30 in the non-attainment Lake Michigan counties of Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha.

Preformed Plastic (Tape) Marking Materials

See notes below

For 647.xxxx and Roundabout SPV bid numbers
For Special Marking

Date edited: 6/13/2012

Companion of Hot Topics Grooved Preformed Plastic Special http://dotnet/dtid_bho/extranet/manuals/hottopics/index.shtm

Product	Manufacturer	Training
Stamark™ Extended Season Tape Series 380I ES	3M Traffic Control Materials Division 3M Center, Building 225-5S-08 P. O. Box 33225 St. Paul, MN 55133-3225 www.3m.com/tcm	3M Traffic Control Materials Division 1-800-553-1380
Adhesive- 3M Brand P-50 or SPA-60		
Deltaline XRP	Brite-Line Technologies, LLC. 10660 E.51st Ave. Denver, CO 80239 Phone: 888-201-6448 www.brite-line.com	
Adhesive- Brite-Line C20 or D20 Contact Adhesive		
Swarco Director 60	Swarco Industries, Inc. 270 Rutherford Lane TN 38402 Columbia / USA Phone: 001-931-388-5900 Fax: 001-931-388-4039 E-Mail: office.industries@swarco.com	
Swarco Contact Cement Adhesive or Primer Sealer		

Note: SMA pavements require grooving

Contact Information:
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Deborah.Kozol@dot.wi.gov

Avoid use of the listed adhesives, except for SPA-60, no matter the container size, between May 1 and September 30 in the non-attainment Lake Michigan counties of Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha.

Preformed Thermoplastic Marking Materials

For 647.xxxx Surface Placement and Roundabout Groove SPV bid numbers

Companion of Hot Topics Preformed Thermoplastic Specials http://dotnet/dtid_bho/extranet/manuals/hottopics/index.shtm

Date: 5/3/2012

Manufacturer	Product Name/brand	Surface Preheating Required?
Ennis-Flint Trading 115 Todd Court Thomasville, NC 27360	FlametapeHS*	Yes
Ennis-Flint Trading 115 Todd Court Thomasville, NC 27360	HotTape with Skid Optics*	Yes
Ennis-Flint Trading 115 Todd Court Thomasville, NC 27360	PreMark VisiGrip*	No

Contact:
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E-Mail: deborah.kozol@dot.state.wi.us
Deborah.Kozol@dot.wi.gov

Preformed Thermoplastic Contrast Marking Materials	For Roundabout Groove SPV bid numbers

Companion of Hot Topics Preformed Thermoplastic Specials http://dotnet/dtid_bho/extranet/manuals/hottopics/index.shtm

Date: 5/8/2012

Manufacturer	Product Name/brand	Surface Preheating Required?
Ennis-Flint Trading 115 Todd Court Thomasville, NC 27360	FlametapeHS*	Yes
Ennis-Flint Trading 115 Todd Court Thomasville, NC 27360	HotTape with Skid Optics*	Yes
Ennis-Flint Trading 115 Todd Court Thomasville, NC 27360	PreMark VisiGrip*	No

Contact:
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Deborah.Kozol@dot.wi.gov

*Utilize border ,outside edge black marking, when contrast is specified in the contract.

WATERBORNE PAINT

Date last edited: 10/16/12

Only approved pavement marking products selected from the below list may be used for let contract work. The list is established from the current Traffic Paint Performance Test done by the Bureau of Traffic Operations. A sample of the product may be required by the engineer before use in order to verify the product is manufactured within the range of values on file. The paint number shown on the list is a product number. This number must be marked on product containers and shipping documents. Refer to the Standard Specifications, section 646.2.1.

Company	Color	Paint Number	Manufacture Number
Sherwin Williams - Baltimore	White	BP 16435	TM 2326 (1)
	Yellow	BP 16436	TM 2327 (1)
	White	BP 16442 (Durable High Build)	
	Yellow	BP 16443 (Durable High Build)	
	White		TM 2508 (1)
	Yellow		TM 2509 (1)
Ennis Traffic Safety Solutions	White	WW0021	
	Yellow	WY0021	
	White	985351	Wolverine Low
	Yellow	985352	Temperature Paint
	White	985221	High Build
	Yellow	985222	High Build
Diamond -Vogel	White	VLX 15559	
	Yellow	VLX 15565	
	White	VLX 15562 High Build	
	Yellow	VLX 15563 High Build	
Hallman Lindsay 2	White		AQUA ZONE 471
Hallman Lindsay 2	Yellow		AQUA ZONE 471Y
Sherwin Williams (Niche Brands) 2	White		SW 106
Sherwin Williams (Niche Brands) 2	Yellow		SW 506
Diamond Vogel 2	White	UC-1509	
Diamond Vogel 2	Yellow	UC-3584	

(1) Only Sherwin Williams products can be used for both let and contract and county TMA maintenance marking as a part of state contract #270353. Sherwin Williams High Build products are optional for let and county maintenance.

2)Approval for these products is only acceptable for temporary pavement markings under standard specifications section 648

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Temporary Pavt. Marking Tape

TEMPORARY PAVEMENT MARKING, REMOVABLE TAPE

Date last edited: 9/10/2012

Manufacturer	Product Name/model	Color
Advanced Traffic Markings	ATM 200 Series	white or yellow
	ATM 280 Series	black
Brite-Line Technologies, Inc.	Deltaline BTR	black
	Series 100	white or yellow
	Delta-Line TWR	white or yellow
3M Company	3M Stamark Wet Reflective 710	white or yellow
	3M Stamark Mask Tape 715	black
Swarco Industries, Inc.	Director 2	white or yellow
	Director 2 Blackout	black

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EPOXY PAVEMENT MARKING MATERIALS, QUALIFIED PRODUCTS

NOTE: Only epoxy products from this list may be furnished to WisDOT projects
For each contract the contractor must submit a certification of compliance certifying
that the epoxy suplied under the contract conforms to the Standard Specifications Section 646
The applicable manufacturer batch numbers are to be identified in the submittal.

Date last edited: 1/31/2011

All yellow epoxy markings approved for use in Wisconsin are required to be lead free.

		Color
Poly-Carb, Inc. 33095 Bainbridge Road Cleveland, Ohio 44139	Slow set Mark-55A, B	White
	Slow set Mark-55A, B (Non-Lead)	Yellow
	Fast set Mark 55.3A, B	White
	Fast set Mark 55.3A, B (Non-Lead)	Yellow
Ennis Traffic Safety Solutions (dba Ennis Paint, Inc.) Coprorate Head Quarters 5510 N. Central Expressway Suite 1050 Dallas, TX 75206 800-331-6010 fax 214-696-8922 Tony Turcao- Technical Director turcao@ennistraffic.com www.ennistraffic.com	Slow set HPS-2	White
	Slow set HPS-2 (Non-Lead)	Yellow
	Fast set HPS-3	White
	Fast set HPS-3	No lead Yellow
Epoplex One Park Avenue Maple Shade, NJ 08052	Fast set LS60	White A
	Fast set LS60 (Non-Lead)	Yellow - LF A
	Slow set LS60	White A
	Slow set LS60 (Non-Lead)	Yellow - LF A
Sherwin-Williams 2325 Hollins Ferry Rd Baltimore, Maryland 21230	Slow Cure BP 16427 [*PMM(99W)-130]*	White
	Lead Free- Slow Cure BP 16429 [*PMM(99W)-132]*	Yellow
	Fast Cure TM-8212	White
	Lead Free - Fast Cure TM-8215	Yellow

*[PMM(99W)-131X] = AASHTO National Transportation Product Evaluation Program(NTPEP)"Report 00, Number 214" line number provided for information only.

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TEMPORARY RAISED PAVEMENT MARKERS

Date last edited: 5/19/2010

Manufacturer	Product Name/model
Apex Universal, Inc. 11033 Forest Pl. Santa Fe Springs, CA 90670	Apex 921 Series
Stimsonite Corporation Niles, Illinois	Stimsonite 88
3M	3M 290/291
Ray-O-Lite Division of Pac-Tec, Inc. 1870 James Parkway Heath, Ohio 43056	Square Shoulder 8700 Series Round Shoulder 8800 Series AA 9700 Series

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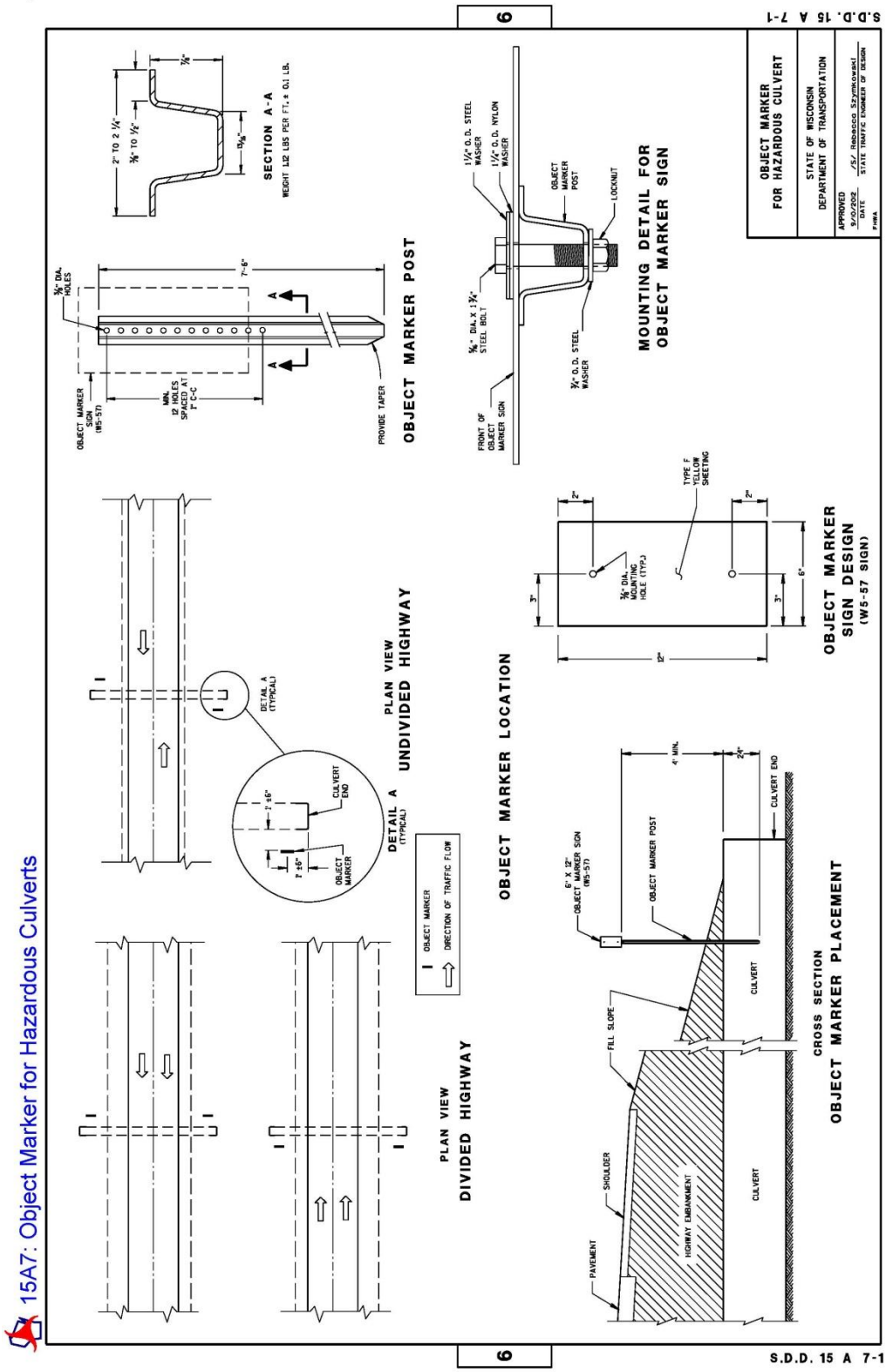
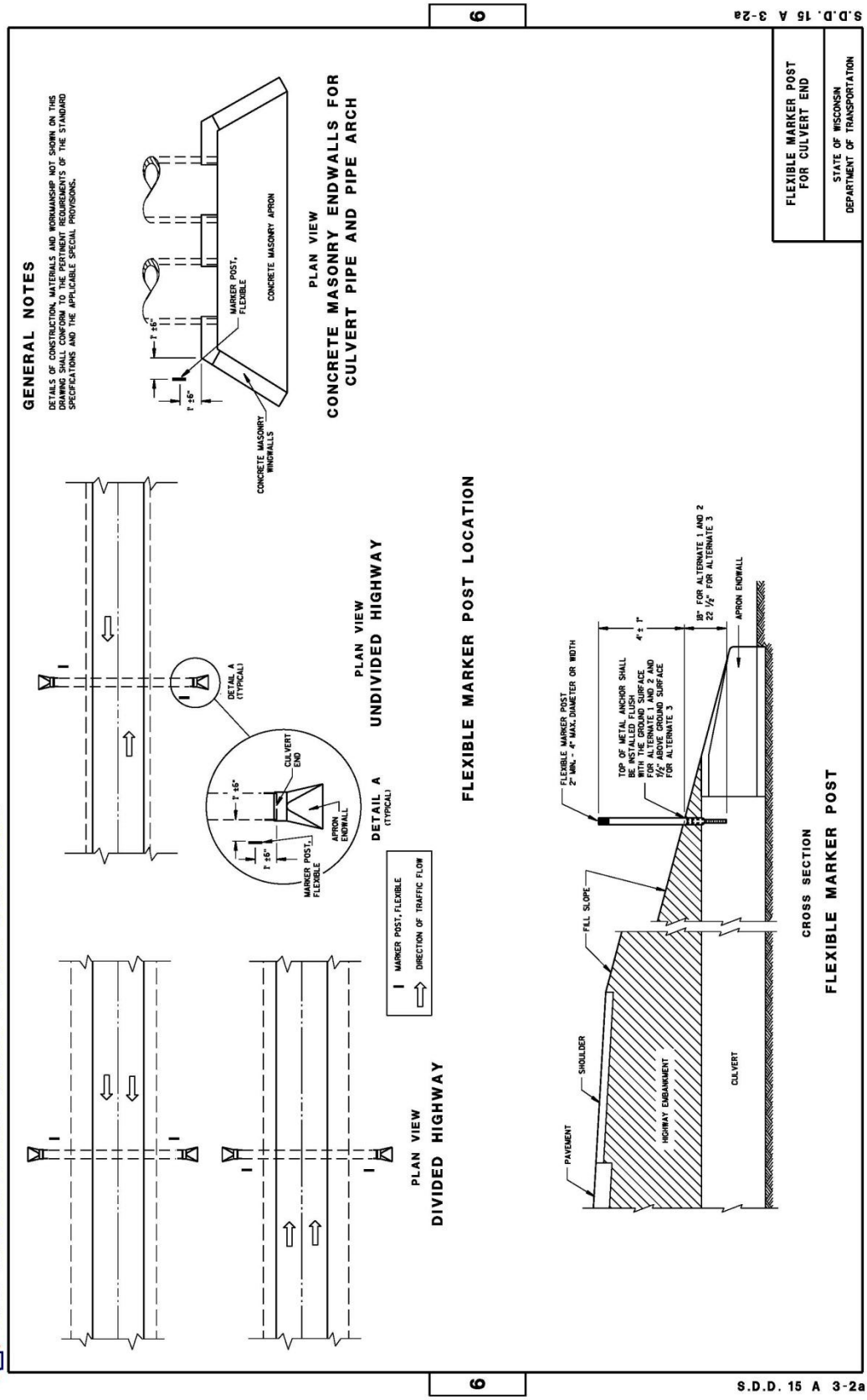
This *new* Standard Detail Drawing has been added for the installation of object markers at unprotected culvert ends that are within the clear zone.



15A3 sheet a: Flexible Marker Post for Culvert End