



**Minnesota Manual
on
Uniform Traffic
Control Devices**

MN

MUTCD

February 2015

**MINNESOTA
MANUAL
ON
UNIFORM
TRAFFIC
CONTROL
DEVICES**



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Minnesota Department of Transportation

Office of Traffic, Safety, & Technology
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April 7, 2015

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To: Holders of the 2011 Minnesota Manual of Uniform Traffic Control Devices

Transmitted herewith is Revision Number 4 to the "2011 Minnesota Manual on Uniform Traffic Control Devices" (2011 MN MUTCD) as adopted by the Commissioner of the Minnesota Department of Transportation (MnDOT). The attached pages to the 2011 MN MUTCD incorporate changes or corrections brought about by changes in the FHWA MUTCD and Minnesota practices or procedures.

All revised pages are attached herewith and shall replace corresponding pages in this manual. The attached Commissioner's Order No. 94687 amends Commissioner's Orders 93799, 93167, 92452, and 94040. It is important to retain all Orders because they amend but do not replace previous Orders.

The 2011 MN MUTCD including Revision Numbers 1, 2, 3, and 4 is available on the MnDOT website at <http://www.dot.state.mn.us/trafficeng/publ/mutcd/index.html>. This manual will be updated annually, typically near the beginning of each calendar year. The latest version will be available on the website after it has been adopted by the Commissioner of Transportation.

MnDOT no longer maintains a mailing list for printed updates to this manual. Users of the manual must fill out the "[Updates Notification Form](#)" found on the website above under "Quick Links." When an update/revision is made to the manual, an email will be sent out advising users to visit the website. The user must then download and print the revised pages and insert them into the printed version of their 2011 MN MUTCD.

To purchase additional copies of this manual or other State of Minnesota manuals call the MnDOT Map & Manual Sales Unit at 651-366-3017 for current costs and ordering information. They are located at the following address:

MnDOT Map & Manual Sales Unit
395 John Ireland Blvd. - MS 260
St. Paul, Minnesota 55155-1899

Comments regarding the content of the 2011 MN MUTCD should be referred to Janelle Anderson, MnDOT, Office of Traffic, Safety and Technology, phone (651) 234-7388, email address: janelle.anderson@state.mn.us.

Sincerely,

Susan M. Groth, PE, PTOE
State Traffic Engineer



**REVISIONS TO THE
2011 MINNESOTA UNIFORM TRAFFIC CONTROL DEVICES MANUAL
ORDER NO. 94687**

**(This is a republication of the Commissioner's Order dated February 10, 2015
revising the record of revisions and additions)**

This is the fourth order revising the 2011 Minnesota Manual on Uniform Traffic Control Devices (2011 MN MUTCD).

By Order number 92452 dated December 15, 2011 and published in the State Register of December 26, 2011, the Commissioner of Transportation (Commissioner) has adopted the 2011 MN MUTCD establishing a uniform system of traffic control devices for streets and highways of the State of Minnesota as required by Minnesota Statutes, Section 169.06, Subdivision 1 (2011). The 2011 MN MUTCD correlates with and so far as possible conforms to the current system as approved by the American Association of State Highway Officials and the national Manual on Uniform Traffic Control Devices (Federal MUTCD). (Minn. Stat. § 169.06, subd. 1 (2011); Federal Highway Administration, 23 C.F.R. § 655.603 (2011).)

The Commissioner adopted revisions and changes to the 2011 MN MUTCD by Order numbers:

93167 dated July 12, 2012 published in the State Register of July 23, 2012,
93799 dated July 8, 2013 published in the State Register of August 5, 2013, and
94040 dated December 11, 2013 published in the State Register December 16, 2013.

A multi-agency committee has reviewed the changes in the 2009 Federal MUTCD and recommended further revisions and additions.

Pursuant to Minnesota Statutes, Section 169.06, subd. 1 (2011), and 169.215, subd. 2 (2011), the Commissioner hereby adopts the revisions listed below:

Record of Revisions or Additions to the MN MUTCD

<u>Revision Number</u>	<u>Date Issued</u>	<u>Pages Revised or Added</u>
4	4/1/2015	v, ix, 2C-i, 2C-iii, 2C-5, 2C-23, 3A-i, 3A-iii, 3B-8, 3B-10, 3B-11, 3B-14, 3B-36, 6A-iii, 6A-v, 6A-vi, 6C-6, 6F-20, Chapter 6H (Speed Limits in Temporary Traffic Control Zones) in its entirety.

This Order revises Commissioner's Order number 92452, dated December 15, 2011 as revised by Commissioner's Orders numbers 93167 dated July 12, 2012, 93799 dated July 8, 2013, and 94040 dated December 11, 2013.

Signed this 1st day of April, 2015.

A handwritten signature in black ink, appearing to read "Charles A. Zelle". The signature is fluid and cursive, with the first name "Charles" being more prominent and the last name "Zelle" following in a similar style.

Charles A. Zelle
Commissioner of Transportation

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Record of Revisions or Additions to the MN MUTCD

<u>Revision Number</u>	<u>Date Issued</u>	<u>Pages Revised or Added</u>
4	02/10/15	2C-5, 2C-23, 3B-8, 3-10, 3B-11, 3B-14, 3-36, 6C-6, 6F-20, Chapter 6H (Speed Limits in Temporary Traffic Control Zones) in its entirety.

This Order revises Commissioner's Order number 92452, dated December 15, 2011 as revised by Commissioner's Orders numbers 93167 dated July 12, 2012, 93799 dated July 8, 2013, and 94040 dated December 11, 2013.

Signed this 10th day of February 2015.



Charles A. Zelle
Commissioner of Transportation

Minnesota Manual on Uniform Traffic Control Devices

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Year	Name	Commissioner's Order Number	Month/Day/Year of Adoption
1939	Manual on Uniform Traffic Control Devices for Streets and Highways of the State of Minnesota	12328	4/21/39
1949	Manual on Uniform Traffic Control Devices for Streets and Highways of the State of Minnesota	19270	3/22/49
1956	Manual on Uniform Traffic Control Devices for Streets and Highways of the State of Minnesota	25729	5/23/56
1962	Manual on Uniform Traffic Control Devices for Streets and Highways of the State of Minnesota	32517 49894 50987	2/16/62 9/15/71 4/21/72
1974	Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways	54014	12/20/73
1986	Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways (MN MUTCD)	70797 71787	4/15/86 12/19/86
1991	Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways (MN MUTCD)	77588 78988 79901 80748 80878 81551 82232 82843 83387 84240 85045	10/3/91 1/4/93 2/4/94 1/6/95 4/3/95 3/15/96 1/10/97 1/2/98 11/17/99 1/26/00 12/20/00
2001	Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD)	86252 87127 87570	4/15/02 5/22/03 1/2/04
2005	Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD)	88522 89453 90038 90627	5/5/05 1/2/07 2/15/08 3/26/09
2011	Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD)	92952 93167 93799 94040 94687	12/15/11 7/15/12 7/29/13 12/11/13 2/10/15

Table I-1a. Evolution of the Minnesota MUTCD

MN Rev. 1
MN Rev. 2
MN Rev. 3
MN Rev. 4

GUIDANCE:

The States should adopt Section 15-116 of the UVC, which states that "No person shall install or maintain in any area of private property used by the public any sign, signal, marking, or other device intended to regulate, warn, or guide traffic unless it conforms with the State manual and specifications adopted under Section 15-104."

SUPPORT:

The Standard, Guidance, Option, and Support material described in this edition of the MUTCD provide the transportation professional with the information needed to make appropriate decisions regarding the use of traffic control devices on streets, highways, bikeways, and private roads open to public travel (see definition in Section 1A.13).

Throughout this Manual the headings Standard, Guidance, Option, and Support are used to classify the nature of the text that follows. Figures and tables, including the notes contained therein, supplement the text and might constitute a Standard, Guidance, Option, or Support. The user needs to refer to the appropriate text to classify the nature of the figure, table, or note contained therein.

STANDARD:

When used in this Manual, the text headings of Standard, Guidance, Option, and Support shall be as defined in the first paragraph of Section 1A.13.

SUPPORT:

Throughout this Manual all dimensions and distances are provided in English units. Appendix A2 contains tables for converting each of the English unit numerical values that are used in this Manual to the equivalent Metric (International System of Units) values.

GUIDANCE:

If Metric units are to be used in laying out distances or determining sizes of devices, such units should be specified on plan drawings and made known to those responsible for designing, installing, or maintaining traffic control devices.

Except when a specific numeral is required or recommended by the text of a Section of the Manual, numerals displayed on the images of devices in the figures that specify quantities such as times, distances, speed limits, and weights should be regarded as examples only. When installing any of these devices, the numerals should be appropriately altered to fit the specific situation.

SUPPORT:

The following information will be useful when reference is being made to a specific portion of text in this Manual.

There are nine Parts in this Manual and each Part is

comprised of one or more Chapters. Each Chapter is comprised of one or more Sections. Parts are given a numerical identification, such as Part 2-Signs. Chapters are identified by the Part number and a letter, such as Chapter 2B-Regulatory Signs, Barricades and Gates. Sections are identified by the Chapter number and letter followed by a decimal point and a number, such as Section 2B.3-Size of Regulatory Signs.

Each Section is comprised of one or more paragraphs. The paragraphs are indented but are not identified by a number. Paragraphs are counted from the beginning of each Section without regard to the intervening text headings (Standard, Guidance, Option, or Support). Some paragraphs have lettered or numbered items. As an example of how to cite this Manual, the phrase "Not less than 40 feet beyond the stop line" that appears in Section 4D-14 of this Manual would be referenced in writing as "Section 4D.14, P7, D1, A.1," and would be verbally referenced as "Item A.1 of Paragraph 1 of Section 4D.14."

STANDARD:

In accordance with 23 CFR 655.603(b)(3), Minnesota shall revise the MN MUTCD to be in substantial conformance with changes to the National MUTCD within 2 years of the effective date of the Final Rule for the changes. Substantial conformance of such State or other Federal agency MUTCDs or Supplements shall be as defined in 23 CFR 655.603(b)(1).

After the adoption and issuance of a new edition of the MN MUTCD or a revision thereto, new or reconstructed devices installed shall be in compliance with the new edition or revision.

In cases involving Federal-aid projects for new street, highway or bicycle trail construction or reconstruction, the traffic control devices installed (temporary or permanent) shall be in conformance with the most recent edition of the MN MUTCD before that highway is opened or re-opened to the public for unrestricted travel [23 CFR 655.603(d)(2) and (d)(3)].

Unless a particular device is no longer serviceable, non-compliant devices on existing highways and bikeways shall be brought into compliance with the current edition of the MN MUTCD as part of the systematic upgrading of substandard traffic control devices (and installation of new required traffic control devices) required pursuant to the Highway Safety Program, 23 U.S.C. § 402(a). The FHWA and the State of Minnesota have the authority to establish other target compliance dates for implementation of particular changes to the MN MUTCD [23 CFR 655.603(d)(1)]. These target compliance dates established by the FHWA shall be as shown in Table I-2.

RECORD OF REVISIONS OR ADDITIONS		
Revision Number	Date Issued	Pages Revised or Added
	12/15/2011	Issued as a new manual
1	6/15/2012	v, viii, ix, 1A-4, 1A-28, 1A-29, 2A-5, 2A-18, 2B-1 thru 2B-6, 2B-11, 2B-15, 2B-34, 2B-35, 2B-38, 2B-41, 2B-53, 2B-56, 2B-57, 2C-3, 2C-4, 2C-11, 2C-13, 2C-17, 2C-18, 2C-20, 2C-24 thru 2C-28, 2C-30, 2C-34, 2D-23, 2D-27 thru 2D-29, 2E-6, 2E-33, 2E-37, 2E-41, 2E-51, 2F-6, 2G-11, 2G-16, 2I-2, 2I-5, 2I-10, 2I-11, 2I-13, 2J-5, 2M-1, 2M-2, 2N-2, 3B-27, 3B-35, 4D-1, 4D-39, 4D-46, 4E-3, 4E-6, 4F-3, 5C-2, 6D-1, 6D-2, 6D-4, 6E-1, 6F-3, 6F-7, 6F-20, 6F-29, 6F-37, 6F-52, 6G-1, 7B-1, 7B-5, 7B-6, 7B-9, 7B-11, 7C-1, 7D-1, 7E-a thru 7E-21, 8B-1, 8B-3, 8B-4, 8B-7 thru 8B-10, 8B-14, 8B-18, 8C-4, 8C-8, 8C-9, 9A-i, 9A-ii, 9B-2 thru 9B-4, 9B-6, 9B-9, 9B-18, 9C-1, A2-1, C-1 thru C-8, C-15 thru C-24, C-26, C-28 thru C-31, C-33 thru C-40, C-42, C-43, C-47, C-52 thru C-60, C-62 thru C-70, C-75 thru C-77, C-79 thru C-83
2	6/29/2013	ii, vi, 2A-4, 2A-18, 2A-19, 2B-2 thru 2B-6, 2B-11, 2B-12, 2B-18, 2B-21, 2B-22, 2B-37, 2B-40, 2B-47, 2B-48, 2B-51, 2B-56, 2B-59, 2C-4, 2C-5, 2C-7, 2C-10, 2C-26, 2C-32, 2D-1, 2D-9, 2D-27, 2D-39, 2E-18, 2E-47, 2E-48, 2E-51, 2G-3, 2G-4, 2H-i, 2H-2, 2H-7 thru 2H-9, 2I-2 thru 2I-4, 2I-7, 2I-10, 2J-4, 2J-6, 2K-1, 2K-5, 2M-i, 2M-1, 2M-2, 2M-9, 2M-12 thru 2M-14, 3B-9, 4D-2, 4D-31, 4D-33, 6F-5, 6J-4, 6J-17, 7A-i, 7B-2, 7B-10, 9B-9, 9B-16, 9B-18, C-1, C-2, C-5, C-13, C-14, C-16 thru C-21, C-24, C-26 thru C-39, C-41 thru C-57, C-59 thru C-61, C-63 thru C-66, C-82 thru C-95, INDEX-9 thru INDEX-16.
3	12/11/2013	v, ix, 2B-i, 2B-17, 2B-55, 2C-ii, 2C-23, 2C-26 thru 2C-36, 2D-28, 2E-11, 3B-14, 3C-1, 4G-3, 4L-1, 6A-iii thru 6A-vi, 6F-3 thru 6F-5, 6F-14, 6F-17, 6F-19, 6F-20, 6F-40 thru 6F-53, 6G-7, 6J-iii, 6J-2, 6J-4, 6J-5, 6J-7, 6J-8, 6J-10, 6J-11, 6J-14 thru 6J-21, 6J-24a thru 6J-25b, Chapter 6K (the Field Manual) in its entirety, 7B-2, 8B-2, 9B-6, C-3, C-19, C-38, C-39, C-46, C-56 thru C-58, remove Appendix B in its entirety.
4	2/10/2015	v, ix, 2C-i, 2C-iii, 2C-5, 2C-23, 3A-i, 3A-iii, 3B-8, 3B-10, 3B-11, 3B-14, 3B-36, 6A-iii, 6A-v, 6A-vi, 6C-6, 6F-20, Chapter 6H (Speed Limits in Temporary Traffic Control Zones) in its entirety.

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Sign or Plaque	Sign Designation	Section	Conventional Road		Expressway	Freeway	Minimum	Oversized
			Single Lane	Multi-Lane				
Trail Xing (plaque)	W11-15P	2C.49	24 x 18	24 x 18	30 x 24	---	---	36 x 30
Trucks Entering	W11-X3	2C.49	36 x 36	36 x 36	48 x 48	---	24 x 24	48 x 48
Double Arrow	W12-1	2C.25	30 x 30	36 x 36	36 x 36	---	---	---
Low Clearance (with arrow)	W12-2	2C.27	36 x 36	36 x 36	48 x 48	48 x 48	30 x 30	---
Low Clearance	W12-2a	2C.27	78 x 24	78 x 24	--	---	---	---
Low Clearance (with arrows)	W12-X2	2C.27	48 x 24	48 x 24	----	---	---	---
Advisory Speed (plaque)	W13-1P	2C.8	18 x 18	18 x 18	24 x 24	30 x 30	---	30 x 30
Advisory Exit or Ramp Speed	W13-2,3	2C.14	24 x 30	24 x 30	36 x 48	48 x 60	---	48 x 60
Combination Horizontal Alignment/Advisory Exit or Ramp Speed	W13-6,7	2C.15	24 x 42	24 x 42	36 x 60	36 x 60	---	48 x 84
Dead End, No Outlet	W14-1,2	2C.26	30 x 30	36 x 36	36 x 36	---	24 x 24	48 x 48
Dead End, No Outlet (w/arrow)	W14-1a, 2a	2C.26	36 x 8	36 x 8	---	---	---	---
No Passing Zone (pennant)	W14-3	2C.45	48 x 48 x 36	48 x 48 x 36	---	---	40 x 40 x 30	64 x 64 x 48
Playground	W15-1	2C.51	30 x 30	36 x 36	36 x 36	---	24 x 24	48 x 48
Share the Road (plaque)	W16-1P	2C.60	18 x 24	18 x 24	24 x 30	---	---	24 x 30
XX Feet	W16-2P	2C.55	24 x 18	24 x 18	---	---	---	30 x 24
XX Ft	W16-2aP	2C.55	24 x 12	24 x 12	---	---	---	30 x 18
XX Miles (2-line plaque)	W16-3P	2C.55	30 x 24	30 x 24	---	---	---	---
XX Miles (1-line plaque)	W16-3aP	2C.55	30 x 12	30 x 12	---	---	---	---
Next XX Feet (plaque)	W16-4P	2C.55	30 x 24	30 x 24	---	---	---	---
Supplemental Arrow (plaque)	W16-5P,6P	2C.56	24 x 18	24 x 18	---	---	---	---
Downward Diagonal Arrow (plaque)	W16-7P	2C.50	24 x 12	24 x 12	---	---	---	30 x 18
Advance Street Name (1-line plaque)	W16-8P	2C.58	Varies x 8	Varies x 8	---	---	---	---
Advance Street Name (2-line plaque)	W16-8aP	2C.58	Varies x 15	Varies x 15	---	---	---	---
Ahead (plaque)	W16-9P	2C.50	24 x 12	24 x 12	30 x 18	---	---	---
Photo Enforced (symbol plaque)	W16-10P	2C.61	24 x 12	24 x 12	36 x 18	---	---	48 x 24
Photo Enforced (plaque)	W16-10aP	2C.61	24 x 18	24 x 18	36 x 30	---	---	48 x 36
HOV (plaque)	W16-11P	2G.9	24 x 12	24 x 12	30 x 18	---	---	30 x 18
Traffic Circle (plaque)	W16-12P	2C.46	24 x 18	24 x 18	---	---	---	---
When Flashing (plaque)	W16-13P	2C.50	24 x 18	24 x 18	---	---	---	---
New (plaque)	W16-15P	2C.62	24 x 12	24 x 12	---	---	---	---
Roundabout (plaque)	W16-17P	2C.46	24 x 12	24 x 12	---	---	---	---
NOTICE (plaque)	W16-18P	2A.15	24 x 12	24 x 12	---	---	---	---
Speed Hump	W17-1	2C.29	30 x 30	36 x 36	---	---	24 x 24	48 x 48
Freeway Ends XX Miles	W19-1	2C.24	---	---	---	144 x 48	---	---
Expressway Ends XX Miles	W19-2	2C.24	---	---	144 x 48	---	---	---
Freeway Ends	W19-3	2C.24	---	---	---	48 x 48	---	---
Expressway Ends	W19-4	2C.24	---	---	48 x 48	---	---	---
All Traffic Must Exit	W19-5	2C.24	---	---	90 x 48	90 x 48	---	---
New Traffic Pattern Ahead	W23-2	2C.52	36 x 36	36 x 36	---	---	---	---
Traffic Signal Extended Green	W25-1,2	2C.48	24 x 30	24 x 30	---	---	---	---

* The minimum size required for diamond-shaped warning signs facing traffic on multi-lane conventional roads shall be 36 x 36 where the posted speed limit is greater than 35 mph (see Section 2C.4).

Notes:

1. Larger signs may be used when appropriate
2. Dimensions in inches are shown as width x height

Table 2C-2 Warning Sign and Plaque Sizes (Sheet 3 of 3)

2C.4 Size of Warning Signs

STANDARD:

Except as provided in Section 2A.11, the sizes for warning signs shall be as shown in Table 2C-2 and in Appendix C at the back of this Manual.

SUPPORT:

Section 2A.11 contains information regarding the applicability of the various columns in Table 2C-2.

STANDARD:

Except as provided in the Option below, the minimum size for all diamond-shaped warning signs facing traffic on a multi-lane conventional road where the posted speed limit is higher than 35 mph shall be 36 x 36 inches.

The minimum size for supplemental warning plaques that are not included in Table 2C-2 shall be as shown in Table 2C-3.

OPTION:

If a diamond-shaped warning sign is placed on the left-hand side of a multi-lane roadway to supplement the installation of the same warning sign on the right-hand side of the roadway, the minimum size identified in the Single Lane column in Table 2C-2 may be used.

Signs and plaques larger than those shown in Appendix C and Tables 2C-2 and 2C-3 may be used (see Section 2A.11).

GUIDANCE:

The minimum size for all diamond-shaped warning signs facing traffic on exit and entrance ramps should be the size identified in Table 2C-2 for the mainline roadway classification (Expressway or Freeway). If a minimum size is not provided in the Freeway Column, the Expressway size should be used. If a minimum size is not provided in the Freeway or the Expressway Column, the Oversized size should be used.

2C.5 Placement of Warning Signs

SUPPORT:

For information on placement of warning signs, see Sections 2A.16 to 2A.21.

The time needed for detection, recognition, decision, and reaction is called the Perception-Response Time (PRT). Table 2C-4 is provided as an aid for determining warning sign location. The distances shown in Table 2C-4 can be adjusted for roadway features, other signing, and to improve visibility.

GUIDANCE:

Warning signs should be placed so that they provide adequate PRT. The distances contained in Table 2C-4 are for guidance purposes and should be applied with engineering judgment. Warning signs should not be placed too far in advance of the condition, such that drivers might tend to forget the warning because of other driving distractions, especially in urban areas.

Minimum spacing between warning signs with different messages should be based on the estimated PRT for driver comprehension of and reaction to the second sign.

The effectiveness of the placement of warning signs should be periodically evaluated under both day and night conditions.

OPTION:

Warning signs that advise road users about conditions that are not related to a specific location, such as Deer Crossing or SOFT SHOULDER, may be installed in an appropriate location, based on engineering judgment, since they are not covered in Table 2C-4.

Size of Warning Sign	Size of Supplemental Plaque			
	Rectangular			Square
	1 Line	2 Lines	Arrow	
24 x 24 30 x 30	24 x 12	24 x 18	24 x 12	18 x 18
36 x 36 48 x 48	30 x 18	30 x 24	30 x 18	24 x 24

- Notes: 1. Larger supplemental plaques may be used when appropriate.
2. Dimensions are in inches and are shown as width x height.

Table 2C-3. Minimum Size of Supplemental Warning Plaques

2C.36 Advance Traffic Control Signs (W3-1, W3-2, W3-3, W3-4, W3-X2, W3-X4)



STANDARD:

The Advance Traffic Control signs include the Stop Ahead (W3-1), Yield Ahead (W3-2), and Signal Ahead (W3-3) signs. These signs shall be installed on an approach to a primary traffic control device that is not visible for a sufficient distance to permit the road user to respond to the device (see Table 2C-4). The visibility criteria for a traffic control signal shall be based on having a continuous view of at least two signal faces for the distance specified in Table 4D-2.

SUPPORT:

Figure 2A-4 shows the typical placement of an Advance Traffic Control sign.

Permanent obstructions causing the limited visibility might include roadway alignment or structures. Intermittent obstructions might include foliage or parked vehicles.

GUIDANCE:

Where intermittent obstructions occur, engineering judgment should determine the treatment to be implemented.

OPTION:

An Advance Traffic Control sign may be used for additional emphasis of the primary traffic control device, even when the visibility distance to the device is satisfactory.

An advance street name plaque (see Section 2C.58) may be installed above or below an Advance Traffic Control sign.

A warning beacon may be used with an Advance Traffic Control sign.

A BE PREPARED TO STOP (W3-4) sign may be used to warn of stopped traffic caused by a traffic control signal or in advance of a section of roadway that regularly experiences traffic congestion.

STANDARD:

When a BE PREPARED TO STOP sign is used in advance of a traffic control signal, it shall be used in addition to a Signal Ahead sign and shall be placed downstream from the Signal Ahead (W3-3) sign.

OPTION:

The BE PREPARED TO STOP sign may be supplemented with a warning beacon (see Section 4L.3).

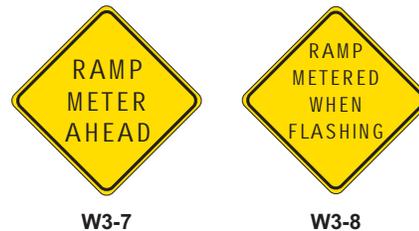
STANDARD:

When the warning beacon is interconnected with a traffic control signal or queue detection system, the BE PREPARED TO STOP sign shall be supplemented with a WHEN FLASHING plaque (W3-X2) or use the PREPARE TO STOP WHEN FLASHING sign (W3-X4). See Section 4M.

SUPPORT:

Section 2C.40 contains information regarding the use of a NO MERGE AREA (W4-5P) supplemental plaque in conjunction with a Yield Ahead sign.

2C.37 Advance Ramp Control Signal Signs (W3-7, W3-8)



OPTION:

A RAMP METER AHEAD (W3-7) sign may be used to warn road users that a freeway entrance ramp is metered and that they will encounter a ramp control signal (see Chapter 4I).

GUIDANCE:

When the ramp control signals are operated only during certain periods of the day and sight distance is insufficient to react to stopped vehicles, a RAMP METERED WHEN FLASHING (W3-8) sign should be installed in advance of the ramp control signal near the entrance to the ramp, or on the arterial on the approach to the ramp, to alert road users to the presence and operation of ramp meters.

STANDARD:

The RAMP METERED WHEN FLASHING sign shall be supplemented with a warning beacon (see Section 4L.3) that flashes when the ramp control signal is in operation.

2C.38 Reduced Speed Limit Ahead Signs (W3-5, W3-5a)



W3-5



W3-5a

GUIDANCE:

A Reduced Speed Limit Ahead (W3-5 or W3-5a) sign should be used to inform road users of a reduced speed zone where the speed limit is being reduced by more than 10 mph, or where engineering judgment indicates the need for advance notice to comply with the posted speed limit ahead.

STANDARD:

If used, Reduced Speed Limit Ahead signs shall be followed by a Speed Limit (R2-1) sign installed at the beginning of the zone where the speed limit applies.

The speed limit displayed on the Reduced Speed Limit Ahead sign shall be identical to the speed limit displayed on the subsequent Speed Limit sign.

2C.39 DRAW BRIDGE Sign (W3-6)



W3-6

STANDARD:

A DRAW BRIDGE (W3-6) sign shall be used in advance of movable bridge signals and gates (see Section 4J.2) to give warning to road users, except in urban conditions where such signing would not be practical.

2C.40 Merge Signs (W4-1)



W4-1

OPTION:

A Merge (W4-1) sign may be used to warn road users on the major roadway that merging movements might be encountered in advance of a point where lanes from two separate roadways converge as a single traffic lane and no turning conflict occurs.

A Merge sign may also be installed on the side of the entering roadway to warn road users on the entering roadway of the merge condition.

GUIDANCE:

The Merge sign should be installed on the side of the major roadway where merging traffic will be encountered and in such a position as to not obstruct the road user's view of entering traffic.

Where two roadways of approximately equal importance converge, a Merge sign should be placed on each roadway.

When a Merge sign is to be installed on an entering roadway that curves before merging with the major roadway, such as a ramp with a curving horizontal alignment as it approaches the major roadway, the Entering Roadway Merge (W4-5) sign should be used to better portray the actual geometric conditions to road users on the entering roadway.

The Merge sign should not be used where two roadways converge and merging movements are not required.

The Merge sign should not be used in place of a Lane Ends sign (see Section 2C.42) where lanes of traffic moving on a single roadway must merge because of a reduction in the actual or usable pavement width.

OPTION:

For a yield-controlled channelized right-turn movement onto a roadway without an acceleration lane, a NO MERGE AREA (W4-5P) supplemental plaque may be mounted below a Yield Ahead (W3-2) sign and/or below a YIELD (R1-2) sign when engineering judgment indicates that road users would expect an acceleration lane to be present. (see Section 2B.9 for YIELD sign applications)

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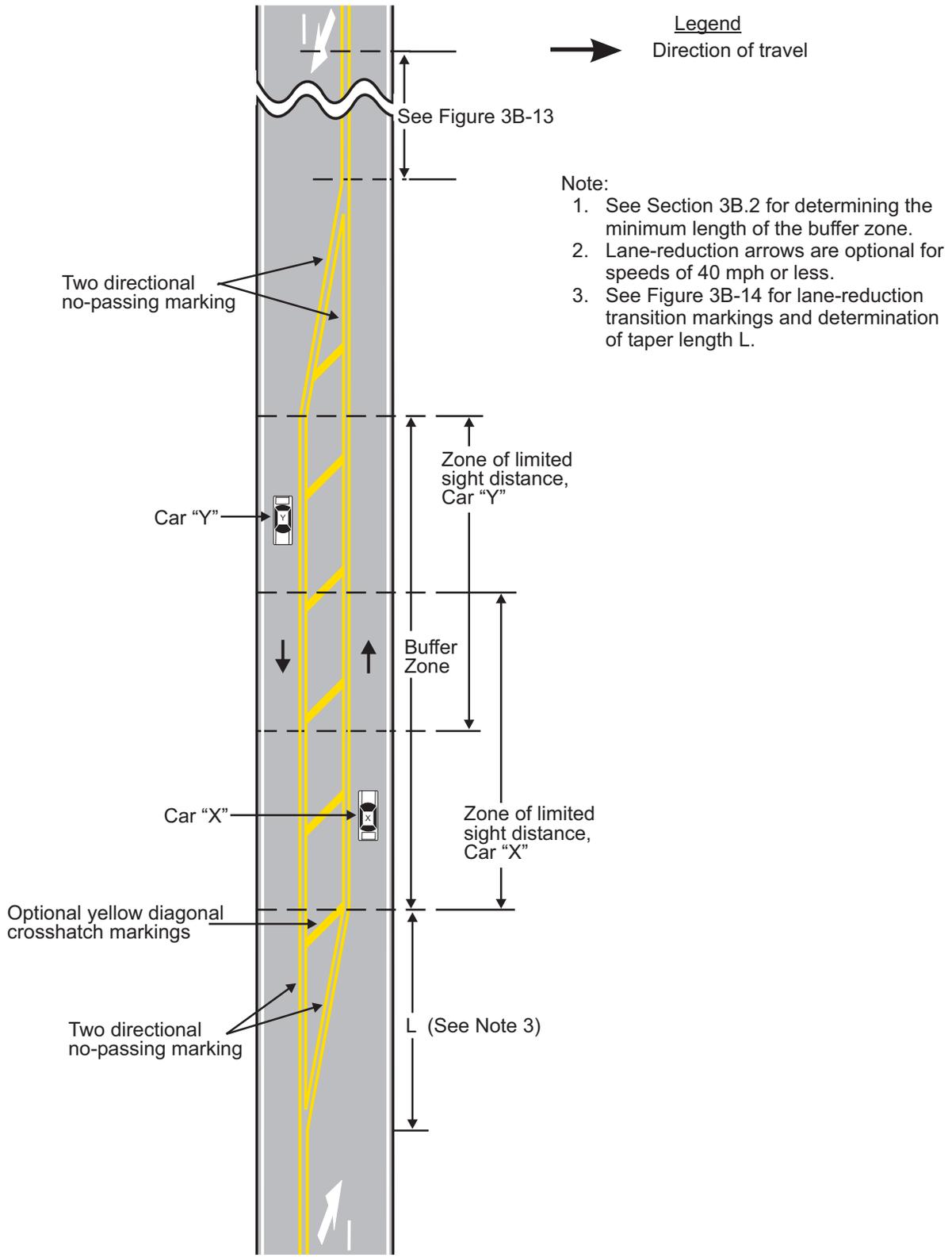


Figure 3B-5 Example of Application of Three-Lane, Two-Way Marking for Changing Direction of the Center Lane

Legend
→ Direction of travel

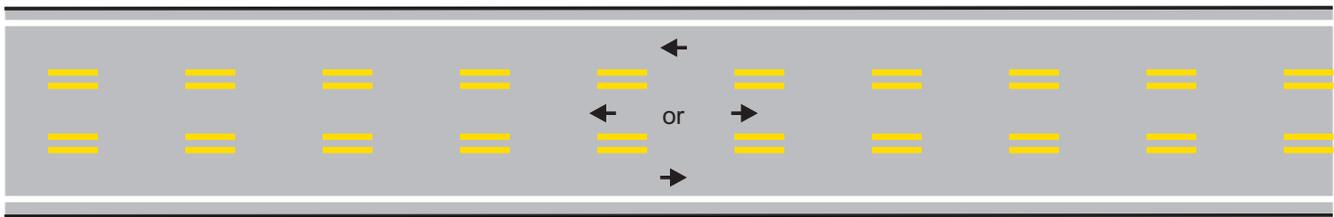


Figure 3B-6 Example of Reversible Lane Marking Application

STANDARD:

If a continuous flush median island formed by pavement markings separating travel in opposite directions is used, two sets of solid double yellow lines shall be used to form the island as shown in Figures 3B-2 and 3B-5. Other markings in the median island area shall also be yellow, except crosswalk markings which shall be white (see Section 3B.18).

3B.4 White Lane Line Pavement Markings and Warrants

STANDARD:

When used, lane line pavement markings delineating the separation of traffic lanes that have the same direction of travel shall be white.

Lane line markings shall be used on all freeways and interstate highways.

GUIDANCE:

Lane line markings should be used on all roadways that are intended to operate with two or more adjacent traffic lanes in the same direction of travel, except as otherwise required for reversible lanes. Lane line markings should also be used at congested locations where the roadway will accommodate more traffic lanes with lane line markings than without the markings.

SUPPORT:

Examples of lane line markings are shown in Figures 3B-2, 3B-3, and 3B-7 through 3B-13.

STANDARD:

Except as provided in the following paragraph, where crossing the lane line markings with care is permitted, the lane line markings shall consist of a normal broken white line.

A dotted white line marking shall be used as the lane line

to separate a through lane that continues beyond the interchange or intersection from an adjacent lane for any of the following conditions:

- A. A deceleration or acceleration lane,
- B. A through lane that becomes a mandatory exit or turn lane,
- C. An auxiliary lane 2 miles or less in length between an entrance ramp and an exit ramp, or
- D. An auxiliary lane 1 mile or less in length between two adjacent intersections.

For exit ramps with a parallel deceleration lane, a normal width dotted white lane line shall be installed from the upstream end of the full-width deceleration lane to the theoretical gore or to the upstream end of a solid white lane line, if used, that extends upstream from the theoretical gore as shown in Drawings A and C of Figure 3B-8.

OPTION:

For exit ramps with a parallel deceleration lane, a normal width dotted white line extension may be installed in the taper area upstream from the full-width deceleration lane as shown in Drawings A and C of Figure 3B-8.

For an exit ramp with a tapered deceleration lane, a normal width dotted white line extension may be installed from the theoretical gore through the taper area such that it meets the edge line at the upstream end of the taper as shown in Drawing B of Figure 3B-8.

STANDARD:

For entrance ramps with a parallel acceleration lane, a normal width dotted white lane line shall be installed from the theoretical gore or from the downstream end of a solid white lane line, if used, that extends downstream from the theoretical gore, to a point at least one-half the distance from the theoretical gore to the downstream end of the acceleration taper, as shown in Drawing A of Figure 3B-9.

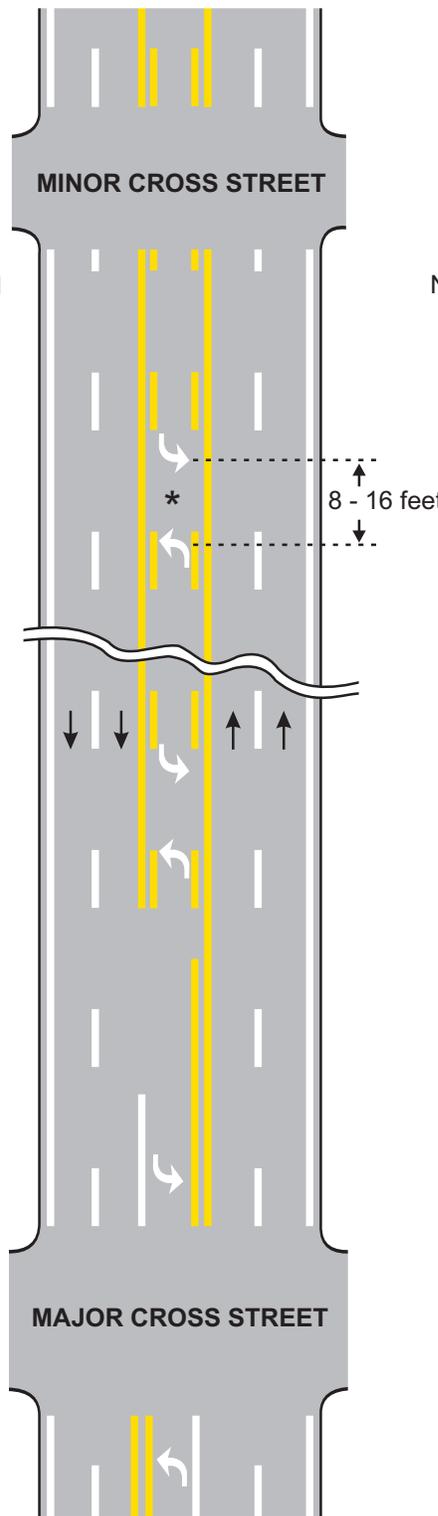
OPTION:

For entrance ramps with a parallel acceleration lane, a

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* See Section 3B.20 for use of additional arrows beyond the beginning of the two-way left-turn lane.



Legend
→ Direction of travel

Note:
Single-direction left-turn arrows shall not be used in lanes bordered on both sides by two-way left-turn lane markings

Figure 3B-7 Example of Two-Way Left-Turn Lane Marking Applications

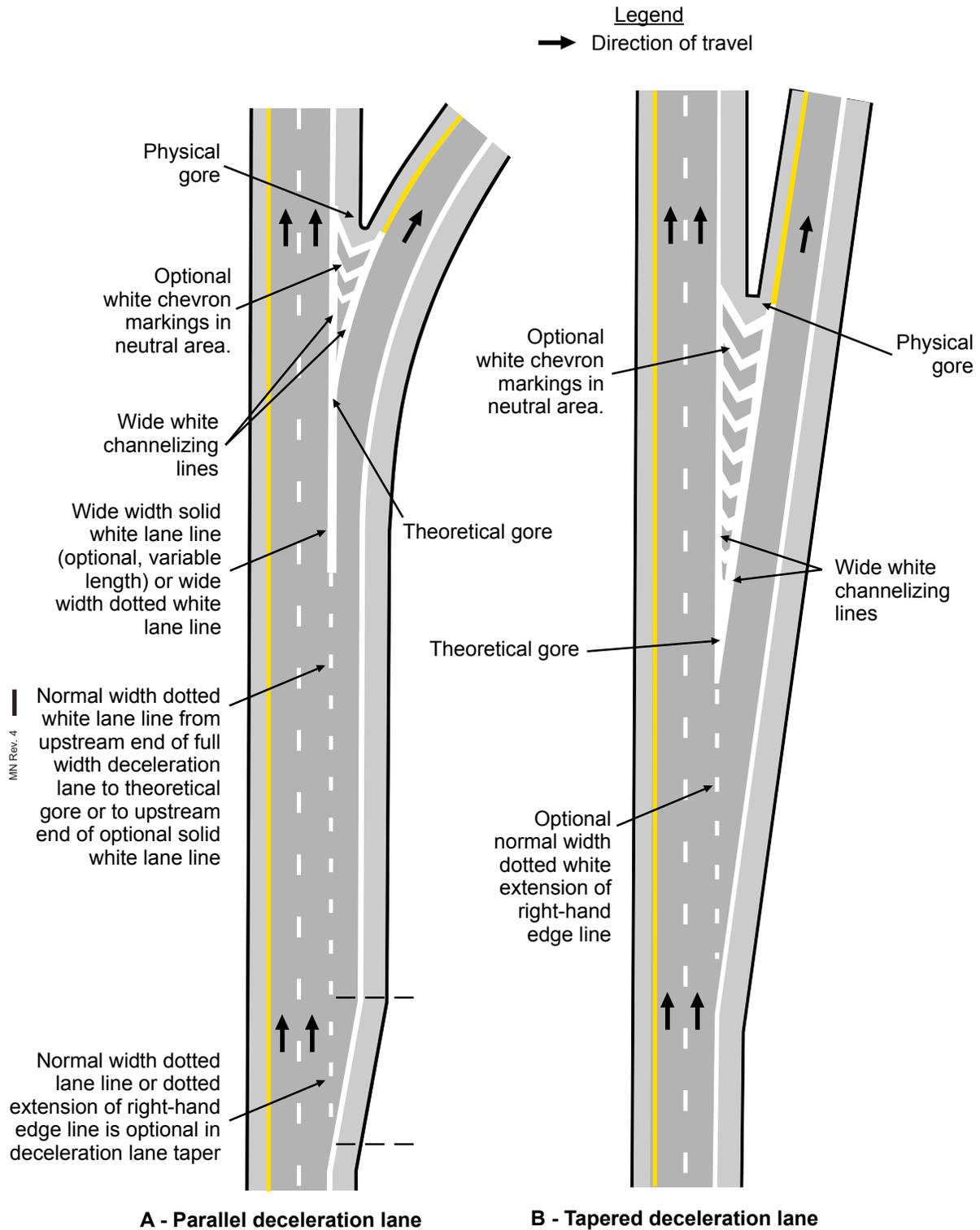
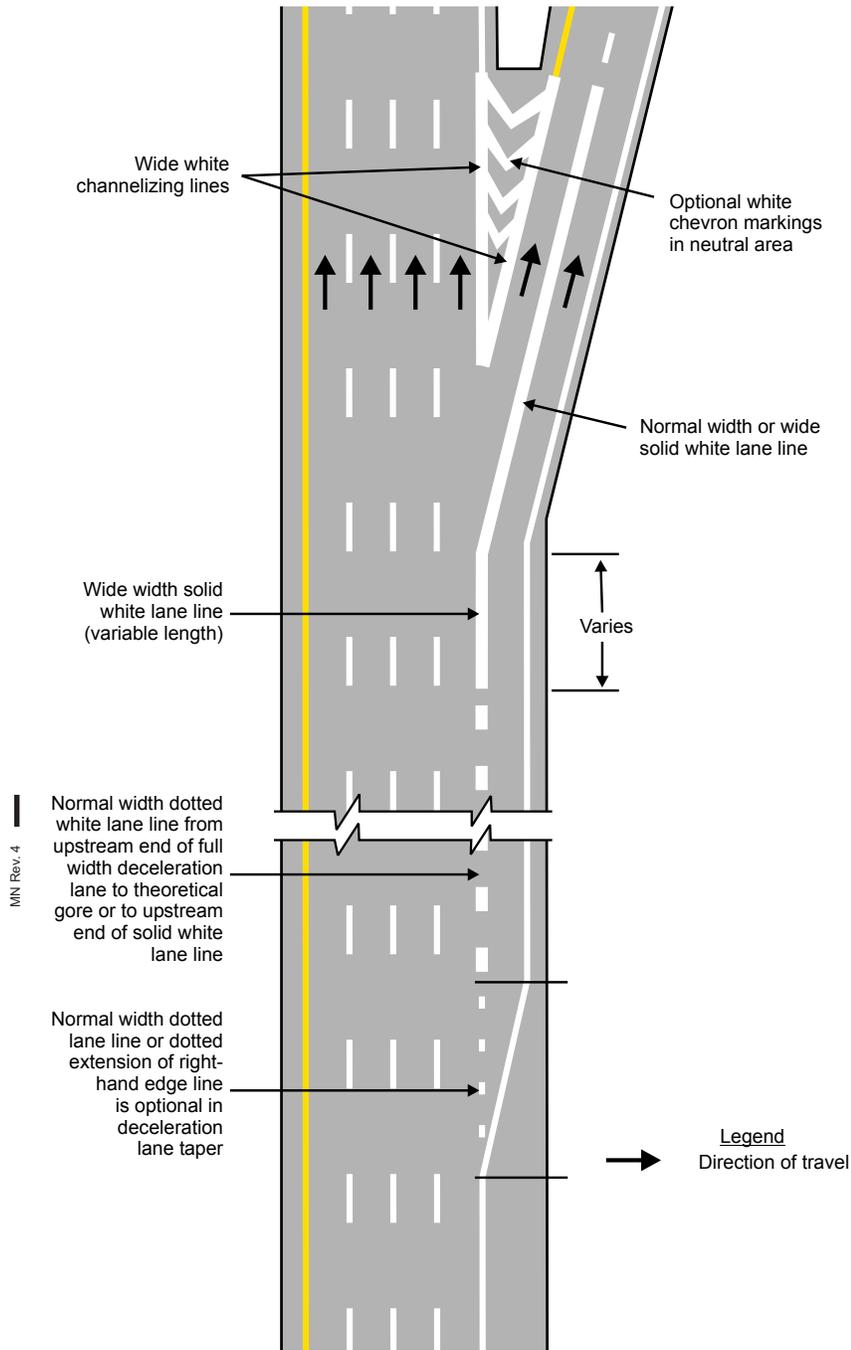


Figure 3B-8 Examples of Dotted Line and Channelizing Line Applications for Exit Ramp Markings
 (Sheet 1 of 2)



C - Parallel deceleration lane at a multi-lane exit ramp having an optional exit lane that also carries the through route

Figure 3B-8 Examples of Dotted Line and Channelizing Line Applications for Exit Ramp Markings

(Sheet 2 of 2)

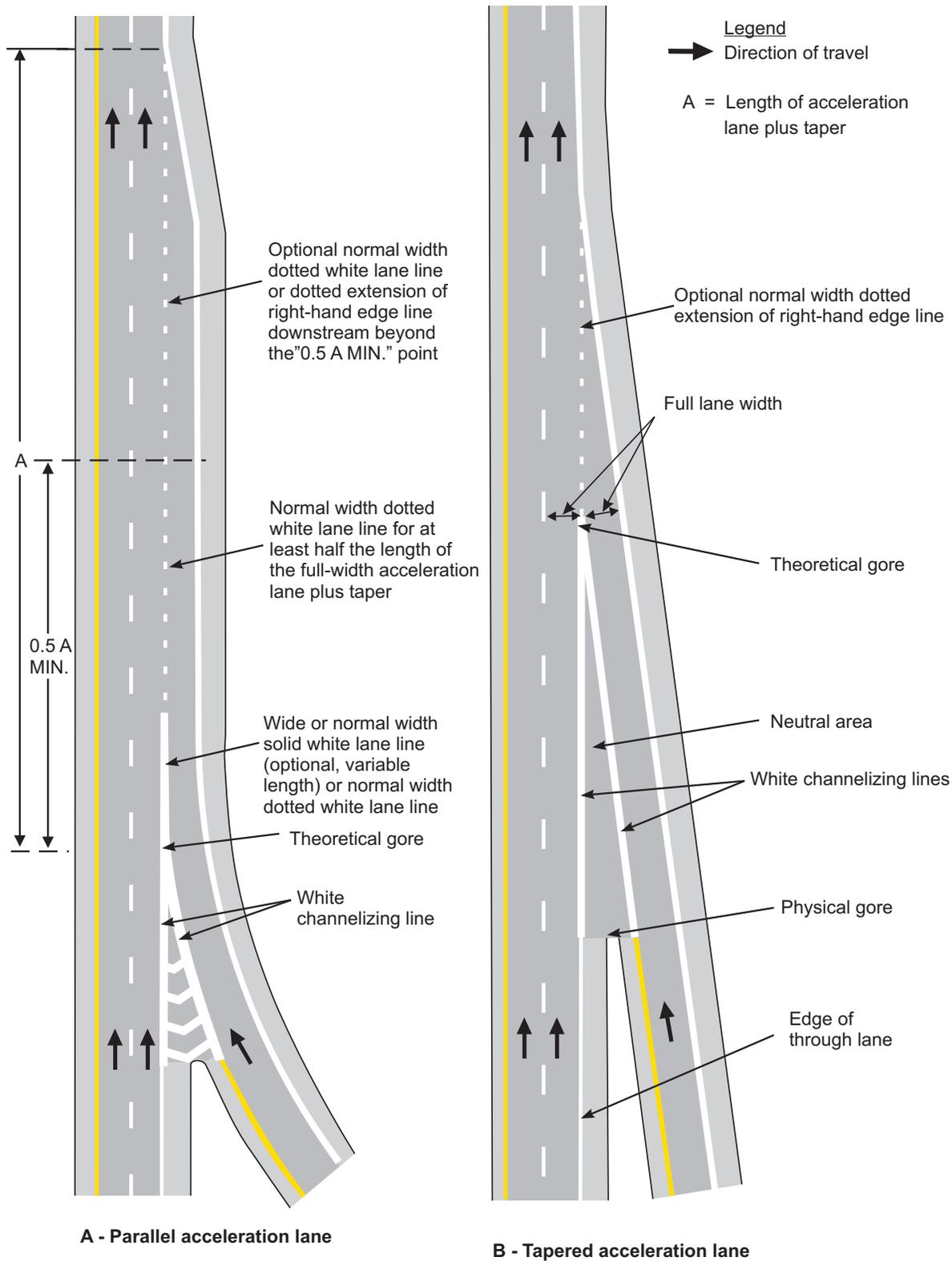


Figure 3B-9 Examples of Dotted Line and Channelizing Lane Applications for Entrance Ramp Markings
 (Sheet 1 of 2)

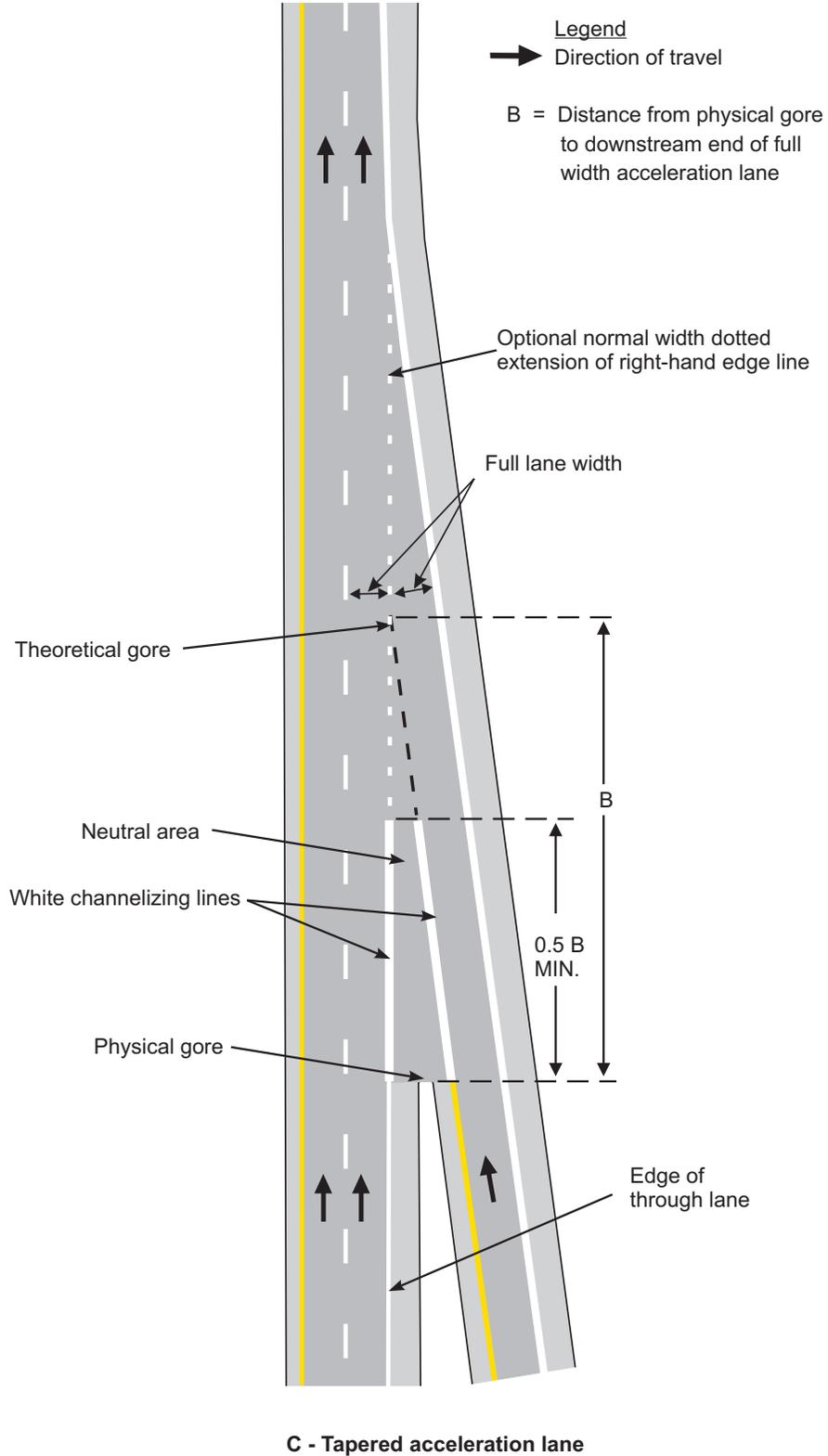


Figure 3B-9 Examples of Dotted Line and Channelizing Lane Applications for Entrance Ramp Markings
 (Sheet 2 of 2)

normal width dotted white line extension may be installed from the downstream end of the dotted white lane line to the downstream end of the acceleration taper, as shown in Drawing A of Figure 3B-9.

For entrance ramps with a tapered acceleration lane, a normal width dotted white line extension may be installed from the downstream end of the channelizing line adjacent to the through lane to the downstream end of the acceleration taper, as shown in Drawings B and C of Figure 3B-9.

STANDARD:

A wide dotted white lane line shall be used:

- A. As a lane drop marking in advance of lane drops at exit ramps to distinguish a lane drop from a normal exit ramp (see Drawings A, B, and C of Figure 3B-10),
- B. In advance of freeway route splits with dedicated lanes (see Drawing D of Figure 3B-10),
- C. To separate a through lane that continues beyond an interchange from an adjacent auxiliary lane between an entrance ramp and an exit ramp (see Drawing E of Figure 3B-10),
- D. As a lane drop marking in advance of lane drops at intersections to distinguish a lane drop from an intersection through lane (see Drawing A of Figure 3B-11), and
- E. To separate a through lane that continues beyond an intersection from an adjacent auxiliary lane between two intersections (see Drawing B of Figure 3B-11).

GUIDANCE:

Lane drop markings used in advance of lane drops at freeway and expressway exit ramps should begin at least 1/2 mile in advance of the theoretical gore.

On the approach to a multi-lane exit ramp having an optional exit lane that also carries through traffic, lane line markings should be used as illustrated in Drawing B of Figure 3B-10. In this case, if the right-most exit lane is an added lane such as a parallel deceleration lane, the lane drop marking should begin at the upstream end of the full-width deceleration lane, as shown in Drawing C of Figure 3B-8.

Lane drop markings used in advance of lane drops at intersections should begin a distance in advance of the intersection that is determined by engineering judgment as suitable to enable drivers who do not desire to make the mandatory turn to move out of the lane being dropped prior to reaching the queue of vehicles that are waiting to make the turn. The lane drop marking should begin no closer to the intersection than the most upstream regulatory or warning sign associated with the lane drop.

The dotted white lane lines that are used for lane drop markings and that are used as a lane line separating through

lanes from auxiliary lanes should consist of line segments that are 3 feet in length separated by 9-foot gaps. One alternative is to use line segments that are 3 feet in length separated by 12-foot gaps.

SUPPORT:

Section 3B.20 contains information regarding other markings that are associated with lane drops, such as lane-use arrow markings and ONLY word markings.

Section 3B.9 contains information about the lane line markings that are to be used for transition areas where the number of through lanes is reduced.

STANDARD:

Where crossing the lane line markings is discouraged, the lane line markings shall consist of a normal or wide solid white line.

OPTION:

Where it is intended to discourage lane changing on the approach to an exit ramp, a wide solid white lane line may extend upstream from the theoretical gore or, for multi-lane exits, as shown in Drawing B of Figure 3B-10, for a distance that is determined by engineering judgment.

Where lane changes might cause conflicts, a wide or normal solid white lane line may extend upstream from an intersection.

In the case of a lane drop at an exit ramp or intersection, such a solid white line may replace a portion, but not all of the length of the wide dotted white lane line.

GUIDANCE:

On approaches to intersections, a solid white lane line marking should be used to separate a through lane from an added mandatory turn lane.

OPTION:

On approaches to intersections, solid white lane line markings may be used to separate adjacent through lanes or adjacent mandatory turn lanes from each other.

Where the median width allows the left-turn lanes to be separated from the through lanes to give drivers on opposing approaches a less obstructed view of opposing through traffic, white pavement markings may be used to form channelizing islands as shown in Figure 2B-17.

Solid white lane line markings may be used to separate through traffic lanes from auxiliary lanes, such as an added uphill truck lane or a preferential lane (see Section 3D.2).

Wide solid lane line markings may be used for greater emphasis.

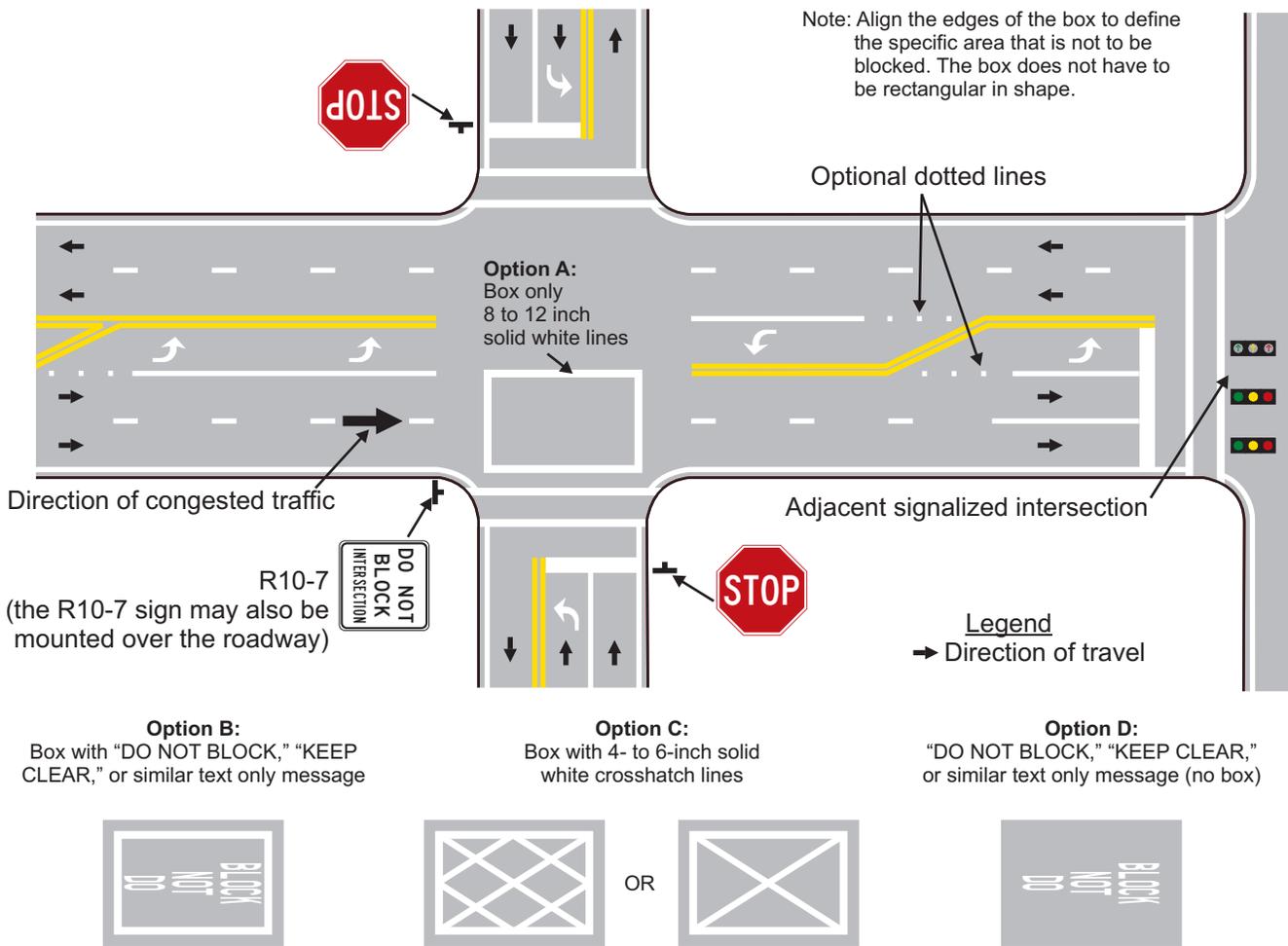


Figure 3B-18 Do Not Block Intersection Markings

At non-intersection locations, crosswalk markings legally establish the crosswalk.

STANDARD:

When crosswalk lines are used, they shall consist of solid white lines that mark the crosswalk. They shall not be less than 6 inches or greater than 24 inches in width.

GUIDANCE:

If transverse lines are used to mark a crosswalk, the gap between the lines should not be less than 6 feet. If diagonal or longitudinal lines are used without transverse lines to mark a crosswalk, the crosswalk should be not less than 6 feet wide.

Crosswalk lines, if used on both sides of the crosswalk, should extend across the full width of pavement to the edge of the intersecting crosswalk to discourage diagonal walking between crosswalks (see Figure 3B-17 and 3B-19).

At locations controlled by traffic control signals or on approaches controlled by STOP or YIELD signs, crosswalk lines should be installed where engineering judgment indicates they are needed to direct pedestrians to the proper crossing path(s).

Crosswalk lines should not be used indiscriminately. An engineering study should be performed before a marked crosswalk is installed at a location away from a traffic control signal or an approach controlled by a STOP or YIELD sign. The engineering study should consider the number of lanes, the presence of a median, the distance from adjacent signalized intersections, the pedestrian volumes

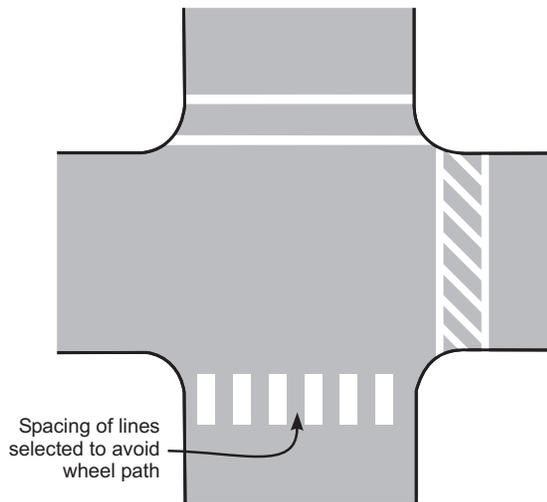


Figure 3B-19 Examples of Crosswalk Markings

and delays, the average daily traffic (ADT), the posted or statutory speed limit or 85th-percentile speed, the geometry of the location, the possible consolidation of multiple crossing points, the availability of street lighting, and other appropriate factors.

New marked crosswalks alone, without other measures designed to reduce traffic speeds, shorten crossing distances, enhance driver awareness of the crossing, and/or provide active warning of pedestrian presence, should not be installed across uncontrolled roadways where the speed limit exceeds 40 mph and either:

- A. The roadway has four or more lanes of travel without a raised median or pedestrian refuge island and an ADT of 12,000 vehicles per day or greater; or
- B. The roadway has four or more lanes of travel with a raised median or pedestrian refuge island and an ADT of 15,000 vehicles per day or greater.

SUPPORT:

Chapter 4F contains information on Pedestrian Hybrid Beacons. Section 4L.3 contains information regarding Warning Beacons to provide active warning of a pedestrian's presence. Section 4N.2 contains information regarding In-Roadway Warning Lights at crosswalks. Chapter 7D contains information regarding school crossing supervision.

GUIDANCE:

Because non-intersection pedestrian crossings are generally unexpected by the road user, warning signs (see Section 2C.50) should be installed for all marked crosswalks at non-intersection locations and adequate visibility should be provided by parking prohibitions.

SUPPORT:

Section 3B.16 contains information regarding placement of stop line markings near crosswalk markings.

OPTION:

For added visibility, the area of the crosswalk may be marked with white diagonal lines at a 45-degree angle to the line of the crosswalk or with white longitudinal lines parallel to traffic flow as shown in Figure 3B-19.

When diagonal or longitudinal lines are used to mark a crosswalk, the transverse crosswalk lines may be omitted. This type of marking may be used at locations where substantial numbers of pedestrians cross without any other traffic control device, at locations where physical conditions are such that added visibility of the crosswalk is desired, or at places where a pedestrian crosswalk might not be expected.

GUIDANCE:

If used, the diagonal or longitudinal lines should be 12 to 36 inches wide and separated by gaps of 12 to 60 inches. The design of the lines and gaps should avoid the wheel paths if possible, and the gap between the lines should not exceed 2.5 times the width of the diagonal or longitudinal lines.

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OPTION:

When an exclusive pedestrian phase that permits diagonal

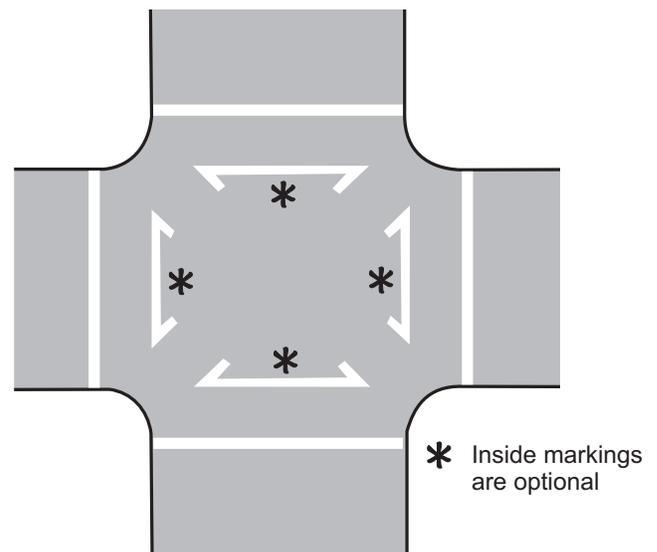


Figure 3B-20 Examples of Crosswalk Markings for an Exclusive Pedestrian Phase That Permits Diagonal Crossing

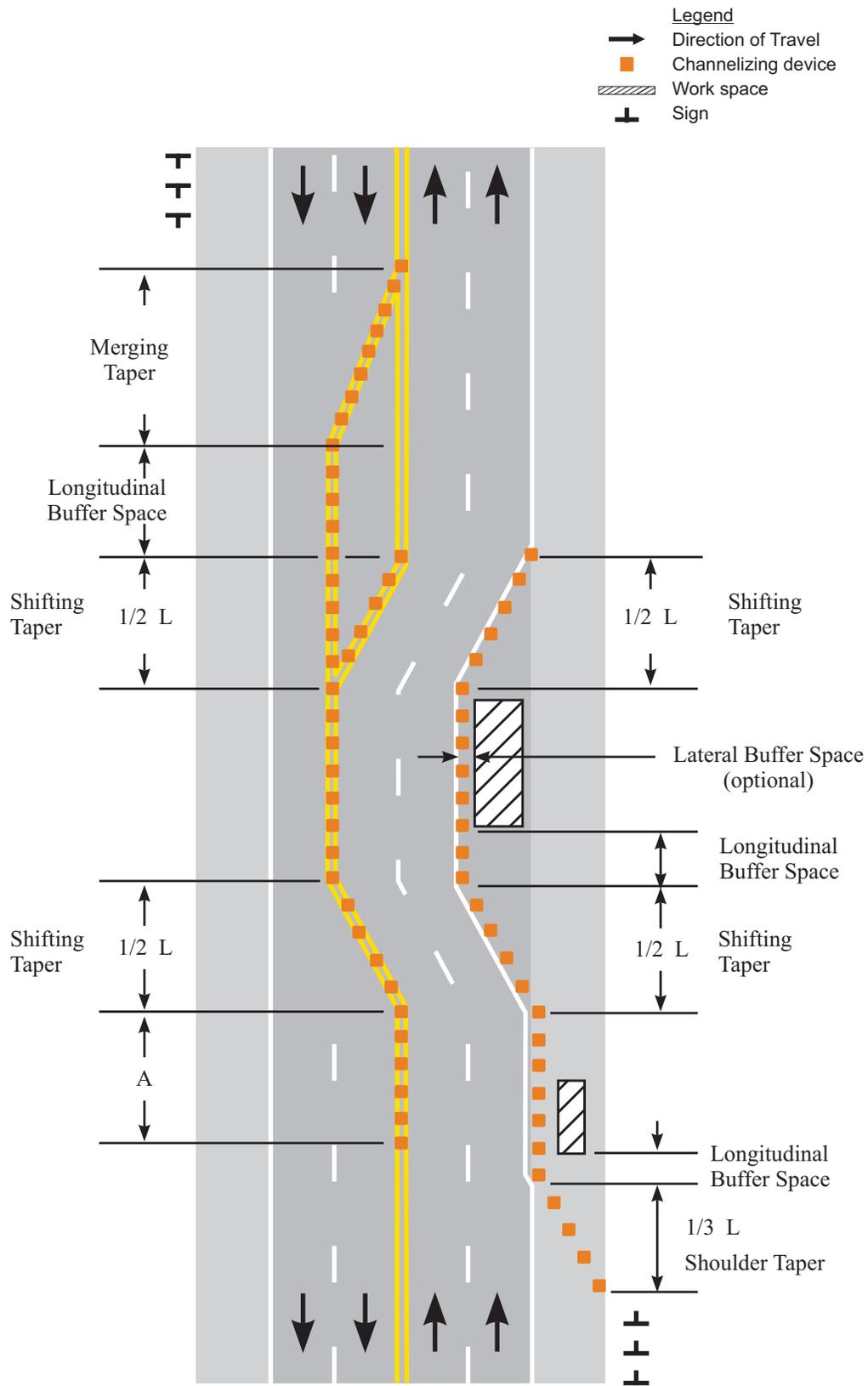


Figure 6C-2 Types of Tapers and Buffer Spaces

Speed*	Distance
30 mph	200 feet
35 mph	305 feet
40 mph	305 feet
45 mph	425 feet
50 mph	425 feet
55 mph	500 feet
60 mph	650 feet
65 mph	650 feet
70 mph	820 feet
75 mph	820 feet

* This distance is related to approach speeds, friction factors, and pavement and tire conditions. These distances may be increased for downgrades.

Table 6C-2 Guidelines for the Length of a Longitudinal Buffer

GUIDANCE:

Neither work activity nor storage of equipment, vehicles, or material should occur within a buffer space.

OPTION:

Buffer spaces may be positioned either longitudinally or laterally with respect to the direction of road user flow. The activity area may contain one or more lateral or longitudinal buffer spaces.

A longitudinal buffer space may be placed in advance of a work space.

The longitudinal buffer space may also be used to separate opposing road user flows that use portions of the same traffic lane, as shown in Figure 6C-2.

If a longitudinal buffer space is used, the values shown in Table 6C-2 may be used to determine the length of the longitudinal buffer space.

SUPPORT:

Typically, the buffer space is formed as a traffic island and defined by channelizing devices.

When a shadow vehicle, arrow board, or changeable message sign is placed in a closed lane in advance of a work space, only the area upstream of the vehicle, arrow board, or changeable message sign constitutes the buffer space.

OPTION:

The lateral buffer space may be used to separate the traffic space from the work space, as shown in Figures 6C-1 and 6C-2, or such areas as excavations or pavement edge drop-offs. A lateral buffer space also may be used between two travel lanes, especially those carrying opposing flows.

GUIDANCE:

Guide for the length of longitudinal buffer space is shown in Table 6C-2. These distances are based upon the braking distance portion of stopping sight distance for wet and level pavements (A Policy on Geometric Design of Highways and

6F.44.1 SHOULDER DROP OFF Sign (W8-9a)



W8-9a

STANDARD:

The SHOULDER DROP-OFF (W8-9a) sign shall be used when a shoulder drop-off, adjacent to the travel lane, exceeds 2 inches in depth and is not protected by portable barriers and the LOW SHOULDER sign (W8-9) is not used.

6F.44.2 LOW SHOULDER Sign (W8-9) HIGH SHOULDER (W21-X9)



W8-9



W21-X9

STANDARD:

The LOW SHOULDER sign (W8-9) and the HIGH SHOULDER sign (W21-X9) shall be used for a shoulder drop-off or rise in accordance with the guidelines shown in Figure 6K-3 on page 6K-xxi.

6F.44.3 NO SHOULDER Sign (W8-23)



W8-23

STANDARD:

The NO SHOULDER sign (W8-23) shall be used for a shoulder drop-off in accordance with the guidelines shown in Figure 6K-4 and 6K-5 on pages 6K-xxii and 6K-xxiii.

6F.44.4 SOFT SHOULDER Sign (W8-4)

OPTION:

The SOFT SHOULDER sign (W8-4) may be used for a shoulder drop-off between 2 and 4 inches in height and the edge has been tapered and compacted at a rate of 6:1 so that a vehicle may safely drive on it.



W8-4



W8-11

6F.45 UNEVEN LANES Sign (W8-11)

STANDARD:

The UNEVEN LANES (W8-11) sign shall be used in accordance with the guidelines shown in Figure 6-3 on page xxi.

GUIDANCE:

The UNEVEN LANES (W8-11) sign should be used during operations that create a difference in elevation between adjacent lanes that are open to travel.

6F.46 STEEL PLATE AHEAD Sign (W8-24)



W8-24

OPTION:

A STEEL PLATE AHEAD (W8-24) sign may be used to warn road users that the presence of a temporary steel plate(s) might make the road surface uneven and might create slippery conditions during wet weather.

6F.47 NO CENTER STRIPE Sign (W8-12a)



W8-12a

STANDARD:

The NO CENTER STRIPE (W8-12a) sign shall be used as detailed in Section 6F.78.

GUIDANCE:

This sign should also be used at major connection, traffic generators, and/or at appropriate intervals to advise motorists entering the zone.

6F.48 Reverse Curve Signs (W1-4 Series)



W1-4



W1-4b



W1-4c

GUIDANCE:

In order to give road users advance notice of a lane shift, a Reverse Curve (W1-4, W1-4b, or W1-4c) sign (see Figure 6F-4) should be used when a lane (or lanes) is being shifted to the left or right. If the design speed of the curves is 30 mph or less, a Reverse Turn (W1-3) sign should be used.

STANDARD:

If a Reverse Curve (or Turn) sign is used, the direction of the reverse curve (or turn) symbol shall be consistent with the desired vehicle path. Except as provided in the following Option, the number of lanes illustrated on the sign shall be the same as the number of through lanes available to road users.

OPTION:

Where two or more lanes are being shifted, a W1-4 (or W1-3) sign with an ALL LANES (W24-1cP) plaque (see Figure 6F-4) may be used instead of a sign that illustrates the number of lanes.

Where more than three lanes are being shifted, the Reverse Curve (or Turn) sign may be rectangular.

6F.49 Double Reverse Curve Signs (W24-1, W24-1a, W24-1b)



W24-1



W24-1a



W24-1b

OPTION:

The Double Reverse Curve (W24-1, W24-1a, W24-1b) sign may be used where the tangent distance between two reverse curves is less than 600 feet, thus making it difficult for a second Reverse Curve (W1-4 series) sign to be placed between the curves. If the design speed of the curves is 30 mph or less, Double Reverse Turn signs should be used.

STANDARD:

If a Double Reverse Curve (or Turn) sign is used, the direction of the double reverse curve (or turn) symbol shall be consistent with the desired vehicle path. Except as provided in the first paragraph of the following Option, the number of lanes illustrated on the sign shall be the same as the number of through lanes available to road users.

OPTION:

Where two or more lanes are being shifted, a W24-1 (or Double Reverse Turn sign showing one lane) sign with an ALL LANES (W24-1cP) plaque may be used instead of a sign that illustrates the number of lanes.

Where more than three lanes are being shifted, the Double Reverse Curve (or Turn) sign may be rectangular.

6F.50 Other Warning Signs

OPTION:

Advance warning signs may be used by themselves or with other advance warning signs.

Besides the warning signs specifically related to TTC zones, several other warning signs in Part 2 may apply in TTC zones.

STANDARD:

Except as provided in Section 6F.02, other warning signs that are used in TTC zones shall have black legends and borders on an orange background.

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**SHORT TERM TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS
*The Field Manual***

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PART 6. TEMPORARY TRAFFIC CONTROL

Chapter 6H. Speed Limits in Temporary Traffic Control Zones

6H-1 General

SUPPORT:

There are three different methods of signing available for speed control in temporary traffic control zones: advisory speeds, 24/7 Construction Speed Limits, and Workers Present Speed Limits.

Under certain conditions, a Workers Present Speed Limit is required by Minnesota Statutes 169.14, Subdivision 5d. Minnesota Statutes 169.14, Subdivision 6a sets a fine of \$300 for a violation of a regulatory speed limit.

It must be noted that signing alone will not reduce the speed through a temporary traffic control zone. The driver must clearly perceive the need to reduce speed before a reduction in speed can be achieved. The worker should not feel a false sense of security with temporary traffic control zone speed limits in place. The speed limit in temporary traffic control zones must be used correctly and judiciously to obtain the maximum effectiveness, to earn drivers respect, and to gain compliance.

OPTION:

Advisory speeds, 24/7 Construction Speed Limits, and Workers Present Speed Limits may be used in construction or maintenance temporary traffic control zones.

SUPPORT:

The posted speed must be reasonable to the driver. In order to achieve maximum benefit, the speed zone must be correctly signed, installed, documented, maintained, and removed in a timely manner.

Research has demonstrated that large reductions in the regulatory speed limit, such as a 30 mph reduction, increase speed variance and the potential for crashes. Smaller reductions in the speed limit of up to 10 mph cause smaller changes in speed variance and lessen the potential for increased crashes. A reduction in the regulatory speed limit of only up to 10 mph from the normal speed limit has been shown to be more effective.

Just as with any type of temporary traffic control zone signing, leaving speed limit signs in place when they are clearly not needed causes driver disrespect and encourages non-compliance.

STANDARD:

The temporary traffic control speed limit shall be carefully documented. This documentation shall include the location

of the road, the reference point of the temporary traffic control zone, the date and time installed, direction of travel, the speed installed, and the date and time removed.

6H-2 Advisory Speeds

SUPPORT:

The purpose of advisory speeds is to identify safe speeds for specific hazards. Warning signs with advisory speed plaques warn drivers of a particular hazard or a potentially hazardous condition and indicate the safe speed at which to navigate the hazard. Examples of situations where an advisory speed plaque may be used are horizontal curve locations (such as bypasses or lane shifts), low and no shoulder locations, and where there is reduced visibility due to work activities, environmental factors, or geometrics.

OPTION:

Advisory speed plaques may be posted any time a hazard is present; an authorization from the Commissioner of Transportation is not necessary.

GUIDANCE:

Traffic engineering personnel should be consulted as to the reasonable speed to be posted.

SUPPORT:

In some applications such as sharp curves, there are recommended maximum speeds established for a certain degree of curve. In situations other than horizontal curves, the proper advisory speed is determined by experience and engineering judgement.

STANDARD:

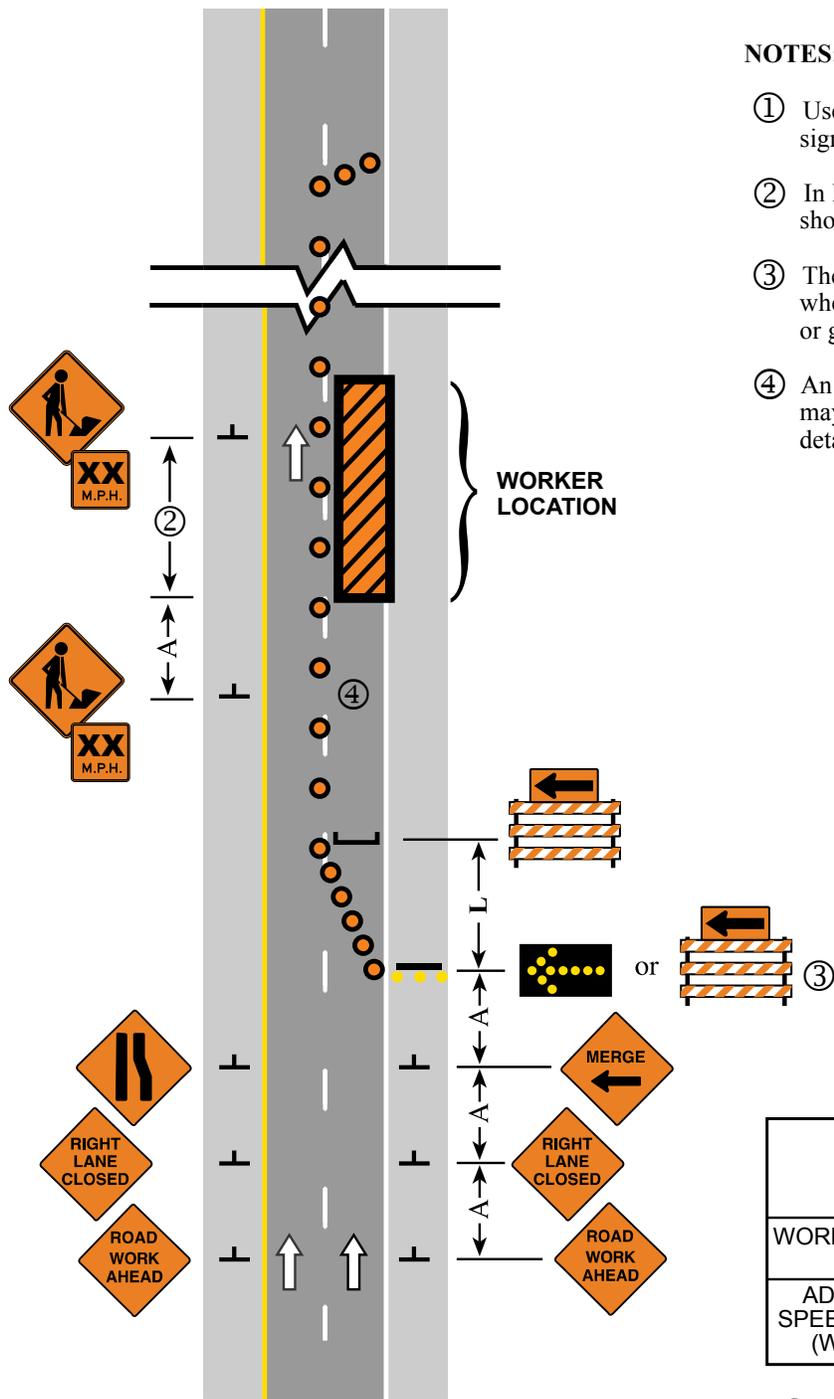
When used, the Advisory Speed Plaque (W13-IP) (see [Section 6F.52](#)) shall be installed below the appropriate advance warning sign(s) or below the Worker Ahead sign (W21-1) (see [Section 6F.33](#)).

Inplace speed limits shall be reviewed to ensure that the advisory speed is not greater than the regulatory speed.

GUIDANCE:

Once installed, the advisory speed should be validated by driving through the work zone area necessitating the advisory speed.

Care should be taken when posting an advisory speed plaque so that it is not placed near a regulatory speed sign such that the motorist may confuse the two speeds.



NOTES:

- ① Use the appropriate layout for advance signing and spacing.
- ② In long work zones, this sign assembly should be repeated at 1 mile intervals.
- ③ The flashing arrow panel shall be used when the posted speed limit is 45 mph or greater.
- ④ An OPTIONAL Dynamic Speed Display may be used. See Layout 2 for spacing details and sign specifications.

Posted Speed Limit Prior to Work Starting mph	Advance Warning Sign Spacing - A - feet
0 - 30	250
35 - 40	325
45 - 50	600
55	750
60 - 65	1000
70 - 75	1200

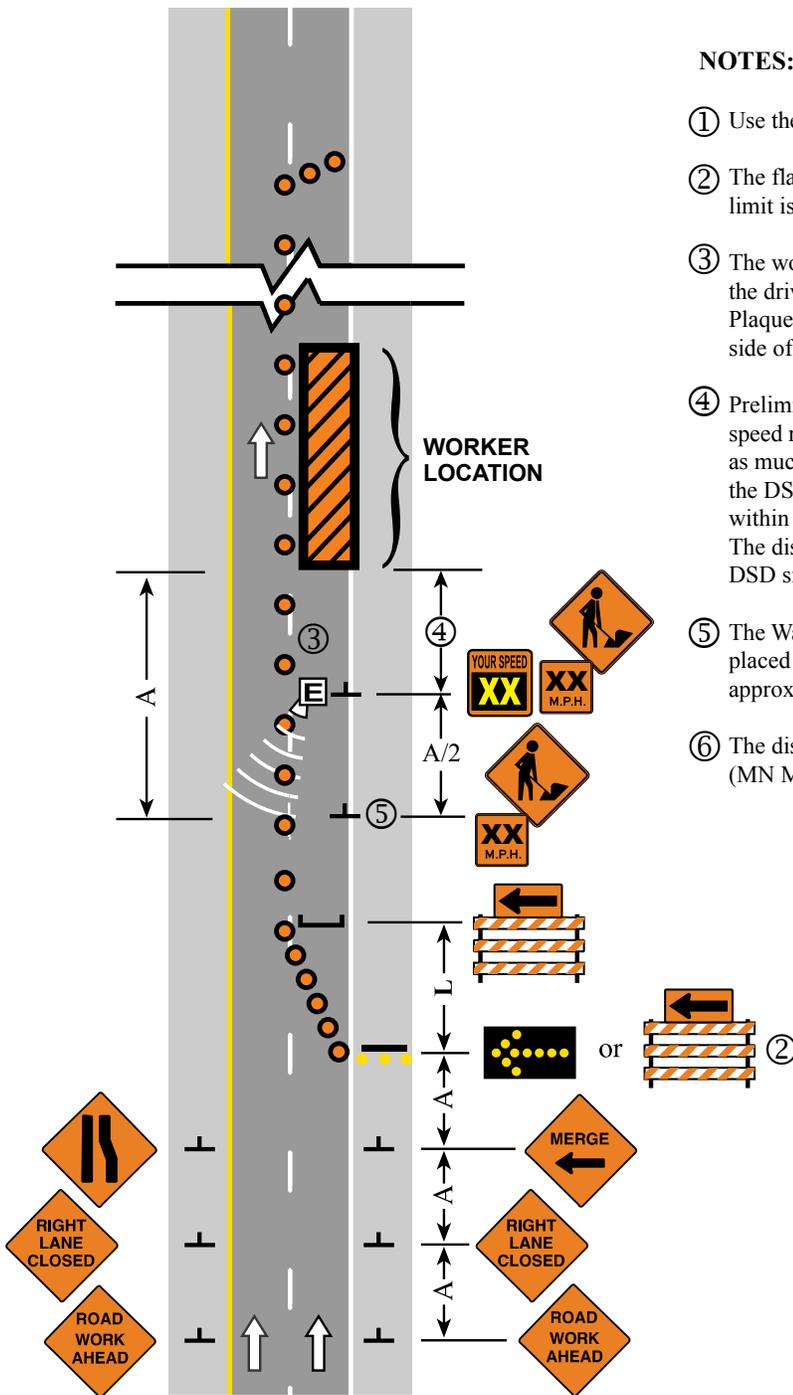
Minimum Sign Sizes For Advisory Speed Limit Signing

Sign	Posted Speed Limit Prior to Work Starting	
	0 - 40 mph	45 - 75 mph
WORKER AHEAD (W21-1)	36" x 36"	48" x 48"
ADVISORY SPEED PLAQUE (W13-1P)	18" x 18"	24" x 24"

● - Retroreflective channelizing device.

ADVISORY SPEED LIMIT MULTI-LANE ROAD

LAYOUT 6H-1



NOTES:

- ① Use the appropriate layout for advance signing and spacing.
- ② The flashing arrow panel shall be used when the posted speed limit is 45 mph or greater.
- ③ The work crew (or poor road condition) should be visible to the driver from the point of viewing the Advisory Speed Plaque and DSD sign display. It may be located on either side of the open traffic lane as space allows for the equipment.
- ④ Preliminary studies show “A” is the optimum distance for speed reduction, therefore, it’s advised to maintain that distance as much as practical. As workers move within the work zone, the DSD location should be re-positioned such that it remains within 300 feet (min) and 600 feet (max) of the worker location. The distances may be adjusted following further studies of the DSD sign usage in work zones.
- ⑤ The Warning Sign with Speed Advisory Plaque should be placed a minimum distance “A” ahead of the workers and approximately “A/2” ahead of the DSD device location.
- ⑥ The distances “A” and “L” are found in the Field Manual (MN MUTCD Part 6K) Distance Charts.

**MINIMUM SPECIFICATIONS
on DSD SIGN EQUIPMENT**

Display size of the DSD sign is dependent on the size of the speed plaque used.

Plaque size	DSD display MIN.
18" X 18"	10" character
24" X 24"	10"
30" X 30"	14" character
36" X 36"	14"

The static sign (YOUR SPEED) should be black letters on a **fluorescent orange** background when used with a work zone advisory speed plaque. The font should be a minimum of 4" high when used with a 10" display character, and 6" when used with a 14" or greater character display sign.

● - Retroreflective channelizing device.

DYNAMIC SPEED DISPLAY SIGN

LAYOUT 6H-2

SUPPORT:

Layout 6H-1 provides an example of the use of advisory speeds on a divided multi-lane road.

OPTION:

A changeable message sign that displays to approaching drivers the speed at which they are traveling (or dynamic speed display sign) may be installed in conjunction with the advisory speed.

SUPPORT:

Layout 6H-2 provides an example of the use of a dynamic speed sign in conjunction with an advisory speed limit on a divided multi-lane road.

6H-3 24/7 Construction Speed Limits

SUPPORT:

24/7 Construction Speed Limits are regulatory speed limits that indicate a full-time regulatory speed through a temporary traffic control zone or a detour. They are established for long term, stationary, temporary traffic control zones and remain in place on a twenty-four hour basis. These speed limits are used where the physical features of the roadway or temporary traffic control zone require lower vehicle speeds. Examples include a bypass/diversion with sub-standard geometrics or a two-lane, two-way operation on what is normally a four-lane divided highway. 24/7 Construction Speed Limits are primarily used to provide safety for the motorist.

STANDARD:

An order from the Commissioner of Transportation shall be obtained to establish a 24/7 Construction Speed Limit on all roads. A traffic engineering investigation shall be performed based on the anticipated conditions identified in the construction plan and the transportation management plan in order to establish a safe and reasonable speed limit.

The date of installation and removal of the signs shall be documented on the speed limit authorization form for enforcement purposes.

GUIDANCE:

The temporary traffic control zone should be monitored throughout the duration of the project to ensure that the appropriate speed limit is in place.

STANDARD:

A 24/7 Construction Speed Limit assembly shall consist of a black and white SPEED LIMIT sign (R2-1) (see Section 2B.13) with a black and orange WORK ZONE plaque (G20-5aP) (see Section 6F.12) installed above the SPEED LIMIT

sign. This assembly shall be installed at the beginning of the temporary traffic control zone.

OPTION:

A black and white \$300 FINE plaque (R2-6bP) (see Section 6F.12) may be installed below the 24/7 Construction Speed Limit assembly.

OPTION:

A changeable message sign that displays to approaching drivers the speed at which they are traveling (or dynamic speed display sign) may be installed in conjunction with the 24/7 Construction Speed Limit.

GUIDANCE:

A Reduced Speed Limit Ahead sign (W3-5 or W3-5a) (see Section 6F.50) should be used to inform road users of a reduced 24/7 Construction Speed Limit where the speed limit is being reduced more than 10 mph or where engineering judgement indicates the need for advance notice to comply with the posted speed limit ahead.

An END WORK ZONE SPEED LIMIT sign (R2-12) (see Section 6F.12) should be placed at the end of the work zone to indicate the end of the higher fine area.

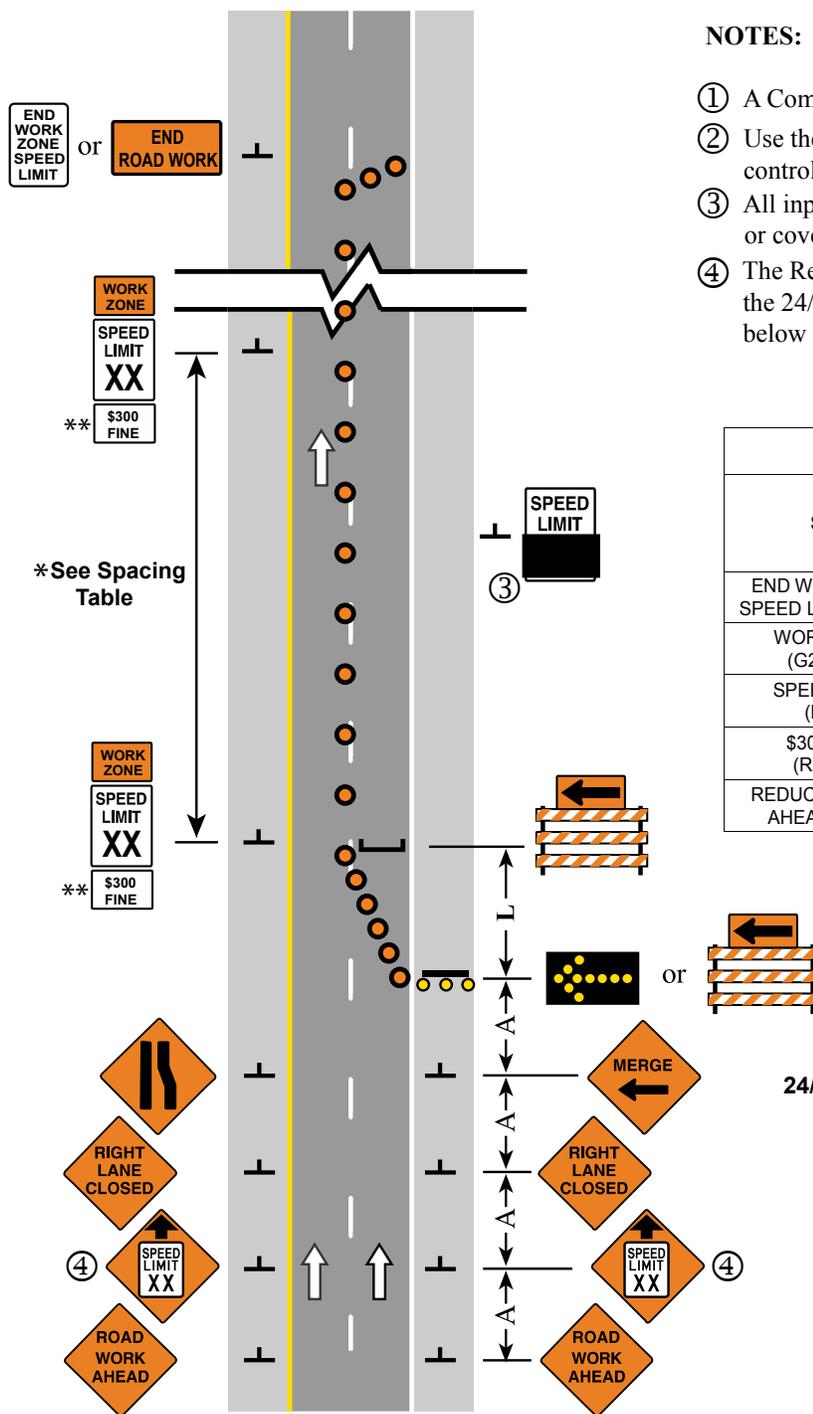
OPTION:

A SPEED LIMIT sign (R2-1) of the in place speed zone may be placed downstream of the END WORK ZONE LIMIT sign (R2-12) to notify the driver of the in place speed zone.

An END ROAD WORK sign (G20-2a) (see Section 6F.57) may be used to indicate the end of the higher fine area in lieu of the END WORK ZONE SPEED LIMIT sign (R2-12).

SUPPORT:

Layout 6H-3 provides an example of the use of the 24/7 Construction Speed Limit on a divided multi-lane road.



NOTES:

- ① A Commissioners Authorization is required.
- ② Use the appropriate layout for temporary traffic control.
- ③ All inplace Speed Limit signs shall be removed or covered.
- ④ The Reduced Speed Ahead sign should be used when the 24/7 Construction Speed Limit is more than 10 mph below the inplace speed limit.

Minimum Sign Sizes		
Sign	Posted Speed Limit Prior to Work Starting	
	≤40 mph	>40 mph
END WORK ZONE SPEED LIMIT (R2-12)	24" X 36"	36" X 54"
WORK ZONE (G20-5aP)	24" X 18"	36" X 24"
SPEED LIMIT (R2-1)	24" X 30"	36" X 48"
\$300 FINE (R2-6bP)	24" X 18"	36" X 24"
REDUCED SPEED AHEAD (W3-5)	36" X 36"	48" X 48"

*** Typical Spacing For 24/7 Construction Speed Limit Signs**

24/7 Construction Speed Limit mph	Sign Spacing mile
≤ 25	1/4
30 - 35	1/2
40 - 45	3/4
≥ 50	1

** - Optional

● - Retroreflective channelizing device.

24/7 CONSTRUCTION SPEED LIMIT

LAYOUT 6H-3

6H-4 Workers Present Speed Limits

SUPPORT:

A Workers Present Speed Limit is a regulatory speed limit in a temporary traffic control zone to improve worker safety. Minnesota Statutes 169.14, Subdivision 5d provides for the authority of a local road agency to set a work zone speed limit, without an engineering and traffic investigation, when workers are present in active work zones. This statute also requires a reduced work zone speed limit under certain conditions (see the following Standard). To better identify this type of speed limit, the MN MUTCD will refer to this type of speed limit as a Workers Present Speed Limit.

STANDARD:

Workers Present Speed Limits shall only be used when workers are present and working directly adjacent to the traveled lanes. Workers Present Speed Limit signs shall be covered, folded, or removed when the workers are not present or are not working directly adjacent to traffic.

A Workers Present Speed Limit of 45 mph shall be used on a road with an established speed limit of at least 50 mph when at least one lane or portion of a lane of traffic is closed in either direction and workers are present directly adjacent to the traveled lanes.

OPTION:

Exceptions to the required Workers Present Speed Limit of 45 mph as listed in the Standard above include:

- On the roadway of a divided highway with a median that does not include a temporary traffic control zone;
- where positive barriers are placed between workers and the traveled portion of the highway;
- where temporary traffic control zone devices are deployed for less than 24 hours;
- where a 24/7 Construction Speed Limit is in place; or
- where a different Workers Present Speed Limit is established by the road authority.

The local road authority may authorize a Workers Present Speed Limit within the limitations established in Minnesota Statutes 169.14, Subdivision 5d paragraph (c), as summarized below.

STANDARD:

Other than the required Workers Present Speed Limit of 45 mph as listed in the Standard above, a Workers Present Speed Limit shall not reduce the speed limit on the affected

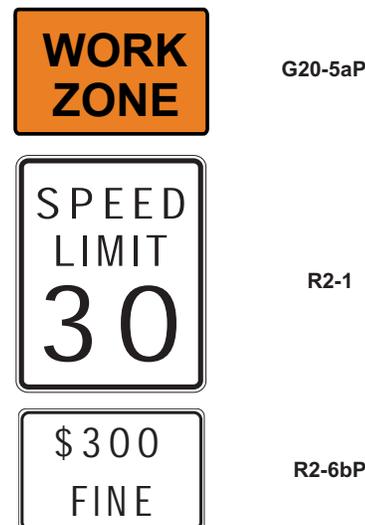
roadway by more than (1) 20 mph on a roadway having an established speed limit of 55 mph or greater, and (2) 15 mph on a roadway having an established speed limit of 50 mph or less.

SUPPORT:

Typical applications where a Workers Present Speed Limit may be used include a concrete joint repair project, a bituminous paving project, and other type of activities where workers are adjacent to traffic.

STANDARD:

A Workers Present Speed Limit assembly shall consist of a black and white SPEED LIMIT sign (R2-1) (see Section 2B.13) with a black and orange WORK ZONE plaque (G20-5aP) (see Section 6F.12) installed above the SPEED LIMIT sign.



OPTION:

A black and white \$300 FINE plaque (R2-6bP) (see Section 6F.12) may be installed below the Workers Present Speed Limit assembly.

GUIDANCE:

A Workers Present Speed Limit assembly should be placed prior to that portion of the work zone where the workers are actually working.

A Reduced Speed Limit Ahead sign (W3-5 or W3-5a) (see Section 6F.50) should be used to inform road users of a Workers Present Speed Limit where the speed limit is being reduced more than 10 mph or where engineering judgment indicates the need for advance notice to comply with the posted speed limit ahead.

SUPPORT:

Layout 6H-4 provides an example of the use of Workers Present Speed Limit signs on a divided multi-lane road.

Layout 6H-4a provides an example of the use of Electronic Workers Present Speed Limit signs on a divided multi-lane road.

Layout 6H-4b provides an example of the use of Workers Present Speed Limit signs on a two-lane, two-way road with flaggers.

OPTION:

A changeable message sign that displays to approaching drivers the speed at which they are traveling (or dynamic speed display sign) may be installed in conjunction with the Workers Present Speed Limit.

STANDARD:

As the work activity proceeds downstream through the work area, the Workers Present Speed Limit assembly shall be no greater than 1 mile in advance of the active work area where workers are present. When the workers reach this distance, the assembly shall be relocated closer to the active work area.

GUIDANCE:

In locations with a Workers Present Speed Limit of less than 40 mph, the Workers Present Speed Limit assembly should be no greater than 1/2 mile in advance of the active work area where workers are present.

STANDARD:

All in-place speed limit signing shall be removed, folded, or covered while the Workers Present Speed Limit is in-place.

OPTION:

Where the Workers Present Speed Limit assemblies are installed and removed each day, the in-place speed limit signs may be covered for the duration of the project if the in-place speed limit is the statutory speed limit.

STANDARD:

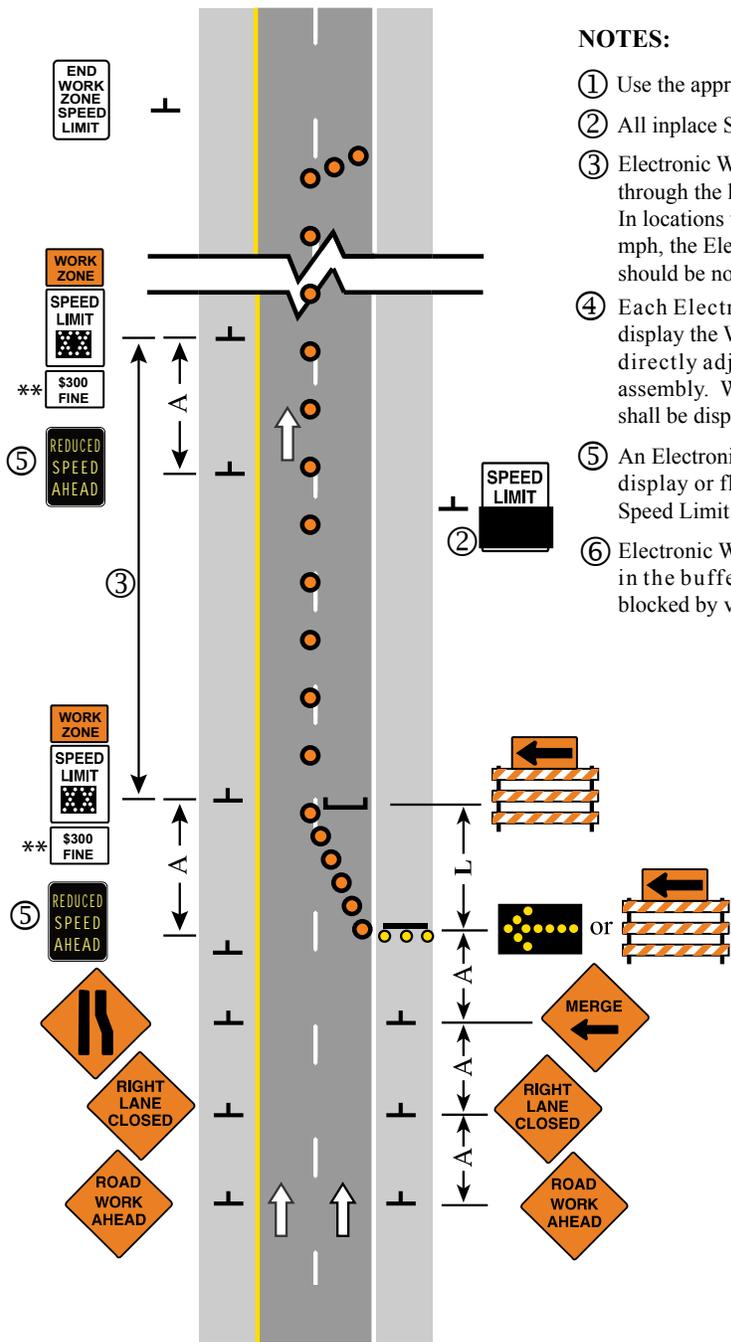
For other speed limits, the first sign of the in-place speed zone and the in-place speed limit signs at major intersections shall be covered and uncovered daily.

An END WORK ZONE SPEED LIMIT sign (R2-12) (see [Section 6F.12](#)) shall be placed at the end of the work zone to indicate the end of the higher fine area.

OPTION:

A SPEED LIMIT sign (R2-1) of the in-place speed zone may be placed downstream of the END WORK ZONE SPEED LIMIT sign (R2-12) to notify the driver of the in-place speed zone.

An END ROAD WORK sign (G20-2a) (see [Section 6F.57](#)) may be used to indicate the end of the higher fine area in lieu of the END WORK ZONE SPEED LIMIT sign (R2-12) if workers are present near the end of the work zone.



NOTES:

- ① Use the appropriate layout for temporary traffic control.
- ② All in-place Speed Limit signs shall be removed or covered.
- ③ Electronic Workers Present Speed Limit assemblies shall be placed through the length of the activity area no greater than 1 mile apart. In locations with a Workers Present Speed Limit of less than 40 mph, the Electronic Workers Present Speed Limit assemblies should be no greater than 1/2 mile apart.
- ④ Each Electronic Workers Present Speed Limit assembly shall display the Workers Present Speed Limit when workers are present directly adjacent to traveled lanes in the segment beyond the assembly. When workers are not present, the in-place Speed Limit shall be displayed.
- ⑤ An Electronic Reduced Speed Ahead sign (may be electronic display or flip board) should be used when the Workers Present Speed Limit is more than 10 mph below the in-place speed limit.
- ⑥ Electronic Workers Present Speed Limit assemblies may be placed in the buffer or work space as long as the assemblies are not blocked by vehicles or devices.

Sign	Minimum Sign Sizes	
	Posted Speed Limit Prior to Work Starting	
	≤40 mph	>40 mph
END WORK ZONE SPEED LIMIT (R2-12)	24" X 36"	36" X 54"
WORK ZONE (G20-5aP)	24" X 18"	36" X 24"
SPEED LIMIT (R2-1)	24" X 30"	36" X 48"
\$300 FINE (R2-6bP)	24" X 18"	36" X 24"
REDUCED SPEED AHEAD (Electronic Display or Flip Board)	24" X 30"	36" X 48"

** - Optional

● - Retroreflective channelizing device.

ELECTRONIC WORKERS PRESENT SPEED LIMIT

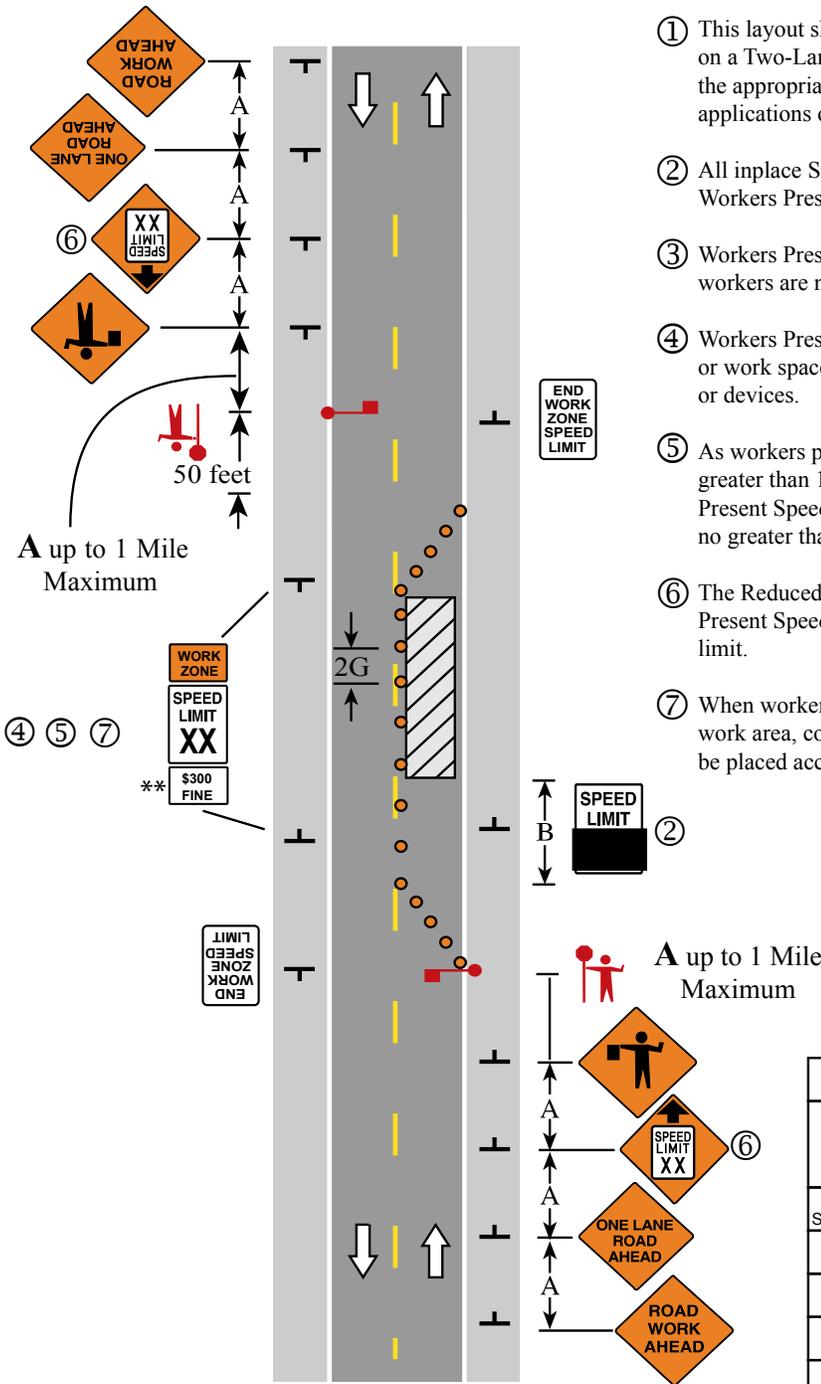
LAYOUT 6H-4a

NOTES:

- ① This layout shows an application of Workers Present Speed Limits on a Two-Lane Two-Way Road with Flaggers as an example. Use the appropriate layout for temporary traffic control for other applications on Two-Lane Two-Way Roads.
- ② All in-place Speed Limit signs shall be removed or covered when the Workers Present Speed Limit is implemented.
- ③ Workers Present Speed Limit assemblies shall be removed when workers are not present directly adjacent to traveled lanes.
- ④ Workers Present Speed Limit assemblies may be placed in the buff or work space as long as the assemblies are not blocked by vehicle or devices.
- ⑤ As workers proceed through the work area, the assembly shall be greater than 1 mile in advance of the work crew. For Workers Present Speed Limits of less than 40 mph, the assembly should be no greater than 1/2 mile in advance of the work crew.
- ⑥ The Reduced Speed Ahead sign should be used when the Workers Present Speed Limit is more than 10 mph below the in-place speed limit.
- ⑦ When workers are present adjacent to traveled lanes throughout the work area, confirming Workers Present Speed Limit assemblies may be placed according to the Spacing Table below:

Typical Spacing for Workers Present Speed Limits	
Workers Present Speed Limit (mph)	Assembly Spacing (mile)
< 40	1/2
≥ 40	1

Sign	Minimum Sign Sizes	
	Posted Speed Limit Prior to Work Starting	
	≤ 40 mph	> 40 mph
END WORK ZONE SPEED LIMIT (R2-12)	24" X 36"	36" X 54"
WORK ZONE (G20-5aP)	24" X 18"	36" X 24"
SPEED LIMIT (R2-1)	24" X 30"	36" X 48"
\$300 FINE (R2-6bP)	24" X 18"	36" X 24"
REDUCED SPEED AHEAD (W3-5)	36" X 36"	48" X 48"



**WORKERS PRESENT SPEED LIMIT
TWO-LANE TWO-WAY ROAD
WITH TWO FLAGGERS**

LAYOUT 6H-4b

6H-5 Speed Limit Fines in Work Zones

SUPPORT:

Since statute sets a fine of \$300 for a violation of a regulatory speed limit in a work zone, the local road authority may determine that the traveling public be made aware of the increased fines.

OPTION:

A black and orange WORK ZONE plaque (G20-5aP) (see [Section 6F.12](#)) may be installed above a SPEED LIMIT sign to reinforce the presence of the work zone. This assembly may be supplemented by the installation of a black and white \$300 FINE plaque (R2-6bP) (see [Section 6F.12](#)) below the SPEED LIMIT sign to indicate the increased fine within the work zone.

GUIDANCE:

If an assembly is created per the aforementioned Option, an END WORK ZONE SPEED LIMIT sign (R2-12) (see [Section 6F.12](#)) should be placed at the end of the work zone to indicate the end of the higher fine area.

OPTION:

An END ROAD WORK sign (G20-2a) (see [Section 6F.57](#)) may be used to indicate the end of the higher fine area in lieu of the END WORK ZONE SPEED LIMIT sign (R2-12).

6H-6 Guidelines for Speed Limits in Work Zones

SUPPORT:

Guidelines, layouts, and procedures for implementing work zone speed limits in highway work zones may also be found in the publication, "[Speed Limits in Work Zones Guidelines](#)" published by MnDOT's Office of Traffic Safety and Technology.