

PART 5. TRAFFIC CONTROL DEVICES FOR LOW-VOLUME ROADS

CHAPTER 5A. GENERAL

Section 5A.01 Function

Standard:

- 01 **A low-volume road shall be defined for this Part of the Manual as follows:**
 - A. **A low-volume road shall be a facility lying outside of built-up areas of Cities, towns, and communities, and it shall have a traffic volume of less than 400 AADT.**
 - B. **A low-volume road shall not be a freeway, an expressway, an interchange ramp, a freeway service road, a road on a designated State highway system, or a residential street in a neighborhood. In terms of highway classification, it shall be a variation of a conventional road or a special purpose road as defined in Section 1A.13.**
 - C. **A low-volume road shall be classified as either paved or unpaved.**

Support:

- 02 Low-volume roads typically include agricultural, recreational, resource management and development such as mining and logging and grazing, and local roads in rural areas.

Guidance:

- 03 *The needs of unfamiliar road users for occasional, recreational, and commercial transportation purposes should be considered.*

Support:

- 04 At some locations on low-volume roads, the use of traffic control devices might be needed to provide the road user limited, but essential, information regarding regulation, guidance, and warning.
- 05 Other Parts of this Manual contain provisions applicable to all low-volume roads; however, Part 5 specifically supplements and references the provisions for traffic control devices commonly used on low-volume roads.

Section 5A.02 Application

Support:

- 01 It is possible, in many cases, to provide essential information to road users on low-volume roads with a limited number of traffic control devices. The focus might be on devices that:
 - A. Warn of conditions not normally encountered;
 - B. Prohibit unsafe movements; or
 - C. Provide minimal destination guidance.

Standard:

- 02 **The provisions contained in Part 5 shall not prohibit the installation or the full application of traffic control devices on a low-volume road where conditions justify their use.**

Guidance:

- 03 *Additional traffic control devices and provisions contained in other Parts of the Manual should be considered for use on low-volume roads.*

Support:

- 04 Section 1A.09 contains information regarding the assistance that is available to jurisdictions that do not have engineers on their staffs who are trained and/or experienced in traffic control devices.

Section 5A.03 Design

Standard:

- 01 **Traffic control devices for use on low-volume roads shall be designed in accordance with the provisions contained in Part 5, and where required, in other applicable Parts of this Manual.**
- 02 **The typical sizes for signs and plaques installed on low-volume roads shall be as shown in Table 5A-1. The sizes in the minimum column shall only be used on low-volume roads where the 85th-percentile speed or posted speed limit is less than 35 mph.**

Guidance:

- 03 *The sizes in the oversized column should be used where engineering judgment indicates a need based on high vehicle operating speeds, driver expectancy, traffic operations, or roadway conditions.*

Option:

- 04 Signs and plaques larger than those shown in Table 5A-1 may be used (see Section 2A.11).

Standard:

- 05 **All signs shall be retroreflective or illuminated to show the same shape and similar color both day and night, unless specifically stated otherwise in other applicable Parts of this Manual. The requirements for sign illumination shall not be considered to be satisfied by street, highway, or strobe lighting.**

- 06 **All markings shall be visible at night and shall be retroreflective unless ambient illumination provides adequate visibility of the markings.**

Section 5A.04 Placement**Standard:**

- 01 **Except as provided in Paragraph 3, the traffic control devices used on low-volume roads shall be placed and positioned in accordance with the lateral, longitudinal, and vertical placement provisions contained in Part 2 and other applicable Sections of this Manual.**

Guidance:

- 02 *The placement of warning signs should comply with the guidance contained in Section 2C.05 and other applicable Sections of this Manual.*

Option:

- 03 A lateral offset of not less than 2 feet from the roadway edge to the roadside edge of a sign may be used where roadside features such as terrain, shrubbery, and/or trees prevent lateral placement in accordance with Section 2A.19.

Standard:

- 04 **If located within a clear zone, post-mounted sign supports shall be yielding, breakaway, or shielded with a longitudinal barrier or crash cushion as required in Section 2A.19.**

Table 5A-1. Sign and Plaque Sizes on Low-Volume Roads (Sheet 1 of 2)

Sign or Plaque	Sign Designation	Section	Sign Sizes		
			Typical	Minimum	Oversized
STOP	R1-1	5B.02	30 x 30	—	36 x 36
YIELD	R1-2	5B.02	30 x 30 x 30	—	36 x 36 x 36
Speed Limit	R2-1	5B.03	24 x 30	18 x 24	36 x 48
DO NOT PASS	R4-1	5B.04	24 x 30	—	36 x 48
PASS WITH CARE	R4-2	5B.04	24 x 30	18 x 24	36 x 48
Keep Right	R4-7	5B.04	24 x 30	18 x 24	36 x 48
DO NOT ENTER	R5-1	5B.04	30 x 30	—	36 x 36
No Trucks	R5-2	5B.04	24 x 24	—	30 x 30
One Way	R6-2	5B.04	18 x 24	—	24 x 30
No Parking (symbol)	R8-3	5B.05	24 x 24	18 x 18	30 x 30
No Parking	R8-3a	5B.05	18 x 24	—	24 x 30
NO PARKING (plaque)	R8-3cP, 3dP	5B.05	24 x 18	18 x 12	30 x 24
ROAD CLOSED	R11-2	5B.04	48 x 30	—	—
Road Closed, Local Traffic Only	R11-3a	5B.04	60 x 30	—	—
Bridge Out, Local Traffic Only	R11-3b	5B.04	60 x 30	—	—
ROAD CLOSED TO THRU TRAFFIC	R11-4	5B.04	60 x 30	—	—
Weight Limit	R12-1	5B.04	24 x 30	—	36 x 48
Grade Crossing (Crossbuck)	R15-1	5F.02	48 x 9	—	—
Number of Tracks (plaque)	R15-2P	5F.02	27 x 18	—	—
Horizontal Alignment	W1-1, 2, 3, 4, 5	5C.02	30 x 30	—	36 x 36
One-Direction Large Arrow	W1-6	5C.02	36 x 18	—	48 x 24
Two-Direction Large Arrow	W1-7	5C.02	36 x 18	—	48 x 24
Chevron Alignment	W1-8	5C.02	12 x 18	—	18 x 24
Construction Arrow	W1-H16	6F50.1	30 x 30	24 x 24	36 x 36
Intersection Warning	W2-1, 2, 3, 4, 5, 6	5C.03	30 x 30	—	36 x 36
Stop Ahead	W3-1	5C.04	30 x 30	—	36 x 36
Yield Ahead	W3-2	5C.04	30 x 30	—	36 x 36
BE PREPARED TO STOP	W3-4	5G.05	36 x 36	—	48 x 48
NARROW BRIDGE	W5-2	5C.05	30 x 30	—	36 x 36
ONE LANE BRIDGE	W5-3	5C.06	30 x 30	—	36 x 36
Hill	W7-1	5C.07	30 x 30	—	36 x 36
XX % GRADE (plaque)	W7-3P	5C.07	24 x 18	—	30 x 24
NEXT XX MILES (plaque)	W7-3aP	5C.09	24 x 18	—	30 x 24

Table 5A-1. Sign and Plaque Sizes on Low-Volume Roads (Sheet 2 of 2)

Sign or Plaque	Sign Designation	Section	Sign Sizes		
			Typical	Minimum	Oversized
PAVEMENT ENDS	W8-3	5C.08	30 x 30	—	36 x 36
TRUCK CROSSING	W8-6	5C.09	30 x 30	—	36 x 36
LOOSE GRAVEL	W8-7	5G.05	30 x 30	—	36 x 36
ROUGH ROAD	W8-8	5G.05	30 x 30	—	36 x 36
ROAD MAY FLOOD	W8-18	5G.05	30 x 30	—	36 x 36
Grade Crossing Advance Warning	W10-1	5F.03	30 Dia.	—	36 Dia.
Grade Crossing Advance Warning	W10-2, 3, 4	5F.03	30 x 30	—	36 x 36
TRAINS MAY EXCEED 80 MPH	W10-8	5F.06	30 x 30	—	36 x 36
Storage Space Symbol	W10-11	5F.06	30 x 30	—	36 x 36
Skewed Crossing	W10-12	5F.06	30 x 30	—	36 x 36
Entering / Crossing	W11 series	5C.09	30 x 30	—	36 x 36
Advisory Speed (plaque)	W13-1P	5C.10	18 x 18	—	24 x 24
DEAD END / NO OUTLET	W14-1, 2	5C.11	30 x 30	—	36 x 36
DEAD END / NO OUTLET	W14-1a, 2a	5C.11	36 x 8	24 x 6	—
NO PASSING ZONE (pennant)	W14-3	5G.05	40 x 40 x 30	—	48 x 48 x 36
Supplemental Distance (plaque)	W16-2P	5C.09	24 x 18	18 x 12	30 x 24
Diagonal Arrow (plaque)	W16-7P	5C.09	24 x 12	—	30 x 18
AHEAD (plaque)	W16-9P	5C.09	24 x 12	—	30 x 18
NO TRAFFIC SIGNS	W18-1	5C.12	30 x 30	24 x 24	36 x 36
ROAD WORK (with distance)	W20-1	5G.05	36 x 36	—	48 x 48
ROAD CLOSED (with distance)	W20-3	5G.05	36 x 36	—	48 x 48
ONE LANE ROAD (with distance)	W20-4	5G.05	36 x 36	—	48 x 48
Flagger	W20-7	5G.05	36 x 36	—	48 x 48
Workers	W21-1	5G.05	36 x 36	—	48 x 48
FRESH OIL	W21-2	5G.05	30 x 30	—	48 x 48
ROAD MACHINERY AHEAD	W21-3	5G.05	30 x 30	—	48 x 48
SHOULDER WORK	W21-5	5G.05	36 x 36	—	48 x 48
SURVEY CREW	W21-6	5G.05	36 x 36	—	48 x 48
UTILITY WORK (with distance)	W21-7	5G.05	36 x 36	—	48 x 48

Notes:

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

CHAPTER 5B. REGULATORY SIGNS

Section 5B.01 Introduction

Support:

- 01 The purpose of a regulatory sign is to inform highway users of traffic laws or regulations, and to indicate the applicability of legal requirements that would not otherwise be apparent.
- 02 The provisions for regulatory signs are contained in Chapter 2B and in other Sections of this Manual. Provisions for regulatory signs that are specific to low-volume roads are contained in this Chapter.

Section 5B.02 STOP and YIELD Signs (R1-1, R1-2)

Guidance:

- 01 *STOP (R1-1) and YIELD (R1-2) signs (see Figure 5B-1) should be considered for use on low-volume roads where engineering judgment or a study, consistent with the provisions of Sections 2B.04 to 2B.10, indicates that either of the following conditions applies:*
- A. *An intersection of a less-important road with a main road where application of the normal right-of-way rule might not be readily apparent.*
 - B. *An intersection that has restricted sight distance for the prevailing vehicle speeds.*

Section 5B.03 Speed Limit Signs (R2 Series)

Standard:

- 01 **If used, Speed Limit (R2 series) signs (see Figure 5B-1) shall display the speed limit established by law, ordinance, regulation, or as adopted by the authorized agency following an engineering study. The displayed speed limits shall be in multiples of 5 mph.**
- 02 **Speed limits shall be established in accordance with Section 2B.13.**

Option:

- 03 Speed limit signs may be used on low-volume roads that carry traffic from, onto, or adjacent to higher-volume roads that have posted speed limits.

Section 5B.04 Traffic Movement and Prohibition Signs (R3, R4, R5, R6, R9, R10, R11, R12, R13, and R14 Series)

Support:

- 01 The regulatory signs (see Figure 5B-1) in these series inform road users of required, permitted, or prohibited traffic movements involving turn, alignment, exclusion, and pedestrians.

Standard:

- 02 **If used, signs for traffic prohibitions or restrictions shall be placed in advance of the prohibition or restriction so that traffic can use an alternate route or turn around.**

Guidance:

- 03 *Signs should be used on low-volume roads to indicate traffic prohibitions and restrictions such as road closures and weight restrictions.*

Option:

- 04 Signs for traffic prohibitions or restrictions may be used on a low-volume road near and at the intersections or the connections with a higher class of road, and where the regulatory message is essential for transition from the low-volume road to the higher-class facility or vice versa.

Section 5B.05 Parking Signs (R8 Series)

Option:

- 01 Parking signs (see Figure 5B-2) may be installed selectively on low-volume roads with due consideration of enforcement.

Section 5B.06 Other Regulatory Signs

Standard:

01 Other regulatory signs used on low-volume roads that are not discussed in Part 5 shall comply with the provisions contained in other Parts of this Manual.

Figure 5B-1. Regulatory Signs on Low-Volume Roads

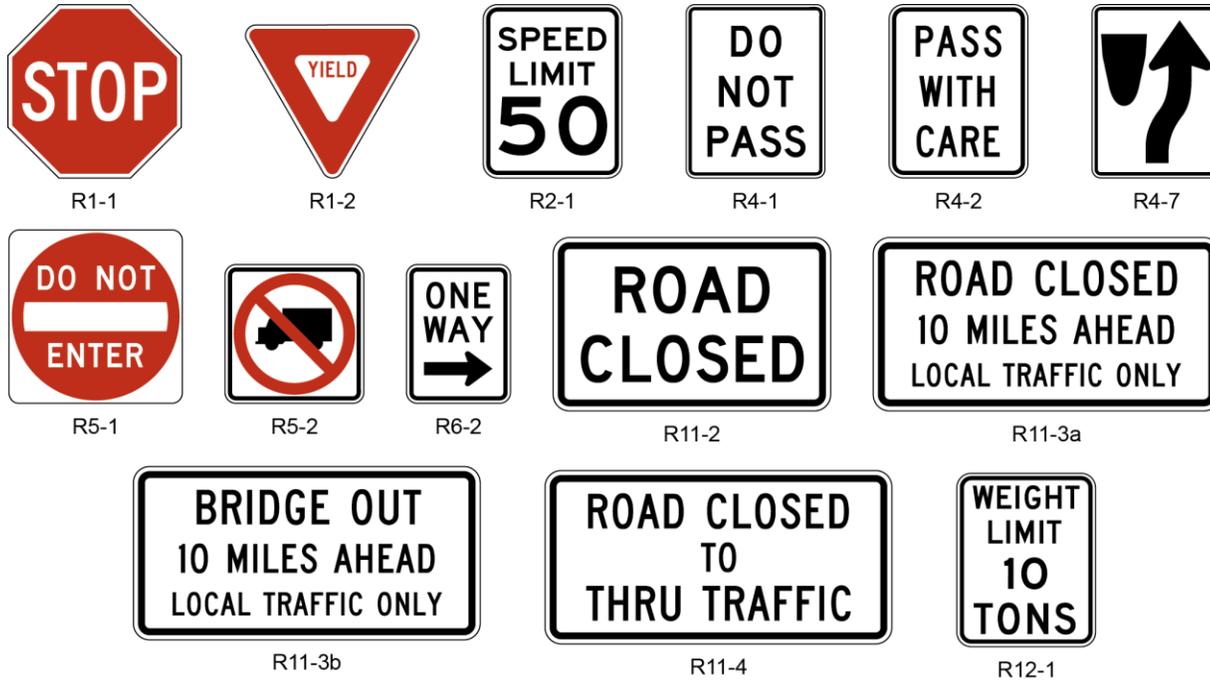


Figure 5B-2. Parking Signs and Plaques on Low-Volume Roads



CHAPTER 5C. WARNING SIGNS

Section 5C.01 Introduction

Support:

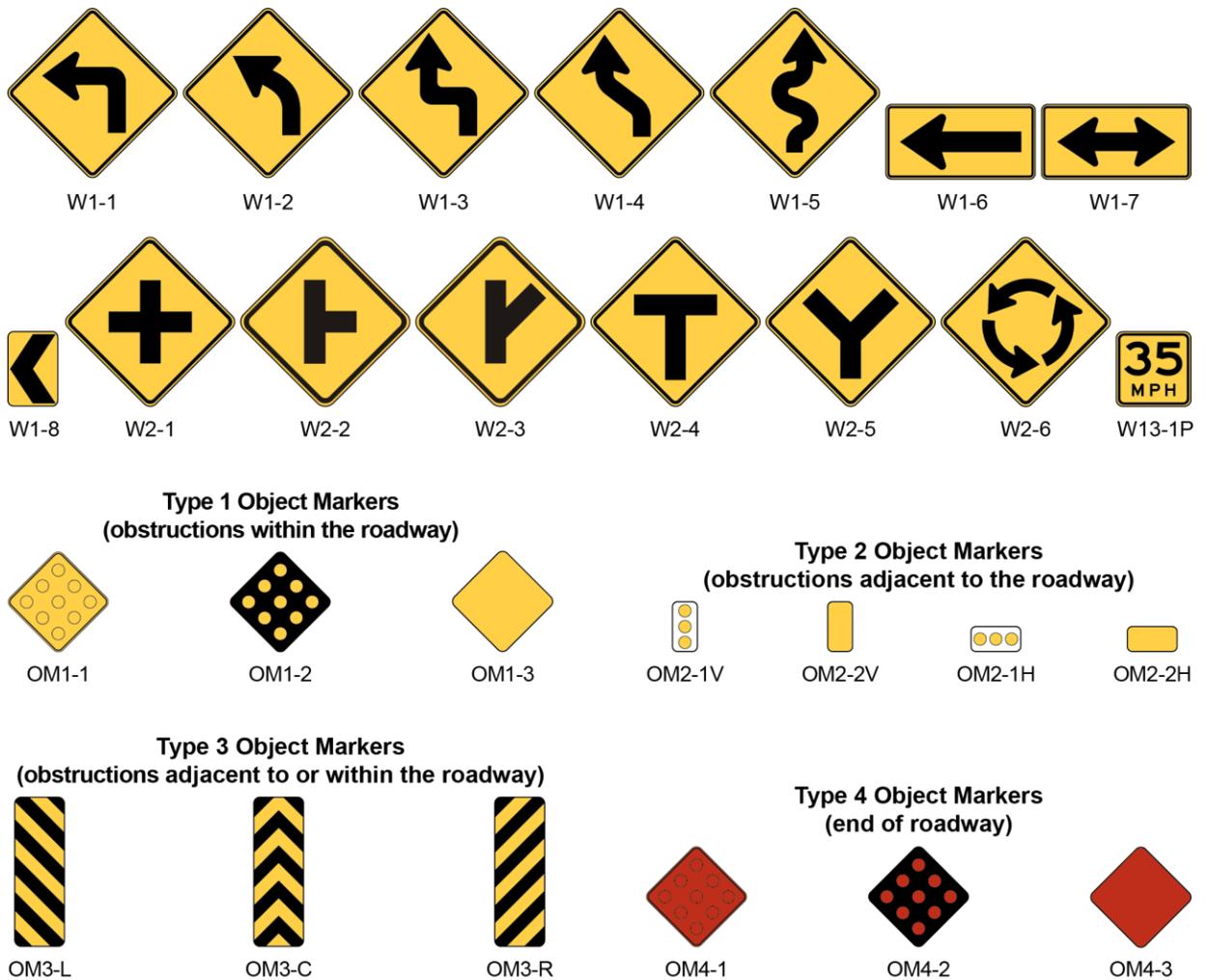
- 01 The purpose of a warning sign is to provide advance warning to the road user of unexpected conditions on or adjacent to the roadway that might not be readily apparent.
- 02 The provisions for warning signs are contained in Chapter 2C and in other Sections of this Manual. Provisions for warning signs that are specific to low-volume roads are contained in this Chapter.

Section 5C.02 Horizontal Alignment Signs (W1-1 through W1-8)

Support:

- 01 Horizontal Alignment signs (see Sections 2C.06 through 2C.12 and Figure 5C-1) include turn, curve, reverse turn, reverse curve, winding road, large arrow, and chevron alignment signs.
- Option:
- 02 Horizontal Alignment signs may be used where engineering judgment indicates a need to inform the road user of a change in the horizontal alignment of the roadway.

Figure 5C-1. Horizontal Alignment and Intersection Warning Signs and Plaques and Object Markers on Low-Volume Roads



Section 5C.03 Intersection Warning Signs (W2-1 through W2-6)**Support:**

01 Intersection signs (see Figure 5C-1) include the crossroad, side road, T-symbol, Y-symbol, and circular intersection signs.

Option:

02 Intersection signs may be used where engineering judgment indicates a need to inform the road user in advance of an intersection.

Section 5C.04 Stop Ahead and Yield Ahead Signs (W3-1, W3-2)**Standard:**

01 A Stop Ahead (W3-1) sign (see Figure 5C-2) shall be used where a STOP sign is not visible for a sufficient distance to permit the road user to bring the vehicle to a stop at the STOP sign.

02 A Yield Ahead (W3-2) sign (see Figure 5C-2) shall be used where a YIELD sign is not visible for a sufficient distance to permit the road user to bring the vehicle to a stop, if necessary, at the YIELD sign.

Section 5C.05 NARROW BRIDGE Sign (W5-2)**Option:**

01 The NARROW BRIDGE (W5-2) sign (see Figure 5C-2) may be used on an approach to a bridge or culvert that has a clear width less than that of the approach roadway.

Section 5C.06 ONE LANE BRIDGE Sign (W5-3)**Guidance:**

01 A ONE LANE BRIDGE (W5-3) sign (see Figure 5C-2) should be used on low-volume two-way roadways in advance of any bridge or culvert:

- A. Having a clear roadway width of less than 16 feet; or
- B. Having a clear roadway width of less than 18 feet when commercial vehicles constitute a high proportion of the traffic; or
- C. Having a clear roadway width of 18 feet or less where the approach sight distance is limited on the approach to the structure.

Option:

02 Roadway alignment and additional warning may be provided on the approach to a bridge or culvert by the use of object markers and/or delineators.

Section 5C.07 Hill Sign (W7-1)**Option:**

01 An engineering study of vehicles and road characteristics, such as percent grade and length of grade, may be conducted to determine hill signing requirements.

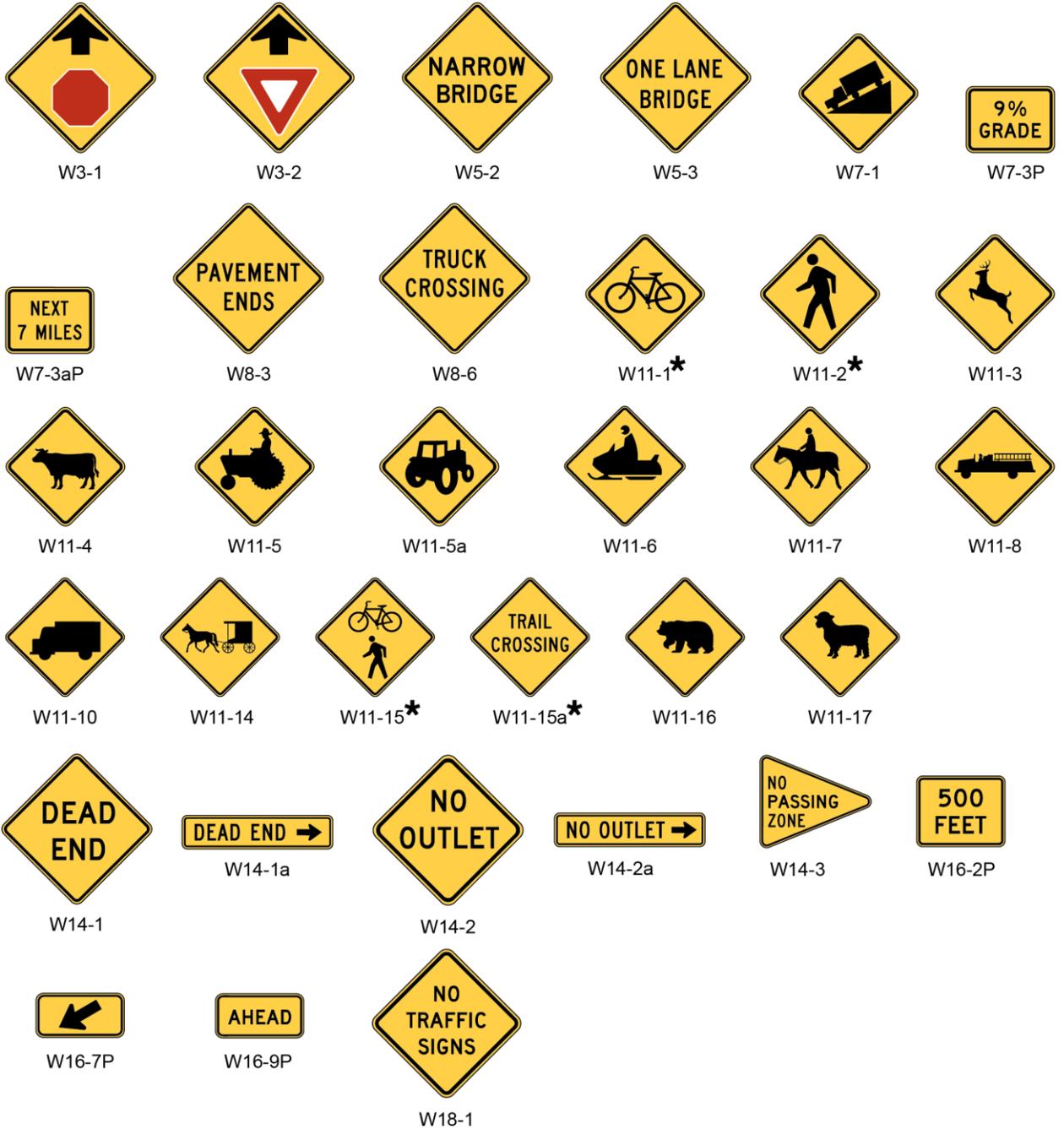
Section 5C.08 PAVEMENT ENDS Sign (W8-3)**Option:**

01 A PAVEMENT ENDS (W8-3) sign (see Figure 5C-2) may be used to warn road users where a paved surface changes to a gravel or earth road surface.

Section 5C.09 Vehicular Traffic Warning and Non-Vehicular Warning Signs (W11 Series and W8-6)**Guidance:**

01 Vehicular Traffic Warning signs (see Figure 5C-2) should be used to alert road users to locations where frequent unexpected entries into the roadway by trucks, bicyclists, farm vehicles, fire trucks, and other vehicles might occur. Such signs should be used only at locations where the road user's sight distance is restricted or the condition, activity, or entering traffic would be unexpected.

Figure 5C-2. Other Warning Signs and Plaques on Low-Volume Roads



* A fluorescent yellow-green background color may be used for this sign or plaque

Option:

02 Non-Vehicular Warning signs (see Figure 5C-2) may be used to alert road users in advance of locations where unexpected entries into the roadway or shared use by pedestrians, large animals, or other crossing activities might occur.

03 A W7-3aP, W16-2P, or W16-9P supplemental plaque (see Figure 5C-2) with the legend NEXT XX MILES, XX FEET, or AHEAD may be installed below a Vehicular Traffic Warning or Non-Vehicular Warning sign (see Sections 2C.49 and 2C.50) to inform road users that they are approaching a portion of the roadway or a point where crossing activity might occur.

Standard:

04 **When a Non-Vehicular Warning sign is placed at the location of the crossing point, a diagonal downward pointing arrow (W16-7P) plaque (see Figure 5C-2) shall be mounted below the sign.**

Guidance:

05 *If the activity is seasonal or temporary, the sign should be removed or covered when the condition or activity does not exist.*

Section 5C.10 Advisory Speed Plaque (W13-1P)

Option:

01 An Advisory Speed (W13-1P) plaque (see Figure 5C-1) may be mounted below a warning sign when the condition requires a reduced speed.

Section 5C.11 DEAD END or NO OUTLET Signs (W14-1, W14-1a, W14-2, W14-2a)

Option:

01 The DEAD END (W14-1) and NO OUTLET (W14-2) signs (see Figure 5C-2) and the DEAD END (W14-1a) and NO OUTLET (W14-2a) signs (see Figure 5C-2) may be used to warn road users of a road that has no outlet or that terminates in a dead end or cul-de-sac.

Guidance:

02 *If used, these signs should be placed at a location that gives drivers of large commercial or recreational vehicles an opportunity to select a different route or turn around.*

Section 5C.12 NO TRAFFIC SIGNS Sign (W18-1)

Option:

01 A W18-1 warning sign (see Figure 5C-2) with the legend NO TRAFFIC SIGNS may be used only on unpaved, low-volume roads to advise users that no signs are installed along the distance of the road. If used, the sign may be installed at the point where road users would enter the low-volume road or where, based on engineering judgment, the road user might need this information.

02 A W7-3aP, W16-2P, or W16-9P supplemental plaque (see Figure 5C-2) with the legend NEXT XX MILES, XX FEET, or AHEAD may be installed below the W18-1 sign when appropriate.

Section 5C.13 Other Warning Signs**Standard:**

01 **Other warning signs used on low-volume roads that are not discussed in Part 5, but are in this Manual, shall comply with the provisions contained in other Parts of this Manual. Warning signs that are not provided in this Manual shall comply with the provisions in Sections 2C.02 and 2C.03.**

Section 5C.14 Object Markers and Barricades

Support:

01 The purpose of object markers is to mark obstructions located within or adjacent to the roadway, such as bridge abutments, drainage structures, and other physical objects.

Guidance:

02 *The end of a low-volume road should be marked with a Type 4 object marker in compliance with Section 2C.66.*

- 03 A Type 3 Barricade may be used where engineering studies or judgment indicates a need for a more visible end-of-roadway treatment (see Section 2B.67).

Standard:

- 04 **Barricades used on low-volume roads shall comply with the provisions contained in Section 2B.67.**

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CHAPTER 5D. GUIDE SIGNS**Section 5D.01 Introduction****Support:**

- 01 The purpose of a guide sign is to inform road users regarding positions, directions, destinations, and routes.
- 02 The provisions for guide signs, in general, are contained in Chapters 2D through 2N and in other Sections of this Manual. Provisions for guide signs that are specific to low-volume roads are contained in this Chapter.

Guidance:

- 03 *The familiarity of the road users with the road should be considered in determining the need for guide signs on low-volume roads.*

Support:

- 04 Low-volume roads generally do not require guide signs to the extent that they are needed on higher classes of roads. Because guide signs are typically only beneficial as a navigational aid for road users who are unfamiliar with a low-volume road, guide signs might not be needed on low-volume roads that serve only local traffic.

Guidance:

- 05 *If used, destination names should be as specific and descriptive as possible. Destinations such as campgrounds, ranger stations, recreational areas, and the like should be clearly indicated so that they are not interpreted to be communities or locations with road user services.*

Option:

- 06 Guide signs may be used at intersections to provide information for road users returning to a higher class of roads.

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CHAPTER 5E. MARKINGS

Section 5E.01 Introduction

Support:

- 01 The purpose of markings on highways is to provide guidance and information for road users regarding roadway conditions and restrictions.
- 02 The provisions for markings and delineators, in general, are contained in Part 3 and in other Sections of this Manual. Provisions for markings that are specific to low-volume roads are contained in this Chapter.

Section 5E.02 Center Line Markings

Standard:

- 01 **Where center line markings are installed, no-passing zone markings in compliance with Section 3B.02 shall also be installed.**

Guidance:

- 02 *Center line markings should be used on paved low-volume roads consistent with the principles of this Manual and with the policies and practices of the road agency and on the basis of either an engineering study or the application of engineering judgment.*

Option:

- 03 Center line markings may be placed on highways with or without edge line markings.

Section 5E.03 Edge Line Markings

Support:

- 01 The purpose of edge line markings is to delineate the left-hand or right-hand edge of the roadway.

Guidance:

- 02 *Edge line markings should be considered for use on paved low-volume roads based on engineering judgment or an engineering study.*

Option:

- 03 Edge line markings may be placed on highways with or without center line markings.
- 04 Edge line markings may be placed on paved low-volume roads for roadway features such as horizontal curves, narrow bridges, pavement width transitions, curvilinear alignment, and at other locations based on engineering judgment or an engineering study.

Section 5E.04 Delineators

Support:

- 01 The purpose of delineators is to enhance driver safety where it is desirable to call attention to a changed or changing condition such as abrupt roadway narrowing or curvature.

Option:

- 02 Delineators may be used on low-volume roads based on engineering judgment, such as for curves, T-intersections, and abrupt changes in the roadway width. In addition, they may be used to mark the location of driveways or other minor roads entering the low-volume road.

Section 5E.05 Other Markings

Standard:

- 01 **Other markings, such as stop lines, crosswalks, pavement legends, channelizing devices, and islands, used on low-volume roads shall comply with the provisions contained in this Manual.**

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CHAPTER 5F. TRAFFIC CONTROL FOR HIGHWAY-RAIL GRADE CROSSINGS

Section 5F.01 Introduction

Support:

- 01 The provisions for highway-rail grade crossing traffic control devices are contained in Part 8 and in other Sections of this Manual.
- 02 Traffic control for highway-rail grade crossings includes all signs, signals, markings, illumination, and other warning devices and their supports along roadways either approaching or at highway-rail grade crossings. The purpose of this traffic control is to promote a safer and more efficient operation of both rail and highway traffic at highway-rail grade crossings.

Section 5F.02 Grade Crossing (Crossbuck) Sign and Number of Tracks Plaque (R15-1, R15-2P)

Support:

- 01 ORC Section 4511.62 addresses a driver's duties related to railroad grade crossings, and Section 4511.61 addresses the use of STOP signs at grade crossings. The vehicles that are required to stop at grade crossings are noted in ORC Section 4511.63, and slow-moving vehicles and equipment crossing railroad tracks are addressed in Section 4511.64.

Standard:

- 02 **The Crossbuck (R15-1) sign shall be used at all highway-rail grade crossings, except as otherwise provided in Section 8B.03. For all low-volume roads, Crossbucks signs shall be used on the right-hand side of each approach. If there are two or more tracks, the supplemental Number of Tracks (R15-2P) plaque (see Figure 5F-1) shall display the number of tracks and shall be installed below the Crossbuck sign.**
- 03 **A strip of retroreflective white material not less than 2 inches in width shall be used on the back of each blade of each Crossbuck sign for the length of each blade, at all highway-rail grade crossings, except those where Crossbuck signs have been installed back-to-back.**
- 04 **A vertical strip of retroreflective white material, not less than 2 inches in width, shall be used on each support at passive highway-rail grade crossings for the full length of the front and back of the support from the Crossbuck sign or Number of Tracks plaque to within 2 feet above the ground, except on the side of those supports where a STOP (R1-1) or YIELD (R1-2) sign or flashing lights have been installed or on the back side of supports for Crossbuck signs installed on one-way streets.**

Section 5F.03 Grade Crossing Advance Warning Signs (W10 Series)

Standard:

- 01 **Except as provided in Paragraph 2, a Grade Crossing Advance Warning (W10-1) sign (see Figure 5F-1) shall be used on all low-volume roads in advance of every highway-rail grade crossing.**

Option:

- 02 The Grade Crossing Advance Warning sign may be omitted for highway-rail grade crossings that are flagged by train crews.
- 03 The W10-2, W10-3, and W10-4 signs (see Figure 5F-1) may be used on low-volume roads that run parallel to railroad tracks to warn road users making a turn that they will encounter a highway-rail grade crossing soon after making the turn.

Section 5F.04 STOP and YIELD Signs (R1-1, R1-2)

Standard:

- 01 **The use and application at passive highway-rail grade crossings on low-volume roads of Crossbuck Assemblies with YIELD (R1-2) signs or STOP (R1-1) signs shall comply with the provisions of Section 8B.04 and Section 4511.61, Stop signs at grade crossings, of the Ohio Revised Code (see Appendix B2).**
- 02 **At all highway-rail grade crossings where YIELD or STOP signs are installed, YIELD Ahead (W3-2) or Stop Ahead (W3-1) signs shall also be installed if the criteria for their installation in Section 2C.36 is met.**

Section 5F.05 Pavement Markings

Guidance:

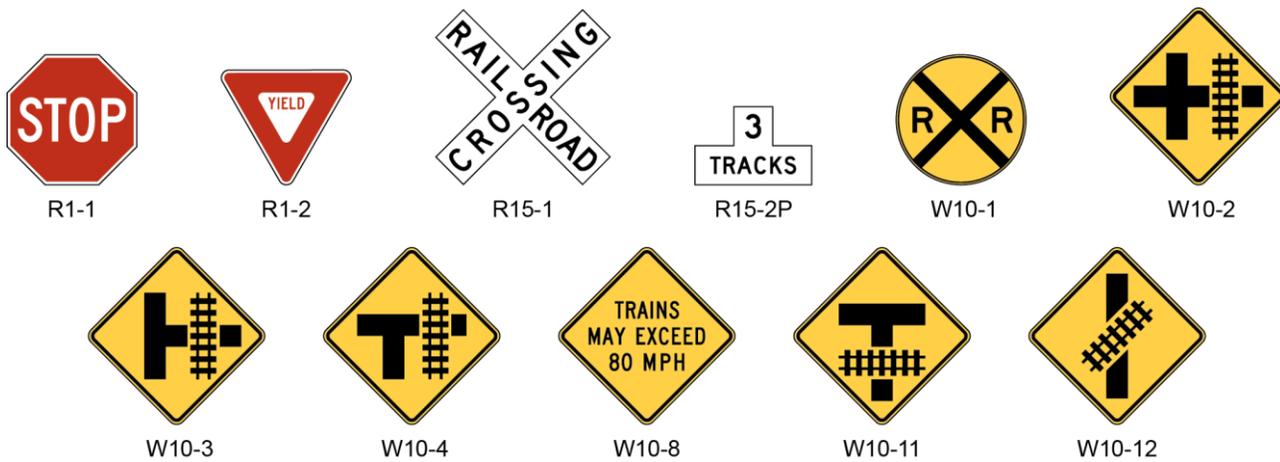
- 01 *Pavement markings at highway-rail grade crossings should be used on paved low-volume roads, particularly if they are already deployed at most other highway-rail grade crossings within the immediate vicinity, or when the roadway has center line markings.*

Section 5F.06 Other Traffic Control Devices

Standard:

- 01 **Other traffic control devices that are used at highway-rail grade crossings on low-volume roads, such as other signs, signals, and illumination that are not in this Chapter, shall comply with the provisions contained in Part 8 and other applicable Parts of this Manual.**

Figure 5F-1. Highway-Rail Grade Crossing Signs and Plaques for Low-Volume Roads



CHAPTER 5G. TEMPORARY TRAFFIC CONTROL ZONES

Section 5G.01 Introduction

Guidance:

- 01 *The safety of road users, including pedestrians and bicyclists, as well as personnel in work zones, should be an integral and high priority element of every project in the planning, design, maintenance, and construction phases. Part 6 should be reviewed for additional, criteria specific details, and more complex temporary traffic control zone requirements. The following principles should be applied to temporary traffic control zones:*
- A. *Traffic movement should be disrupted as little as possible.*
 - B. *Road users should be guided in a clear and positive manner while approaching and within construction, maintenance, and utility work areas.*
 - C. *Routine inspection and maintenance of traffic control elements should be performed both day and night.*
 - D. *Both the contracting agency and the contractor should assign at least one person on each project to have day-to-day responsibility for assuring that the traffic control elements are operating effectively and any needed operational changes are brought to the attention of their supervisors.*
- 02 *Traffic control in temporary traffic control zones should be designed on the assumption that road users will only reduce their speeds if they clearly perceive a need to do so, and then only in small increments of speed. Temporary traffic control zones should not present a surprise to the road user. Frequent and/or abrupt changes in geometrics and other features should be avoided. Transitions should be well delineated and long enough to accommodate driving conditions at the speeds vehicles are realistically expected to travel.*
- 03 *A temporary traffic control plan (see Section 6C.01) should be used for a temporary traffic control zone on a low-volume road to specify particular traffic control devices and features, or to reference typical drawings such as those contained in Part 6.*

Support:

- 04 Applications of speed reduction countermeasures and enforcement can be effective in reducing traffic speeds in temporary traffic control zones.

Section 5G.02 Applications

Guidance:

- 01 *Planned work phasing and sequencing should be the basis for the use of traffic control devices for temporary traffic control zones. Part 6 should be consulted for specific traffic control requirements and examples where construction or maintenance work is planned.*

Support:

- 02 Maintenance activities might not require extensive temporary traffic control if the traffic volumes and speeds are low.

Option:

- 03 The traffic applications shown in Figures 6H-1, 6H-10, 6H-11, 6H-13, 6H-15, 6H-16, and 6H-18 of Part 6 are among those that may be used on low-volume roads.

Support:

- 04 Table 6H-3 provides distances for the advance placement of the traffic control devices shown in the typical applications.

Option:

- 05 For low-volume roadways with speeds of 30 mph or less, a minimum distance of 100 feet may be used for the advance placement distance and the distance between signs shown in the typical applications.
- 06 For temporary traffic control zones on low-volume roads that require flaggers, a single flagger may be adequate if the flagger is visible to approaching traffic from all appropriate directions.

Section 5G.03 Channelization Devices

Standard:

01 **Channelization devices for nighttime use shall have the same retroreflective requirements as specified for higher-volume roadways.**

Option:

02 To alert, guide, and direct road users through temporary traffic control zones on low-volume roads, tapers may be used to move a road user out of the traffic lane and around the work space using the spacing of devices that is described in Section 6F.63.

Section 5G.04 Markings

Guidance:

01 *Pavement markings should be considered for temporary traffic control zones on paved low-volume roads, especially roads that had existing pavement markings or that have a surfaced detour or temporary roadway.*

Option:

02 Interim pavement markings may be omitted in a temporary traffic control zone if they are not needed based on the criteria for these markings in Section 6F.78.

Section 5G.05 Other Traffic Control Devices

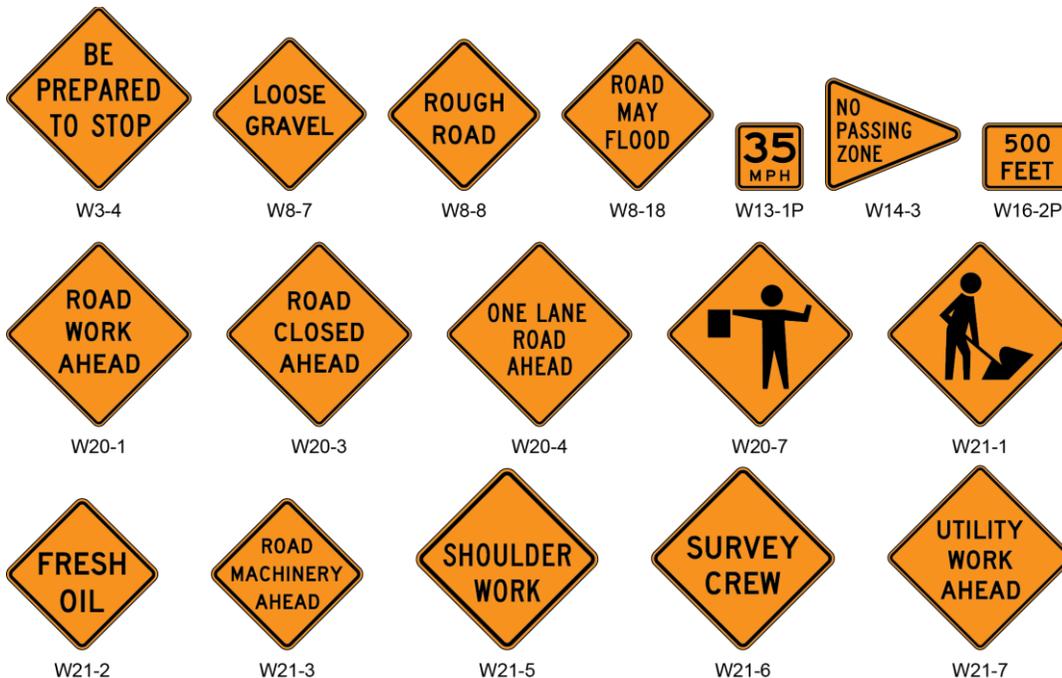
Standard:

01 **Other traffic control devices, such as other signs, signals, and illumination that are used on low-volume roads in temporary traffic control zones, but are not described in Part 5, shall comply with the provisions contained in other Parts of this Manual.**

Support:

02 Some of the signs that might be applicable in a temporary traffic control zone on a low-volume road are shown in Figure 5G-1.

Figure 5G-1. Temporary Traffic Control Signs and Plaques on Low-Volume Roads



CHAPTER 5H. TRAFFIC CONTROL FOR SCHOOL AREAS**Section 5H.01 Introduction**

Support:

- 01 The provisions for school traffic control devices are contained in Part 7 of this Manual.

Standard:

- 02 **The sizes of school signs and plaques on low-volume roads shall be in accordance with Section 7B.01 and Table 7B-1.**

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PART 6. TEMPORARY TRAFFIC CONTROL

CHAPTER 6A. GENERAL

Section 6A.01 General

Support:

- 01 Whenever the acronym “TTC” is used in Part 6, it refers to “temporary traffic control.”

Standard:

- 02 **The needs and control of all road users (motorists, bicyclists, and pedestrians within the highway, or on private roads open to public travel (see definition in Section 1A.13) including persons with disabilities in accordance with the Americans with Disabilities Act of 1990 (ADA), Title II, Paragraph 35.130) through a TTC zone shall be an essential part of highway construction, utility work, maintenance operations, and the management of traffic incidents.**

Support:

- 03 When the normal function of the roadway, or a private road open to public travel, is suspended, TTC planning provides for continuity of the movement of motor vehicle, bicycle, and pedestrian traffic (including accessible passage); transit operations; and access (and accessibility) to property and utilities.

- 04 The primary function of TTC is to provide for the reasonably safe and effective movement of road users through or around TTC zones while reasonably protecting workers, responders to traffic incidents, and equipment.

- 05 Of equal importance to the public traveling through the TTC zone is the safety of workers performing the many varied tasks within the work space. TTC zones present constantly changing conditions that are unexpected by the road user. This creates an even higher degree of vulnerability for the workers and incident management responders on or near the roadway (see Section 6D.03). At the same time, the TTC zone provides for the efficient completion of whatever activity interrupted the normal use of the roadway.

- 06 Consideration for road user safety, worker and responder safety, and the efficiency of road user flow is an integral element of every TTC zone, from planning through completion. A concurrent objective of the TTC is the efficient construction and maintenance of the highway and the efficient resolution of traffic incidents.

- 07 No one set of TTC devices can satisfy all conditions for a given project or incident. At the same time, defining details that would be adequate to cover all applications is not practical. Instead, Part 6 displays typical applications that depict common applications of TTC devices. The TTC selected for each situation depends on type of highway, road user conditions, duration of operation, physical constraints, and the nearness of the work space or incident management activity to road users.

- 08 Improved road user performance might be realized through a well-prepared public relations effort that covers the nature of the work, the time and duration of its execution, the anticipated effects upon road users, and possible alternate routes and modes of travel. Such programs have been found to result in a significant reduction in the number of road users traveling through the TTC zone, which reduces the possible number of conflicts.

- 09 Operational improvements might be realized by using intelligent transportation systems (ITS) in work zones. The use in work zones of ITS technology, such as portable camera systems, highway advisory radio, variable speed limits, ramp metering, traveler information, merge guidance, and queue detection information, is aimed at increasing safety for both workers and road users and helping to ensure a more efficient traffic flow. The use in work zones of ITS technologies has been found to be effective in providing traffic monitoring and management, data collection, and traveler information.

Standard:

- 10 **TTC plans and devices shall be the responsibility of the authority of a public body or official having jurisdiction for guiding road users. There shall be adequate statutory authority for the implementation and enforcement of needed road user regulations, parking controls, speed zoning, and the management of traffic incidents. Such statutes shall provide sufficient flexibility in the application of TTC to meet the needs of changing conditions in the TTC zone.**

Support:

- 11 Temporary facilities, including pedestrian routes around work sites, are also covered by the accessibility requirements of the Americans with Disabilities Act of 1990 (ADA) (Public Law 101-336, 104 Stat. 327, July 26, 1990. 42 USC 12101-12213 (as amended)).

Guidance:

- 12 *The TTC plan should start in the planning phase and continue through the design, construction, and restoration phases. The TTC plans and devices should follow the principles set forth in Part 6. The management of traffic incidents should follow the principles set forth in Chapter 6I.*

Option:

- 13 TTC plans may deviate from the typical applications described in Chapter 6H to allow for conditions and requirements of a particular site or jurisdiction.
- 14 The provisions of Part 6 apply to both rural and urban areas. A rural highway is normally characterized by lower volumes, higher speeds, fewer turning conflicts, and less conflict with pedestrians. An urban street is typically characterized by relatively low speeds, wide ranges of road user volumes, narrower roadway lanes, frequent intersections and driveways, significant pedestrian activity, and more businesses and houses.
- 15 The determination as to whether a particular facility at a particular time of day can be considered to be a high-volume roadway or can be considered to be a low-volume roadway is made by the public agency or official having jurisdiction.

CHAPTER 6B. FUNDAMENTAL PRINCIPLES

Section 6B.01 Fundamental Principles of Temporary Traffic Control

Support:

- 01 Construction, maintenance, utility, and incident zones can all benefit from TTC to compensate for the unexpected or unusual situations faced by road users. When planning for TTC in these zones, it can be assumed that it is appropriate for road users to exercise caution. Even though road users are assumed to be using caution, special care is still needed in applying TTC techniques.
- 02 Special plans preparation and coordination with transit, other highway agencies, law enforcement and other emergency units, utilities, schools, and railroad companies might be needed to reduce unexpected and unusual road user operation situations.
- 03 During TTC activities, commercial vehicles might need to follow a different route from passenger vehicles because of bridge, weight, clearance, or geometric restrictions. Also, vehicles carrying hazardous materials might need to follow a different route from other vehicles. The Truck Route and Hazardous Materials signs are included in Sections 2B.62.
- 04 Experience has shown that following the fundamental principles of Part 6 will assist road users and help protect workers in the vicinity of TTC zones.

Guidance:

- 05 *Road user and worker safety and accessibility in TTC zones should be an integral and high-priority element of every project from planning through design and construction. Similarly, maintenance and utility work should be planned and conducted with the safety and accessibility of all motorists, bicyclists, pedestrians (including those with disabilities), and workers being considered at all times. If the TTC zone includes a grade crossing, early coordination with the railroad company or light rail transit agency should take place.*

Support:

- 06 Formulating specific plans for TTC at traffic incidents is difficult because of the variety of situations that can arise.

Guidance:

- 07 *The following are the seven fundamental principles of TTC:*
1. *General plans or guidelines should be developed to provide safety for motorists, bicyclists, pedestrians, workers, enforcement/emergency officials, and equipment, with the following factors being considered:*
 - A. *The basic safety principles governing the design of permanent roadways and roadsides should also govern the design of TTC zones. The goal should be to route road users through such zones using roadway geometrics, roadside features, and TTC devices as nearly as possible comparable to those for normal highway situations.*
 - B. *A TTC plan, in detail appropriate to the complexity of the work project or incident, should be prepared and understood by all responsible parties before the site is occupied. Any changes in the TTC plan should be approved by an official who is knowledgeable (for example, trained and/or certified) in proper TTC practices.*
 2. *Road user movement should be inhibited as little as practical, based on the following considerations:*
 - A. *TTC at work and incident sites should be designed on the assumption that drivers will only reduce their speeds if they clearly perceive a need to do so (see Section 6C.01).*
 - B. *Frequent and abrupt changes in geometrics such as lane narrowing, dropped lanes, or main roadway transitions that require rapid maneuvers, should be avoided.*
 - C. *Work should be scheduled in a manner that minimizes the need for lane closures or alternate routes, while still getting the work completed quickly and the lanes or roadway open to traffic as soon as possible.*
 - D. *Attempts should be made to reduce the volume of traffic using the roadway or freeway to match the restricted capacity conditions. Road users should be encouraged to use alternative routes.*

For high-volume roadways and freeways, the closure of selected entrance ramps or other access points and the use of signed diversion routes should be evaluated.

- E. *Bicyclists and pedestrians, including those with disabilities, should be provided with access and reasonably safe passage through the TTC zone.*
 - F. *If work operations permit, lane closures on high-volume streets and highways should be scheduled during off-peak hours. Night work should be considered if the work can be accomplished with a series of short-term operations.*
 - G. *Early coordination with officials having jurisdiction over the affected cross streets and providing emergency services should occur if significant impacts to roadway operations are anticipated.*
 - H. *Roadway occupancy and work completion time should be minimized to reduce exposure to potential hazards.*
3. *Motorists, bicyclists, and pedestrians should be guided in a clear and positive manner while approaching and traversing TTC zones and incident sites. The following principles should be applied:*
- A. *Adequate warning, delineation, and channelization should be provided to assist in guiding road users in advance of and through the TTC zone or incident site by using proper pavement marking, signing, or other devices that are effective under varying conditions. Providing information that is in usable formats by pedestrians with visual disabilities should also be considered.*
 - B. *TTC devices inconsistent with intended travel paths through TTC zones should be removed or covered. However, in intermediate-term stationary, short-term, and mobile operations, where visible permanent devices are inconsistent with intended travel paths, devices that highlight or emphasize the appropriate path should be used. Providing traffic control devices that are accessible to and usable by pedestrians with disabilities should be considered.*
 - C. *Flagging procedures, when used, should provide positive guidance to road users traversing the TTC zone.*
4. *To provide acceptable levels of operations, routine day and night inspections of TTC elements should be performed as follows:*
- A. *Individuals who are knowledgeable (for example, trained and/or certified) in the principles of proper TTC should be assigned responsibility for safety in TTC zones. The most important duty of these individuals should be to check that all TTC devices on the project are consistent with the TTC plan and are effective for motorists, bicyclists, pedestrians, and workers.*
 - B. *As the work progresses, temporary traffic controls and/or working conditions should be modified, if appropriate, in order to provide road user and to provide worker safety. The individual responsible for TTC should have the authority to halt work until applicable or remedial safety measures are taken.*
 - C. *TTC zones should be carefully monitored under varying conditions of road user volumes, light, and weather to check that applicable TTC devices are effective, clearly visible, clean, and in compliance with the TTC plan.*
 - D. *When warranted, an engineering study should be made (in cooperation with law enforcement officials) of reported crashes occurring within the TTC zone. Crash records in TTC zones should be monitored to identify the need for changes in the TTC zone.*
5. *Attention should be given to the maintenance of roadside safety during the life of the TTC zone by applying the following principles:*
- A. *To accommodate run-off-the-road incidents, disabled vehicles, or emergency situations, unencumbered roadside recovery areas or clear zones should be provided where practical.*
 - B. *Channelization of road users should be accomplished by the use of pavement markings, signing, and crashworthy, detectable channelizing devices.*
 - C. *Work equipment, workers' private vehicles, materials, and debris should be stored in such a manner to reduce the probability of being impacted by run-off-the-road vehicles.*
6. *Each person whose actions affect TTC zone safety, from the upper-level management through the field workers, should receive training appropriate to the job decisions each individual is required to make. Only those individuals who are trained in proper TTC practices and have a basic understanding of the principles (established by applicable standards and guidelines, including those*

of this Manual) should supervise the selection, placement, and maintenance of TTC devices used for TTC zones and for incident management.

7. *Good public relations should be maintained by applying the following principles:*
 - A. *The needs of all road users should be assessed such that appropriate advance notice is given and clearly defined alternative paths are provided.*
 - B. *The cooperation of the various news media should be sought in publicizing the existence of and reasons for TTC zones because news releases can assist in keeping the road users well informed.*
 - C. *The needs of abutting property owners, residents, and businesses should be assessed and appropriate accommodations made.*
 - D. *The needs of emergency service providers (law enforcement, fire, and medical) should be assessed and appropriate coordination and accommodations made.*
 - E. *The needs of railroads and transit should be assessed and appropriate coordination and accommodations made.*
 - F. *The needs of operators of commercial vehicles such as buses and large trucks should be assessed and appropriate accommodations made.*

Standard:

- 08 **Before any new detour or temporary route is opened to traffic, all necessary signs shall be in place.**
- 09 **All TTC devices shall be removed as soon as practical when they are no longer needed. When work is suspended for short periods of time, TTC devices that are no longer appropriate shall be removed or covered.**

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CHAPTER 6C. TEMPORARY TRAFFIC CONTROL ELEMENTS

Section 6C.01 Temporary Traffic Control Plans

Support:

- 01 A TTC plan describes TTC measures to be used for facilitating road users through a work zone or an incident area. TTC plans play a vital role in providing continuity of effective road user flow when a work zone, incident, or other event temporarily disrupts normal road user flow. Important auxiliary provisions that cannot conveniently be specified on project plans can easily be incorporated into Special Provisions within the TTC plan.
- 02 TTC plans range in scope from being very detailed to simply referencing typical drawings contained in this Manual, standard approved highway agency drawings and manuals, or specific drawings contained in the contract documents. The degree of detail in the TTC plan depends entirely on the nature and complexity of the situation.

Guidance:

- 03 *TTC plans should be prepared by persons knowledgeable (for example, trained and/or certified) about the fundamental principles of TTC and work activities to be performed. The design, selection and placement of TTC devices for a TTC plan should be based on engineering judgment.*
- 04 *Coordination should be made between adjacent or overlapping projects to check that duplicate signing is not used and to check compatibility of traffic control between adjacent or overlapping projects.*
- 05 *Traffic control planning should be completed for all highway construction, utility work, maintenance operations, and incident management including minor maintenance and utility projects prior to occupying the TTC zone. Planning for all road users should be included in the process.*
- 06 *Provisions for effective continuity of accessible circulation paths for pedestrians should be incorporated into the TTC process. Where existing pedestrian routes are blocked or detoured, information should be provided about alternative routes that are usable by pedestrians with disabilities, particularly those who have visual disabilities. Access to temporary bus stops, travel across intersections with accessible pedestrian signals (see Section 4E.09), and other routing issues should be considered where temporary pedestrian routes are channelized. Barriers and channelizing devices that are detectable by people with visual disabilities should be provided.*

Option:

- 07 Provisions may be incorporated into the project bid documents that enable contractors to develop an alternate TTC plan.
- 08 Modifications of TTC plans may be necessary because of changed conditions or a determination of better methods of safely and efficiently handling road users.

Guidance:

- 09 *This alternate or modified plan should have the approval of the responsible highway agency prior to implementation.*
- 10 *Provisions for effective continuity of transit service should be incorporated into the TTC planning process because often public transit buses cannot efficiently be detoured in the same manner as other vehicles (particularly for short-term maintenance projects). Where applicable, the TTC plan should provide for features such as accessible temporary bus stops, pull-outs, and satisfactory waiting areas for transit patrons, including persons with disabilities, if applicable (see Section 8A.08 for additional light rail transit issues to consider for TTC).*
- 11 *Provisions for effective continuity of railroad service and acceptable access to abutting property owners and businesses should also be incorporated into the TTC planning process.*
- 12 *Reduced speed limits should be used only in the specific portion of the TTC zone where conditions or restrictive features are present. However, frequent changes in the speed limit should be avoided. A TTC plan should be designed so that vehicles can travel through the TTC zone with a speed limit reduction of no more than 10 mph.*
- 13 *A reduction of more than 10 mph in the speed limit should be used only when required by restrictive features in the TTC zone. Where restrictive features justify a speed reduction of more than 10 mph,*

additional driver notification should be provided. The speed limit should be stepped down in advance of the location requiring the lowest speed, and additional TTC warning devices should be used.

- 14 *Reduced speed zoning (lowering the regulatory speed limit) should be avoided as much as practical because drivers will reduce their speeds only if they clearly perceive a need to do so.*

Support:

- 15 Research has demonstrated that large reductions in the 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.
- 16 Section 4511.21 of the ORC establishes how speed limits may be reduced and Parts 6 and 12 of the ODOT "Traffic Engineering Manual" (see Section 1A.11) provide additional information on speeds in TTC zones.

Section 6C.02 Temporary Traffic Control Zones

Support:

- 01 A TTC zone is an area of a highway where road user conditions are changed because of a work zone, an incident zone, or a planned special event through the use of TTC devices, uniformed law enforcement officers, or other authorized personnel.
- 02 A work zone is an area of a highway with construction, maintenance, or utility work activities. A work zone is typically marked by signs, channelizing devices, barriers, pavement markings, and/or work vehicles. It extends from the first warning sign or high-intensity rotating, flashing, oscillating, or strobe lights on a vehicle to the END ROAD WORK sign or the last TTC device.
- 03 An incident zone is an area of a highway where temporary traffic controls are imposed by authorized officials in response to a traffic incident (see Section 6I.01). It extends from the first warning device (such as a sign, light, or cone) to the last TTC device or to a point where road users return to the original lane alignment and are clear of the incident.
- 04 A planned special event often creates the need to establish altered traffic patterns to handle the increased traffic volumes generated by the event. The size of the TTC zone associated with a planned special event can be small, such as closing a street for a festival, or can extend throughout a municipality for larger events. The duration of the TTC zone is determined by the duration of the planned special event.

Section 6C.03 Components of Temporary Traffic Control Zones

Support:

- 01 Most TTC zones are divided into four areas: the advance warning area, the transition area, the activity area, and the termination area. Figure 6C-1 illustrates these four areas. These four areas are described in Sections 6C.04 through 6C.07.

Section 6C.04 Advance Warning Area

Support:

- 01 The advance warning area is the section of highway where road users are informed about the upcoming work zone or incident area.

Option:

- 02 The advance warning area may vary from a single sign or high-intensity rotating, flashing, oscillating, or strobe lights on a vehicle to a series of signs in advance of the TTC zone activity area.

Guidance:

- 03 *Typical distances for placement of advance warning signs on freeways and expressways should be longer because drivers are conditioned to uninterrupted flow. Therefore, the advance warning sign placement should extend on these facilities as far as 1/2 mile or more.*

Figure 6C-1. Component Parts of a Temporary Traffic Control Zone

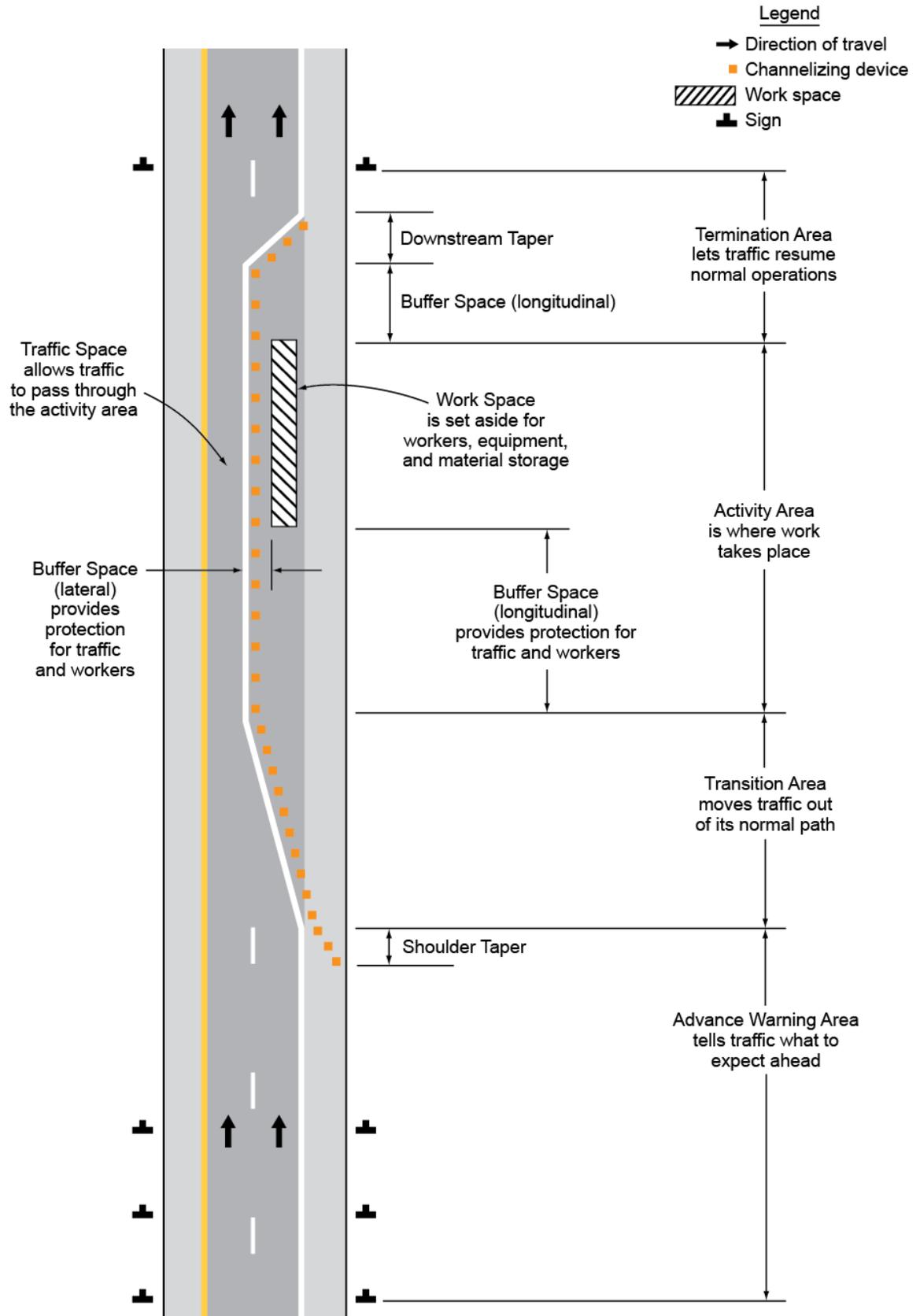


Table 6C-1. Recommended Advance Warning Sign Minimum Spacing

Road Type	Distance Between Signs **		
	A	B	C
Urban (low speed) *	100 feet	100 feet	100 feet
Urban (high speed) *	350 feet	350 feet	350 feet
Rural	500 feet	500 feet	500 feet
Expressway / Freeway	1,000 feet	1,500 feet	2,640 feet

* Speed category to be determined by highway agency.

** The column headings A, B, and C are the dimensions shown in Figures 6H-1 through 6H-46. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The "first sign" is the sign in a three-sign series that is closest to the TTC zone. The "third sign" is the sign that is furthest upstream from the TTC zone.)

04 *On urban streets, the effective placement of the first warning sign in feet should range from 4 to 8 times the speed limit in mph, with the high end of the range being used when speeds are relatively high. When a single advance warning sign is used (in cases such as low-speed residential streets), the advance warning area can be as short as 100 feet. When two or more advance warning signs are used on higher-speed streets, such as major arterials, the advance warning area should extend a greater distance (see Table 6C-1).*

05 *Since rural highways are normally characterized by higher speeds, the effective placement of the first warning sign in feet should be substantially longer—from 8 to 12 times the speed limit in mph. Since two or more advance warning signs are normally used for these conditions, the advance warning area should extend 1,500 feet or more for open highway conditions (see Table 6C-1).*

06 *The distances contained in Table 6C-1 are approximate, are intended for guidance purposes only, and should be applied with engineering judgment. These distances should be adjusted for field conditions, if necessary, by increasing or decreasing the recommended distances.*

Support:

07 The need to provide additional reaction time for a condition is one example of justification for increasing the sign spacing. Conversely, decreasing the sign spacing might be justified in order to place a sign immediately downstream of an intersection or major driveway such that traffic turning onto the roadway in the direction of the TTC zone will be warned of the upcoming condition.

Option:

08 Advance warning may be eliminated when the activity area is sufficiently removed from the road users' path so that it does not interfere with the normal flow.

Section 6C.05 Transition Area

Support:

01 The transition area is that section of highway where road users are redirected out of their normal path. Transition areas usually involve strategic use of tapers, which because of their importance are discussed separately in detail.

Standard:

02 **When redirection of the road users' normal path is required, they shall be directed from the normal path to a new path.**

03 Because it is impractical in mobile operations to redirect the road user’s normal path with stationary channelization, more dominant vehicle-mounted traffic control devices, such as arrow boards, portable changeable message signs, and high-intensity rotating, flashing, oscillating, or strobe lights, may be used instead of channelizing devices to establish a transition area.

Section 6C.06 Activity Area

Support:

01 The activity area is the section of the highway where the work activity takes place. It is comprised of the work space, the traffic space, and the buffer space.

02 The work space is that portion of the highway closed to road users and set aside for workers, equipment, and material, and a shadow vehicle if one is used upstream. Work spaces are usually delineated for road users by channelizing devices or, to exclude vehicles and pedestrians, by temporary barriers.

Option:

03 The work space may be stationary or may move as work progresses.

Guidance:

04 *Since there might be several work spaces (some even separated by several miles) within the project limits, each work space should be adequately signed to inform road users and reduce confusion.*

Support:

05 The traffic space is the portion of the highway in which road users are routed through the activity area.

06 The buffer space is a lateral and/or longitudinal area that separates road user flow from the work space or an unsafe area, and might provide some recovery space for an errant vehicle.

Guidance:

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

Option:

08 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.

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

10 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.

11 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:

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

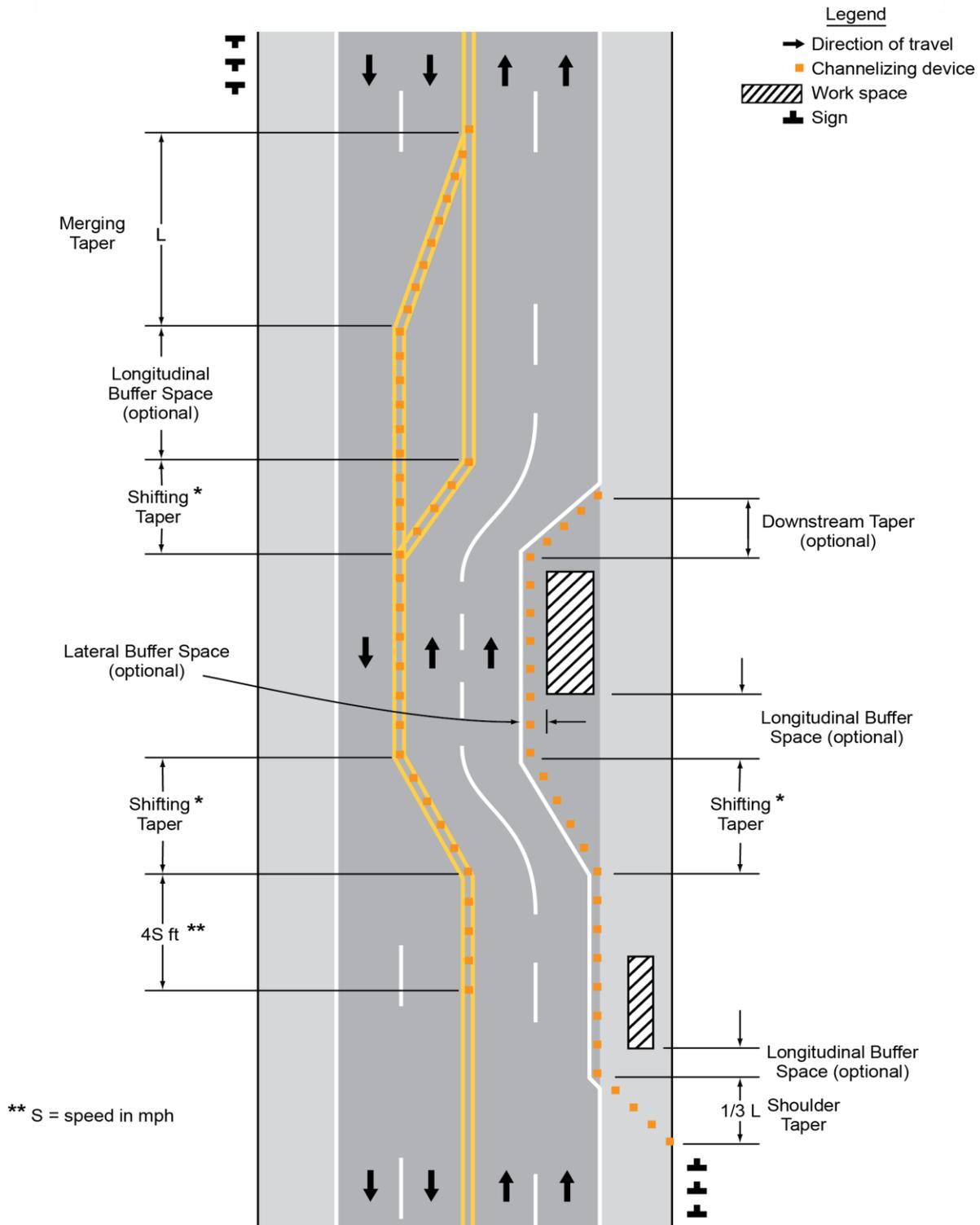
13 When a shadow vehicle, arrow board, or changeable message sign is placed in a closed lane in advance of a work space, only the area upstream of the vehicle, arrow board, or changeable message sign constitutes the buffer space.

Table 6C-2. Stopping Sight Distance as a Function of Speed

Speed *	Distance
20 mph	115 feet
25 mph	155 feet
30 mph	200 feet
35 mph	250 feet
40 mph	305 feet
45 mph	360 feet
50 mph	425 feet
55 mph	495 feet
60 mph	570 feet
65 mph	645 feet
70 mph	730 feet
75 mph	820 feet

* Posted speed, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed

Figure 6C-2. Types of Tapers and Buffer Spaces



* A shifting taper should be approximately L in length; however, it may be $1/2 L$ when the speed is less than 50 mph.

Option:

- 14 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:

- 15 *The width of a lateral buffer space should be determined by engineering judgment.*

Option:

- 16 When work occurs on a high-volume, highly congested facility, a vehicle storage or staging space may be provided for incident response and emergency vehicles (for example, tow trucks and fire apparatus) so that these vehicles can respond quickly to road user incidents.

Section 6C.07 Termination Area

Support:

- 01 The termination area is the section of the highway where road users are returned to their normal driving path. The termination area extends from the downstream end of the work area to the last TTC device such as END ROAD WORK signs, if posted.

Option:

- 02 An END ROAD WORK sign, a Speed Limit sign, or other signs may be used to inform road users that they can resume normal operations.
- 03 A longitudinal buffer space may be used between the work space and the beginning of the downstream taper.

Section 6C.08 Tapers

Option:

- 01 Tapers may be used in both the transition and termination areas. Whenever tapers are to be used in close proximity to an interchange ramp, crossroads, curves, or other influencing factors, the length of the tapers may be adjusted.

Support:

- 02 Tapers are created by using a series of channelizing devices and/or pavement markings to move traffic out of or into the normal path. Types of tapers are shown in Figure 6C-2.

- 03 Longer tapers are not necessarily better than shorter tapers (particularly in urban areas with characteristics such as short block lengths or driveways) because extended tapers tend to encourage sluggish operation and to encourage drivers to delay lane changes unnecessarily. The test concerning adequate lengths of tapers involves observation of driver performance after TTC plans are put into effect.

Table 6C-3. Taper Length Criteria for Temporary Traffic Control Zones

Type of Taper	Taper Length
Merging Taper	at least L
Shifting Taper	L; however, may be 1/2 L when speed is < 50 mph
Shoulder Taper	at least 1/3 L
One-Lane, Two-way Traffic Taper	50 feet minimum; 100 feet maximum
Downstream Taper	50 feet minimum; 100 feet maximum

Table 6C-4. Formulas for Determining Taper Length

Speed Limit (S)	Taper Length (L) in Feet
40 mph or less	$L = \frac{WS^2}{60}$
45 mph or more	$L = WS$

Where: L = taper length in feet
 W = width of offset in feet
 S = posted speed limit, or off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

Guidance:

04 *The appropriate taper length (L) should be determined using the criteria shown in Tables 6C-3 and 6C-4.*

05 *The maximum distance in feet between devices in a taper should not exceed 1.0 times the speed limit in mph.*

Support:

06 A merging taper requires the longest distance because drivers are required to merge into common road space.

Guidance:

07 *A merging taper should be long enough to enable merging drivers to have adequate advance warning and sufficient length to adjust their speeds and merge into an adjacent lane before the downstream end of the transition.*

Support:

08 A shifting taper is used when a lateral shift is needed. When more space is available, a longer than minimum taper distance can be beneficial. Changes in alignment can also be accomplished by using horizontal curves designed for normal highway speeds.

Guidance:

09 *Except as provided in Paragraph 10, a shifting taper should be approximately L in length,*

Option:

10 *Where speeds are less than 50 mph, the shifting taper may be approximately 1/2 L.*

Support:

11 A shoulder taper might be beneficial on a high-speed roadway where shoulders are part of the activity area and are closed, or when improved shoulders might be mistaken as a driving lane. In these instances, the same type, but abbreviated, closure procedures used on a normal portion of the roadway can be used.

Guidance:

12 *If used, shoulder tapers should have a length of approximately 1/3 L (see Tables 6C-3 and 6C-4). If a shoulder is used as a travel lane, either through practice or during a TTC activity, a normal merging or shifting taper should be used.*

Support:

13 A downstream taper might be useful in termination areas to provide a visual cue to the driver that access is available back into the original lane or path that was closed.

Guidance:

14 *If used, a downstream taper should have a minimum length of 50 feet and a maximum length of 100 feet with devices placed at a spacing of approximately 20 feet.*

Support:

15 The one-lane, two-way taper is used in advance of an activity area that occupies part of a two-way roadway in such a way that a portion of the road is used alternately by traffic in each direction.

Guidance:

16 *Traffic should be controlled by a flagger or temporary traffic control signal (if sight distance is limited), or a STOP or YIELD sign. A short taper having a minimum length of 50 feet and a maximum length of 100 feet with channelizing devices at approximately 20-foot spacing should be used to guide traffic into the one-lane section, and a downstream taper should be used to guide traffic back into their original lane.*

Support:

17 An example of a one-lane, two-way traffic taper is shown in Figure 6C-3.

Section 6C.09 Detours and Diversions

Support:

01 A detour is a temporary rerouting of road users onto an existing highway in order to avoid a TTC zone.

Guidance:

- 02 *Detours should be clearly signed over their entire length so that road users can easily use existing highways to return to the original highway.*

Support:

- 03 A diversion is a temporary rerouting of road users onto a temporary highway or alignment placed around the work area.

Section 6C.10 One-Lane, Two-Way Traffic Control**Standard:**

- 01 **Except as provided in Paragraph 5, when traffic in both directions must use a single lane for a limited distance, movements from each end shall be coordinated.**

Guidance:

- 02 *Provisions should be made for alternate one-way movement through the constricted section via methods such as flagger control, a flag transfer, a pilot car, traffic control signals, or stop or yield control.*

- 03 *Control points at each end should be chosen to permit easy passing of opposing lanes of vehicles.*

- 04 *If traffic on the affected one-lane roadway is not visible from one end to the other, then flagging procedures, a pilot car with a flagger used as described in Section 6C.13, or a traffic control signal should be used to control opposing traffic flows.*

Option:

- 05 If the work space on a low-volume street or road is short and road users from both directions are able to see the traffic approaching from the opposite direction through and beyond the worksite, the movement of traffic through a one-lane, two-way constriction may be self-regulating.

Section 6C.11 Flagger Method of One-Lane, Two-Way Traffic Control*Guidance:*

- 01 *Except as provided in Paragraph 2, traffic should be controlled by a flagger at each end of a constricted section of roadway. One of the flaggers should be designated as the coordinator. To provide coordination of the control of the traffic, the flaggers should be able to communicate with each other orally, electronically, or with manual signals. These manual signals should not be mistaken for flagging signals.*

Option:

- 02 When a one-lane, two-way TTC zone is short enough to allow a flagger to see from one end of the zone to the other, traffic may be controlled by either a single flagger or by a flagger at each end of the section.

Guidance:

- 03 *When a single flagger is used, the flagger should be stationed on the shoulder opposite the constriction or work space, or in a position where good visibility and traffic control can be maintained at all times. When good visibility and traffic control cannot be maintained by one flagger station, traffic should be controlled by a flagger at each end of the section.*

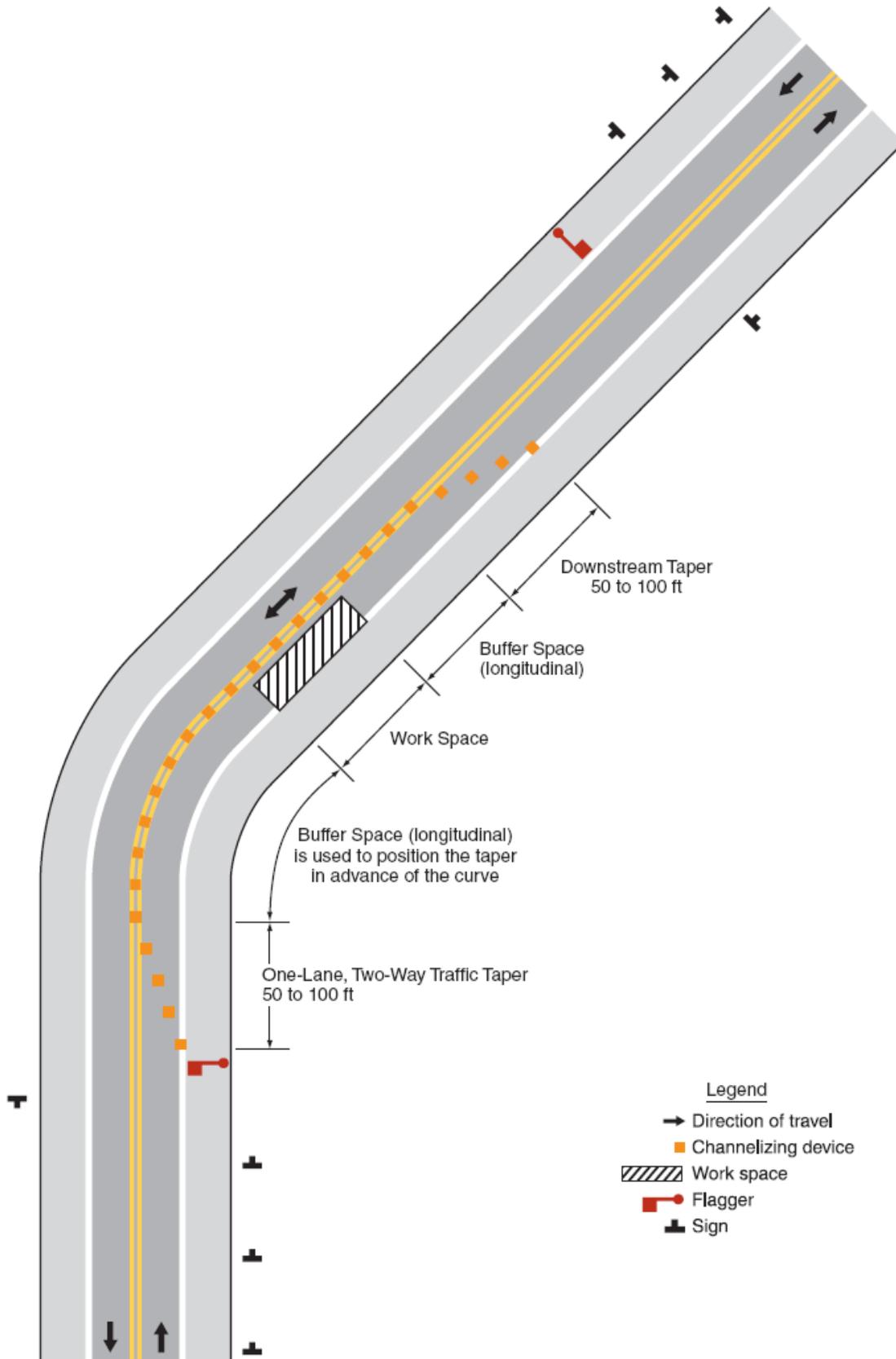
Section 6C.12 Flag Transfer Method of One-Lane, Two-Way Traffic Control*Support:*

- 01 The driver of the last vehicle proceeding into the one-lane section is given a red flag (or other token) and instructed to deliver it to the flagger at the other end. The opposite flagger, upon receipt of the flag, then knows that traffic can be permitted to move in the other direction. A variation of this method is to replace the use of a flag with an official pilot car that follows the last road user vehicle proceeding through the section.

Guidance:

- 02 *The flag transfer method should be employed only where the one-way traffic is confined to a relatively short length of a road, usually no more than 1 mile in length.*

Figure 6C-3. Example of a One-Lane, Two-Way Traffic Taper



Section 6C.13 Pilot Car Method of One-Lane, Two-Way Traffic Control

Option:

- 01 A pilot car may be used to guide a queue of vehicles through the TTC zone or detour.

Guidance:

- 02 *The pilot car should have the name of the contractor or contracting authority prominently displayed.*

Standard:

- 03 **The PILOT CAR FOLLOW ME (G20-4) sign (see Section 6F.58) shall be mounted on the rear of the pilot vehicle.**

- 04 **A flagger shall be stationed on the approach to the activity area to control vehicular traffic until the pilot vehicle is available.**

Section 6C.14 Temporary Traffic Control Signal Method of One-Lane, Two-Way Traffic Control

Option:

- 01 Traffic control signals may be used to control vehicular traffic movements in one-lane, two-way TTC zones (see Figure 6H-12 and Chapter 4H).

Section 6C.15 Stop or Yield Control Method of One-Lane, Two-Way Traffic Control

Option:

- 01 STOP or YIELD signs may be used to control traffic on low-volume roads at a one-lane, two-way TTC zone when drivers are able to see the other end of the one-lane, two-way operation and have sufficient visibility of approaching vehicles.

Guidance:

- 02 *If the STOP or YIELD sign is installed for only one direction, then the STOP or YIELD sign should face road users who are driving on the side of the roadway that is closed for the work activity area.*

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CHAPTER 6D. PEDESTRIAN AND WORKER SAFETY

Section 6D.01 Pedestrian Considerations

Support:

- 01 A wide range of pedestrians might be affected by TTC zones, including the young, elderly, and people with disabilities such as hearing, visual, or mobility. These pedestrians need a clearly delineated and usable travel path. Considerations for pedestrians with disabilities are addressed in Section 6D.02.

Standard:

- 02 **The various TTC provisions for pedestrian and worker safety set forth in Part 6 shall be applied by knowledgeable (for example, trained and/or certified) persons after appropriate evaluation and engineering judgment.**
- 03 **Advance notification of sidewalk closures shall be provided by the maintaining agency.**
- 04 **If the TTC zone affects the movement of pedestrians, adequate pedestrian access and walkways shall be provided. If the TTC zone affects an accessible and detectable pedestrian facility, the accessibility and detectability shall be maintained along the alternate pedestrian route.**

Option:

- 05 If establishing or maintaining an alternate pedestrian route is not feasible during the project, an alternate means of providing for pedestrians may be used, such as adding free bus service around the project or assigning someone the responsibility to assist pedestrians with disabilities through the project limits.

Support:

- 06 It must be recognized that pedestrians are reluctant to retrace their steps to a prior intersection for a crossing or to add distance or out-of-the-way travel to a destination.

Guidance:

- 07 *The following three items should be considered when planning for pedestrians in TTC zones:*
- A. *Pedestrians should not be led into conflicts with vehicles, equipment, and operations.*
 - B. *Pedestrians should not be led into conflicts with vehicles moving through or around the worksite.*
 - C. *Pedestrians should be provided with a convenient and accessible path that replicates as nearly as practical the most desirable characteristics of the existing sidewalk(s) or footpath(s).*
- 08 *A pedestrian route should not be severed and/or moved for nonconstruction activities such as parking for vehicles and equipment.*
- 09 *Consideration should be made to separate pedestrian movements from both worksite activity and vehicular traffic. Unless an acceptable route that does not involve crossing the roadway can be provided, pedestrians should be appropriately directed with advance signing that encourages them to cross to the opposite side of the roadway. In urban and suburban areas with high vehicular traffic volumes, these signs should be placed at intersections (rather than midblock locations) so that pedestrians are not confronted with midblock worksites that will induce them to attempt skirting the worksite or making a midblock crossing.*

Support:

- 10 Figures 6H-28 and 6H-29 show typical TTC device usage and techniques for pedestrian movement through work zones.

Guidance:

- 11 *To accommodate the needs of pedestrians, including those with disabilities, the following considerations should be addressed when temporary pedestrian pathways in TTC zones are designed or modified:*
- A. *Provisions for continuity of accessible paths for pedestrians should be incorporated into the TTC plan.*
 - B. *Access to transit stops should be maintained.*
 - C. *A smooth, continuous hard surface should be provided throughout the entire length of the temporary pedestrian facility. There should be no curbs or abrupt changes in grade or terrain that could cause tripping or be a barrier to wheelchair use. The geometry and alignment of the facility should meet the applicable requirements of the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" (see Section 1A.11).*

- D. *The width of the existing pedestrian facility should be provided for the temporary facility if practical. Traffic control devices and other construction materials and features should not intrude into the usable width of the sidewalk, temporary pathway, or other pedestrian facility. When it is not possible to maintain a minimum width of 60 inches throughout the entire length of the pedestrian pathway, a 60 x 60-inch passing space should be provided at least every 200 feet to allow individuals in wheelchairs to pass.*
- E. *Blocked routes, alternate crossings, and sign and signal information should be communicated to pedestrians with visual disabilities by providing devices such as audible information devices, accessible pedestrian signals, or barriers and channelizing devices that are detectable to the pedestrians traveling with the aid of a long cane or who have low vision. Where pedestrian traffic is detoured to a TTC signal, engineering judgment should be used to determine if pedestrian signals or accessible pedestrian signals should be considered for crossings along an alternate route.*
- F. *When channelization is used to delineate a pedestrian pathway, a continuous detectable edging should be provided throughout the length of the facility such that pedestrians using a long cane can follow it. These detectable edgings should comply with the provisions of Section 6F.74.*
- G. *Signs and other devices mounted lower than 7 feet above the temporary pedestrian pathway should not project more than 4 inches into accessible pedestrian facilities.*

Option:

- 12 Whenever it is feasible, closing off the worksite from pedestrian intrusion may be preferable to channelizing pedestrian traffic along the site with TTC devices.

Guidance:

- 13 *Fencing should not create sight distance restrictions for road users. Fences should not be constructed of materials that would be hazardous if impacted by vehicles. Wooden railing, fencing, and similar systems placed immediately adjacent to motor vehicle traffic should not be used as substitutes for crashworthy temporary traffic barriers.*
- 14 *Ballast for TTC devices should be kept to the minimum amount needed and should be mounted low to prevent penetration of the vehicle windshield.*
- 15 *Movement by work vehicles and equipment across designated pedestrian paths should be minimized and, when necessary, should be controlled by flaggers or TTC. Staging or stopping of work vehicles or equipment along the side of pedestrian paths should be avoided, since it encourages movement of workers, equipment, and materials across the pedestrian path.*
- 16 *Access to the work space by workers and equipment across pedestrian walkways should be minimized because the access often creates unacceptable changes in grade, and rough or muddy terrain, and pedestrians will tend to avoid these areas by attempting non-intersection crossings where no curb ramps are available.*

Option:

- 17 A canopied walkway may be used to protect pedestrians from falling debris, and to provide a covered passage for pedestrians.

Guidance:

- 18 *Covered walkways should be sturdily constructed and adequately lighted for nighttime use.*
- 19 *When pedestrian and vehicle paths are rerouted to a closer proximity to each other, consideration should be given to separating them by a temporary traffic barrier.*
- 20 *If a temporary traffic barrier is used to shield pedestrians, it should be designed to accommodate site conditions.*

Support:

- 21 Depending on the possible vehicular speed and angle of impact, temporary traffic barriers might deflect upon impact by an errant vehicle. Guidance for locating and designing temporary traffic barriers can be found in Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11).

Standard:

- 22 **Short intermittent segments of temporary traffic barrier shall not be used because they nullify the containment and redirective capabilities of the temporary traffic barrier, increase the potential for serious injury both to vehicle occupants and pedestrians, and encourage the presence of blunt, leading**

ends. All upstream leading ends that are present shall be appropriately flared or protected with properly installed and maintained crashworthy cushions. Adjacent temporary traffic barrier segments shall be properly connected in order to provide the overall strength required for the temporary traffic barrier to perform properly.

- 23 **Normal vertical curbing shall not be used as a substitute for temporary traffic barriers when temporary traffic barriers are needed.**

Option

- 24 Temporary traffic barriers or longitudinal channelizing devices may be used to discourage pedestrians from unauthorized movements into the work space. They may also be used to inhibit conflicts with vehicular traffic by minimizing the possibility of midblock crossings.

Support:

- 25 A major concern for pedestrians is urban and suburban building construction encroaching onto the contiguous sidewalks, which forces pedestrians off the curb into direct conflict with moving vehicles.

Guidance:

- 26 *If a significant potential exists for vehicle incursions into the pedestrian path, pedestrians should be rerouted or temporary traffic barriers should be installed.*

Support:

- 27 TTC devices, including temporary traffic barriers, and wood or chainlink fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.

Guidance:

- 28 *Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" (see Section 1A.11), and should not be used as a control for pedestrian movements.*

- 29 *In general, pedestrian routes should be preserved in urban and commercial suburban areas. Alternative routing should be discouraged.*

- 30 *The highway agency in charge of the TTC zone should regularly inspect the activity area so that effective pedestrian TTC is maintained.*

Section 6D.02 Accessibility Considerations

Support:

- 01 Additional information on the design and construction of accessible temporary facilities is found in publications listed in Section 1A.11 (see Publications 12, 38, 39, and 42).

Guidance:

- 02 *The extent of pedestrian needs should be determined through engineering judgment or by the individual responsible for each TTC zone situation. Adequate provisions should be made for pedestrians with disabilities.*

Standard:

- 03 **When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Where pedestrians with visual disabilities normally use the closed sidewalk, a barrier that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.**

Support:

- 04 Maintaining a detectable, channelized pedestrian route is much more useful to pedestrians who have visual disabilities than closing a walkway and providing audible directions to an alternate route involving additional crossings and a return to the original route. Braille is not useful in conveying such information because it is difficult to find. Audible instructions might be provided, but the extra distance and additional street crossings might add complexity to a trip.

Guidance:

05 *Because printed signs and surface delineation are not usable by pedestrians with visual disabilities, blocked routes, alternate crossings, and sign and signal information should be communicated to pedestrians with visual disabilities by providing audible information devices, accessible pedestrian signals, and barriers and channelizing devices that are detectable to pedestrians traveling with the aid of a long cane or who have low vision.*

Support:

06 The most desirable way to provide information to pedestrians with visual disabilities that is equivalent to visual signing for notification of sidewalk closures is a speech message provided by an audible information device. Devices that provide speech messages in response to passive pedestrian actuation are the most desirable. Other devices that continuously emit a message, or that emit a message in response to use of a pushbutton, are also acceptable. Signing information can also be transmitted to personal receivers, but currently such receivers are not likely to be carried or used by pedestrians with visual disabilities in TTC zones. Audible information devices might not be needed if detectable channelizing devices make an alternate route of travel evident to pedestrians with visual disabilities.

Guidance:

07 *If a pushbutton is used to provide equivalent TTC information to pedestrians with visual disabilities, the pushbutton should be equipped with a locator tone to notify pedestrians with visual disabilities that a special accommodation is available, and to help them locate the pushbutton.*

Section 6D.03 Worker Safety Considerations*Support:*

01 Equally as important as the safety of road users traveling through the TTC zone is the safety of workers. TTC zones present temporary and constantly changing conditions that are unexpected by the road user. This creates an even higher degree of vulnerability for workers on or near the roadway.

02 Maintaining TTC zones with road user flow inhibited as little as possible, and using TTC devices that get the road user's attention and provide positive direction are of particular importance. Likewise, equipment and vehicles moving within the activity area create a risk to workers on foot. When possible, the separation of moving equipment and construction vehicles from workers on foot provides the operator of these vehicles with a greater separation clearance and improved sight lines to minimize exposure to the hazards of moving vehicles and equipment.

Guidance:

03 *The following are the key elements of worker safety and TTC management that should be considered to improve worker safety:*

- A. *Training—all workers should be trained on how to work next to motor vehicle traffic in a way that minimizes their vulnerability. Workers having specific TTC responsibilities should be trained in TTC techniques, device usage, and placement.*
- B. *Temporary Traffic Barriers—temporary traffic barriers should be placed along the work space depending on factors such as lateral clearance of workers from adjacent traffic, speed of traffic, duration and type of operations, time of day, and volume of traffic.*
- C. *Speed Reduction—reducing the speed of vehicular traffic, mainly through regulatory speed zoning, funneling, lane reduction, or the use of uniformed law enforcement officers or flaggers, should be considered.*
- D. *Activity Area—planning the internal work activity area to minimize backing-up maneuvers of construction vehicles should be considered to minimize the exposure to risk.*
- E. *Worker Safety Planning—a trained person designated by the employer should conduct a basic hazard assessment for the worksite and job classifications required in the activity area. This safety professional should determine whether engineering, administrative, or personal protection measures should be implemented. This plan should be in accordance with the Occupational Safety and Health Act of 1970, as amended, “General Duty Clause” Section 5(a)(1) - Public Law 91-596, 84 Stat. 1590, December 29, 1970, as amended, and with the requirement to assess worker risk exposures for each job site and job classification, as per 29 CFR 1926.20 (b)(2) of “Occupational*

Standard:

- 04 **All workers, including emergency responders, within the right-of-way who are exposed either to traffic (vehicles using the highway for purposes of travel) or to work vehicles and construction equipment within the TTC zone shall wear high-visibility safety apparel that meets the Performance Class 2 or 3 requirements of the ANSI/ISEA 107–2004 publication entitled “American National Standard for High-Visibility Safety Apparel and Headwear” (see Section 1A.11), or equivalent revisions, and labeled as meeting the ANSI 107-2004 standard performance for Class 2 or 3 risk exposure, except as provided in Paragraph 5. A person designated by the employer to be responsible for worker safety shall make the selection of the appropriate class of garment.**

Option:

- 05 Emergency and incident responders and law enforcement personnel within the TTC zone may wear high-visibility safety apparel that meets the performance requirements of the ANSI/ISEA 207-2006 publication entitled “American National Standard for High-Visibility Public Safety Vests” (see Section 1A.11), or equivalent revisions, and labeled as ANSI 207-2006, in lieu of ANSI/ISEA 107-2004 apparel.

Standard:

- 06 **When uniformed law enforcement personnel are used to direct traffic, to investigate crashes, or to handle lane closures, obstructed roadways, and disasters, high-visibility safety apparel as described in this Section shall be worn by the law enforcement personnel.**

- 07 **Except as provided in Paragraph 8, firefighters or other emergency responders working within the right-of-way shall wear high-visibility safety apparel as described in this Section.**

Option:

- 08 Firefighters or other emergency responders working within the right-of-way and engaged in emergency operations that directly expose them to flame, fire, heat, and/or hazardous materials may wear retroreflective turn-out gear that is specified and regulated by other organizations, such as the National Fire Protection Association.

- 09 The following are additional elements of TTC management that may be considered to improve worker safety:

- A. Shadow Vehicle—in the case of mobile and constantly moving operations, such as pothole patching and striping operations, a shadow vehicle, equipped with appropriate lights and warning signs may be used to protect the workers from impacts by errant vehicles. The shadow vehicle may be equipped with a rear-mounted impact attenuator.
- B. Road Closure—if alternate routes are available to handle road users, the road may be closed temporarily. This may also facilitate project completion and thus further reduce worker vulnerability.
- C. Law Enforcement Use—in highly vulnerable work situations, particularly those of relatively short duration, law enforcement units may be stationed to heighten the awareness of passing vehicular traffic and to improve safety through the TTC zone.
- D. Lighting—for nighttime work, the TTC zone and approaches may be lighted.
- E. Special Devices—these include rumble strips, changeable message signs, hazard identification beacons, flags, and warning lights. Intrusion warning devices may be used to alert workers to the approach of errant vehicles.

Support:

- 10 Judicious use of the special devices described in Item E in Paragraph 9 might be helpful for certain difficult TTC situations, but misuse or overuse of special devices or techniques might lessen their effectiveness.

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CHAPTER 6E. FLAGGER CONTROL

Section 6E.01 Qualifications for Flaggers

Guidance:

- 01 *Because flaggers are responsible for public safety and make the greatest number of contacts with the public of all highway workers, they should be trained in safe traffic control practices and public contact techniques. Flaggers should be able to satisfactorily demonstrate the following abilities:*
- A. *Ability to receive and communicate specific instructions clearly, firmly, and courteously;*
 - B. *Ability to move and maneuver quickly in order to avoid danger from errant vehicles;*
 - C. *Ability to control signaling devices (such as paddles and flags) in order to provide clear and positive guidance to drivers approaching a TTC zone in frequently changing situations;*
 - D. *Ability to understand and apply safe traffic control practices, sometimes in stressful or emergency situations; and*
 - E. *Ability to recognize dangerous traffic situations and warn workers in sufficient time to avoid injury.*

Section 6E.02 High-Visibility Safety Apparel

Standard:

- 01 **For daytime and nighttime activity, flaggers shall wear high-visibility safety apparel that meets the Performance Class 2 or 3 requirements of the ANSI/ISEA 107-2004 publication entitled “American National Standard for High-Visibility Apparel and Headwear” (see Section 1A.11) and labeled as meeting the ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. The apparel background (outer) material color shall be fluorescent orange-red, fluorescent yellow-green, or a combination of the two as defined in the ANSI standard. The retroreflective material shall be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and shall be visible at a minimum distance of 1000 feet. The retroreflective safety apparel shall be designed to clearly identify the wearer as a person.**

Guidance:

- 02 *For nighttime activity, high-visibility safety apparel that meets the Performance Class 3 requirements of the ANSI/ISEA 107-2004 publication entitled “American National Standard for High-Visibility Apparel and Headwear” (see Section 1A.11) and labeled as meeting the ANSI 107-2004 standard performance for Class 3 risk exposure should be considered for flagger wear.*

Standard:

- 03 **When uniformed law enforcement officers are used to direct traffic within a TTC zone, they shall wear high-visibility safety apparel as described in this Section.**

Option:

- 04 **In lieu of ANSI/ISEA 107-2004 apparel, law enforcement personnel within the TTC zone may wear high-visibility safety apparel that meets the performance requirements of the ANSI/ISEA 207-2006 publication entitled “American National Standard for High-Visibility Public Safety Vests” (see Section 1A.11) and labeled as ANSI 207-2006.**

Section 6E.03 Hand-Signaling Devices

Guidance:

- 01 *The STOP/SLOW paddle should be the primary and preferred hand-signaling device because the STOP/SLOW paddle gives road users more positive guidance than red flags. Use of flags should be limited to emergency situations and low-speed and/or low-volume locations which can best be controlled by a single flagger.*

Standard:

- 02 **The STOP/SLOW paddle shall have an octagonal shape on a rigid handle. STOP/SLOW paddles shall be at least 18 inches wide with letters at least 6 inches high. The STOP (R1-1) face shall have white letters and a white border on a red background. The SLOW (W20-8) face shall have black letters and a black border on an orange background. When used at night, the STOP/SLOW paddle shall be retroreflectorized.**

Guidance:

03 *The STOP/SLOW paddle should be fabricated from light semi-rigid material.*

Support:

04 The optimum method of displaying a STOP or SLOW message is to place the STOP/SLOW paddle on a rigid staff that is tall enough that when the end of the staff is resting on the ground, the message is high enough to be seen by approaching or stopped traffic.

Option:

05 The STOP/SLOW paddle may be modified to improve conspicuity by incorporating either white or red flashing lights on the STOP face, and either white or yellow flashing lights on the SLOW face. The flashing lights may be arranged in any of the following patterns:

- A. Two white or red lights, one centered vertically above and one centered vertically below the STOP legend; and/or two white or yellow lights, one centered vertically above and one centered vertically below the SLOW legend; or
- B. Two white or red lights, one centered horizontally on each side of the STOP legend; and/or two white or yellow lights, one centered horizontally on each side of the SLOW legend; or
- C. One white or red light centered below the STOP legend; and/or one white or yellow light centered below the SLOW legend; or
- D. A series of eight or more small white or red lights no larger than 1/4 inches in diameter along the outer edge of the paddle, arranged in an octagonal pattern at the eight corners of the border of the STOP face; and/or a series of eight or more small white or yellow lights no larger than 1/4 inches in diameter along the outer edge of the paddle, arranged in a diamond pattern along the border of the SLOW face.
- E. A series of white lights forming the shapes of the letters in the legend.

Standard:

06 **If flashing lights are used on the STOP face of the paddle, their colors shall be all white or all red. If flashing lights are used on the SLOW face of the paddle, their colors shall be all white or all yellow.**

07 **If more than eight flashing lights are used, the lights shall be arranged such that they clearly convey the octagonal shape of the STOP face of the paddle and/or the diamond shape of the SLOW face of the paddle.**

08 **If flashing lights are used on the STOP/SLOW paddle, the flash rate shall be at least 50, but not more than 60, flashes per minute.**

09 **Flags, when used, shall be red or fluorescent orange/red in color, shall be a minimum of 24 inches square, and shall be securely fastened to a staff that is approximately 36 inches in length.**

Guidance:

10 *The free edge of a flag should be weighted so the flag will hang vertically, even in heavy winds.*

Standard:

11 **When used at nighttime, flags shall be retroreflectorized red.**

Option:

12 When flagging in an emergency situation at night in a non-illuminated flagger station, a flagger may use a flashlight with a red glow cone to supplement the STOP/SLOW paddle or flag.

Standard:

13 **When a flashlight is used for flagging in an emergency situation at night in a non-illuminated flagger station, the flagger shall hold the flashlight in the left hand, shall hold the paddle or flag in the right hand as shown in Figure 6E-3, and shall use the flashlight in the following manner to control approaching road users:**

- A. **To inform road users to stop, the flagger shall hold the flashlight with the left arm extended and pointed down toward the ground, and then shall slowly wave the flashlight in front of the body in a slow arc from left to right such that the arc reaches no farther than 45 degrees from vertical.**

- B. To inform road users to proceed, the flagger shall point the flashlight at the vehicle's bumper, slowly aim the flashlight toward the open lane, then hold the flashlight in that position. The flagger shall not wave the flashlight.
- C. To alert or slow traffic, the flagger shall point the flashlight toward oncoming traffic and quickly wave the flashlight in a figure eight motion.

Section 6E.04 Automated Flagger Assistance Devices

Support:

- 01 Automated Flagger Assistance Devices (AFADs) enable a flagger(s) to be positioned out of the lane of traffic and are used to control road users through temporary traffic control zones. These devices are designed to be remotely operated either by a single flagger at one end of the TTC zone or at a central location, or by separate flaggers near each device's location.
- 02 There are two types of AFADs:
- A. An AFAD (see Section 6E.05) that uses a remotely controlled STOP/SLOW sign on either a trailer or a movable cart system to alternately control right-of-way.
 - B. An AFAD (see Section 6E.06) that uses remotely controlled red and yellow lenses and a gate arm to alternately control right-of-way.
- 03 AFADs might be appropriate for short-term and intermediate-term activities (see Section 6G.02). Typical applications include TTC activities such as, but not limited to:
- A. Bridge maintenance;
 - B. Haul road crossings; and
 - C. Pavement patching.

Standard:

- 04 **AFADs shall only be used in situations where there is only one lane of approaching traffic in the direction to be controlled.**
- 05 **When used at night, the AFAD location shall be illuminated in accordance with Section 6E.08.**

Guidance:

- 06 *AFADs should not be used for long-term stationary work (see Section 6G.02).*

Standard:

- 07 **Because AFADs are not traffic control signals, they shall not be used as a substitute for or a replacement for a continuously operating temporary traffic control signal as described in Section 6F.84.**

- 08 **AFADs shall meet the crashworthy performance criteria contained in Section 6F.01.**

Guidance:

- 09 *If used, AFADs should be located in advance of one-lane, two-way tapers and downstream from the point where approaching traffic is to stop in response to the device.*

Standard:

- 10 **If used, AFADs shall be placed so that all of the signs and other items controlling traffic movement are readily visible to the driver of the initial approaching vehicle with advance warning signs alerting other approaching traffic to be prepared to stop.**

- 11 **If used, an AFAD shall be operated only by a flagger (see Section 6E.01) who has been trained on the operation of the AFAD. The flagger(s) operating the AFAD(s) shall not leave the AFAD(s) unattended at any time while the AFAD(s) is being used.**

- 12 **The use of AFADs shall conform to one of the following methods:**

- A. An AFAD at each end of the TTC zone (Method 1), or
- B. An AFAD at one end of the TTC zone and a flagger at the opposite end (Method 2).

- 13 **Except as provided in Paragraph 14, two flaggers shall be used when using either Method 1 or Method 2.**

Option:

14 A single flagger may simultaneously operate two AFADs (Method 1) or may operate a single AFAD on one end of the TTC zone while being the flagger at the opposite end of the TTC zone (Method 2) if both of the following conditions are present:

- A. The flagger has an unobstructed view of the AFAD(s), and
- B. The flagger has an unobstructed view of approaching traffic in both directions.

Guidance:

15 *When an AFAD is used, the advance warning signing should include a ROAD WORK AHEAD (W20-1) sign, a ONE LANE ROAD (W20-4) sign, and a BE PREPARED TO STOP (W3-4) sign.*

Standard:

16 **When the AFAD is not in use, the signs associated with the AFAD, both at the AFAD location and in advance, shall be removed or covered.**

Guidance:

17 *A highway agency that elects to use AFADs should adopt a policy, based on engineering judgment, governing AFAD applications. The policy should also consider more detailed and/or more restrictive requirements for AFAD use, such as the following:*

- A. *Conditions applicable for the use of Method 1 and Method 2 AFAD operation,*
- B. *Volume criteria,*
- C. *Maximum distance between AFADs,*
- D. *Conflicting lenses/indications monitoring requirements,*
- E. *Fail safe procedures,*
- F. *Additional signing and pavement markings,*
- G. *Application consistency,*
- H. *Larger signs or lenses to increase visibility, and*
- I. *Use of backplates.*

Section 6E.05 STOP/SLOW Automated Flagger Assistance Devices

Standard:

01 A STOP/SLOW Automated Flagger Assistance Device (AFAD) (see Section 6E.04) shall include a STOP/SLOW sign that alternately displays the STOP (R1-1) face and the SLOW (W20-8) face of a STOP/SLOW paddle (see Figure 6E-1).

02 The AFAD's STOP/SLOW sign shall have an octagonal shape, shall be fabricated of rigid material, and shall be mounted with the bottom of the sign a minimum of 6 feet above the pavement on an appropriate support. The size of the STOP/SLOW sign shall be at least 24 x 24 inches with letters at least 8 inches high. The background of the STOP face shall be red with white letters and border. The background of the SLOW face shall be diamond shaped and orange with black letters and border. Both faces of the STOP/SLOW sign shall be retroreflectorized.

03 The AFAD's STOP/SLOW sign shall have a means to positively lock, engage, or otherwise maintain the sign assembly in a stable condition when set in the STOP or SLOW position.

04 The AFAD's STOP/SLOW sign shall be supplemented with active conspicuity devices by incorporating either:

- A. **White or red flashing lights within the STOP face and white or yellow flashing lights within the SLOW face meeting the provisions contained in Section 6E.03; or**
- B. **A Stop Beacon (see Section 4L.05) mounted a maximum of 24 inches above the STOP face and a Warning Beacon (see Section 4L.03) mounted a maximum of 24 inches above, below, or to the side of the SLOW face. The Stop Beacon shall not be flashed or illuminated when the SLOW face is displayed, and the Warning Beacon shall not be flashed or illuminated when the STOP face is displayed. Except for the mounting locations, the beacons shall comply with the provisions of Chapter 4L.**

Figure 6E-1. Example of the Use of a STOP/SLOW Automated Flagger Assistance Device (AFAD)

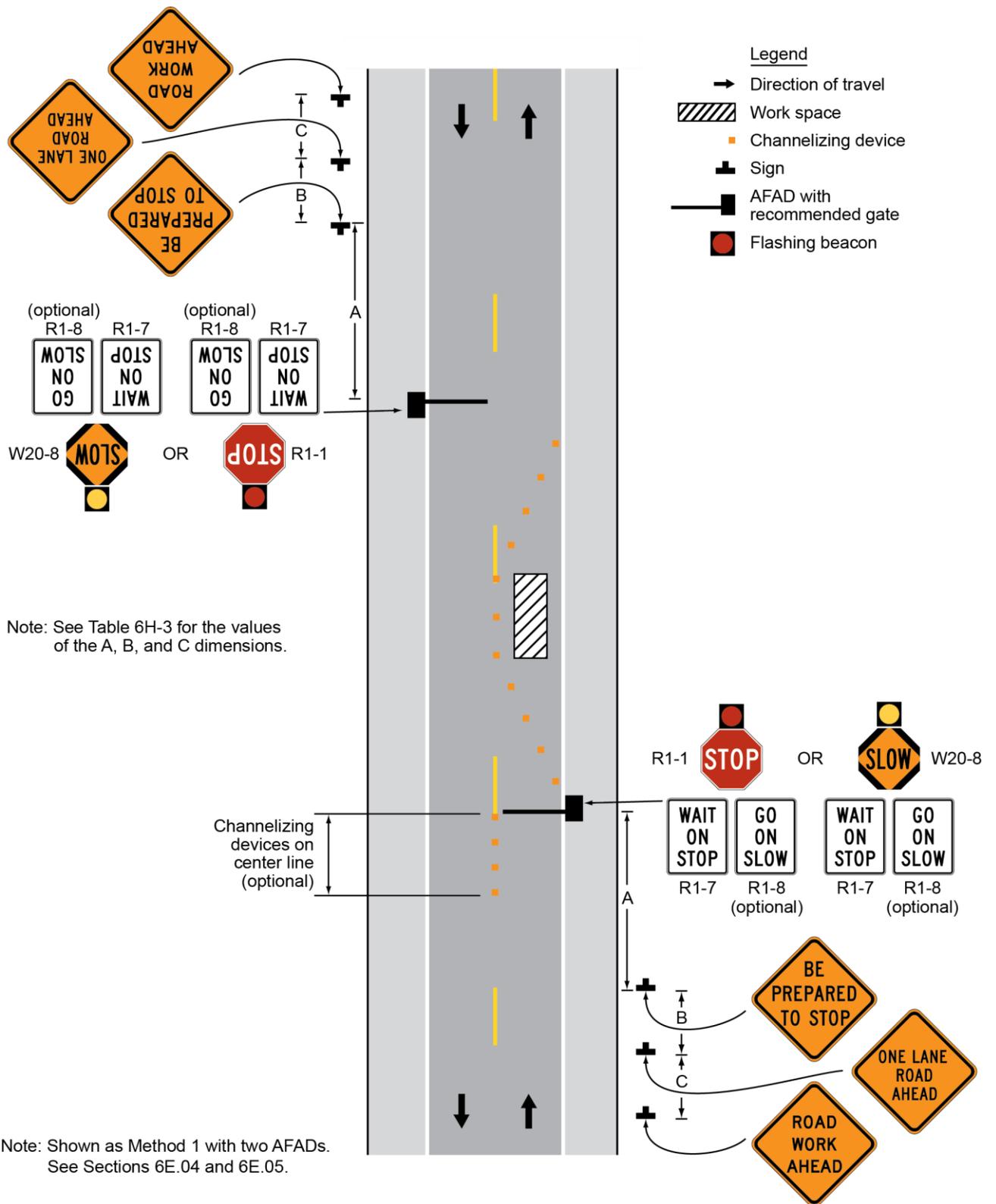
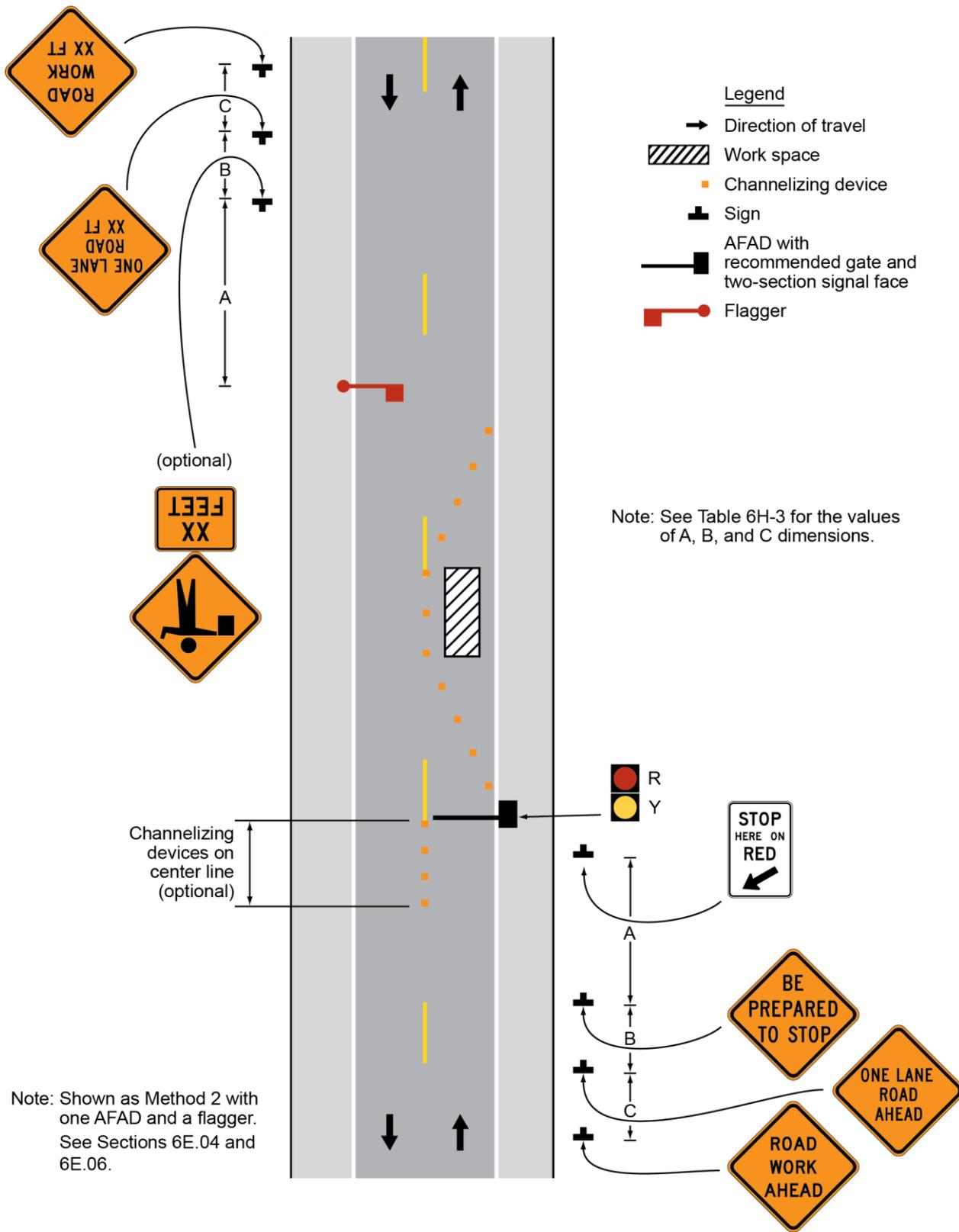


Figure 6E-2. Example of the Use of a Red/Yellow Lens Automated Flagger Assistance Device (AFAD)



Option:

- 05 Type B warning light(s) (see Section 6F.83) may be used in lieu of the Warning Beacon during the display of the SLOW face of the AFAD's STOP/SLOW sign.

Standard:

- 06 **If Type B warning lights are used in lieu of a Warning Beacon, they shall flash continuously when the SLOW face is displayed and shall not be flashed or illuminated when the STOP face is displayed.**

Option:

- 07 The faces of the AFAD's STOP/SLOW sign may include louvers to improve the stability of the device in windy or other adverse environmental conditions.

Standard:

- 08 **If louvers are used, the louvers shall be designed such that the full sign face is visible to approaching traffic at a distance of 50 feet or greater.**

Guidance:

- 09 *The STOP/SLOW AFAD should include a gate arm that descends to a down position across the approach lane of traffic when the STOP face is displayed and then ascends to an upright position when the SLOW face is displayed.*

Option:

- 10 In lieu of a stationary STOP/SLOW sign with a separate gate arm, the STOP/SLOW sign may be attached to a mast arm that physically blocks the approach lane of traffic when the STOP face is displayed and then moves to a position that does not block the approach lane when the SLOW face is displayed.

Standard:

- 11 **Gate arms, if used, shall be fully retroreflectorized on both sides, and shall have vertical alternating red and white stripes at 16-inch intervals measured horizontally as shown in Figure 8C-1. When the arm is in the down position blocking the approach lane:**

- A. The minimum vertical aspect of the arm and sheeting shall be 2 inches; and
- B. The end of the arm shall reach at least to the center of the lane being controlled.

- 12 **A WAIT ON STOP (R1-7) sign (see Figure 6E-1) shall be displayed to road users approaching the AFAD.**

Option:

- 13 A GO ON SLOW (R1-8) sign (see Figure 6E-1) may also be displayed to road users approaching the AFAD.

Standard:

- 14 **The GO ON SLOW sign, if used, and the WAIT ON STOP sign shall be positioned on the same support structure as the AFAD or immediately adjacent to the AFAD such that they are in the same direct line of view of approaching traffic as the sign faces of the AFAD. Both signs shall have black legends and borders on white backgrounds. Each of these signs shall be rectangular in shape and each shall be at least 24 x 30 inches in size with letters at least 6 inches high.**

- 15 **To inform road users to stop, the AFAD shall display the STOP face and the red or white lights, if used, within the STOP face shall flash or the Stop Beacon shall flash. To inform road users to proceed, the AFAD shall display the SLOW face and the yellow or white lights, if used, within the SLOW face shall flash or the Warning Beacon or the Type B warning lights shall flash.**

- 16 **If STOP/SLOW AFADs are used to control traffic in a one-lane, two-way TTC zone, safeguards shall be incorporated to prevent the flagger(s) from simultaneously displaying the SLOW face at each end of the TTC zone. Additionally, the flagger(s) shall not display the AFAD's SLOW face until all oncoming vehicles have cleared the one-lane portion of the TTC zone.**

Section 6E.06 Red/Yellow Lens Automated Flagger Assistance Devices

Standard:

- 01 **A Red/Yellow Lens Automated Flagger Assistance Device (AFAD) (see Section 6E.04) shall alternately display a steadily illuminated CIRCULAR RED lens and a flashing CIRCULAR**

YELLOW lens to control traffic without the need for a flagger in the immediate vicinity of the AFAD or on the roadway (see Figure 6E-2).

- 02 **Red/Yellow Lens AFADs shall have at least one set of CIRCULAR RED and CIRCULAR YELLOW lenses that are 12 inches in diameter. Unless otherwise provided in this Section, the lenses and their arrangement, CIRCULAR RED on top and CIRCULAR YELLOW below, shall comply with the applicable provisions for traffic signal indications in Part 4. If the set of lenses is post-mounted, the bottom of the housing (including brackets) shall be at least 7 feet above the pavement. If the set of lenses is located over any portion of the highway that can be used by motor vehicles, the bottom of the housing (including brackets) shall be at least 15 feet above the pavement.**

Option:

- 03 Additional sets of CIRCULAR RED and CIRCULAR YELLOW lenses, located over the roadway or on the left-hand side of the approach and operated in unison with the primary set, may be used to improve visibility and/or conspicuity of the AFAD.

Standard:

- 04 **A Red/Yellow Lens AFAD shall include a gate arm that descends to a down position across the approach lane of traffic when the steady CIRCULAR RED lens is illuminated and then ascends to an upright position when the flashing CIRCULAR YELLOW lens is illuminated. The gate arm shall be fully retroreflectorized on both sides, and shall have vertical alternating red and white stripes at 16-inch intervals measured horizontally as shown in Figure 8C-1. When the arm is in the down position blocking the approach lane:**

- A. The minimum vertical aspect of the arm and sheeting shall be 2 inches; and
- B. The end of the arm shall reach at least to the center of the lane being controlled.

- 05 **A Stop Here On Red (R10-6 or R10-6a) sign (see Section 2B.53) shall be installed on the right-hand side of the approach at the point at which drivers are expected to stop when the steady CIRCULAR RED lens is illuminated (see Figure 6E-2).**

- 06 **To inform road users to stop, the AFAD shall display a steadily illuminated CIRCULAR RED lens and the gate arm shall be in the down position. To inform road users to proceed, the AFAD shall display a flashing CIRCULAR YELLOW lens and the gate arm shall be in the upright position.**

- 07 **If Red/Yellow Lens AFADs are used to control traffic in a one-lane, two-way TTC zone, safeguards shall be incorporated to prevent the flagger(s) from actuating a simultaneous display of a flashing CIRCULAR YELLOW lens at each end of the TTC zone. Additionally, the flagger shall not actuate the AFAD's display of the flashing CIRCULAR YELLOW lens until all oncoming vehicles have cleared the one-lane portion of the TTC zone.**

- 08 **A change interval shall be provided as the transition between the display of the flashing CIRCULAR YELLOW indication and the display of the steady CIRCULAR RED indication. During the change interval, the CIRCULAR YELLOW lens shall be steadily illuminated. The gate arm shall remain in the upright position during the display of the steadily illuminated CIRCULAR YELLOW change interval.**

- 09 **A change interval shall not be provided between the display of the steady CIRCULAR RED indication and the display of the flashing CIRCULAR YELLOW indication.**

Guidance:

- 10 *The steadily illuminated CIRCULAR YELLOW change interval should have a duration of at least 5 seconds, unless a different duration, within the range of durations recommended by Section 4D.26, is justified by engineering judgment.*

Section 6E.07 Flagger Procedures

Support:

- 01 The use of paddles and flags by flaggers is illustrated in Figure 6E-1.

Standard:

- 02 **Flaggers shall use a STOP/SLOW paddle, a flag, or an Automated Flagger Assistance Device (AFAD) to control road users approaching a TTC zone. The use of hand movements alone without a**

paddle, flag, or AFAD to control road users shall be prohibited except for law enforcement personnel or emergency responders at incident scenes as described in Section 6I.01.

03 **The following methods of signaling with paddles shall be used:**

- A. **To stop road users, the flagger shall face road users and aim the STOP paddle face toward road users in a stationary position with the arm extended horizontally away from the body. The free arm shall be held with the palm of the hand above shoulder level toward approaching traffic.**
- B. **To direct stopped road users to proceed, the flagger shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body. The flagger shall motion with the free hand for road users to proceed.**
- C. **To alert or slow traffic, the flagger shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body.**

Option:

04 To further alert or slow traffic, the flagger holding the SLOW paddle face toward road users may motion up and down with the free hand, palm down.

Standard:

05 **The following methods of signaling with a flag shall be used:**

- A. **To stop road users, the flagger shall face road users and extend the flag staff horizontally across the road users' lane in a stationary position so that the full area of the flag is visibly hanging below the staff. The free arm shall be held with the palm of the hand above shoulder level toward approaching traffic.**
- B. **To direct stopped road users to proceed, the flagger shall face road users with the flag and arm lowered from the view of the road users, and shall motion with the free hand for road users to proceed. Flags shall not be used to signal road users to proceed.**
- C. **To alert or slow traffic, the flagger shall face road users and slowly wave the flag in a sweeping motion of the extended arm from shoulder level to straight down without raising the arm above a horizontal position. The flagger shall keep the free hand down.**

Guidance:

06 *The flagger should stand either on the shoulder adjacent to the road user being controlled or in the closed lane prior to stopping road users. A flagger should only stand in the lane being used by moving road users after road users have stopped. The flagger should be clearly visible to the first approaching road user at all times. The flagger also should be visible to other road users. The flagger should be stationed sufficiently in advance of the workers to warn them (for example, with audible warning devices such as horns or whistles) of approaching danger by out-of-control vehicles. The flagger should stand alone, away from other workers, work vehicles, or equipment.*

Option:

07 At spot lane closures where adequate sight distance is available for the reasonably safe handling of traffic, the use of one flagger may be sufficient.

Guidance:

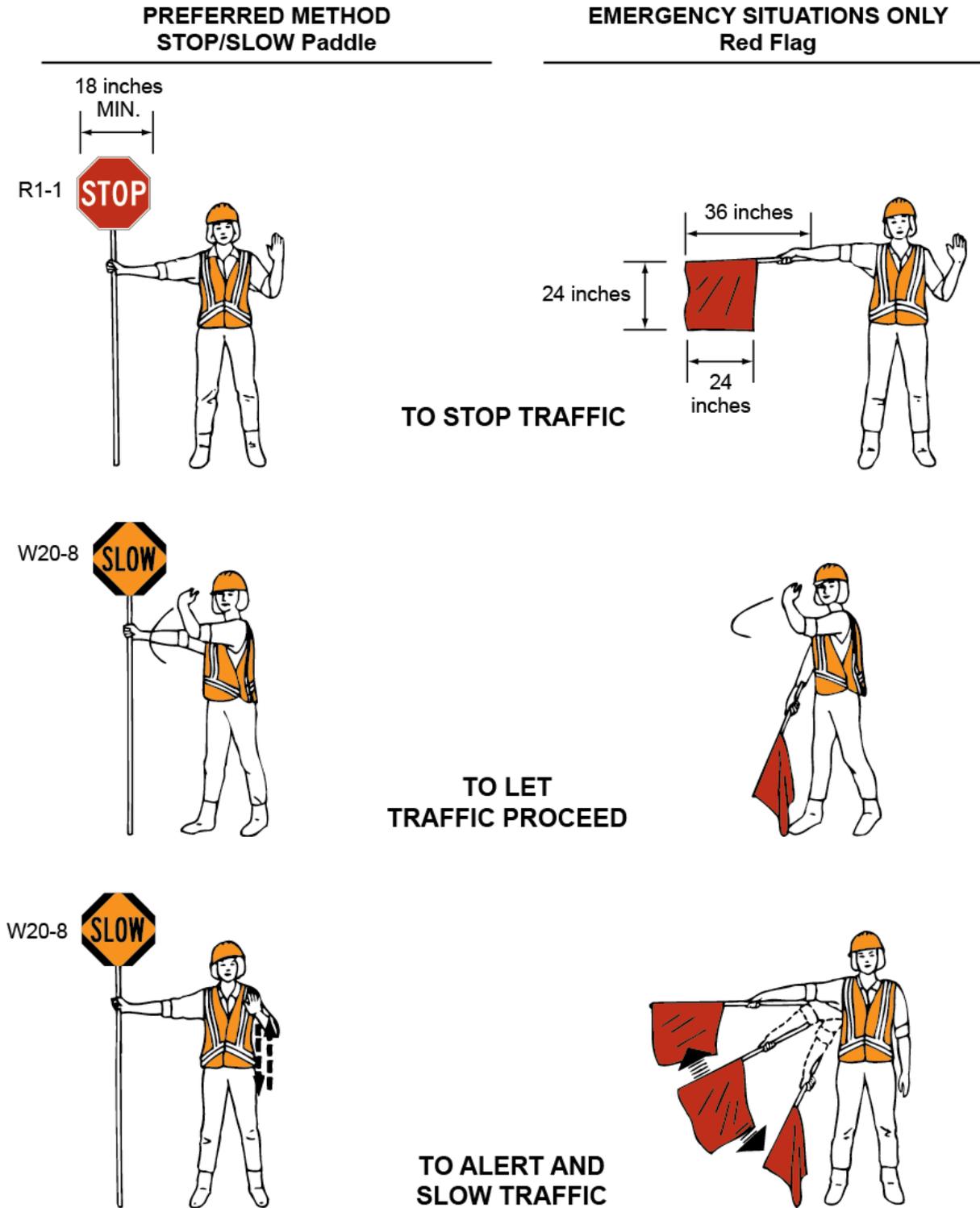
08 *When a single flagger is used, the flagger should be stationed on the shoulder opposite the spot lane closure or work space, or in a position where good visibility and traffic control can be maintained at all times.*

Section 6E.08 Flagger Stations

Standard:

01 **Flagger stations shall be located such that approaching road users will have sufficient distance to stop at an intended stopping point.**

Figure 6E-3. Use of Hand-Signaling Devices by Flaggers



02 The distances shown in Table 6E-1, which provides information regarding the stopping sight distance as a function of speed, may be used for the location of a flagger station. These distances may be increased for downgrades and other conditions that affect stopping distance.

Guidance:

03 *Flagger stations should be located such that an errant vehicle has additional space to stop without entering the work space. The flagger should identify an escape route that can be used to avoid being struck by an errant vehicle.*

Standard:

04 **Except in emergency situations, flagger stations shall be preceded by an advance warning sign or signs. Except in emergency situations, flagger stations shall be illuminated at night.**

Table 6E-1. Stopping Sight Distance as a Function of Speed

Speed *	Distance
20 mph	115 feet
25 mph	155 feet
30 mph	200 feet
35 mph	250 feet
40 mph	305 feet
45 mph	360 feet
50 mph	425 feet
55 mph	495 feet
60 mph	570 feet
65 mph	645 feet
70 mph	730 feet
75 mph	820 feet

* Posted speed, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed

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CHAPTER 6F. TEMPORARY TRAFFIC CONTROL ZONE DEVICES

Section 6F.01 Types of Devices

Guidance:

- 01 *The design and application of TTC devices used in TTC zones should consider the needs of all road users (motorists, bicyclists, and pedestrians), including those with disabilities.*

Support:

- 02 FHWA policy requires that all roadside appurtenances such as traffic barriers, barrier terminals and crash cushions, bridge railings, sign and light pole supports, and work zone hardware used on the National Highway System meet the crashworthy performance criteria contained in the National Cooperative Highway Research Program (NCHRP) Report 350, “Recommended Procedures for the Safety Performance Evaluation of Highway Features,” or the “Manual for Assessing Safety Hardware” (MASH). The NCHRP 350 and/or MASH safety criteria also apply to the use of such roadside appurtenances on ODOT-maintained highways. The website maintained by FHWA at <http://safety.fhwa.dot.gov/programs/roadsideHardware.htm> identifies all such hardware and includes copies of FHWA acceptance letters for each of them. In the case of proprietary items, links are provided to manufacturers' websites as a source of detailed information on specific devices. The website also contains an “Ask the Experts” section where questions on roadside design issues can be addressed.
- 03 Various Sections of the OMUTCD require certain traffic control devices, their supports, and/or related appurtenances to be crashworthy. Such OMUTCD crashworthiness provisions apply to all streets, highways, and private roads open to public travel. Also, local agencies might have expanded the NCHRP Report 350 and/or MASH crashworthy criteria to apply to certain other roadside appurtenances.
- 04 Crashworthiness and crash testing information on devices described in Part 6 are found in AASHTO’s “Roadside Design Guide” (see Section 1A.11) and the “Manual for Assessing Safety Hardware” (MASH).
- 05 As defined in Section 1A.13, “crashworthy” is a characteristic of a roadside appurtenance that has been successfully crash tested in accordance with a national standard such as the NCHRP Report 350, “Recommended Procedures for the Safety Performance Evaluation of Highway Features,” or the “Manual for Assessing Safety Hardware” (MASH).

Standard:

- 06 **As noted in the Preface and Section 1A.13, traffic control devices shall be defined as “all flaggers, signs, signals, markings, and devices placed or erected by authority of a public body or official having jurisdiction, for the purpose of regulating, warning, or guiding traffic, including signs denoting names of streets and highways.”**
- 07 **All traffic control devices used for construction, maintenance, utility, or incident management operations on a street, highway, or private road open to public travel (see definition in Section 1A.13) shall comply with the applicable provisions of this Manual.**

Section 6F.02 General Characteristics of Signs

Support:

- 01 TTC zone signs convey both general and specific messages by means of words, symbols, and/or arrows and have the same three categories as all road user signs: regulatory, warning, and guide.
- 02 See Part 2 for more information regarding sign uniformity.

Standard:

- 03 **The colors for regulatory signs shall follow the Standards for regulatory signs in Table 2A-5 and Chapter 2B. Warning signs in TTC zones shall have a black legend and border on an orange background, except for the Grade Crossing Advance Warning (W10-1) sign which shall have a black legend and border on a yellow background, and except for signs that are required or recommended in Part 2 or 7 to have fluorescent yellow-green backgrounds. Colors for guide signs shall follow the Standards in Table 2A-5 and Chapter 2D, except for guide signs as otherwise provided in Section 6F.55.**

Option:

- 04 Where the color orange is required, the fluorescent orange color may also be used.

Support:

05 The fluorescent version of orange provides higher conspicuity than standard orange, especially during twilight.

Option:

06 Existing warning signs that are still applicable may remain in place.

07 In order to maintain the systematic use of yellow or fluorescent yellow-green backgrounds for pedestrian, bicycle, and school warning signs in a jurisdiction, the yellow or fluorescent yellow-green background for pedestrian, bicycle, and school warning signs may be used in TTC zones.

08 Standard orange flags or flashing warning lights may be used in conjunction with signs.

Standard:

09 **When standard orange flags or flashing warning lights are used in conjunction with signs, they shall not block the sign face.**

10 **Except as provided in Section 2A.11, the sizes for TTC signs and plaques shall be as shown in Table 6F-1. The sizes in the minimum column shall only be used on local streets or roadways where the 85th-percentile speed or posted speed limit is less than 35 mph.**

Option:

11 The dimensions of signs and plaques shown in Table 6F-1 may be increased wherever necessary for greater legibility or emphasis.

Standard:

12 **Deviations from standard sizes as prescribed in this Manual shall be in 6-inch increments.**

Support:

13 Sign design details are contained in the "Sign Designs and Markings Manual" (SDMM) (see Section 1A.11).

14 Section 2A.06 contains additional information regarding the design of signs, including an Option allowing the development of special word message signs if a standard word message or symbol sign is not available to convey the necessary regulatory, warning, or guidance information.

Standard:

15 **All signs used at night shall be either retroreflective with a material that has a smooth, sealed outer surface or illuminated to show the same shape and similar color both day and night.**

16 **The requirement for sign illumination shall not be considered to be satisfied by street, highway, or strobe lighting.**

Option:

17 Sign illumination may be either internal or external.

18 Signs may be made of rigid or flexible material.

Section 6F.03 Sign Placement*Guidance:*

01 *Signs should be located on the right-hand side of the roadway unless otherwise provided in this Manual.*

Option:

02 Where special emphasis is needed, signs may be placed on both the left-hand and right-hand sides of the roadway. Signs mounted on portable supports may be placed within the roadway itself. Signs may also be mounted on or above barricades.

Support:

03 The Provisions of this section regarding mounting height apply unless otherwise provided for a particular sign elsewhere in this Manual.

Standard:

04 **The minimum height, measured vertically from the bottom of the sign to the elevation of the near edge of the pavement, of signs installed at the side of the road in rural areas shall be 5 feet (see Figure 6F-1).**

05 **The minimum height, measured vertically from the bottom of the sign to the top of the curb, or in the absence of curb, measured vertically from the bottom of the sign to the elevation of the near edge of the traveled way, of signs installed at the side of the road in business, commercial, or residential areas where parking or pedestrian movements are likely to occur, or where the view of the sign might be obstructed, shall be 7 feet (see Figure 6F-1).**

06 **The minimum height, measured vertically from the bottom of the sign to the sidewalk, of signs installed above sidewalks shall be 7 feet.**

Option:

07 The height to the bottom of a secondary sign mounted below another sign may be 1 foot less than the height provided in Paragraphs 4 through 6.

Guidance:

08 *Neither portable nor permanent sign supports should be located on sidewalks, bicycle facilities, or areas designated for pedestrian or bicycle traffic. If the bottom of a secondary sign that is mounted below another sign is mounted lower than 7 feet above a pedestrian sidewalk or pathway (see Section 6D.02), the secondary sign should not project more than 4 inches into the pedestrian facility.*

Standard:

09 **Where it has been determined that the accommodation of pedestrians with disabilities is necessary, signs shall be mounted and placed in accordance with Section 4.4 of the “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)” (see Section 1A.11).**

10 **Signs mounted on barricades and barricade/sign combinations shall be crashworthy.**

Guidance:

11 *Except as provided in Paragraph 12, signs mounted on portable sign supports that do not meet the minimum mounting heights provided in Paragraphs 4 through 6 should not be used for a duration of more than 3 days.*

Option:

12 The R9-8 through R9-11a series, R11 series, W1-6 through W1-8 series, M4-10, E5-1, or other similar type signs (see Figures 6F-3, 6F-4, and 6F-5) may be used on portable sign supports that do not meet the minimum mounting heights provided in Paragraphs 4 through 6 for longer than 3 days.

Support:

13 Methods of mounting signs other than on posts are illustrated in Figure 6F-2.

Guidance:

14 *Signs mounted on Type 3 barricades should not cover more than 50 percent of the top two rails or 33 percent of the total area of the three rails.*

15 ***Regulatory or guide signs mounted on fixed or movable Type 3 barricades should be mounted so that the center of the sign is at or above the height of the top of the barricade. Other signs mounted on movable Type 3 barricades should be mounted below the top rail so that the top of the sign is in line with the top of the barricades. Guide signs, although ordinarily erected on posts, may also be mounted above barricades, but shall not interfere with the effectiveness of necessary regulatory and warning signs.***

Standard:

16 **Sign supports shall be crashworthy. Where large signs having an area exceeding 50 square feet are installed on multiple breakaway posts, the clearance from the ground to the bottom of the sign shall be at least 7 feet.**

17 **The bottom of a sign mounted on a barricade, or other portable support, shall be at least 1 foot above the traveled way.**

Table 6F-1. Sizes of Temporary Traffic Control Signs¹ (Sheet 1 of 4)

Sign or Plaque	Sign Designation	Section	Conventional Road	Freeway or Expressway	Minimum
STOP	R1-1	6F.06	30 x 30 ²	—	—
STOP (on STOP/SLOW Paddle)	R1-1	6E.03	18 x 18	—	—
YIELD	R1-2	6F.06	36 x 36 x 3 ²	—	30 x 30 x 30
TO ONCOMING TRAFFIC plaque	R1-2aP	6F.06	36 x 30	48 x 36	24 x 18
WAIT ON STOP	R1-7	6E.05	24 x 30	24 x 30	—
GO ON SLOW	R1-8	6E.05	24 x 30	24 x 30	—
Speed Limit	R2-1	6F.12	24 x 30 ²	36 x 48	—
VEHICLES OVER 4 TONS EMPTY...	R2-H2a	6F.06	—	36 x 48 / 48 x 60	—
SPEED LIMIT 65 VEHICLES OVER ...	R2-H2b	6F.06	—	36 x 72 / 48 x 96	—
FINES HIGHER (plaque)	R2-6P	6F.12	24 x 18	36 x 24	—
FINES DOUBLE (plaque)	R2-6aP	6F.12	24 x 18	36 x 24	—
\$ XX FINE (plaque)	R2-6bP	6F.12	24 x 18	36 x 24	—
BEGIN HIGHER FINES ZONE	R2-10	6F.12	24 x 30	36 x 48	—
END HIGHER FINES ZONE	R2-11	6F.12	24 x 30	36 x 48	—
END WORK ZONE SPEED LIMIT	R2-12	6F.12	24 x 36	36 x 54	—
Movement Prohibition	R3-1, 2, 3, 4, 18, 27	6F.06	24 x 24 ²	36 x 54	—
Mandatory Movement (1 lane)	R3-5	6F.06	30 x 36	—	—
Optional Movement (1 lane)	R3-6	6F.06	30 x 36	—	—
Mandatory Movement (text)	R3-7	6F.06	30 x 30 ²	—	—
Advanced Intersection Lane Control	R3-8	6F.06	Varies x 30	—	—
DO NOT PASS	R4-1	6F.06	24 x 30	36 x 48	—
PASS WITH CARE	R4-2	6F.06	24 x 30	36 x 48	—
Keep Right	R4-7	6F.06	24 x 30	36 x 48	—
Narrow Keep Right	R4-7c	6F.06	18 x 30	—	—
STAY IN LANE	R4-9	6F.11	24 x 30	36 x 48	—
DO NOT ENTER	R5-1	6F.06	30 x 30 ²	36 x 36	—
WRONG WAY	R5-1a	6F.06	36 x 24 ²	42 x 30	—
ONE WAY	R6-1	6F.06	36 x 12 ²	54 x 18	—
ONE WAY	R6-2	6F.06	24 x 30 ²	36 x 48	—
No Parking (symbol)	R8-3	6F.06	24 x 24	36 x 36	—
Pedestrian Crosswalk	R9-8	6F.13	36 x 18	—	—
SIDEWALK CLOSED	R9-9	6F.14	24 x 12	—	—
SIDEWALK CLOSED, USE OTHER SIDE	R9-10	6F.14	24 x 12	—	—
SIDEWALK CLOSED AHEAD, CROSS HERE	R9-11	6F.14	24 x 18	—	—
SIDEWALK CLOSED, CROSS HERE	R9-11a	6F.14	24 x 12	—	—
ROAD CLOSED	R11-2	6F.08	48 x 30	—	—
ROAD CLOSED – LOCAL TRAFFIC ONLY	R11-3a, 3b, 4	6F.09	60 x 30	—	—

Table 6F-1. Sizes of Temporary Traffic Control Signs¹ (Sheet 2 of 4)

Sign or Plaque	Sign Designation	Section	Conventional Road	Freeway or Expressway	Minimum
Work Zone Increased Penalties	R11-H5a	6F.12	24 x 48	48 x 96	—
Weight Limit	R12-1, 2	6F.10	24 x 30	36 x 48	—
Weight Limit (with symbols)	R12-H5	6F.10	30 x 42	—	—
Turn and Curve Signs	W1-1, 2, 3, 4	6F.16	36 x 36	48 x 48	30 x 30
Reverse Curve (2 or more lanes)	W1-4b, 4c	6F.48	36 x 36	48 x 48	30 x 30
One-Direction Large Arrow	W1-6	6F.16	48 x 24	60 x 30	—
Chevron	W1-8	6F.16	18 x 24	30 x 36	—
Construction Arrow	W1-H16	6F.50.1	30 x 30	48 x 48	—
Stop Ahead	W3-1	6F.16	36 x 36	48 x 48	30 x 30
Yield Ahead	W3-2	6F.16	36 x 36	48 x 48	30 x 30
Signal Ahead	W3-3	6F.16	36 x 36	48 x 48	30 x 30
BE PREPARED TO STOP	W3-4	6F.16	36 x 36	48 x 48	30 x 30
Reduced Speed Limit Ahead	W3-5	6F.16	36 x 36	48 x 48	30 x 30
XX MPH SPEED ZONE AHEAD	W3-5a	6F.16	36 x 36	48 x 48	30 x 30
Merging Traffic	W4-1, 5	6F.16	36 x 36	48 x 48	36 x 36
Lane Ends	W4-2	6F.24	36 x 36	48 x 48	30 x 30
Added Lane	W4-3, 6	6F.16	36 x 36	48 x 48	30 x 30
No Merge Area (plaque)	W4-5P	6F.16	18 x 24	24 x 30	—
ROAD NARROWS	W5-1	6F.16	36 x 36	48 x 48	30 x 30
NARROW BRIDGE	W5-2	6F.16	36 x 36	48 x 48	30 x 30
ONE LANE BRIDGE	W5-3	6F.16	36 x 36	48 x 48	30 x 30
RAMP NARROWS	W5-4	6F.26	36 x 36	48 x 48	30 x 30
Divided Highway	W6-1	6F.16	36 x 36	48 x 48	30 x 30
Divided Highway Ends	W6-2	6F.16	36 x 36	48 x 48	30 x 30
Two-Way Traffic	W6-3	6F.32	36 x 36	48 x 48	30 x 30
Two-Way Traffic	W6-4	6F.76	12 x 18	12 x 18	—
Hill	W7-1	6F.16	36 x 36	48 x 48	30 x 30
NEXT XX MILES (plaque)	W7-3aP	6F.53	24 x 18	36 x 30	—
BUMP	W8-1	6F.16	36 x 36	48 x 48	30 x 30
DIP	W8-2	6F.16	36 x 36	48 x 48	30 x 30
PAVEMENT ENDS	W8-3	6F.16	36 x 36	48 x 48	30 x 30
SOFT SHOULDER	W8-4	6F.44	36 x 36	48 x 48	30 x 30
Slippery When Wet	W8-5	6F.16	36 x 36	48 x 48	30 x 30
TRUCK CROSSING	W8-6	6F.36	36 x 36	48 x 48	30 x 30
LOOSE GRAVEL	W8-7	6F.16	36 x 36	48 x 48	30 x 30
ROUGH ROAD	W8-8	6F.16	36 x 36	48 x 48	30 x 30
LOW SHOULDER	W8-9	6F.44	36 x 36	48 x 48	30 x 30
UNEVEN LANES	W8-11	6F.45	36 x 36	48 x 48	30 x 30
NO CENTER LINE	W8-12	6F.47	36 x 36	48 x 48	30 x 30

Table 6F-1. Sizes of Temporary Traffic Control Signs¹ (Sheet 3 of 4)

Sign or Plaque	Sign Designation	Section	Conventional Road	Freeway or Expressway	Minimum
NO EDGE LINE	W8-H12a	6F.47	36 x 36	48 x 48	30 x 30
FALLEN ROCKS	W8-14	6F.16	36 x 36	48 x 48	30 x 30
GROOVED PAVEMENT	W8-15	6F.16	36 x 36	48 x 48	30 x 30
MOTORCYCLE (plaque)	W8-15P	6F.54	24 x 18	30 x 24	—
Shoulder Drop-Off (symbol)	W8-17	6F.44	36 x 36	48 x 48	30 x 30
SHOULDER DROP-OFF (plaque)	W8-17P	6F.44	24 x 18	30 x 24	—
ROAD MAY FLOOD	W8-18	6F.16	36 x 36	48 x 48	30 x 30
NO SHOULDER	W8-23	6F.16	36 x 36	48 x 48	30 x 30
STEEL PLATE AHEAD	W8-24	6F.46	36 x 36	48 x 48	30 x 30
SHOULDER ENDS	W8-25	6F.16	36 x 36	48 x 48	30 x 30
Lane Ends	W9-1, 2	6F.16	36 x 36	48 x 48	30 x 30
CENTER LANE CLOSED AHEAD	W9-3	6F.23	36 x 36	48 x 48	30 x 30
Grade Crossing Advance Warning	W10-1	6F.16	36 dia.	—	—
Truck	W11-10	6F.36	36 x 36	48 x 48	30 x 30
Double Arrow	W12-1	6F.16	30 x 30	—	—
Low Clearance	W12-2	6F.16	36 x 36	48 x 48	30 x 30
Advisory Speed (plaque)	W13-1P	6F.52	24 x 24	30 x 30	18 x 18
ON RAMP (plaque)	W13-4P	6F.25	36 x 36	36 x 36	—
NO PASSING ZONE (pennant)	W14-3	6F.16	48 x 48 x 36	64 x 64 x 48	40 x 40 x 30
XX FEET (plaque)	W16-2P	6F.16	24 x 18	30 x 24	—
Road Work (with distance)	W20-1	6F.18	36 x 36	48 x 48	30 x 30
Detour (with distance)	W20-2	6F.19	36 x 36	48 x 48	30 x 30
Road (Street) Closed (with distance)	W20-3	6F.20	36 x 36	48 x 48	30 x 30
One Lane Road (with distance)	W20-4	6F.21	36 x 36	48 x 48	30 x 30
Lane(s) Closed (with distance)	W20-5,5a	6F.22	36 x 36	48 x 48	30 x 30
Flagger (symbol)	W20-7	6F.31	36 x 36	48 x 48	30 x 30
FLAGGER	W20-7a	6F.31	36 x 36	48 x 48	30 x 30
SLOW (on the STOP/SLOW Paddle)	W20-8	6E.03	18 x 18	—	—
Workers	W21-1,1a	6F.33	36 x 36	48 x 48	30 x 30
FRESH OIL (TAR)	W21-2	6F.34	36 x 36	48 x 48	30 x 30
ROAD MACHINERY AHEAD	W21-3	6F.35	36 x 36	48 x 48	30 x 30
SLOW MOVING VEHICLE	W21-4	6G.06	36 x 18	—	—
SHOULDER WORK	W21-5	6F.37	36 x 36	48 x 48	30 x 30
SHOULDER CLOSED	W21-5a	6F.37	36 x 36	48 x 48	30 x 30
SHOULDER CLOSED (with distance)	W21-5b	6F.37	36 x 36	48 x 48	30 x 30

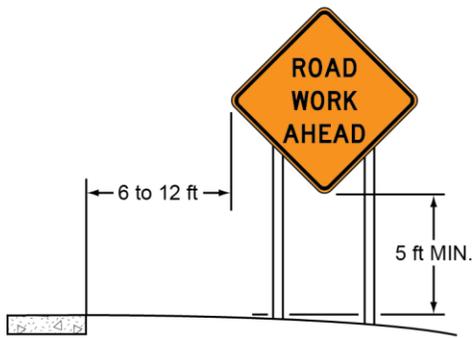
Table 6F-1. Sizes of Temporary Traffic Control Signs¹ (Sheet 4 of 4)

Sign or Plaque	Sign Designation	Section	Conventional Road	Freeway or Expressway	Minimum
SURVEY CREW	W21-6	6F.38	36 x 36	48 x 48	30 x 30
UTILITY WORK AHEAD	W21-7	6F.39	36 x 36	48 x 48	30 x 30
MOWING AHEAD	W21-8	6G.06	36 x 36	48 x 48	30 x 30
BLASTING ZONE AHEAD	W22-1	6F.41	36 x 36	48 x 48	30 x 30
TURN OFF 2-WAY RADIO AND CELL PHONE	W22-2	6F.42	42 x 36	42 x 36	—
END BLASTING ZONE	W22-3	6F.43	42 x 36	42 x 36	36 x 30
SLOW TRAFFIC AHEAD	W23-1	6F.27	48 x 24	48 x 24	—
NEW TRAFFIC PATTERN AHEAD	W23-2	6F.30	36 x 36	48 x 48	30 x 30
Double Reverse Curve (1 lane)	W24-1	6F.49	36 x 36	48 x 48	30 x 30
Double Reverse Curve (2 lanes)	W24-1a	6F.49	36 x 36	48 x 48	30 x 30
Double Reverse Curve (3 lanes)	W24-1b	6F.49	36 x 36	48 x 48	30 x 30
ALL LANES	W24-1cP	6F.49	24 x 24	30 x 30	—
ROAD WORK NEXT XX MILES	G20-1	6F.56	36 x 18	48 x 24	—
END ROAD WORK	G20-2	6F.57	36 x 18	48 x 24	—
PILOT CAR FOLLOW ME	G20-4	6F.58	36 x 18	—	—
WORK ZONE (plaque)	G20-5aP	6F.12	24 x 18	36 x 24	—
EXIT OPEN	E5-2	6F.28	48 x 36	48 x 36	—
EXIT CLOSED	E5-2a	6F.28	48 x 36	48 x 36	—
EXIT OPEN AHEAD	E5-H2b	6F.28	48 x 48	48 x 48	—
EXIT CLOSED AHEAD	E5-H2c	6F.28	48 x 48	48 x 48	—
EXIT ONLY	E5-3	6F.29	48 x 36	48 x 36	—
DETOUR	M4-8	6F.59	24 x 12	30 x 15	—
END DETOUR	M4-8a	6F.59	24 x 18	24 x 18	—
END	M4-8b	6F.59	24 x 12	24 x 12	—
DETOUR (with arrow)	M4-9	6F.59	30 x 24	48 x 36	—
Bike/Pedestrian Detour	M4-9a	6F.59	30 x 24	—	—
Pedestrian Detour	M4-9b	6F.59	30 x 24	—	—
Bike Detour	M4-9c	6F.59	30 x 24	—	—
Detour (inside arrow)	M4-10	6F.59	48 x 18	—	—

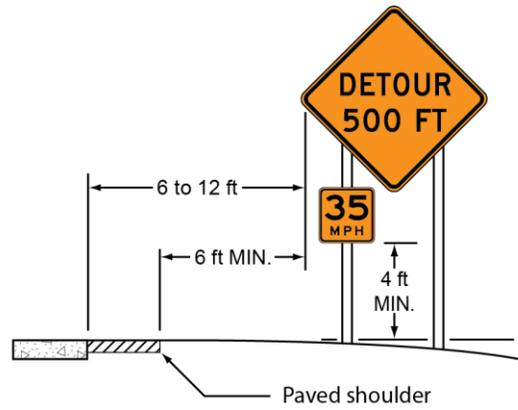
Notes:

- a.) Larger signs may be used wherever necessary for greater legibility or emphasis.
b.) Dimensions are shown in inches and are shown as width x height.
- See Table 2B-1 for minimum size required for signs facing traffic on multi-lane conventional roads.

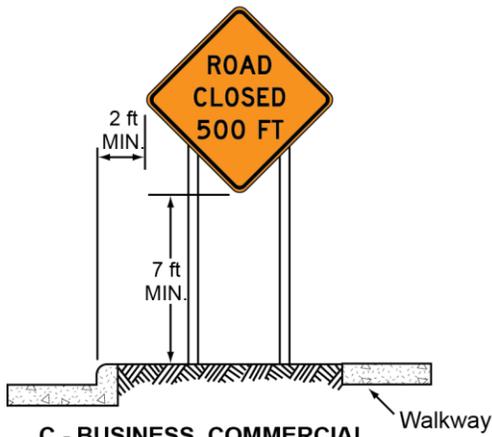
Figure 6F-1. Height and Lateral Location of Signs—Typical Installations



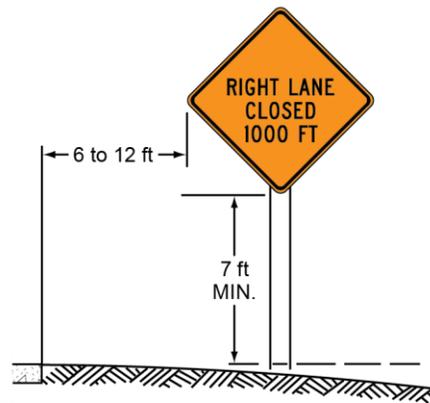
A - RURAL AREA



B - RURAL AREA WITH ADVISORY SPEED PLAQUE

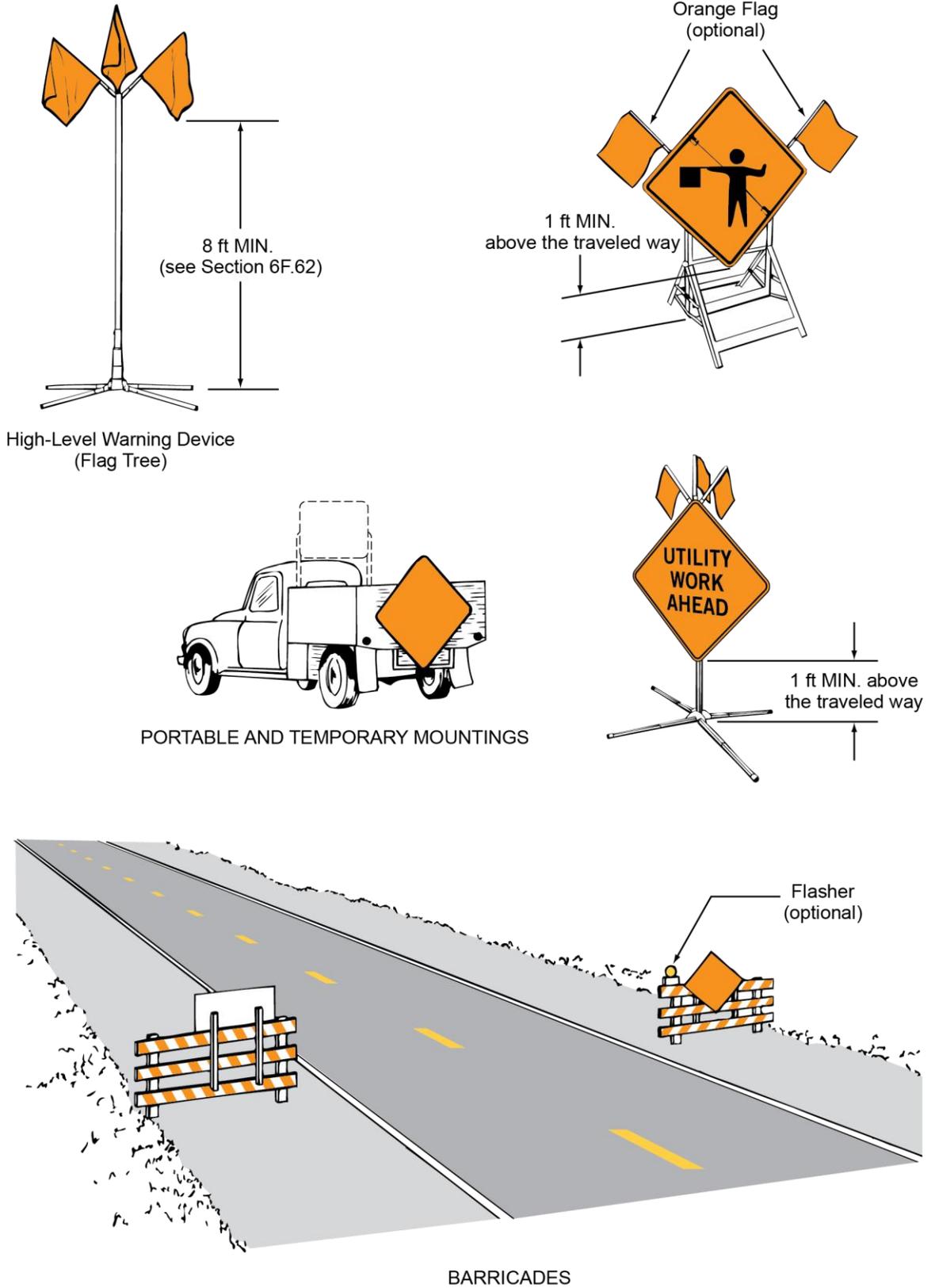


**C - BUSINESS, COMMERCIAL,
OR RESIDENTIAL AREA**



**D - BUSINESS, COMMERCIAL, OR RESIDENTIAL
AREA (WITHOUT CURB)**

Figure 6F-2. Methods of Mounting Signs Other Than on Posts



Option:

- 18 For mobile operations, a sign may be mounted on a work vehicle, a shadow vehicle, or a trailer stationed in advance of the TTC zone or moving along with it.

Support:

- 19 If alterations are made to specific traffic control device supports that have been successfully crash tested in accordance with NCHRP Report 350, or MASH, the altered supports might not be considered to be crashworthy.

Section 6F.04 Sign Maintenance

Guidance:

- 01 *Signs should be properly maintained for cleanliness, visibility, and correct positioning.*
02 *Signs that have lost significant legibility should be promptly replaced.*

Support:

- 03 Section 2A.08 contains information regarding the retroreflectivity of signs, including the signs that are used in TTC zones.

Section 6F.05 Regulatory Sign Authority

Support:

- 01 Regulatory signs such as those shown in Figure 6F-3 and Appendix C inform road users of traffic laws or regulations and indicate the applicability of legal requirements that would not otherwise be apparent.

Standard:

- 02 **Regulatory signs shall be authorized by the public agency or official having jurisdiction and shall comply with Chapter 2B.**

Section 6F.06 Regulatory Sign Design

Standard:

- 01 **TTC regulatory signs shall comply with the Standards for regulatory signs presented in Part 2 and the “Sign Designs and Markings Manual” (SDMM) (see Section 1A.11).**

Support:

- 02 Regulatory signs are generally rectangular with a black legend and border on a white background. Exceptions include the STOP, YIELD, DO NOT ENTER, WRONG WAY, and ONE WAY signs.

Option:

- 03 The ONE WAY sign may be either a horizontal or vertical rectangular sign.

Section 6F.07 Regulatory Sign Applications

Standard:

- 01 **If a TTC zone requires regulatory measures different from those existing, the existing permanent regulatory devices shall be removed or covered and superseded by the appropriate temporary regulatory signs. This change shall be made in compliance with applicable ordinances or statutes of the jurisdiction.**

Section 6F.08 ROAD (STREET) CLOSED Sign (R11-2)

Guidance:

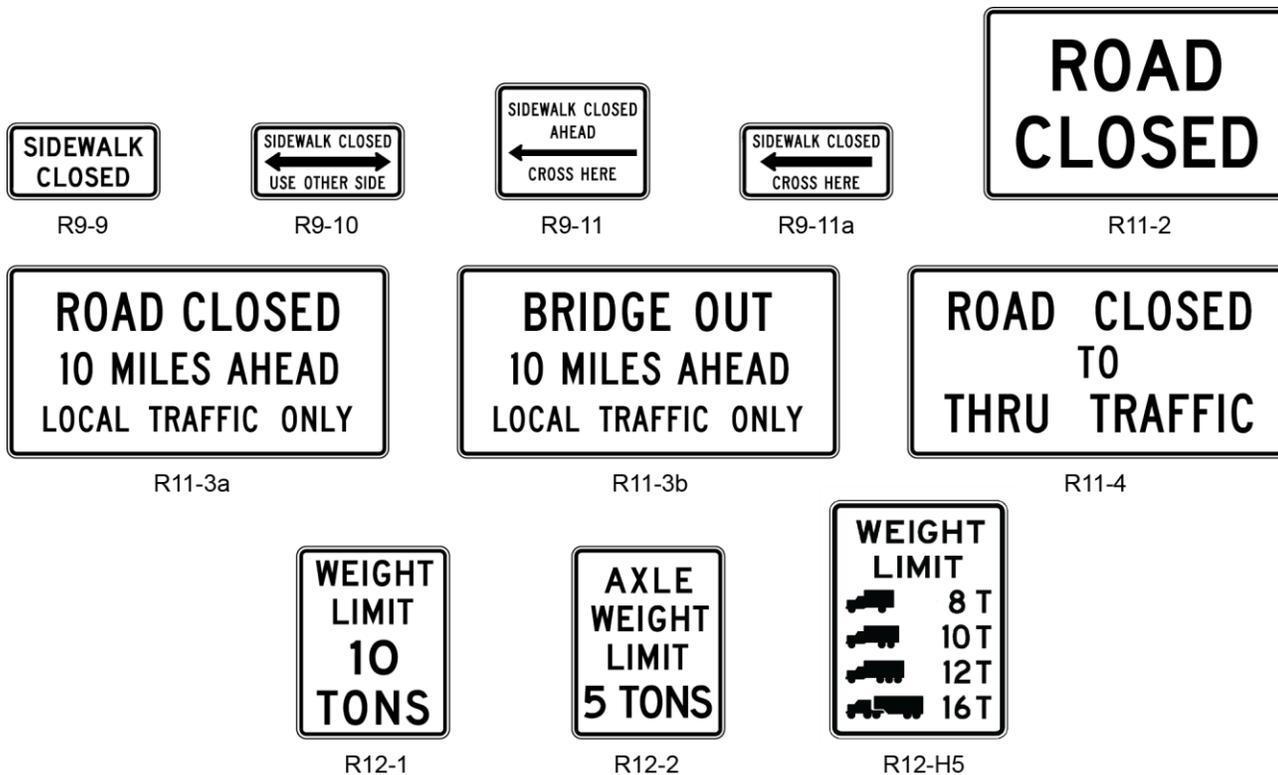
- 01 *The ROAD (STREET) CLOSED (R11-2) sign (see Figure 6F-3) should be used when the roadway is closed to all road users except contractors' equipment or officially authorized vehicles. The R11-2 sign should be accompanied by appropriate warning and detour signing.*

Option:

- 02 The words BRIDGE OUT (or BRIDGE CLOSED) may be substituted for ROAD (STREET) CLOSED where applicable.

Figure 6F-3. Regulatory Signs in Temporary Traffic Control Zones (Sheet 1 of 2)



Figure 6F-3. Regulatory Signs in Temporary Traffic Control Zones (Sheet 2 of 2)*Guidance:*

- 03 The ROAD (STREET) CLOSED sign should be installed at or near the center of the roadway on or above a Type 3 barricade that closes the roadway (see Section 6F.68).

Standard:

- 04 The ROAD (STREET) CLOSED sign shall not be used where road user flow is maintained through the TTC zone with a reduced number of lanes on the existing roadway or where the actual closure is some distance beyond the sign.

Section 6F.09 Local Traffic Only Signs (R11-3a, R11-3b, R11-4, R11-H8)*Guidance:*

- 01 The Local Traffic Only signs (see Figure 6F-3) should be used where road user flow detours to avoid a closure some distance beyond the sign, but where local road users can use the roadway to the point of closure. These signs should be accompanied by appropriate warning and detour signing.
- 02 In rural applications, the Local Traffic Only sign should have the legend ROAD CLOSED XX MILES AHEAD, LOCAL TRAFFIC ONLY (R11-3a).
- 03 The ROUTE CLOSED (R11-H8) sign (see Appendix C) should be used when the road on which it is used is not closed but the route, on another road, is closed. When used, the ROUTE CLOSED sign shall have attached to it a Route Marker (M1) sign.

Option:

- 04 In urban areas, the legend ROAD (STREET) CLOSED TO THRU TRAFFIC (R11-4) or ROAD CLOSED, LOCAL TRAFFIC ONLY may be used.
- 05 In urban areas, a word message that includes the name of an intersecting street name or well-known destination may be substituted for the words XX MILES AHEAD on the R11-3a (or R11-3b) sign where applicable.

- 06 The words BRIDGE OUT (or BRIDGE CLOSED) may be substituted for the words ROAD (STREET) CLOSED on the R11-3a or R11-4 sign where applicable.

Section 6F.10 Weight Limit Signs (R12-1, R12-2, R12-H5)

Standard:

- 01 A Weight Limit sign (see Figure 6F-3), which shows the gross weight or axle weight that is permitted on the roadway or bridge, shall be consistent with State or local regulations and shall not be installed without the approval of the authority having jurisdiction over the highway.
- 02 When weight restrictions are imposed because of the activity in a TTC zone, a marked detour shall be provided for vehicles weighing more than the posted limit.

Section 6F.11 STAY IN LANE Sign (R4-9)

Option:

- 01 A STAY IN LANE (R4-9) sign (see Figure 6F-3) may be used where a multi-lane shift has been incorporated as part of the TTC on a highway to direct road users around road work that occupies part of the roadway on a multi-lane highway.

Section 6F.12 Work Zone and Higher Fines Signs and Plaques

Option:

- 01 A WORK ZONE (G20-5aP) plaque (see Figure 6F-3) may be mounted above a Speed Limit sign to emphasize that a reduced speed limit is in effect within a TTC zone. An END WORK ZONE SPEED LIMIT (R2-12) sign (see Figure 6F-3) may be installed at the downstream end of the reduced speed limit zone.

Guidance:

- 02 A BEGIN HIGHER FINES ZONE (R2-10) sign (see Figure 6F-3) should be installed at the upstream end of a work zone where increased fines are imposed for traffic violations, and an END HIGHER FINES ZONE (R2-11) sign (see Figure 6F-3) should be installed at the downstream end of the work zone.

Option:

- 03 Alternate legends such as BEGIN (or END) DOUBLE FINES ZONE may also be used for the R2-10 and R2-11 signs.
- 04 A FINES HIGHER, FINES DOUBLE, or \$XX FINE plaque (see Section 2B.17 and Figure 6F-3) may be mounted below the Speed Limit sign if increased fines are imposed for traffic violations within the TTC zone.
- 05 Individual signs and plaques for work zone speed limits and higher fines may be combined into a single sign or may be displayed as an assembly of signs and plaques.

Support:

- 06 ORC Section 5501.27(A)(1) requires that the Director of Transportation “adopt rules governing the posting of signs advising motorists that increased penalties apply for certain traffic violations on streets or highways in a construction zone.” Also, ORC Section 5501.27(A)(2) requires that the Director adopt “rules governing the posting of signs to be used pursuant to section 2903.081 of the Revised Code giving notice to motorists of the prohibitions set forth in sections 2903.06 and 2903.08 of the Revised Code regarding the death of or injury to any person in a construction zone as a proximate result of a reckless operation offense or speeding offense.”

Standard:

- 07 In accordance with ORC Section 4511.98, the “director of transportation, board of county commissioners, or board of township trustees shall cause signs to be erected advising motorists that increased penalties apply for certain traffic violations occurring on streets or highways in a construction zone. The increased penalties shall be effective only when signs are erected in accordance with the guidelines and design specifications established by the director under section 5501.27 of the Revised Code, and when a violation occurs during hours of actual work within the construction zone.”
- 08 The Work Zone Increased Penalties (R11-H5a) sign (see Appendix C) shall be used for this purpose.

09 The guidelines established by the Director are in Part 6 of the ODOT Traffic Engineering Manual (TEM) (see Section 1A.11) and in Chapter 5501:2-10 of the Ohio Administrative Code (OAC). Administrative Code Section 5501:2-10-02 also requires that each agency adopt procedures pertaining to requiring a contractor, work crew, or utility to erect, maintain, and remove signs, in conformance with these guidelines.

Section 6F.13 PEDESTRIAN CROSSWALK Sign (R9-8)

Option:

01 The PEDESTRIAN CROSSWALK (R9-8) sign (see Figure 6F-3) may be used to indicate where a temporary crosswalk has been established.

Standard:

02 **If a temporary crosswalk is established, it shall be accessible to pedestrians with disabilities in accordance with Section 6D.02.**

Section 6F.14 SIDEWALK CLOSED Signs (R9-9, R9-10, R9-11, R9-11a)

Guidance:

01 *SIDEWALK CLOSED signs (see Figure 6F-3) should be used where pedestrian flow is restricted. Bicycle/Pedestrian Detour (M4-9a) signs or Pedestrian Detour (M4-9b) signs should be used where pedestrian flow is rerouted (see Section 6F.59).*

02 *The SIDEWALK CLOSED (R9-9) sign should be installed at the beginning of the closed sidewalk, at the intersections preceding the closed sidewalk, and elsewhere along the closed sidewalk as needed.*

03 *The SIDEWALK CLOSED (ARROW) USE OTHER SIDE (R9-10) sign should be installed at the beginning of the restricted sidewalk when a parallel sidewalk exists on the other side of the roadway.*

04 *The SIDEWALK CLOSED AHEAD (ARROW) CROSS HERE (R9-11) sign should be used to indicate to pedestrians that sidewalks beyond the sign are closed and to direct them to open crosswalks, sidewalks, or other travel paths.*

05 *The SIDEWALK CLOSED (ARROW) CROSS HERE (R9-11a) sign should be installed just beyond the point to which pedestrians are being redirected.*

Support:

06 These signs are typically mounted on a detectable barricade to encourage compliance and to communicate with pedestrians that the sidewalk is closed. Printed signs are not useful to many pedestrians with visual disabilities. A barrier or barricade detectable by a person with a visual disability is sufficient to indicate that a sidewalk is closed. If the barrier is continuous with detectable channelizing devices for an alternate route, accessible signing might not be necessary. An audible information device is needed when the detectable barricade or barrier for an alternate channelized route is not continuous.

Section 6F.15 Special Regulatory Signs

Option:

01 Special regulatory signs may be used based on engineering judgment consistent with regulatory requirements.

Guidance:

02 *Special regulatory signs should comply with the general requirements of color, shape, and alphabet size and series. The sign message should be brief, legible, and clear.*

Section 6F.16 Warning Sign Function, Design, and Application

Support:

01 TTC zone warning signs (see Figure 6F-4 and Appendix C) notify road users of specific situations or conditions on or adjacent to a roadway that might not otherwise be apparent.

Standard:

02 **TTC warning signs shall comply with the Standards for warning signs presented in Part 2 and in the “Sign Designs and Markings Manual” (SDMM) (see Section 1A.11). Except as provided in Paragraph 3, TTC warning signs shall be diamond-shaped with a black legend and border on an**

orange background, except for the W10-1 sign which shall have a black legend and border on a yellow background, and except for signs that are required or recommended in Part 2 or 7 to have fluorescent yellow-green backgrounds.

Option:

03 Warning signs used for TTC incident management situations may have a black legend and border on a fluorescent pink background (see Chapter 6I).

04 Mounting or space considerations may justify a change from the standard diamond shape.

05 In emergencies, available warning signs having yellow backgrounds may be used if signs with orange or fluorescent pink backgrounds are not at hand.

Guidance:

06 *Where roadway or road user conditions require greater emphasis, larger than standard size warning signs should be used, with the legend enlarged approximately in proportion to the outside dimensions.*

07 *Where any part of the roadway is obstructed or closed by work activities or incidents, advance warning signs should be installed to alert road users well in advance of these obstructions or restrictions.*

08 *Where road users include pedestrians, the provision of supplemental audible information or detectable barriers or barricades should be considered for people with visual disabilities.*

Support:

09 Detectable barriers or barricades communicate very clearly to pedestrians who have visual disabilities that they can no longer proceed in the direction that they are traveling.

Option:

10 Advance warning signs may be used singly or in combination.

11 Where distances are not displayed on warning signs as part of the message, a supplemental plaque with the distance legend may be mounted immediately below the sign on the same support.

Section 6F.17 Position of Advance Warning Signs

Guidance:

01 *As shown in Figure 6C-1, where highway conditions permit, warning signs should be placed in advance of the transition area at varying distances depending on roadway type, condition, and posted speed. Table 6C-1 contains information regarding the spacing of advance warning signs. Where a series of two or more advance warning signs is used, the closest sign to the transition area should be placed approximately 100 feet for low-speed urban streets to 1,000 feet or more for freeways and expressways.*

02 *Where multiple advance warning signs are needed, the ROAD WORK AHEAD (W20-1) sign should be the first advance warning sign encountered by road users.*

Support:

03 Various conditions, such as limited sight distance or obstructions that might require a driver to reduce speed or stop, might require additional advance warning signs.

Option:

04 As an alternative to a specific distance on advance warning signs, the word AHEAD may be used.

Support:

05 At TTC zones on lightly-traveled roads, all of the advance warning signs prescribed for major construction might not be needed.

Option:

06 Utility work, maintenance, or minor construction can occur within the TTC zone limits of a major construction project, and additional warning signs may be needed.

Guidance:

07 *Utility, maintenance, and minor construction signing and TTC should be coordinated with appropriate authorities so that road users are not confused or misled by the additional TTC devices.*

Section 6F.18 ROAD (STREET) WORK Sign (W20-1)**Guidance:**

01 The ROAD (STREET) WORK (W20-1) sign (see Figure 6F-4), which serves as a general warning of
 obstructions or restrictions, should be located in advance of the work space or any detour, on the road
 where the work is taking place.

02 Where traffic can enter a TTC zone from a crossroad or a major (high-volume) driveway, an advance
 warning sign should be used on the crossroad or major driveway.

Standard:

03 The ROAD (STREET) WORK (W20-1) sign shall have the legend ROAD (STREET) WORK, XX
 FT, XX MILES, or AHEAD.

Section 6F.19 DETOUR Sign (W20-2)**Guidance:**

01 The DETOUR (W20-2) sign (see Figure 6F-4) should be used in advance of a road user detour over a
 different roadway or route.

Standard:

02 The DETOUR sign shall have the legend DETOUR, XX FT, XX MILES, or AHEAD.

Section 6F.20 ROAD (STREET) CLOSED Sign (W20-3)**Guidance:**

01 The ROAD (STREET) CLOSED (W20-3) sign (see Figure 6F-4) should be used in advance of the point
 where a highway is closed to all road users, or to all but local road users.

Standard:

02 The ROAD (STREET) CLOSED sign shall have the legend ROAD (STREET) CLOSED, XX FT,
 XX MILES, or AHEAD.

Section 6F.21 ONE LANE ROAD Sign (W20-4)**Standard:**

01 The ONE LANE ROAD (W20-4) sign (see Figure 6F-4) shall be used only in advance
 of that point where vehicular traffic in both directions must use a common single lane (see Section
 6C.10). It shall have the legend ONE LANE ROAD, XX FEET, XX MILES, or AHEAD.

Section 6F.22 Lane(s) Closed Signs (W20-5, W20-5a)**Standard:**

01 The Lane(s) Closed sign (see Figure 6F-4) shall be used in advance of that point where one or
 more through lanes of a multi-lane roadway are closed.

02 For a single lane closure, the Lane Closed (W20-5) sign (see Figure 6F-4) shall have the legend
 RIGHT (LEFT) LANE CLOSED, XX FEET, XX MILES, or AHEAD. Where two adjacent lanes are
 closed, the W20-5a sign (see Figure 6F-4) shall have the legend 2 RIGHT (LEFT) LANES CLOSED,
 XX FEET, XX MILES, or AHEAD.

Section 6F.23 CENTER LANE CLOSED AHEAD Sign (W9-3)**Guidance:**

01 The CENTER LANE CLOSED AHEAD (W9-3) sign (see Figure 6F-4) should be used in advance of that
 point where work occupies the center lane(s) and approaching vehicular traffic is directed to the right or left
 of the work zone in the center lane.

Figure 6F-4. Warning Signs and Plaques in Temporary Traffic Control Zones
(Sheet 1 of 3)

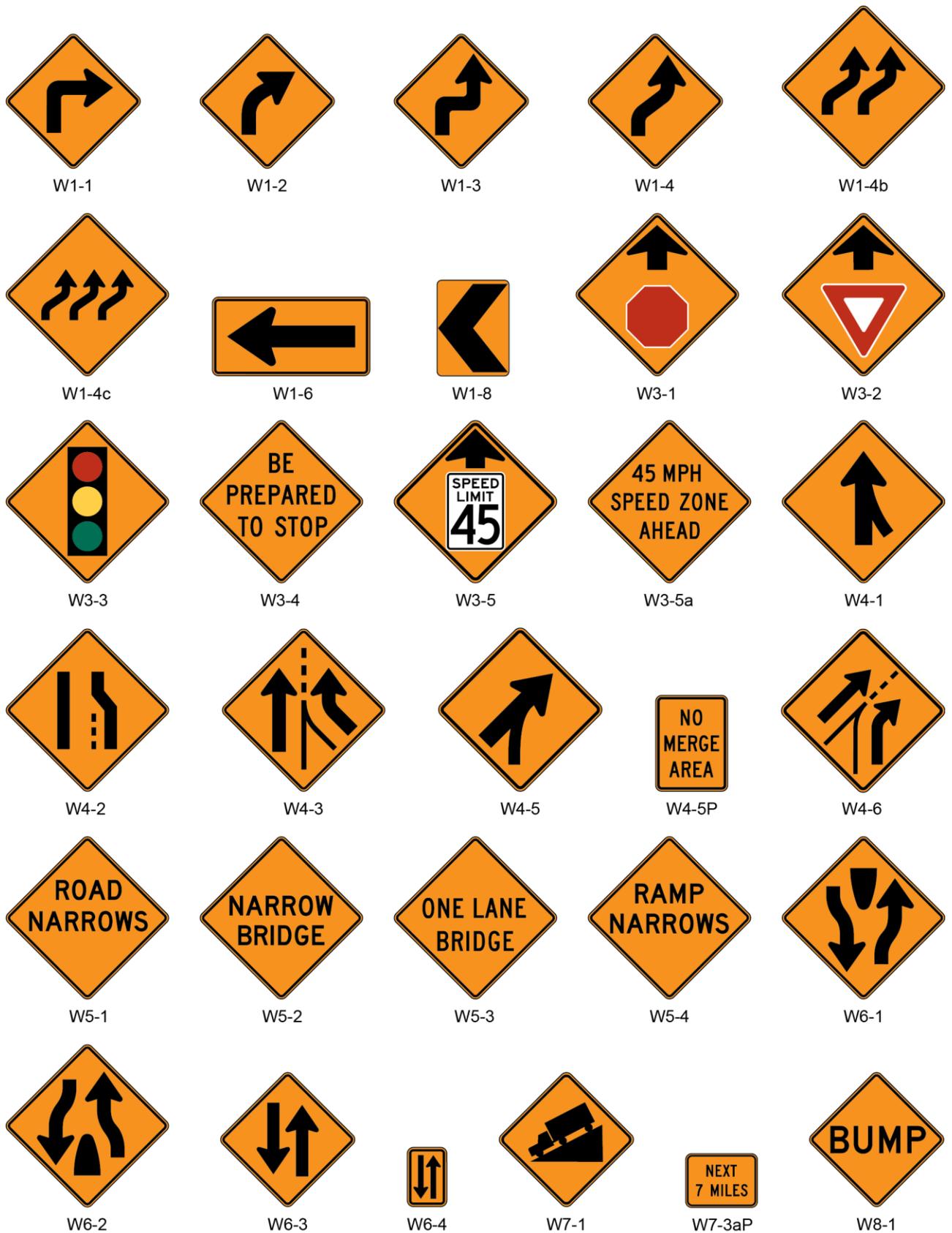


Figure 6F-4. Warning Signs and Plaques in Temporary Traffic Control Zones
(Sheet 2 of 3)



W8-2



W8-3



W8-4



W8-5



W8-6



W8-7



W8-8



W8-9



W8-11



W8-12



W8-14



W8-15



W8-17



W8-18



W8-23



W8-15P



W8-17P



W8-24



W8-25



W9-1



W9-2



W9-3



W11-10



W12-1



W12-2

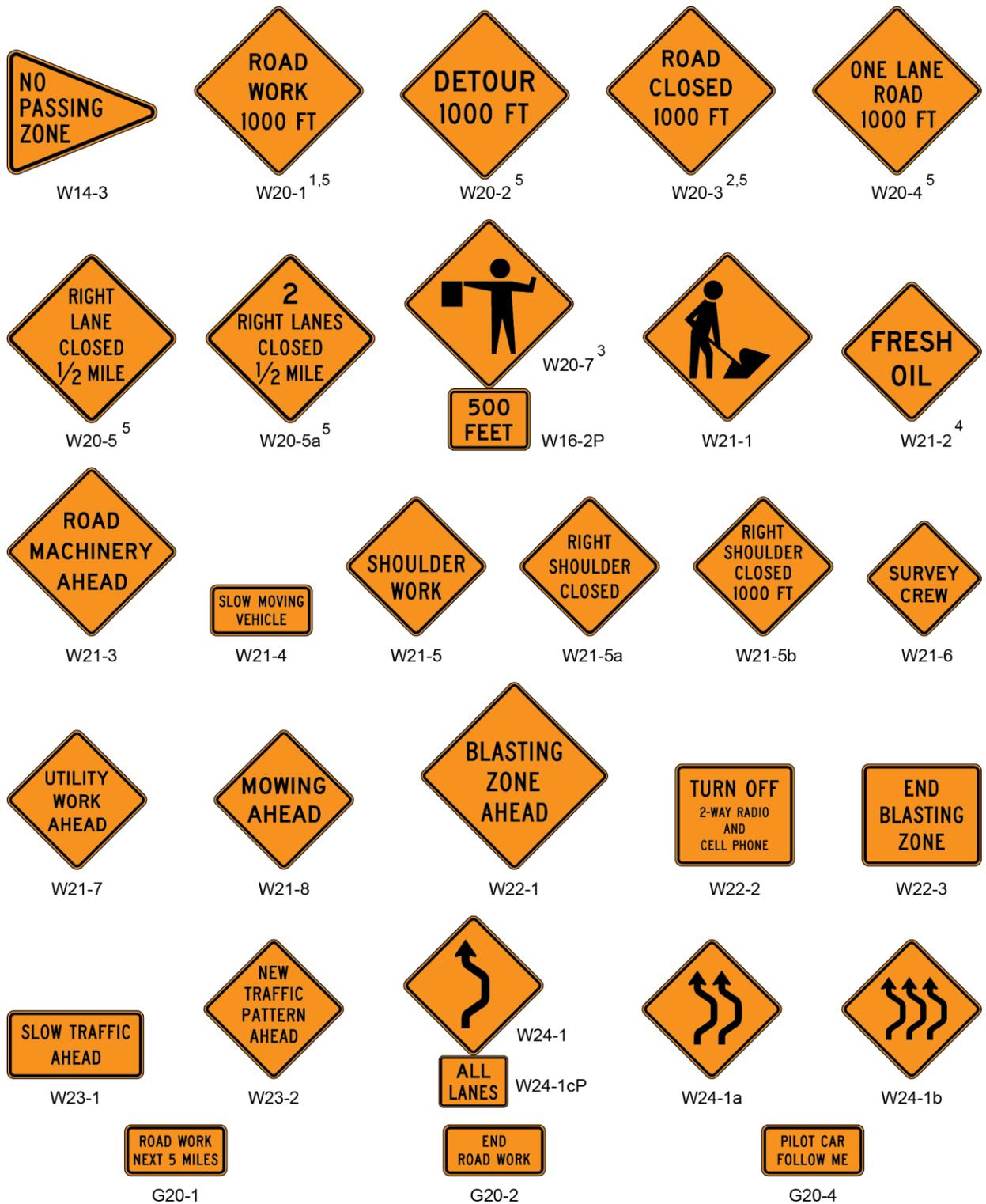


W13-1P



W13-4P

Figure 6F-4. Warning Signs and Plaques in Temporary Traffic Control Zones
(Sheet 3 of 3)



Notes:

1. An optional STREET WORK word message sign is shown in the "Sign Designs and Markings Manual" (SDMM).
2. An optional STREET CLOSED word message sign is shown in the SDMM.
3. An optional FLAGGER (W20-7a) word message sign is shown in the SDMM.
4. An optional FRESH TAR word message sign is show in the SDMM.
5. The W20-1, 2, 3, 4, 5 and 5a are shown in Appendix C and in the SDMM with the optional AHEAD legend for the last line of the message.

Section 6F.24 Lane Ends Sign (W4-2)

Option:

- 01 The Lane Ends (W4-2) symbol sign (see Figure 6F-4) may be used to warn drivers of the reduction in the number of lanes for moving vehicular traffic in the direction of travel on a multi-lane roadway.

Section 6F.25 ON RAMP Plaque (W13-4P)

Guidance:

- 01 When work is being done on a ramp, but the ramp remains open, the ON RAMP (W13-4P) plaque (see Figure 6F-4) should be used to supplement the advance ROAD WORK sign.

Section 6F.26 RAMP NARROWS Sign (W5-4)

Guidance:

- 01 The RAMP NARROWS (W5-4) sign (see Figure 6F-4) should be used in advance of the point where work on a ramp reduces the normal width of the ramp along a part, or all, of the ramp.

Section 6F.27 SLOW TRAFFIC AHEAD Sign (W23-1)

Option:

- 01 The SLOW TRAFFIC AHEAD (W23-1) sign (see Figure 6F-4) may be used on a shadow vehicle, usually mounted on the rear of the most upstream shadow vehicle, along with other appropriate signs for mobile operations to warn of slow moving work vehicles. A ROAD WORK (W20-1) sign may also be used with the SLOW TRAFFIC AHEAD sign.

Section 6F.28 EXIT OPEN and EXIT CLOSED (AHEAD) Signs (E5-2, E5-2a, E5-H2b, E5-H2c)

Option:

- 01 An EXIT OPEN (E5-2) or EXIT CLOSED (E5-2a) sign (see Figure 6F-5) may be used to supplement other warning signs where work is being conducted in the vicinity of an exit ramp and where the exit maneuver for vehicular traffic using the ramp is different from the normal condition. The EXIT OPEN AHEAD (E5-H2b) and the EXIT CLOSED AHEAD (E5-H2c) signs may also be used (see Appendix C).

Guidance:

- 02 When an exit ramp is closed, an EXIT CLOSED sign panel with a black legend and border on an orange background should be placed diagonally across the interchange/intersection guide signs.

Section 6F.29 EXIT ONLY Sign (E5-3)

Option:

- 01 An EXIT ONLY (E5-3) sign (see Figure 6F-5) may be used to supplement other warning signs where work is being conducted in the vicinity of an exit ramp and where the exit maneuver for vehicular traffic using the ramp is different from the normal condition.

Section 6F.30 NEW TRAFFIC PATTERN AHEAD Sign (W23-2)

Option:

- 01 A NEW TRAFFIC PATTERN AHEAD (W23-2) sign (see Figure 6F-4) may be used on the approach to an intersection or along a section of roadway to provide advance warning of a change in traffic patterns, such as revised lane usage, roadway geometry, or signal phasing.

Guidance:

- 02 To retain its effectiveness, the W23-2 sign should be displayed for up to 2 weeks, and then it should be covered or removed until it is needed again.

Section 6F.31 Flagger Signs (W20-7, W20-7a)*Guidance:*

- 01 *The Flagger (W20-7) symbol sign (see Figure 6F-4) should be used in advance of any point where a flagger is stationed to control road users.*

Option:

- 02 A distance legend may be displayed on a supplemental plaque below the Flagger sign. The sign may be used with appropriate legends or in conjunction with other warning signs, such as the BE PREPARED TO STOP (W3-4) sign (see Figure 6F-4).

- 03 The FLAGGER (W20-7a) word message sign with distance legends may be substituted for the Flagger (W20-7) symbol sign.

Section 6F.32 Two-Way Traffic Sign (W6-3)*Guidance:*

- 01 *When one roadway of a normally divided highway is closed, with two-way vehicular traffic maintained on the other roadway, the Two-Way Traffic (W6-3) sign (see Figure 6F-4) should be used at the beginning of the two-way vehicular traffic section and at intervals to remind road users of opposing vehicular traffic.*

Section 6F.33 Workers Sign (W21-1, W21-1a)*Option:*

- 01 A Workers (W21-1) symbol sign (see Figure 6F-4) may be used to alert road users of workers in or near the roadway.

Guidance:

- 02 *In the absence of other warning devices, a Workers symbol sign should be used when workers are in the roadway.*

Option:

- 03 The WORKERS (W21-1a) word message sign may be used as an alternate to the Workers (W21-1) symbol sign.

Section 6F.34 FRESH OIL (TAR) Sign (W21-2)*Guidance:*

- 01 *The FRESH OIL (TAR) (W21-2) sign (see Figure 6F-4) should be used to warn road users of the surface treatment.*

Section 6F.35 ROAD MACHINERY AHEAD Sign (W21-3)*Option:*

- 01 The ROAD MACHINERY AHEAD (W21-3) sign (see Figure 6F-4) may be used to warn of machinery operating in or adjacent to the roadway.

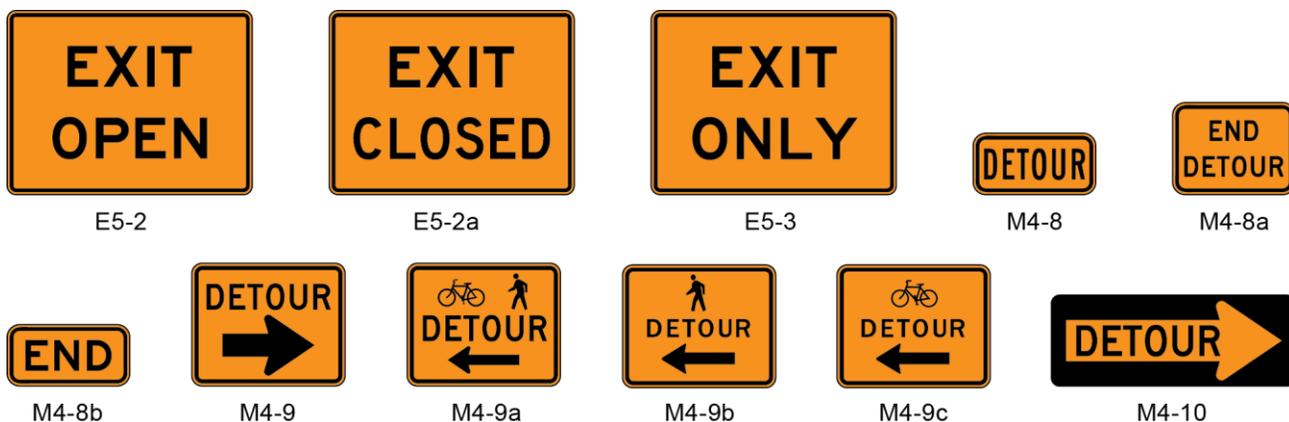
Section 6F.36 Motorized Traffic Signs (W8-6, W11-10)*Option:*

- 01 Motorized Traffic (W8-6, W11-10) signs may be used to alert road users to locations where unexpected travel on the roadway or entries into or departures from the roadway by construction vehicles might occur. The TRUCK CROSSING (W8-6) word message sign may be used as an alternate to the Truck Crossing symbol (W11-10) sign (see Figure 6F-4) where there is an established construction vehicle crossing of the roadway.

Support:

- 02 These locations might be relatively confined or might occur randomly over a segment of roadway.

Figure 6F-5. Exit Open and Closed and Detour Signs



Section 6F.37 Shoulder Work Signs (W21-5, W21-5a, W21-5b)

Support:

- 01 Shoulder Work signs (see Figure 6F-4) warn of maintenance, reconstruction, or utility operations on the highway shoulder where the roadway is unobstructed.

Standard:

- 02 **The Shoulder Work sign shall have the legend SHOULDER WORK (W21-5), RIGHT (LEFT) SHOULDER CLOSED (W21-5a), or RIGHT (LEFT) SHOULDER CLOSED XX FT or AHEAD (W21-5b).**

Option:

- 03 The Shoulder Work sign may be used in advance of the point on a non-limited access highway where there is shoulder work. It may be used singly or in combination with a ROAD WORK NEXT XX MILES or ROAD WORK AHEAD sign.

Guidance:

- 04 *On freeways and expressways, the RIGHT (LEFT) SHOULDER CLOSED XX FT or AHEAD (W21-5b) sign followed by RIGHT (LEFT) SHOULDER CLOSED (W21-5a) sign should be used in advance of the point where the shoulder work occurs and should be preceded by a ROAD WORK AHEAD sign.*

Section 6F.38 SURVEY CREW Sign (W21-6)

Guidance:

- 01 *The SURVEY CREW (W21-6) sign (see Figure 6F-4) should be used to warn of surveying crews working in or adjacent to the roadway.*

Section 6F.39 UTILITY WORK Sign (W21-7)

Option:

- 01 The UTILITY WORK (W21-7) sign (see Figure 6F-4) may be used as an alternate to the ROAD (STREET) WORK (W20-1) sign for utility operations on or adjacent to a highway.

Support:

- 02 Typical examples of where the UTILITY WORK sign is used appear in Figures 6H-4, 6H-6, 6H-10, 6H-15, 6H-18, 6H-21, 6H-22, 6H-26, and 6H-33.

Standard:

- 03 **The UTILITY WORK sign shall carry the legend UTILITY WORK, XX FEET, XX MILES, or AHEAD.**

Section 6F.40 Signs for Blasting Areas

Support:

- 01 Radio-Frequency (RF) energy can cause the premature firing of electric detonators (blasting caps) used in TTC zones.

Standard:

- 02 Road users shall be warned to turn off mobile radio transmitters and cellular telephones where blasting operations occur. A sequence of signs shall be prominently displayed to direct operators of mobile radio equipment, including cellular telephones, to turn off transmitters in a blasting area. These signs shall be covered or removed when there are no explosives in the area or the area is otherwise secured.

Section 6F.41 BLASTING ZONE AHEAD Sign (W22-1)**Standard:**

- 01 The BLASTING ZONE AHEAD (W22-1) sign (see Figure 6F-4) shall be used in advance of any TTC zone where explosives are being used. The TURN OFF 2-WAY RADIO AND CELL PHONE and END BLASTING ZONE signs shall be used in sequence with this sign.

Section 6F.42 TURN OFF 2-WAY RADIO AND CELL PHONE Sign (W22-2)**Standard:**

- 01 The TURN OFF 2-WAY RADIO AND CELL PHONE (W22-2) sign (see Figure 6F-4) shall follow the BLASTING ZONE AHEAD sign and shall be placed at least 1,000 feet before the beginning of the blasting zone.

Section 6F.43 END BLASTING ZONE Sign (W22-3)**Standard:**

- 01 The END BLASTING ZONE (W22-3) sign (see Figure 6F-4) shall be placed a minimum of 300 m (1,000 ft) past the blasting zone.

Option:

- 02 The END BLASTING ZONE sign may be placed either with or preceding the END ROAD WORK sign.

Section 6F.44 Shoulder Signs and Plaque (W8-4, W8-9, W8-17, W8-17P)

Option:

- 01 The SOFT SHOULDER (W8-4) sign (see Figure 6F-4) may be used to warn of a soft shoulder condition.

- 02 The LOW SHOULDER (W8-9) sign (see Figure 6F-4) may be used to warn of a shoulder condition where there is an elevation difference of 3 inches or less between the shoulder and the travel lane.

Guidance:

- 03 *The Shoulder Drop-Off (W8-17) sign (see Figure 6F-4) should be used when a shoulder drop-off, adjacent to the travel lane, exceeds 3 inches in depth for a continuous length along the roadway, based on engineering judgment.*

Option:

- 04 A SHOULDER DROP-OFF (W8-17P) supplemental plaque (see Figure 6F-4) may be mounted below the W8-17 sign.

Section 6F.45 UNEVEN LANES Sign (W8-11)*Guidance:*

- 01 *The UNEVEN LANES (W8-11) sign (see Figure 6F-4) should be used during operations that create a difference in elevation between adjacent lanes that are open to travel.*

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

Option:

- 01 A STEEL PLATE AHEAD (W8-24) sign (see Figure 6F-4) 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.

Section 6F.47 NO CENTER LINE and NO EDGE LINE Signs (W8-12, W8-H12a)

Guidance:

- 01 *The NO CENTER LINE (W8-12) sign (see Figure 6F-4) or the NO EDGE LINE sign (W8-H112a) sign (see Appendix C) should be used as appropriate when the work obliterates the center or edge line pavement markings. The sign should be placed at the beginning of the TTC zone and repeated at 2-mile intervals in long TTC zones.*

Support:

- 02 Section 6F.78 contains information regarding temporary markings.

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

Guidance:

- 01 *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:

- 02 **If a Reverse Curve (or Turn) sign is used, the direction of the reverse curve (or turn) shall be appropriately illustrated. Except as provided in Paragraph 3, the number of lanes illustrated on the sign shall be the same as the number of through lanes available to road users.**

Option:

- 03 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.
- 04 Where more than three lanes are being shifted, the Reverse Curve (or Turn) sign may be rectangular.

Section 6F.49 Double Reverse Curve Signs (W24-1 Series)

Option:

- 01 The Double Reverse Curve (W24-1, W24-1a, or W24-1b) sign (see Figure 6F-4) may be used when 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:

- 02 **If a Double Reverse Curve (or Turn) sign is used, the direction of the double reverse curve (or turn) shall be appropriately illustrated. Except as provided in Paragraph 3, the number of lanes illustrated on the sign shall be the same as the number of through lanes available to road users.**

Option:

- 03 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 (see Figure 6F-4) may be used instead of a sign that illustrates the number of lanes.
- 04 Where more than three lanes are being shifted, the Double Reverse Curve (or Turn) sign may be rectangular.

Section 6F.50 Other Warning Signs

Option:

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

- 02 Besides the warning signs specifically related to TTC zones, several other warning signs in Part 2 may apply in TTC zones (see Appendix C).

Standard:

- 03 **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.**

Section 6F. 50.1 Construction Arrow Sign (W1-H16)

Option:

- 01 This sign may be used to help guide traffic through TTC zones.

Standard:

- 02 **The Construction Arrow (W1-H16) sign (see Appendix C) shall not be used in place of the standard symbol warning signs. The sign shall be mounted so that the arrow indicates either an oblique left or right movement.**

Option:

- 03 The sign may be located on the left or right side of the traveled lane.

Support:

- 04 An example of a situation where this sign might be used would be a lane shift, such as those shown in Figures 6H-31, 6H-32 and 6H-36.

Section 6F.51 Special Warning Signs

Option:

- 01 Special warning signs may be used based on engineering judgment.

Guidance:

- 02 *Special warning signs should comply with the general requirements of color, shape, and alphabet size and series. The sign message should be brief, legible, and clear.*

Section 6F.52 Advisory Speed Plaque (W13-1P)

Option:

- 01 In combination with a warning sign, an Advisory Speed (W13-1) plaque (see Figure 6F-4) may be used to indicate a recommended speed through the TTC zone.

Standard:

- 02 **The Advisory Speed plaque shall not be used in conjunction with any sign other than a warning sign, nor shall it be used alone. When used with orange TTC zone signs, this plaque shall have a black legend and border on an orange background. The sign shall be at least 24 x 24 inches in size when used with a sign that is 36 x 36 inches or larger. Except in emergencies, an Advisory Speed plaque shall not be mounted until the recommended speed is determined by the highway agency.**

Section 6F.53 Supplementary Distance Plaque (W7-3aP)

Option:

- 01 In combination with a warning sign, a Supplementary Distance (W7-3aP) plaque (see Figure 6F-4) with the legend NEXT XX MILE may be used to indicate the length of highway over which a work activity is being conducted, or over which a condition exists in the TTC zone.

- 02 In long TTC zones, Supplementary Distance plaques with the legend NEXT XX MILES may be placed in combination with warning signs at regular intervals within the zone to indicate the remaining length of highway over which the TTC work activity or condition exists.

Standard:

- 03 **The Supplementary Distance plaque with the legend NEXT XX MILES shall not be used in conjunction with any sign other than a warning sign, nor shall it be used alone. When used with orange TTC zone signs, this plaque shall have a black legend and border on an orange background. The sign shall be at least 30 x 24 inches in size when used with a sign that is 36 x 36 inches or larger.**

Guidance:

- 04 *When used in TTC zones, the Supplementary Distance plaque with the legend NEXT XX MILES should be placed below the initial warning sign designating that, within the approaching zone, a temporary work activity or condition exists.*

Section 6F.54 Motorcycle Plaque (W8-15P)

Option:

- 01 A Motorcycle (W8-15P) plaque (see Figure 6F-4) may be mounted below a LOOSE GRAVEL (W8-7) sign, a GROOVED PAVEMENT (W8-15) sign, a METAL BRIDGE DECK (W8-16) sign, or a STEEL PLATE AHEAD (W8-24) sign if the warning is intended to be directed primarily to motorcyclists.

Section 6F.55 Guide Signs

Support:

- 01 Guide signs along highways provide road users with information to help them along their way through the TTC zone. The design of guide signs is presented in Part 2.

Guidance:

- 02 *The following guide signs should be used in TTC zones as needed:*
- A. *Standard route markings, where temporary route changes are necessary;*
 - B. *Directional signs and street name signs; and*
 - C. *Special guide signs relating to the condition or work being done.*

Standard:

- 03 **If additional temporary guide signs are used in TTC zones, they shall have a black legend and border on an orange background.**

Option:

- 04 Guide signs used in TTC incident management situations may have a black legend and border on a fluorescent pink background (see Chapter 6I).
- 05 When directional signs and street name signs are used in conjunction with detour routing, these signs may have a black legend and border on an orange background.
- 06 When permanent directional signs or permanent street name signs are used in conjunction with detour signing, they may have a white legend on a green background.

Section 6F.56 ROAD WORK NEXT XX MILES Sign (G20-1)*Guidance:*

- 01 *The ROAD WORK NEXT XX MILES (G20-1) sign (see Figure 6F-4) should be installed in advance of TTC zones that are more than 2 miles in length.*

Option:

- 02 The ROAD WORK NEXT XX MILES sign may be mounted on a Type 3 barricade. The sign may also be used for TTC zones of shorter length.

Standard:

- 03 **The distance displayed on the ROAD WORK NEXT XX MILES sign shall be stated to the nearest whole mile.**

Section 6F.57 END ROAD WORK Sign (G20-2)*Guidance:*

- 01 *When used, the END ROAD WORK (G20-2) sign (see Figure 6F-4) should be placed near the downstream end of the termination area, as determined by engineering judgment.*

Option:

- 02 The END ROAD WORK sign may be installed on the back of a warning sign facing the opposite direction of road users or on the back of a Type 3 barricade.

Section 6F.58 PILOT CAR FOLLOW ME Sign (G20-4)**Standard:**

- 01 **The PILOT CAR FOLLOW ME (G20-4) sign (see Figure 6F-4) shall be mounted in a conspicuous position on the rear of a vehicle used for guiding one-way vehicular traffic through or around a TTC zone (see Section 6C.13).**

Section 6F.59 Detour Signs (M4-8, M4-8a, M4-8b, M4-9, M4-9a, M4-9b, M4-9c, M4-10)**Standard:**

- 01 **Each detour shall be adequately marked with standard temporary route signs and destination signs.**

Option:

- 02 Detour signs in TTC incident management situations may have a black legend and border on a fluorescent pink background (see Chapter 6I).

- 03 The Detour Arrow (M4-10) sign (see Figure 6F-5) may be used where a detour route has been established.

- 04 The DETOUR (M4-8) sign (see Figure 6F-5) may be mounted at the top of a route sign assembly to mark a temporary route that detours from a highway, bypasses a section closed by a TTC zone, and rejoins the highway beyond the TTC zone.

Guidance:

- 05 *The Detour Arrow (M4-10) sign should normally be mounted just below the ROAD CLOSED (R11-2, R11-3a, or R11-4) sign. The Detour Arrow sign should include a horizontal arrow pointed to the right or left as required.*

- 06 *The DETOUR (M4-9) sign (see Figure 6F-5) should be used for unnumbered highways, for emergency situations, for periods of short durations, or where, over relatively short distances, road users are guided along the detour and back to the desired highway without route signs.*

- 07 *A Street Name sign should be placed above, or the street name should be incorporated into, a DETOUR (M4-9) sign to indicate the name of the street being detoured.*

Option:

- 08 The END DETOUR (M4-8a) or END (M4-8b) sign (see Figure 6F-5) may be used to indicate that the detour has ended.

Guidance:

- 09 *When the END DETOUR sign is used on a numbered highway, the sign should be mounted above a route sign after the downstream end of the detour.*

- 10 *The Pedestrian/Bicycle Detour (M4-9a) sign (see Figure 6F-5) should be used where a pedestrian/bicycle detour route has been established because of the closing of a pedestrian/bicycle facility to through traffic.*

Standard:

- 11 **If used, the Pedestrian/Bicycle Detour sign shall have an arrow pointing in the appropriate direction.**

Option:

- 12 The arrow on a Pedestrian/Bicycle Detour sign may be on the sign face or on a supplemental plaque.

- 13 The Pedestrian Detour (M4-9b) sign or Bicycle Detour (M4-9c) sign (see Figure 6F-5) may be used where a pedestrian or bicycle detour route (not both) has been established because of the closing of the pedestrian or bicycle facility to through traffic.

Section 6F.60 Portable Changeable Message Signs**Support:**

- 01 Portable changeable message signs (PCMS) are TTC devices installed for temporary use with the flexibility to display a variety of messages. In most cases, portable changeable message signs follow the same provisions for design and application as those given for changeable message signs in Chapter 2L. The
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information in this Section describes situations where the provisions for portable changeable message signs differ from those given in Chapter 2L.

02 Portable changeable message signs are used most frequently on high-density urban freeways, but have applications on all types of highways where highway alignment, road user routing problems, or other pertinent conditions require advance warning and information.

03 Portable changeable message signs have a wide variety of applications in TTC zones including: roadway, lane, or ramp closures; incident management: width restriction information: speed control or reductions; advisories on work scheduling: road user management and diversion; warning of adverse conditions or special events; and other operational control.

04 The primary purpose of PCMS in TTC zones is to advise the road user of unexpected situations. Portable changeable message signs are particularly useful as they are capable of:

- A. Conveying complex messages,
- B. Displaying real time information about conditions ahead, and
- C. Providing information to assist road users in making decisions prior to the point where actions must be taken.

05 Some typical applications include the following:

- A. Where the speed of vehicular traffic is expected to drop substantially;
- B. Where significant queuing and delays are expected;
- C. Where adverse environmental conditions are present;
- D. Where there are changes in alignment or surface conditions;
- E. Where advance notice of ramp, lane, or roadway closures is needed;
- F. Where crash or incident management is needed; and/or
- G. Where changes in the road user pattern occur.

Guidance:

06 The components of a PCMS should include: a message sign, control systems, a power source, and mounting and transporting equipment. The front face of the sign should be covered with a protective material.

Standard:

07 **Portable changeable message signs shall comply with the applicable design and application principles established in Chapter 2A. Portable changeable message signs shall display only traffic operational, regulatory, warning, and guidance information, and shall not be used for advertising messages.**

Support:

08 Section 2L.02 contains information regarding overly simplistic or vague messages that is also applicable to portable changeable message signs.

Standard:

09 **The colors used for legends on PCMS shall comply with those shown in Table 2A-5.**

Support:

10 Section 2L.04 contains information regarding the luminance, luminance contrast, and contrast orientation that is also applicable to PCMS.

Guidance:

11 *Portable Changeable Message signs should be visible from 1/2 mile under both day and night conditions.*

Support:

12 Section 2B.13 contains information regarding the design of PCMS that are used to display the speed at which approaching drivers are traveling.

Guidance:

13 *A PCMS should be limited to three lines of eight characters per line or should consist of a full matrix display.*

- 14 *Except as provided in Paragraph 15, the letter height used for PCMS messages should be a minimum of 18 inches.*

Option:

- 15 For PCMS mounted on service patrol trucks or other incident response vehicles, a letter height as short as 10 inches may be used. Shorter letter sizes may also be used on a PCMS used on low speed facilities provided that the message is legible from at least 650 feet.

- 16 The PCMS may vary in size.

Guidance:

- 17 *Messages on a PCMS should consist of no more than two phases, and a phase should consist of no more than three lines of text. Each phase should be capable of being understood by itself, regardless of the order in which it is read. Messages should be centered within each line of legend. If more than one PCMS is simultaneously legible to road users, then only one of the signs should display a sequential message at any given time.*

Support:

- 18 Road users have difficulties in reading messages displayed in more than two phases on a typical three-line PCMS.

Standard:

- 19 **Techniques of message display such as animation, rapid flashing, dissolving, exploding, scrolling, travelling horizontally or vertically across the face of the sign, or other dynamic elements shall not be used.**

Guidance:

- 20 *When a message is divided into two phases, the display time for each phase should be at least 2 seconds, and the sum of the display times for both of the phases should be a maximum of 8 seconds.*

- 21 *All messages should be designed with consideration given to the principles provided in this Section and also taking into account the following:*

A. *The message should be as brief as possible and should contain three thoughts (with each thought preferably shown on its own line) that convey:*

1. *The problem or situation that the road user will encounter ahead,*
2. *The location of or distance to the problem or situation, and*
3. *The recommended driver action.*

B. *If more than two phases are needed to display a message, additional PCMS should be used. When multiple PCMS are needed, they should be placed on the same side of the roadway and they should be separated from each other by a distance of at least 1,000 feet on freeways and expressways, and by a distance of at least 500 feet on other types of highways.*

Standard:

- 22 **When the word messages shown in Tables 1A-1 or 1A-2 need to be abbreviated on a PCMS, the provisions described in Section 1A.15 shall be followed.**

- 23 **In order to maintain legibility, PCMS shall automatically adjust their brightness under varying light conditions.**

- 24 **The control system shall include a display screen upon which messages can be reviewed before being displayed on the message sign. The control system shall be capable of maintaining memory when power is unavailable.**

- 25 **Portable changeable message signs shall be equipped with a power source and a battery back-up to provide continuous operation when failure of the primary power source occurs.**

- 26 **The mounting of a PCMS on a trailer, a large truck, or a service patrol truck shall be such that the bottom of the message sign shall be a minimum of 7 feet above the roadway in urban areas and 5 feet above the roadway in rural areas when it is in the operating mode.**

Guidance:

- 27 *Portable changeable message signs should be used as a supplement to and not as a substitute for conventional signs and pavement markings.*

28 *When PCMS are used for route diversion, they should be placed far enough in advance of the diversion to allow road users ample opportunity to perform necessary lane changes, to adjust their speed, or to exit the affected highway.*

29 *Portable changeable message signs should be sited and aligned to provide maximum legibility and to allow time for road users to respond appropriately to the PCMS message. Portable changeable message signs should be placed off the shoulder of the roadway and behind a traffic barrier, if practical. Where a traffic barrier is not available to shield the PCMS, it should be placed off the shoulder and outside of the clear zone. If a PCMS has to be placed on the shoulder of the roadway or within the clear zone, it should be delineated with retroreflective TTC devices.*

30 *When PCMS are used in TTC zones, they should display only TTC messages*

31 *When PCMS signs are not being used to display TTC messages, they should be relocated such that they are outside of the clear zone or shielded behind a traffic barrier and turned away from traffic. If relocation or shielding is not practical, they should be delineated with retroreflective TTC devices.*

32 *Portable changeable message sign trailers should be delineated on a permanent basis by affixing retroreflective material, known as conspicuity material, in a continuous line on the face of the trailer as seen by oncoming road users.*

Section 6F.61 Arrow Boards

Standard:

01 **An arrow board shall be a sign with a matrix of elements capable of either flashing or sequential displays. This sign shall provide additional warning and directional information to assist in merging and controlling road users through or around a TTC zone.**

Guidance:

02 *An arrow board in the arrow or chevron mode should be used to advise approaching traffic of a lane closure along major multi-lane roadways in situations involving heavy traffic volumes, high speeds, and/or limited sight distances, or at other locations and under other conditions where road users are less likely to expect such lane closures.*

03 *If used, an arrow board should be used in combination with appropriate signs, channelizing devices, or other TTC devices.*

04 *An arrow board should be placed on the shoulder of the roadway or, if practical, further from the traveled lane. It should be delineated with retroreflective TTC devices. When an arrow board is not being used, it should be removed; if not removed, it should be shielded; or if the previous two options are not feasible, it should be delineated with retroreflective TTC devices.*

Standard:

05 **Arrow boards shall meet the minimum size, legibility distance, number of elements, and other specifications shown on Figure 6F-6.**

Support:

06 Type A arrow boards are appropriate for use on low-speed urban streets. Type B arrow boards are appropriate for intermediate-speed facilities and for maintenance or mobile operations on high-speed roadways. Type C arrow boards are intended to be used on high-speed, high-volume motor vehicle traffic control projects.

Standard:

07 **Arrow boards shall have solid rectangular appearances.**

08 **All arrow boards shall be finished in non-reflective black. The arrow board shall be mounted on a vehicle, a trailer, or other suitable support.**

Guidance:

09 *The minimum mounting height, measured vertically from the bottom of the board to the roadway below it or to the elevation of the near edge of the roadway, of an arrow board should be 7 feet, except on vehicle-mounted arrow boards, which should be as high as practical.*

10 *A vehicle-mounted arrow board should be provided with remote controls.*

Standard:

- 11 **Arrow board elements shall be capable of at least a 50 percent dimming from full brilliance. The dimmed mode shall be used for nighttime operation of arrow boards.**

Guidance:

- 12 *Full brilliance should be used for daytime operation of arrow boards.*

Standard:

- 13 **The arrow board shall have suitable elements capable of the various operating modes. The color presented by the elements shall be yellow.**

Guidance:

- 14 *If an arrow board consisting of a bulb matrix is used, the elements should be recess-mounted or equipped with an upper hood of not less than 180 degrees.*

Standard:

- 15 **The minimum element on-time shall be 50 percent for the flashing mode, with equal intervals of 25 percent for each sequential phase. The flashing rate shall be not less than 25 or more than 40 flashes per minute.**

- 16 **An arrow board shall have the following three mode selections:**

- A. **A Flashing Arrow, Sequential Arrow, or Sequential Chevron mode;**
- B. **A flashing Double Arrow mode; and**
- C. **A flashing Caution or Alternative Diamond mode.**

- 17 **An arrow board in the arrow or chevron mode shall be used only for stationary or moving lane closures on multi-lane roadways.**

- 18 **For shoulder work, blocking the shoulder, for roadside work near the shoulder, or for temporarily closing one lane on a two-lane, two-way roadway, an arrow board shall be used only in the caution mode.**

Guidance:

- 19 *For a stationary lane closure, the arrow board should be located on the shoulder at the beginning of the merging taper.*

- 20 *Where the shoulder is narrow, the arrow board should be located in the closed lane.*

Standard:

- 21 **When arrow boards are used to close multiple lanes, a separate arrow board shall be used for each closed lane.**

Guidance:

- 22 *When arrow boards are used to close multiple lanes, if the first arrow board is placed on the shoulder, the second arrow board should be placed in the first closed lane at the upstream end of the second merging taper (see Figure 6H-37). When the first arrow board is placed in the first closed lane, the second arrow board should be placed in the second closed lane at the downstream end of the second merging taper.*

- 23 *For mobile operations where a lane is closed, the arrow board should be located to provide adequate separation from the work operation to allow for appropriate reaction by approaching drivers.*

Standard:

- 24 **A vehicle displaying an arrow board shall be equipped with high-intensity rotating, flashing, oscillating, or strobe lights.**

- 25 **Arrow boards shall only be used to indicate a lane closure. Arrow boards shall not be used to indicate a lane shift.**

Option:

- 26 *A PCMS may be used to simulate an arrow board display.*

Section 6F.62 High-Level Warning Devices (Flag Trees)*Option:*

- 01 *A high-level warning device (flag tree) may supplement other TTC devices in TTC zones.*

Support:

- 02 A high-level warning device is designed to be seen over the top of typical passenger cars. A typical high-level warning device is shown in Figure 6F-2.

Standard:

- 03 **A high-level warning device shall consist of a minimum of two flags with or without a Type B high-intensity flashing warning light. The distance from the roadway to the bottom of the lens of the light and to the lowest point of the flag material shall be not less than 8 feet. The flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color.**

Option:

- 04 An appropriate warning sign may be mounted below the flags.

Support:

- 05 High-level warning devices are most commonly used in high-density road user situations to warn road users of short-term operations.

Section 6F.63 Channelizing Devices**Standard:**

- 01 **Designs of various channelizing devices shall be as shown in Figure 6F-7. All channelizing devices shall be crashworthy.**

Support:

- 02 The function of channelizing devices is to warn road users of conditions created by work activities in or near the roadway and to guide road users. Channelizing devices include cones, tubular markers, vertical panels, drums, barricades, and longitudinal channelizing devices.

- 03 Channelizing devices provide for smooth and gradual vehicular traffic flow from one lane to another, onto a bypass or detour, or into a narrower traveled way. They are also used to channelize vehicular traffic away from the work space, pavement drop-offs, pedestrian or shared-use paths, or opposing directions of vehicular traffic.

Standard:

- 04 **Devices used to channelize pedestrians shall be detectable to users of long canes and visible to persons having low vision.**

- 05 **Where channelizing devices are used to channelize pedestrians, there shall be continuous detectable bottom and top surfaces to be detectable to users of long canes. The bottom of the bottom surface shall be no higher than 2 inches above the ground. The top of the top rail shall be no lower than 32 inches above the ground.**

Option:

- 06 A gap not exceeding 2 inches between the bottom rail and the ground surface may be used to facilitate drainage.

Guidance:

- 07 *Where multiple channelizing devices are aligned to form a continuous pedestrian channelizer, connection points should be smooth to optimize long-cane and hand trailing.*

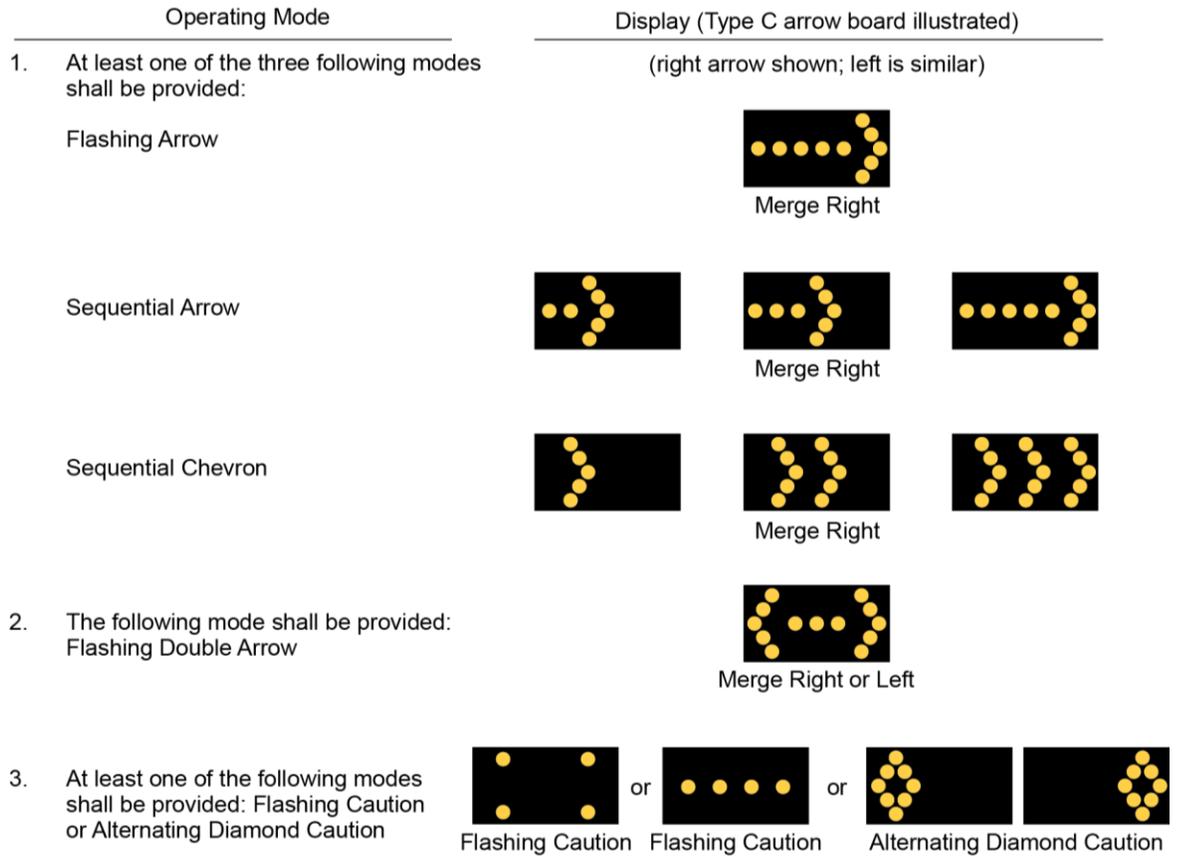
- 08 *The spacing between cones, tubular markers, vertical panels, drums, and barricades should not exceed a distance in feet equal to 1.0 times the speed limit in mph when used for taper channelization, and a distance in feet 2.0 times the speed limit in mph when used for tangent channelization.*

- 09 *When channelizing devices have the potential of leading vehicular traffic out of the intended vehicular traffic space as shown in Figure 6H-39, the channelizing devices should be extended a distance in feet 2.0 times the speed limit in mph beyond the downstream end of the transition area.*

Option:

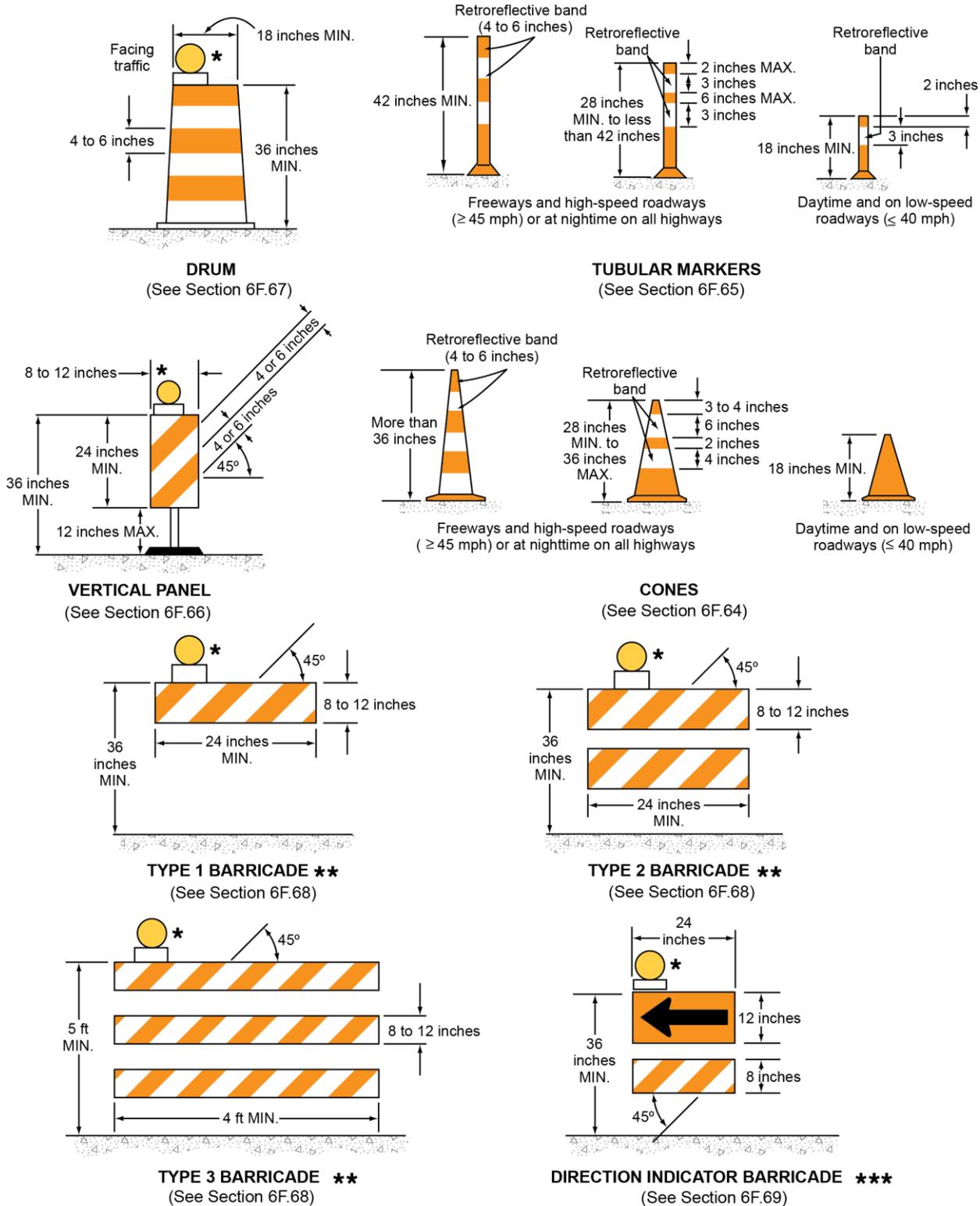
- 10 Warning lights (see Section 6F.83) may be added to channelizing devices in areas with frequent fog, snow, or severe roadway curvature, or where visual distractions are present.

Figure 6F-6. Advance Warning Arrow Board Display Specifications



Arrow Board Type	Minimum Size	Minimum Legibility Distance	Minimum Number of Elements
A	48 x 24 inches	1/2 mile	12
B	60 x 30 inches	3/4 mile	13
C	96 x 48 inches	1 mile	15

Figure 6F-7. Channelizing Devices



* Warning lights (optional)
 ** Rail stripe widths shall be 6 inches, except that 4-inch wide stripes may be used if rail lengths are less than 36 inches. The sides of barricades facing traffic shall have retroreflective rail faces.
 *** Rail stripe widths shall be 4 inches. The sides of barricades facing traffic shall have retroreflective rail faces.

Standard:

- 11 **Warning lights shall flash when placed on channelizing devices used alone or in a cluster to warn of a condition. Except for the sequential flashing warning lights discussed in Paragraphs 12 and 13, warning lights placed on channelizing devices used in a series to channelize road users shall be steady-burn.**

Option:

- 12 A series of sequential flashing warning lights may be placed on channelizing devices that form a merging taper in order to increase driver detection and recognition of the merging taper.

Standard:

- 13 **When used, the successive flashing of the sequential warning lights shall occur from the upstream end of the merging taper to the downstream end of the merging taper in order to identify the desired vehicle path. Each warning light in the sequence shall be flashed at a rate of not less than 55 nor more than 75 times per minute.**

- 14 **The retroreflective material used on channelizing devices shall have a smooth, sealed outer surface that will display a similar color day or night.**

Option:

- 15 The name and telephone number of the highway agency, contractor, or supplier may be displayed on the non-retroreflective surface of all types of channelizing devices.

Standard:

- 16 **The letters and numbers of the name and telephone number shall be non-retroreflective and not over 2 inches in height.**

Guidance:

- 17 *Particular attention should be given to maintaining the channelizing devices to keep them clean, visible, and properly positioned at all times.*

Standard:

- 18 **Devices that are damaged or have lost a significant amount of their retroreflectivity and effectiveness shall be replaced.**

Section 6F.64 Cones**Standard:**

- 01 **Cones (see Figure 6F-7) shall be predominantly orange and shall be made of a material that can be struck without causing damage to the impacting vehicle. For daytime and low-speed roadways, cones shall be not less than 18 inches in height. When cones are used on freeways and other high-speed highways or at night on all highways, or when more conspicuous guidance is needed, cones shall be a minimum of 28 inches in height.**

- 02 **For nighttime use, cones shall be retroreflectorized or equipped with lighting devices for maximum visibility. Retroreflectorization of cones that are 28 to 36 inches in height shall be provided by a 6-inch wide white band located 3 to 4 inches from the top of the cone and an additional 4-inch wide white band located approximately 2 inches below the 6-inch band.**

- 03 **Retroreflectorization of cones that are more than 36 inches in height shall be provided by horizontal, circumferential, alternating orange and white retroreflective stripes that are 4 to 6 inches wide. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any non-retroreflective spaces between the orange and white stripes shall not exceed 3 inches in width.**

Option:

- 04 Traffic cones may be used to channelize road users, divide opposing vehicular traffic lanes, divide lanes when two or more lanes are kept open in the same direction, and delineate short duration maintenance and utility work.

Guidance:

- 05 *Steps should be taken to minimize the possibility of cones being blown over or displaced by wind or moving vehicular traffic.*

Option:

06 Cones may be doubled up to increase their weight.

Support:

07 Some cones are constructed with bases that can be filled with ballast. Others have specially weighted bases, or weight such as sandbag rings that can be dropped over the cones and onto the base to provide added stability.

Guidance:

08 *Ballast should be kept to the minimum amount needed.*

Section 6F.65 Tubular Markers**Standard:**

01 **Tubular markers (see Figure 6F-7) shall be predominantly orange and shall be not less than 18 inches high and 2 inches wide facing road users. They shall be made of a material that can be struck without causing damage to the impacting vehicle.**

02 **Tubular markers shall be a minimum of 28 inches in height when they are used on freeways and other high-speed highways, on all highways during nighttime, or whenever more conspicuous guidance is needed.**

03 **For nighttime use, tubular markers shall be retroreflectorized. Retroreflectorization of tubular markers that have a height of less than 42 inches shall be provided by two 3-inch wide white bands placed a maximum of 2 inches from the top with a maximum of 6 inches between the bands. Retroreflectorization of tubular markers that have a height of 42 inches or more shall be provided by four 4- to 6-inch wide alternating orange and white stripes with the top stripe being orange.**

Guidance:

04 *Tubular markers have less visible area than other devices and should be used only where space restrictions do not allow for the use of other more visible devices.*

05 *Tubular markers should be stabilized by affixing them to the pavement, by using weighted bases, or weights such as sandbag rings that can be dropped over the tubular markers and onto the base to provide added stability. Ballast should be kept to the minimum amount needed.*

Option:

06 Tubular markers may be used effectively to divide opposing lanes of road users, divide vehicular traffic lanes when two or more lanes of moving vehicular traffic are kept open in the same direction, and to delineate the edge of a pavement drop-off where space limitations do not allow the use of larger devices.

Standard:

07 **A tubular marker shall be attached to the pavement to display the minimum 2-inch width to the approaching road users.**

Section 6F. 66 Vertical Panels**Standard:**

01 **Vertical panels (see Figure 6F-7) shall have retroreflective striped material that is 8 to 12 inches in width and at least 24 inches in height. They shall have alternating diagonal orange and white retroreflective stripes, sloping downward at an angle of 45 degrees in the direction vehicular traffic is to pass.**

02 **Where the height of the retroreflective material on the vertical panel is 36 inches or more, a stripe width of 6 inches shall be used.**

Option:

03 Where the height of the retroreflective material on the vertical panel is less than 36 inches, a panel stripe width of 4 inches may be used.

04 Where space is limited, vertical panels may be used to channelize vehicular traffic, divide opposing lanes, or replace barricades.

Section 6F.67 Drums**Standard:**

- 01 **Drums (see Figure 6F-7) used for road user warning or channelization shall be constructed of lightweight, deformable materials. They shall be a minimum of 36 inches in height and have at least a 18 inches minimum width regardless of orientation. Metal drums shall not be used. The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4 to 6 inches wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectorized spaces between the horizontal orange and white stripes shall not exceed 3 inches wide. Drums shall have closed tops that will not allow collection of construction debris or other debris.**

Support:

- 02 Drums are highly visible, have good target value, give the appearance of being formidable obstacles and, therefore, command the respect of road users. They are portable enough to be shifted from place to place within a TTC zone in order to accommodate changing conditions, but are generally used in situations where they will remain in place for a prolonged period of time.

Option:

- 03 Although drums are most commonly used to channelize or delineate road user flow, they may also be used alone or in groups to mark specific locations.

Guidance:

- 04 *Drums should not be weighted with sand, water, or any material to the extent that would make them hazardous to road users or workers when struck. Drums used in regions susceptible to freezing should have drain holes in the bottom so that water will not accumulate and freeze causing a hazard if struck by a road user.*

Standard:

- 05 **Ballast shall not be placed on the top of a drum.**

Section 6F.68 Type 1, 2, or 3 Barricades**Support:**

- 01 A barricade is a portable or fixed device having from one to three rails with appropriate markings and is used to control road users by closing, restricting, or delineating all or a portion of the right-of-way.

- 02 As shown in Figure 6F-7, barricades are classified as Type 1, Type 2, or Type 3.

Standard:

- 03 **Stripes on barricade rails shall be alternating orange and white retroreflective stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Except as provided in Paragraph 4, the stripes shall be 6 inches wide.**

Option:

- 04 When rail lengths are less than 36 inches, 4 inch wide stripes may be used.

Standard:

- 05 **The minimum length for Type 1 and Type 2 Barricades shall be 24 inches, and the minimum length for Type 3 Barricades shall be 48 inches. Each barricade rail shall be 8 to 12 inches wide. Barricades used on freeways, expressways and other high-speed roadways shall have a minimum of 270 inches² of retroreflective area facing road users.**

Guidance:

- 06 *Where barricades extend entirely across a roadway, the stripes should slope downward in the direction toward which road users must turn.*

- 07 *Where both right and left turns are provided, the barricade stripes should slope downward in both directions from the center of the barricade or barricades.*

- 08 *Where no turns are intended, the stripes should be positioned to slope downward toward the center of the barricade or barricades.*

09 *Barricade rails should be supported in a manner that will allow them to be seen by the road user, and in a manner that provides a stable support that is not easily blown over or displaced.*

10 *The width of the existing pedestrian facility should be provided for the temporary facility if practical. Traffic control devices and other construction materials and features should not intrude into the usable width of the sidewalk, temporary pathway, or other pedestrian facility. When it is not possible to maintain a minimum width of 60 inches throughout the entire length of the pedestrian pathway, a 60 x 60 inch passing space should be provided at least every 200 feet to allow individuals in wheelchairs to pass.*

11 *Barricade rail supports should not project into pedestrian circulation routes more than 4 inches from the support between 27 inches and 80 inches from the surface as described in Section 4.4.1 of the “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)” (see Section 1A.11).*

Option:

12 For Type 1 Barricades, the support may include other unstriped horizontal rails necessary to provide stability.

Guidance:

13 *On high-speed expressways or in other situations where barricades may be susceptible to overturning in the wind, ballasting should be used.*

Option:

Sandbags may be placed on the lower parts of the frame or the stays of barricades to provide the required ballast.

Support:

14 Type 1 or Type 2 Barricades are intended for use in situations where road user flow is maintained through the TTC zone.

Option:

15 Barricades may be used alone or in groups to mark a specific condition or they may be used in a series for channelizing road users.

16 Type 1 Barricades may be used on conventional roads or urban streets.

Guidance:

17 *Type 2 or Type 3 Barricades should be used on freeways and expressways or other high-speed roadways. Type 3 Barricades should be used to close or partially close a road.*

Option:

18 Type 3 Barricades used at a road closure may be placed completely across a roadway or from curb to curb.

Guidance:

19 *Where provision is made for access of authorized equipment and vehicles, the responsibility for Type 3 Barricades should be assigned to a person who will provide proper closure at the end of each work day.*

Support:

20 When a highway is legally closed but access must still be allowed for local road users, barricades usually are not extended completely across the roadway.

Standard:

21 **A sign shall be installed with the appropriate legend concerning permissible use by local road users (see Section 6F.09). Adequate visibility of the barricades from both directions shall be provided.**

Option:

22 Signs may be installed on barricades (see Section 6F.03).

Section 6F.69 Direction Indicator Barricades

Standard:

01 **The Direction Indicator Barricade (see Figure 6F-7) shall consist of a One-Direction Large Arrow (W1-6) sign mounted above a diagonal striped, horizontally aligned, retroreflective rail.**

- 02 **The One-Direction Large Arrow (W1-6) sign shall be black on an orange background. The stripes on the bottom rail shall be alternating orange and white retroreflective stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. The stripes shall be 4 inches wide. The One-Direction Large Arrow (W1-6) sign shall be 24 x 12 inches. The bottom rail shall have a length of 24 inches and a height of 8 inches.**

Option:

- 03 The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.

Guidance:

- 04 *If used, Direction Indicator Barricades should be used in series to direct the driver through the transition and into the intended travel lane.*

Section 6F.70 Temporary Traffic Barriers as Channelizing Devices

Support:

- 01 Temporary traffic barriers are not TTC devices in themselves; however, when placed in a position identical to a line of channelizing devices and marked and/or equipped with appropriate channelization features to provide guidance and warning both day and night, they serve as TTC devices.

Standard:

- 02 **Temporary traffic barriers serving as TTC devices shall comply with requirements for such devices as set forth throughout Part 6.**

- 03 **Temporary traffic barriers (see Section 6F.85) shall not be used solely to channelize road users, but also to protect the work space. If used to channelize vehicular traffic, the temporary traffic barrier shall be supplemented with delineation, pavement markings, or channelizing devices for improved daytime and nighttime visibility.**

Guidance:

- 04 *Temporary traffic barriers should not be used for a merging taper except in low-speed urban areas.*

- 05 *When it is necessary to use a temporary traffic barrier for a merging taper in low-speed urban areas or for a constricted/restricted TTC zone, the taper length should be designed to optimize road user operations considering the available geometric conditions.*

Standard:

- 06 **When it is necessary to use a temporary traffic barrier for a merging taper in low-speed urban areas or for a constricted/restricted TTC zone, the taper shall be delineated.**

Guidance:

- 07 *When used for channelization, temporary traffic barriers should be of a light color for increased visibility.*

Section 6F.71 Longitudinal Channelizing Devices

Support:

- 01 Longitudinal channelizing devices are lightweight, deformable devices that are highly visible, have good target value, and can be connected together.

Standard:

- 02 **If used singly as Type 1, 2, or 3 barricades, longitudinal channelizing devices shall comply with the general size, color, stripe pattern, retroreflectivity, and placement characteristics established for the devices described in this Chapter.**

Guidance:

- 03 *If used to channelize vehicular traffic at night, longitudinal channelizing devices should be supplemented with retroreflective material or delineation for improved nighttime visibility.*

Option:

- 04 Longitudinal channelizing devices may be used instead of a line of cones, drums, or barricades.

05 Longitudinal channelizing devices may be hollow and filled with water as a ballast.

06 Longitudinal channelizing devices may be used for pedestrian traffic control.

Standard:

07 **If used for pedestrian traffic control, longitudinal channelizing devices shall be interlocked to delineate or channelize flow including pedestrian traffic control. The interlocking devices shall not have gaps that allow pedestrians to stray from the channelizing path.**

Guidance:

08 *Longitudinal channelizing devices have not met the crashworthy requirements for temporary traffic barriers and should not be used to shield obstacles or provide positive protection for pedestrians or workers.*

Section 6F.72 Temporary Lane Separators

Option:

01 Temporary lane separators may be used to channelize road users, to divide opposing vehicular traffic lanes, to divide lanes when two or more lanes are open in the same direction, and to provide continuous pedestrian channelization.

Standard:

02 **Temporary lane separators shall be crashworthy. Temporary lane separators shall have a maximum height of 4 inches and a maximum width of 1 foot, and shall have sloping sides in order to facilitate crossover by emergency vehicles.**

Option:

03 Temporary lane separators may be supplemented with any of the approved channelizing devices contained in this Chapter, such as tubular markers, vertical panels, and opposing traffic lane dividers.

Standard:

04 **If appropriate channelizing devices are used to supplement a temporary lane separator, the channelizing devices shall be retroreflectorized to provide nighttime visibility. If channelizing devices are not used, the temporary lane separator shall contain retroreflectorization to enhance its visibility.**

Guidance:

05 *A temporary lane separator should be stabilized by affixing it to the pavement in a manner suitable to its design, while allowing the unit to be shifted from place to place within the TTC zone in order to accommodate changing conditions.*

Standard:

06 **At pedestrian crossing locations, temporary lane separators shall have an opening or be shortened to provide a pathway that is at least 60 inches wide for crossing pedestrians.**

Section 6F.73 Other Channelizing Devices

Option:

01 Channelizing devices other than those described in this Chapter may be used in special situations based on an engineering study.

Guidance:

02 *Other channelizing devices should comply with the general size, color, stripe pattern, retroreflection, and placement characteristics established for the devices described in this Chapter.*

Section 6F.74 Detectable Edging for Pedestrians

Support:

01 Individual channelizing devices, tape or rope used to connect individual devices, other discontinuous barriers and devices, and pavement markings are not detectable by persons with visual disabilities and are

incapable of providing detectable path guidance on temporary or realigned sidewalks or other pedestrian facilities.

Guidance:

- 02 *When it is determined that a facility should be accessible to and detectable by pedestrians with visual disabilities, a continuously detectable edging should be provided throughout the length of the facility such that it can be followed by pedestrians using long canes for guidance. This edging should protrude at least 6 inches above the surface of the sidewalk or pathway, with the bottom of the edging a maximum of 2 inches above the surface. This edging should be continuous throughout the length of the facility except for gaps at locations where pedestrians or vehicles will be turning or crossing. This edging should consist of a prefabricated or formed-in-place curbing or other continuous device that is placed along the edge of the sidewalk or walkway. This edging should be firmly attached to the ground or to other devices. Adjacent sections of this edging should be interconnected such that the edging is not displaced by pedestrian or vehicular traffic or work operations, and such that it does not constitute a hazard to pedestrians, workers, or other road users.*

Support:

- 03 Examples of detectable edging for pedestrians include:
- A. Prefabricated lightweight sections of plastic, metal, or other suitable materials that are interconnected and fixed in place to form a continuous edge.
 - B. Prefabricated lightweight sections of plastic, metal, or other suitable materials that are interconnected, fixed in place, and placed at ground level to provide a continuous connection between channelizing devices located at intervals along the edge of the sidewalk or walkway.
 - C. Sections of lumber interconnected and fixed in place to form a continuous edge.
 - D. Formed-in-place asphalt or concrete curb.
 - E. Prefabricated concrete curb sections that are interconnected and fixed in place to form a continuous edge.
 - F. Continuous temporary traffic barrier or longitudinal channelizing barricades placed along the edge of the sidewalk or walkway that provides a pedestrian edging at ground level.
 - G. Chain link or other fencing equipped with a continuous bottom rail.

Guidance:

- 04 *Detectable pedestrian edging should be orange, white, or yellow and should match the color of the adjacent channelizing devices or traffic control devices, if any are present.*

Section 6F.75 Temporary Raised Islands

Standard:

- 01 **Temporary raised islands shall be used only in combination with pavement striping and other suitable channelizing devices.**

Guidance:

- 02 *Temporary raised islands should only be used on roadways with speeds of 40 mph or less except when recommended by an engineering study.*

Option:

- 03 A temporary raised island may be used to separate vehicular traffic flows in two-lane, two-way operations on roadways having a vehicular traffic volume range of 4,000 to 15,000 average daily traffic (ADT) and on freeways having a vehicular traffic volume range of 22,000 ADT to 60,000 ADT.
- 04 Temporary raised islands also may be used in other than two-lane, two-way operations where physical separation of vehicular traffic from the TTC zone is not required.
- 05 Pavement edge lines may be placed on the island itself.

Guidance:

- 06 *Temporary raised islands should have the basic dimensions of 4 inches high by at least 12 inches wide and have rounded or chamfered corners.*
- 07 *The temporary raised islands should not be designed in such a manner that they would cause a motorist to lose control of the vehicle if the vehicle inadvertently strikes the temporary raised island. If struck, pieces*

of the island should not be dislodged to the extent that they could penetrate the occupant compartment or involve other vehicles.

Standard:

- 08 **At pedestrian crossing locations, temporary raised islands shall have an opening or be shortened to provide at least a 60 inch wide pathway for the crossing pedestrian.**

Section 6F.76 Opposing Traffic Lane Divider and Sign (W6-4)

Support:

- 01 Opposing traffic lane dividers are delineation devices used as center lane dividers to separate opposing vehicular traffic on a two-lane, two-way operation.

Standard:

- 02 **Opposing traffic lane dividers shall not be placed across pedestrian crossings.**
- 03 **The Opposing Traffic Lane Divider (W6-4) sign (see Figure 6F-4) shall be an upright, retroreflective orange-colored sign placed on a flexible support and sized at least 12 inches wide by 18 inches high.**
- 04 **Separation of opposing traffic lanes by use of this device shall be limited to locations where speeds are 40 mph or less.**

Section 6F.77 Pavement Markings

Support:

- 01 Pavement markings are installed or existing markings are maintained or enhanced in TTC zones to provide road users with a clearly defined path for travel through the TTC zone in day, night, and twilight periods under both wet and dry pavement conditions.

Guidance:

- 02 *The work should be planned and staged to provide for the placement and removal of the pavement markings in a way that minimizes the disruption to traffic flow approaching and through the TTC zone during the placement and removal process.*

Standard:

- 03 **Existing pavement markings shall be maintained in all long-term stationary (see Section 6G.02) TTC zones in accordance with Chapters 3A and 3B, except as otherwise provided for temporary pavement markings in Section 6F.78. Pavement markings shall match the alignment of the markings in place at both ends of the TTC zone. Pavement markings shall be placed along the entire length of any paved detour or temporary roadway prior to the detour or roadway being opened to road users.**
- 04 **For long-term stationary operations, pavement markings in the temporary traveled way that are no longer applicable shall be removed or obliterated as soon as practical. Pavement marking obliteration shall remove the non-applicable pavement marking material, and the obliteration method shall minimize pavement scarring. Painting over existing pavement markings with black paint or spraying with asphalt shall not be accepted as a substitute for removal or obliteration.**

Option:

- 05 Removable, nonreflective, preformed tape that is approximately the same color as the pavement surface may be used where markings need to be covered temporarily.

Section 6F.78 Temporary Markings

Support:

- 01 Temporary markings are those pavement markings or devices that are placed within TTC zones to provide road users with a clearly defined path of travel through the TTC zone when the permanent markings are either removed or obliterated during the work activities. Temporary markings are typically needed during the reconstruction of a road while it is open to traffic, such as overlays or surface treatments or where lanes are temporarily shifted on pavement that is to remain in place. See Section 6F.47 for information on use of the NO CENTER LINE (W8-12) sign and the NO EDGE LINE (W8-H12a) sign.

Guidance:

02 *Unless justified based on engineering judgment, Temporary pavement markings should not remain in place for more than 14 days after the application of the pavement surface treatment or the construction of the final pavement surface on new roadways or over existing pavements.*

03 *The temporary use of edge lines, channelizing lines, lane reduction transitions, gore markings, and other longitudinal markings, and the various non-longitudinal markings (such as stop lines, railroad crossings, crosswalks, words, symbols, or arrows) should be in accordance with the highway agency's policy.*

Standard:

04 **Warning signs, channelizing devices, and delineation shall be used to indicate required road user paths in TTC zones where it is not possible to provide a clear path by pavement markings.**

05 **Except as otherwise provided in this Section, all temporary pavement markings for no-passing zones shall comply with the requirements of Chapters 3A and 3B. All temporary broken-line pavement markings shall use the same cycle length as permanent markings and shall have line segments that are at least 2 feet long.**

Guidance:

06 *All pavement markings and devices used to delineate road user paths should be reviewed during daytime and nighttime periods.*

Option:

07 Half-cycle lengths with a minimum of 2 feet stripes may be used on roadways with severe curvature (see Section 3A.06) for broken line center lines in passing zones and for lane lines.

08 For temporary situations of 14 calendar days or less, for a two- or three-lane road, no-passing zones may be identified by using DO NOT PASS (R4-1), PASS WITH CARE (R4-2), and NO PASSING ZONE (W14-3) signs (see Sections 2B.28, 2B.29, and 2C.45) rather than pavement markings. Also, DO NOT PASS, PASS WITH CARE, and NO PASSING ZONE signs may be used instead of pavement markings on roads with low volumes for longer periods in accordance with the highway agency's policy.

Guidance:

09 *If used, the DO NOT PASS, PASS WITH CARE, and NO PASSING ZONE signs should be placed in accordance with Sections 2B.28, 2B.29, and 2C.45.*

10 *If used, the NO CENTER LINE sign should be placed in accordance with Section 6F.47.*

Support:

11 The ODOT "Traffic Engineering Manual" (see Section 1A.11) includes additional information about the Ohio Department of Transportation's policy regarding temporary pavement marking on ODOT-maintained highways.

Section 6F.79 Temporary Raised Pavement Markers*Option:*

01 Retroreflective or internally illuminated raised pavement markers, or non-retroreflective raised pavement markers supplemented by retroreflective or internally illuminated markers, may be substituted for markings of other types in TTC zones.

Standard:

02 **If used, the color and pattern of the raised pavement markers shall simulate the color and pattern of the markings for which they substitute.**

03 **If temporary raised pavement markers are used to substitute for broken line segments, a group of at least three retroreflective markers shall be equally spaced at no greater than N/8 (see Section 3B.11). The value of N for a broken or dotted line shall equal the length of one line segment plus one gap.**

04 **If temporary raised pavement markers are used to substitute for solid lines, the markers shall be equally spaced at no greater than N/4, with retroreflective or internally illuminated units at a spacing no greater than N/2. The value of N referenced for solid lines shall equal the N for the broken or dotted lines that might be adjacent to or might extend the solid lines (see Section 3B.11).**

Option:

- 05 Temporary raised pavement markers may be used to substitute for broken line segments by using at least two retroreflective markers placed at each end of a segment of 2 to 5 feet in length, using the same cycle length as permanent markings.

Guidance:

- 06 *Temporary raised pavement markers used on 2- to 5-foot segments to substitute for broken line segments should not be in place for more than 14 days unless justified by engineering judgment.*
- 07 *Raised pavement markers should be considered for use along surfaced detours or temporary roadways, and other changed or new travel-lane alignments.*

Option:

- 08 Retroreflective or internally illuminated raised pavement markers, or nonretroreflective raised pavement markers supplemented by retroreflective or internally illuminated markers, may also be used in TTC zones to supplement markings as prescribed in Chapters 3A and 3B.

Section 6F.80 Delineators**Standard:**

- 01 **When used, delineators shall combine with or supplement other TTC devices. They shall be mounted on crashworthy supports so that the reflecting unit is approximately 4 feet above the near roadway edge. The standard color for delineators used along both sides of two-way streets and highways and the right-hand side of one-way roadways shall be white. Delineators used along the left-hand side of one-way roadways shall be yellow.**

Guidance:

- 02 *Spacing along roadway curves should be as set forth in Section 3F.04 and should be such that several delineators are constantly visible to the driver.*

Option:

- 03 Delineators may be used in TTC zones to indicate the alignment of the roadway and to outline the required vehicle path through the TTC zone.

Section 6F.81 Lighting Devices*Guidance:*

- 01 *Lighting devices should be provided in TTC zones based on engineering judgment.*
- 02 *When used to supplement channelization, the maximum spacing for warning lights should be identical to the channelizing device spacing requirements.*

Option:

- 03 Lighting devices may be used to supplement retroreflectorized signs, barriers, and channelizing devices.
- 04 During normal daytime maintenance operations, the functions of flashing warning beacons may be provided by high-intensity rotating, flashing, oscillating, or strobe lights on a maintenance vehicle.

Standard:

- 05 **Although vehicle hazard warning lights are permitted to be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights, they shall not be used instead of high-intensity rotating, flashing, oscillating, or strobe lights.**

Section 6F.82 Floodlights

Support:

- 01 Utility, maintenance, or construction activities on highways are frequently conducted during nighttime periods when vehicular traffic volumes are lower. Large construction projects are sometimes operated on a double-shift basis requiring night work (see Section 6G.19).

Guidance:

- 02 *When nighttime work is being performed, floodlights should be used to illuminate the work area, equipment crossings, and other areas.*

Standard:

03 **Except in emergency situations, flagger stations shall be illuminated at night.**

04 **Floodlighting shall not produce a disabling glare condition for approaching road users, flaggers, or workers.**

Guidance:

05 *The adequacy of the floodlight placement and elimination of potential glare should be determined by driving through and observing the floodlighted area from each direction on all approaching roadways after the initial floodlight setup, at night, and periodically.*

Support:

06 Desired illumination levels vary depending upon the nature of the task involved. An average horizontal luminance of 5 foot candles can be adequate for general activities. Tasks requiring high levels of precision and extreme care can require an average horizontal luminance of 20 foot candles.

Section 6F.83 Warning Lights*Support:*

01 Type A, Type B, Type C, and Type D 360-degree warning lights are portable, powered, yellow, lens-directed, enclosed lights.

Standard:

02 **Warning lights shall be in accordance with the current ITE “Purchase Specification for Flashing and Steady-Burn Warning Lights” (see Section 1A.11).**

03 **When warning lights are used, they shall be mounted on signs or channelizing devices in a manner that, if hit by an errant vehicle, they will not be likely to penetrate the windshield.**

Guidance:

04 *The maximum spacing for warning lights should be identical to the channelizing device spacing requirements.*

Support:

05 The light weight and portability of warning lights are advantages that make these devices useful as supplements to the retroreflectorization on signs and channelizing devices. The flashing lights are effective in attracting road users' attention.

Option:

06 Warning lights may be used in either a steady-burn or flashing mode.

Standard:

07 **Except for the sequential flashing warning lights that are described in Paragraphs 8 and 9, flashing warning lights shall not be used for delineation, as a series of flashers fails to identify the desired vehicle path.**

Option:

08 A series of sequential flashing warning lights may be placed on channelizing devices that form a merging taper in order to increase driver detection and recognition of the merging taper.

Standard:

09 **If a series of sequential flashing warning lights is used, the successive flashing of the lights shall occur from the upstream end of the merging taper to the downstream end of the merging taper in order to identify the desired vehicle path. Each flashing warning light in the sequence shall be flashed at a rate of not less than 55 or more than 75 times per minute.**

10 **Type A Low-Intensity Flashing warning lights, Type C Steady-Burn warning lights, and Type D 360-degree Steady-Burn warning lights shall be maintained so as to be capable of being visible on a clear night from a distance of 3,000 feet. Type B High-Intensity Flashing warning lights shall be maintained so as to be capable of being visible on a sunny day when viewed without the sun directly on or behind the device from a distance of 1,000 feet.**

11 **Warning lights shall have a minimum mounting height of 30 inches to the bottom of the lens.**

Support:

- 12 Type A Low-Intensity Flashing warning lights are used to warn road users during nighttime hours that they are approaching or proceeding in a potentially hazardous area.

Option:

- 13 Type A warning lights may be mounted on channelizing devices.

Support:

- 14 Type B High-Intensity Flashing warning lights are used to warn road users during both daylight and nighttime hours that they are approaching a potentially hazardous area.

Option:

- 15 Type B warning lights are designed to operate 24 hours per day and may be mounted on advance warning signs or on independent supports.

- 16 Type C Steady-Burn warning lights and Type D 360-degree Steady-Burn warning lights may be used during nighttime hours to delineate the edge of the traveled way.

Guidance:

- 17 *When used to delineate a curve, Type C and Type D 360-degree warning lights should only be used on devices on the outside of the curve, and not on the inside of the curve.*

Section 6F.84 Temporary Traffic Control Signals**Standard:**

- 01 **Temporary traffic control signals (see Section 4D.32) used to control road user movements through TTC zones and in other TTC situations shall comply with the applicable provisions of Part 4.**

Support:

- 02 Temporary traffic control signals are typically used in TTC zones such as temporary haul road crossings; temporary one-way operations along a one-lane, two-way highway; temporary one-way operations on bridges, reversible lanes, and intersections.

Standard:

- 03 **A temporary traffic control signal that is used to control traffic through a one-lane, two-way section of roadway shall comply with the provisions of Section 4H.02.**

Guidance:

- 04 *Where pedestrian traffic is detoured to a temporary traffic control signal, engineering judgment should be used to determine if pedestrian signals or accessible pedestrian signals (see Section 4E.06) are needed for crossing along an alternate route.*

- 05 *When temporary traffic control signals are used, conflict monitors typical of traditional traffic control signal operations should be used.*

Option:

- 06 Temporary traffic control signals may be portable or temporarily mounted on fixed supports.

Guidance:

- 07 Temporary traffic control signals should only be used in situations where temporary traffic control signals are preferable to other means of traffic control, such as changing the work staging or work zone size to eliminate one-way vehicular traffic movements, using flaggers to control one-way or crossing movements, using STOP or YIELD signs, and using warning devices alone.

Support:

- 08 Factors related to the design and application of temporary traffic control signals include the following:
- A. Safety and road user needs;
 - B. Work staging and operations;
 - C. The feasibility of using other TTC strategies (for example, flaggers, providing space for two lanes, or detouring road users, including bicyclists and pedestrians);
 - D. Sight distance restrictions;

- E. Human factors considerations (for example, lack of driver familiarity with temporary traffic control signals);
 - F. Road-user volumes including roadway and intersection capacity;
 - G. Affected side streets and driveways;
 - H. Vehicle speeds;
 - I. The placement of other TTC devices;
 - J. Parking;
 - K. Turning restrictions;
 - L. Pedestrians;
 - M. The nature of adjacent land uses (such as residential or commercial);
 - N. Legal authority;
 - O. Signal phasing and timing requirements;
 - P. Full-time or part-time operation;
 - Q. Actuated, fixed-time, or manual operation;
 - R. Power failures or other emergencies;
 - S. Inspection and maintenance needs;
 - T. Need for detailed placement, timing, and operation records; and
 - U. Operation by contractors or by others.
- 09 Although temporary traffic control signals can be mounted on trailers or lightweight portable supports, fixed supports offer superior resistance to displacement or damage by severe weather, vehicle impact, and vandalism.

Guidance:

- 10 *Other TTC devices should be used to supplement temporary traffic control signals, including warning and regulatory signs, pavement markings, and channelizing devices.*
- 11 *Temporary traffic control signals not in use should be covered or removed.*
- 12 *If a temporary traffic control signal is located within 1/2 mile of an adjacent traffic control signal, consideration should be given to interconnected operation.*

Standard:

- 13 **Temporary traffic control signals shall not be located within 200 feet of a grade crossing unless the temporary traffic control signal is provided with preemption in accordance with Section 4D.27, or unless a uniformed officer or flagger is provided at the crossing to prevent vehicles from stopping within the crossing.**

Section 6F.85 Temporary Traffic Barriers

Support:

- 01 Temporary traffic barriers, including shifting portable or movable barriers, are devices designed to help prevent penetration by vehicles while minimizing injuries to vehicle occupants, and to protect workers, bicyclists, and pedestrians.
- 02 The four primary functions of temporary traffic barriers are:
- A. To keep vehicular traffic from entering work areas, such as excavations or material storage sites;
 - B. To separate workers, bicyclists, and pedestrians from motor vehicle traffic;
 - C. To separate opposing directions of vehicular traffic; and
 - D. To separate vehicular traffic, bicyclists, and pedestrians from the work area such as false work for bridges and other exposed objects.

Option:

- 03 Temporary traffic barriers may be used to separate two-way vehicular traffic.

Guidance:

- 04 *Because the protective requirements of a TTC situation have priority in determining the need for temporary traffic barriers, their use should be based on an engineering study.*

Standard:

05 **Temporary traffic barriers shall be supplemented with standard delineation, pavement markings, or channelizing devices for improved daytime and nighttime visibility if they are used to channelize vehicular traffic. The delineation color shall match the applicable pavement marking color.**

06 **Temporary traffic barriers, including their end treatments, shall be crashworthy. In order to mitigate the effect of striking the upstream end of a temporary traffic barrier, the end shall be installed in accordance with AASHTO's "Roadside Design Guide" (see Section 1A.11) by flaring until the end is outside the acceptable clear zone or by providing crashworthy end treatments.**

Option:

07 Warning lights or steady-burn lamps may be mounted on temporary traffic barrier installations.

Support:

08 Movable barriers are capable of being repositioned laterally using a transfer vehicle that travels along the barrier. Movable barriers enable short-term closures to be installed and removed on long-term projects. Providing a barrier-protected work space for short-term closures and providing unbalanced flow to accommodate changes in the direction of peak-period traffic flows are two of the advantages of using movable barriers.

09 Figure 6H-45 shows a temporary reversible lane using movable barriers. The notable feature of the movable barrier is that in both Phase A and Phase B, the lanes used by opposing traffic are separated by a barrier.

10 Figure 6H-34 shows an exterior lane closure using a temporary traffic barrier. Notes 7 through 9 address the option of using a movable barrier. By using a movable barrier, the barrier can be positioned to close the lane during the off-peak periods and can be relocated to open the lane during peak periods to accommodate peak traffic flows. With one pass of the transfer vehicle, the barrier can be moved out of the lane and onto the shoulder. Furthermore, if so desired, with a second pass of the transfer vehicle, the barrier could be moved to the roadside beyond the shoulder.

11 More specific information on the use of temporary traffic barriers is contained in Chapters 8 and 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11).

Section 6F.86 Crash Cushions**Support:**

01 Crash cushions are systems that mitigate the effects of errant vehicles that strike obstacles, either by smoothly decelerating the vehicle to a stop when hit head-on, or by redirecting the errant vehicle. The two types of crash cushions that are used in TTC zones are stationary crash cushions and truck-mounted attenuators. Crash cushions in TTC zones help protect the drivers from the exposed ends of barriers, fixed objects, shadow vehicles, and other obstacles. Specific information on the use of crash cushions can be found in AASHTO's "Roadside Design Guide" (see Section 1A.11).

Standard:

02 **Crash cushions shall be crashworthy. They shall also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to verify that they have not been hit or damaged. Damaged crash cushions shall be promptly repaired or replaced to maintain their crashworthiness.**

Support:

03 Stationary crash cushions are used in the same manner as permanent highway installations to protect drivers from the exposed ends of barriers, fixed objects, and other obstacles.

Standard:

04 **Stationary crash cushions shall be designed for the specific application intended.**

05 **Truck-mounted attenuators shall be energy-absorbing devices attached to the rear of shadow trailers or trucks. If used, the shadow vehicle with the attenuator shall be located in advance of the work area, workers, or equipment to reduce the severity of rear-end crashes from errant vehicles.**

- 06 Trucks or trailers are often used as shadow vehicles to protect workers or work equipment from errant vehicles. These shadow vehicles are normally equipped with flashing arrows, changeable message signs, and/or high-intensity rotating, flashing, oscillating, or strobe lights located properly in advance of the workers and/or equipment that they are protecting. However, these shadow vehicles might themselves cause injuries to occupants of the errant vehicles if they are not equipped with truck-mounted attenuators.

Guidance:

- 07 *The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.*

Support:

- 08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

Guidance:

- 09 *If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.*

Section 6F.87 Rumble Strips

Support:

- 01 Transverse rumble strips consist of intermittent narrow, transverse areas of rough-textured or slightly raised or depressed road surface that extend across the travel lanes to alert drivers to unusual vehicular traffic conditions. Through noise and vibration they attract the driver's attention to such features as unexpected changes in alignment and to conditions requiring a stop.

- 02 Longitudinal rumble strips consist of a series of rough-textured or slightly raised or depressed road surfaces located along the shoulder to alert road users that they are leaving the travel lanes.

Standard:

- 03 **If it is desirable to use a color other than the color of the pavement for a longitudinal rumble strip, the color of the rumble strip shall be the same color as the longitudinal line the rumble strip supplements.**

- 04 **If the color of a transverse rumble strip used within a travel lane is not the color of the pavement, the color of the rumble strip shall be white, black, or orange.**

Option:

- 05 Intervals between transverse rumble strips may be reduced as the distance to the approached conditions is diminished in order to convey an impression that a closure speed is too fast and/or that an action is imminent. A sign warning drivers of the onset of rumble strips may be placed in advance of any transverse rumble strip installation.

Guidance:

- 06 *Transverse rumble strips should be placed transverse to vehicular traffic movement. They should not adversely affect overall pavement skid resistance under wet or dry conditions.*

- 07 *In urban areas, even though a closer spacing might be warranted, transverse rumble strips should be designed in a manner that does not promote unnecessary braking or erratic steering maneuvers by road users..*

- 08 *Transverse rumble strips should not be placed on sharp horizontal or vertical curves.*

- 09 *Rumble strips should not be placed through pedestrian crossings or on bicycle routes.*

- 10 *Transverse rumble strips should not be placed on roadways used by bicyclists unless a minimum clear path of 4 feet is provided at each edge of the roadway or on each paved shoulder as described in AASHTO's "Guide to the Development of Bicycle Facilities" (see Section 1A.11).*

- 11 *Longitudinal rumble strips should not be placed on the shoulder of a roadway that is used by bicyclists unless a minimum clear path of 4 feet is also provided on the shoulder.*

Sections 6F.88 Screens**Support:**

- 01 Screens are used to block the road users' view of activities that can be distracting. Screens might improve safety and vehicular traffic flow where volumes approach the roadway capacity because they discourage gawking and reduce headlight glare from oncoming vehicular traffic.

Guidance:

- 02 *Screens should not be mounted where they could adversely restrict road user visibility and sight distance and adversely affect the reasonably safe operation of vehicles.*

Option:

- 03 Screens may be mounted on the top of temporary traffic barriers that separate two-way motor vehicle traffic.

Guidance:

- 04 *Design of screens should be in accordance with Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11).*

CHAPTER 6G. TYPE OF TEMPORARY TRAFFIC CONTROL ZONE ACTIVITIES

Section 6G.01 Typical Applications

Support:

- 01 Each TTC zone is different. Many variables, such as location of work, highway type, geometrics, vertical and horizontal alignment, intersections, interchanges, road user volumes, road vehicle mix (buses, trucks, and cars), and road user speeds affect the needs of each zone. The goal of TTC in work zones is safety with minimum disruption to road users. The key factor in promoting TTC zone safety is proper judgment.
- 02 Typical applications (TAs) of TTC zones are organized according to duration, location, type of work, and highway type. Table 6H-1 is an index of these typical applications. These typical applications include the use of various TTC methods, but do not include a layout for every conceivable work situation.
- 03 Well-designed TTC plans for planned special events will likely be developed from a combination of treatments from several of the typical applications.

Guidance:

- 04 *For any planned special event that will have an impact on the traffic on any street or highway, a TTC plan should be developed in conjunction with and be approved by the agency or agencies that have jurisdictions over the affected roadways.*
- 05 *Typical applications should be altered, when necessary, to fit the conditions of a particular TTC zone.*

Option:

- 06 Other devices may be added to supplement the devices shown in the typical applications, while others may be deleted. The sign spacings and taper lengths may be increased to provide additional time or space for driver response.

Support:

- 07 Decisions regarding the selection of the most appropriate typical application to use as a guide for a specific TTC zone require an understanding of each situation. Although there are many ways of categorizing TTC zone applications, the four factors mentioned earlier (work duration, work location, work type, and highway type) are used to characterize the typical applications illustrated in Chapter 6H.

Section 6G.02 Work Duration

Support:

- 01 Work duration is a major factor in determining the number and types of devices used in TTC zones. The duration of a TTC zone is defined relative to the length of time a work operation occupies a spot location.

Standard:

- 02 **The five categories of work duration and their time at a location shall be:**
- A. **Long-term stationary is work that occupies a location more than 3 days.**
 - B. **Intermediate-term stationary is work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.**
 - C. **Short-term stationary is daytime work that occupies a location for more than 1 hour within a single daylight period.**
 - D. **Short duration is work that occupies a location up to 1 hour.**
 - E. **Mobile is work that moves intermittently or continuously.**

Support:

- 03 At long-term stationary TTC zones, there is ample time to install and realize benefits from the full range of TTC procedures and devices that are available for use. Generally, larger channelizing devices, temporary roadways, and temporary traffic barriers are used.

Standard:

- 04 **Since long-term operations extend into nighttime, retroreflective and/or illuminated devices shall be used in long-term stationary TTC zones.**

Guidance:

- 05 *Inappropriate markings in long-term stationary TTC zones should be removed and replaced with temporary markings.*

Support:

- 06 In intermediate-term stationary TTC zones, it might not be feasible or practical to use procedures or devices that would be desirable for long-term stationary TTC zones, such as altered pavement markings, temporary traffic barriers, and temporary roadways. The increased time to place and remove these devices in some cases could significantly lengthen the project, thus increasing exposure time.

Standard:

- 07 **Since intermediate-term operations extend into nighttime, retroreflective and/or illuminated devices shall be used in intermediate-term stationary TTC zones.**

Support:

- 08 Most maintenance and utility operations are short-term stationary work.

- 09 As compared to stationary operations, mobile and short-duration operations are activities that might involve different treatments. Devices having greater mobility might be necessary such as signs mounted on trucks. Devices that are larger, more imposing, or more visible can be used effectively and economically. The mobility of the TTC zone is important.

Guidance:

- 10 *Safety in short-duration or mobile operations should not be compromised by using fewer devices simply because the operation will frequently change its location.*

Option:

- 11 Appropriately colored or marked vehicles with high-intensity rotating, flashing, oscillating, or strobe lights may be used in place of signs and channelizing devices for short-duration or mobile operations. These vehicles may be augmented with signs or arrow boards.

Support:

- 12 During short-duration work, it often takes longer to set up and remove the TTC zone than to perform the work. Workers face hazards in setting up and taking down the TTC zone. Also, since the work time is short, delays affecting road users are significantly increased when additional devices are installed and removed.

Option:

- 13 Considering these factors, simplified control procedures may be warranted for short-duration work. A reduction in the number of devices may be offset by the use of other more dominant devices such as high-intensity rotating, flashing, oscillating, or strobe lights on work vehicles.

Support:

- 14 Mobile operations often involve frequent short stops for activities such as litter cleanup, pothole patching, or utility operations, and are similar to short-duration operations.

Guidance:

- 15 *Warning signs and high-intensity rotating, flashing, oscillating, or strobe lights should be used on the vehicles that are participating in the mobile work.*

Option:

- 16 Flags and/or channelizing devices may additionally be used and moved periodically to keep them near the mobile work area.

- 17 Flaggers may be used for mobile operations that often involve frequent short stops.

Support:

- 18 Mobile operations also include work activities where workers and equipment move along the road without stopping, usually at slow speeds. The advance warning area moves with the work area.

Guidance:

- 19 *When mobile operations are being performed, a shadow vehicle equipped with an arrow board or a sign should follow the work vehicle, especially when vehicular traffic speeds or volumes are high. Where feasible, warning signs should be placed along the roadway and moved periodically as work progresses.*

20 *Under high-volume conditions, consideration should be given to scheduling mobile operations work during off-peak hours.*

21 *If there are mobile operations on a high-speed travel lane of a multi-lane divided highway, arrow boards should be used.*

Standard:

22 **Mobile operations shall have appropriate devices on the equipment (that is, high-intensity rotating, flashing, oscillating, or strobe lights, signs, or special lighting), or shall use a separate vehicle with appropriate warning devices.**

Option:

23 For mobile operations that move at speeds of less than 3 mph, mobile signs or stationary signing that is periodically retrieved and repositioned in the advance warning area may be used.

Section 6G.03 Location of Work

Support:

01 Chapter 6D and Sections 6F.74 and 6G.05 contain additional information regarding the steps to follow when pedestrian or bicycle facilities are affected by the worksite.

02 The choice of TTC needed for a TTC zone depends upon where the work is located. As a general rule, the closer the work is to road users (including bicyclists and pedestrians), the greater the number of TTC devices that are needed. Procedures are described later in this Chapter for establishing TTC zones in the following locations:

- A. Outside the shoulder;
- B. On the shoulder with no encroachment;
- C. On the shoulder with minor encroachment;
- D. Within the median; and
- E. Within the traveled way.

Standard:

03 **When the work space is within the traveled way, except for short-duration and mobile operations, advance warning shall provide a general message that work is taking place and shall supply information about highway conditions. TTC devices shall indicate how vehicular traffic can move through the TTC control zone.**

Section 6G.04 Modifications To Fulfill Special Needs

Support:

01 The typical applications in Chapter 6H illustrate commonly encountered situations in which TTC devices are employed.

Option:

02 Other devices may be added to supplement the devices provided in the typical applications, and device spacing may be adjusted to provide additional reaction time. When conditions are less complex than those depicted in the typical applications, fewer devices may be needed.

Guidance:

03 *When conditions are more complex, typical applications should be modified by giving particular attention to the provisions set forth in Chapter 6B and by incorporating appropriate devices and practices from the following list:*

- A. *Additional devices:*
 - 1. *Signs*
 - 2. *Arrow boards*
 - 3. *More channelizing devices at closer spacing (see Section 6F.74 for information regarding detectable edging for pedestrians)*
 - 4. *Temporary raised pavement markers*
 - 5. *High-level warning devices*
 - 6. *Portable changeable message signs*

7. *Temporary traffic control signals (including pedestrian signals and accessible pedestrian signals)*
8. *Temporary traffic barriers*
9. *Crash cushions*
10. *Screens*
11. *Rumble strips*
12. *More delineation*
- B. *Upgrading of devices:*
 1. *A full complement of standard pavement markings*
 2. *Brighter and/or wider pavement markings*
 3. *Larger and/or brighter signs*
 4. *Channelizing devices with greater conspicuity*
 5. *Temporary traffic barriers in place of channelizing devices*
- C. *Improved geometrics at detours or crossovers*
- D. *Increased distances:*
 1. *Longer advance warning area*
 2. *Longer tapers*
- E. *Lighting:*
 1. *Temporary roadway lighting*
 2. *Steady-burn lights used with channelizing devices*
 3. *Flashing lights for isolated hazards*
 4. *Illuminated signs*
 5. *Floodlights*
- F. *Pedestrian routes and temporary facilities*
- G. *Bicycle diversions and temporary facilities*

Section 6G.05 Work Affecting Pedestrian and Bicycle Facilities

Support:

01 It is not uncommon, particularly in urban areas, that road work and the associated TTC will affect existing pedestrian or bicycle facilities. It is essential that the needs of all road users, including pedestrians with disabilities, are considered in TTC zones.

02 In addition to specific provisions identified in Sections 6G.06 through 6G.13, there are a number of provisions that might be applicable for all of the types of activities identified in this Chapter.

Guidance:

03 *Where pedestrian or bicycle usage is high, the typical applications should be modified by giving particular attention to the provisions set forth in Chapter 6D, this Chapter, Section 6F.74, and in other Sections of Part 6 related to accessibility and detectability provisions in TTC zones.*

04 *Pedestrians should be separated from the worksite by appropriate devices that maintain the accessibility and detectability for pedestrians with disabilities.*

05 *Bicyclists and pedestrians should not be exposed to unprotected excavations, open utility access, overhanging equipment, or other such conditions.*

06 *Except for short duration and mobile operations, when a highway shoulder is occupied, a **SHOULDER WORK (W21-5)** sign should be placed in advance of the activity area. When work is performed on a paved shoulder 8 feet or more in width, channelizing devices should be placed on a taper having a length that conforms to the requirements of a shoulder taper. Signs should be placed such that they do not narrow any existing pedestrian passages to less than 48 inches.*

07 *Pedestrian detours should be avoided since pedestrians rarely observe them and the cost of providing accessibility and detectability might outweigh the cost of maintaining a continuous route. Whenever possible, work should be done in a manner that does not create a need to detour pedestrians from existing routes or crossings.*

Standard:

08 **Where pedestrian routes are closed, alternate pedestrian routes shall be provided.**

- 09 **When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.**

Section 6G.06 Work Outside of the Shoulder

Support:

- 01 When work is being performed off the roadway (beyond the shoulders, but within the right-of-way), little or no TTC might be needed. TTC generally is not needed where work is confined to an area 15 feet or more from the edge of the traveled way. However, TTC is appropriate where distracting situations exist, such as vehicles parked on the shoulder, vehicles accessing the work site via the highway, and equipment traveling on or crossing the roadway to perform the work operations (for example, mowing). For work beyond the shoulder, see Figure 6H-1.

Guidance:

- 02 *Where the situations described in Paragraph 1 exist, a single warning sign, such as ROAD WORK AHEAD (W20-1), should be used. If the equipment travels on the roadway, the equipment should be equipped with appropriate flags, high-intensity rotating, flashing, oscillating, or strobe lights, and/or a SLOW MOVING VEHICLE (W21-4) sign.*

Option:

- 03 If work vehicles are on the shoulder, a SHOULDER WORK (W21-5) sign may be used. For mowing operations, the sign MOWING AHEAD (W21-8) may be used.
- 04 Where the activity is spread out over a distance of more than 2 miles, the SHOULDER WORK (W21-5) sign may be repeated every 1 mile.
- 05 A supplementary plaque with the message NEXT XX MILES (W7-3aP) may be used.

Guidance:

- 06 *A general warning sign like ROAD MACHINERY AHEAD (W21-3) should be used if workers and equipment must occasionally move onto the shoulder.*

Section 6G.07 Work on the Shoulder with No Encroachment

Support:

- 01 The provisions of this Section apply to short-term through long-term stationary operations.

Standard:

- 02 **When paved shoulders having a width of 8 feet or more are closed, at least one advance warning sign shall be used. In addition, channelizing devices shall be used to close the shoulder in advance to delineate the beginning of the work space and direct motor vehicle traffic to remain within the traveled way.**

Guidance:

- 03 *When paved shoulders having a width of 8 feet or more are closed on freeways and expressways, road users should be warned about potential disabled vehicles that cannot get off the traveled way. An initial general warning sign such as ROAD WORK AHEAD (W20-1) should be used, followed by a RIGHT or LEFT SHOULDER CLOSED (W21-5a) sign. Where the downstream end of the shoulder closure extends beyond the distance that can be perceived by road users, a supplementary plaque bearing the message NEXT XX FEET (W16-4P) or MILES (W7-3aP) should be placed below the SHOULDER CLOSED (W21-5a) sign. On multi-lane, divided highways, signs advising of shoulder work or the condition of the shoulder should be placed only on the side of the affected shoulder.*
- 04 *When an improved shoulder is closed on a high-speed roadway, it should be treated as a closure of a portion of the road system because road users expect to be able to use it in emergencies. Road users should be given ample advance warning that shoulders are closed for use as refuge areas throughout a specified length of the approaching TTC zone. The sign(s) should read SHOULDER CLOSED (W21-5a) with distances indicated. The work space on the shoulder should be closed off by a taper or channelizing devices with a length of 1/3 L using the formulas in Table 6C-4.*
- 05 *When the shoulder is not occupied but work has adversely affected its condition, the LOW SHOULDER (W8-9) or SOFT SHOULDER (W8-4) sign should be used, as appropriate.*

06 *Where the condition extends over a distance in excess of 1 mile, the sign should be repeated at 1 mile intervals.*

Option:

07 In addition, a supplementary plaque bearing the message NEXT XX MILES (W7-3aP) may be used. Temporary traffic barriers may be needed to inhibit encroachment of errant vehicles into the work space and to protect workers.

Standard:

08 **When used for shoulder work, arrow boards shall operate only in the caution mode.**

Support:

09 A typical application for stationary work operations on shoulders is shown in Figure 6H-3. Short duration or mobile work on shoulders is shown in Figure 6H-4. Work on freeway shoulders is shown in Figure 6H-5.

Section 6G.08 Work on the Shoulder with Minor Encroachment

Support:

01 Chapter 6D and Sections 6F.74 and 6G.05 contain additional information regarding the steps to follow when pedestrian or bicycle facilities are affected by the worksite.

Guidance:

02 *When work takes up part of a lane, vehicular traffic volumes, vehicle mix (buses, trucks, cars, and bicycles), speed, and capacity should be analyzed to determine whether the affected lane should be closed. Unless the lane encroachment permits a remaining lane width of 10 feet, the lane should be closed.*

03 *Truck off-tracking should be considered when determining whether the minimum lane width of 10 feet is adequate.*

Option:

04 A lane width of 9 feet may be used for short-term stationary work on low-volume, low-speed roadways when vehicular traffic does not include longer and wider heavy commercial vehicles.

Support:

05 Figure 6H-6 illustrates a method for handling vehicular traffic where the stationary or short duration work space encroaches slightly into the traveled way.

Section 6G.09 Work Within the Median

Support:

01 Chapter 6D and Sections 6F.74 and 6G.05 contain additional information regarding the steps to follow when pedestrian or bicycle facilities are affected by the worksite.

Guidance:

02 *If work in the median of a divided highway is within 15 feet from the edge of the traveled way for either direction of travel, TTC should be used through the use of advance warning signs and channelizing devices.*

Section 6G.10 Work Within the Traveled Way of a Two-Lane Highway

Support:

01 Chapter 6D and Sections 6F.74 and 6G.05 contain additional information regarding the steps to follow when pedestrian or bicycle facilities are affected by the worksite.

02 Detour signs are used to direct road users onto another roadway. At diversions, road users are directed onto a temporary roadway or alignment placed within or adjacent to the right-of-way. Typical applications for detouring or diverting road users on two-lane highways are shown in Figures 6H-7, 6H-8, and 6H-9. Figure 6H-7 illustrates the controls around an area where a section of roadway has been closed and a diversion has been constructed. Channelizing devices and pavement markings are used to indicate the transition to the temporary roadway.

Guidance:

- 03 *When a detour is long, Detour (M4-8, M4-9) signs should be installed to remind and reassure road users periodically that they are still successfully following the detour.*
- 04 *When an entire roadway is closed, as illustrated in Figure 6H-8, a detour should be provided and road users should be warned in advance of the closure, which in this example is a closure 10 miles from the intersection. If local road users are allowed to use the roadway up to the closure, the ROAD CLOSED AHEAD, LOCAL TRAFFIC ONLY (R-11-3a) sign should be used. The portion of the road open to local road users should have adequate signing, marking, and delineation.*
- 05 *Detours should be signed so that road users will be able to traverse the entire detour route and back to the original roadway as shown in Figure 6H-9.*

Support:

- 06 *Techniques for controlling vehicular traffic under one-lane, two-way conditions are described in Section 6C.10.*

Option:

- 07 *Flaggers may be used as shown in Figure 6H-10.*
- 08 *STOP/YIELD sign control may be used on roads with low traffic volumes as shown in Figure 6H-11.*
- 09 *A temporary traffic control signal may be used as shown in Figure 6H-12.*

Section 6G.11 Work Within the Traveled Way of an Urban Street*Support:*

- 01 Chapter 6D and Sections 6F.74 and 6G.05 contain additional information regarding the steps to follow when pedestrian or bicycle facilities are affected by the worksite.
- 02 In urban TTC zones, decisions are needed on how to control vehicular traffic, such as how many lanes are required, whether any turns need to be prohibited at intersections, and how to maintain access to business, industrial, and residential areas.
- 03 Pedestrian traffic needs separate attention. Chapter 6D contains information regarding pedestrian movements near TTC zones.

Standard:

- 04 **If the TTC zone affects the movement of bicyclists, adequate access to the roadway or shared-use paths shall be provided (see Part 9).**
- 05 **Where transit stops are affected or relocated because of work activity, both pedestrian and vehicular access to the affected or relocated transit stops shall be provided.**

Guidance:

- 06 *If a designated bicycle route is closed because of the work being done, a signed alternate route should be provided. Bicyclists should not be directed onto the path used by pedestrians.*
- 07 *Work sites within the intersection should be protected against inadvertent pedestrian incursion by providing detectable channelizing devices.*

Support:

- 08 *Utility work takes place both within and outside the roadway to construct and maintain services such as power, gas, light, water, or telecommunications. Operations often involve intersections, since that is where many of the network junctions occur. The work force is usually small, only a few vehicles are involved, and the number and types of TTC devices placed in the TTC zone is usually minimal.*

Standard:

- 09 **All TTC devices shall be retroreflective or illuminated if utility work is performed during nighttime hours.**

Guidance:

- 10 *As discussed under short-duration projects, however, the reduced number of devices in utility work zones should be offset by the use of high-visibility devices, such as high-intensity rotating, flashing, oscillating, or strobe lights on work vehicles or high-level warning devices.*

Support:

- 11 Figures 6H-6, 6H-10, 6H-15, 6H-18, 6H-21, 6H-22, 6H-23, 6H-26, and 6H-33 are examples of typical applications for utility operations. Other typical applications might apply as well.

Section 6G.12 Work Within the Traveled Way of Multi-lane, Non-Access Controlled Highways

Support:

- 01 Chapter 6D and Sections 6F.74 and 6G.05 contain additional information regarding the steps to follow when pedestrian or bicycle facilities are affected by the worksite.
- 02 Work on multi-lane (two or more lanes of vehicular traffic in one direction) highways is divided into right-lane closures, left-lane closures, interior-lane closures, multiple-lane closures, and closures on five-lane roadways.

Standard:

- 03 **When a lane is closed on a multi-lane road for other than a mobile operation, a transition area containing a merging taper shall be used.**

Guidance:

- 04 *When justified by an engineering study, temporary traffic barriers (see Section 6F.70) should be used to prevent incursions of errant vehicles into hazardous areas or work space.*

Support:

- 05 Figure 6H-34 illustrates a lane closure in which temporary traffic barriers are used.

Option:

- 06 When the right lane is closed, TTC similar to that shown in Figure 6H-33 may be used for undivided or divided four-lane roads.

Guidance:

- 07 *If morning and evening peak hour vehicular traffic volumes in the two directions are uneven and the greater volume is on the side where the work is being done in the right-hand lane, consideration should be given to closing the inside lane for opposing vehicular traffic and making the lane available to the side with heavier vehicular traffic, as shown in Figure 6H-31.*
- 08 *If the larger vehicular traffic volume changes to the opposite direction at a different time of the day, the TTC should be changed to allow two lanes for opposing vehicular traffic by moving the devices from the opposing lane to the center line. When it is necessary to create a temporary center line that is not consistent with the pavement markings, channelizing devices should be used and closely spaced.*

Option:

- 09 When closing a left lane on a multi-lane undivided road, as vehicular traffic flow permits, the two interior lanes may be closed, as shown in Figure 6H-30, to provide drivers and workers additional lateral clearance and to provide access to the work space.

Standard:

- 10 **When only the left lane is closed on undivided roads, channelizing devices shall be placed along the center line as well as along the adjacent lane.**

Guidance:

- 11 *When an interior lane is closed, an adjacent lane should also be considered for closure to provide additional space for vehicles and materials and to facilitate the movement of equipment within the work space.*
- 12 *When multiple lanes in one direction are closed, a capacity analysis should be made to determine the number of lanes needed to accommodate motor vehicle traffic needs. Vehicular traffic should be moved over one lane at a time. As shown in Figure 6H-37, the tapers should be separated by a distance of 2L, with L being determined by the formulas in Table 6C-4.*

Option:

- 13 If operating speeds are 40 mph or less and the space approaching the work area does not permit moving traffic over one lane at a time, a single continuous taper may be used.

Standard:

- 14 **When a directional roadway is closed, inapplicable WRONG WAY signs and markings, and other existing traffic control devices at intersections within the temporary two-lane, two-way operations section shall be covered, removed, or obliterated.**

Option:

- 15 When half the road is closed on an undivided highway, both directions of vehicular traffic may be accommodated as shown in Figure 6H-32. When both interior lanes are closed, temporary traffic controls may be used as provided in Figure 6H-30. When a roadway must be closed on a divided highway, a median crossover may be used (see Section 6G.16).

Support:

- 16 TTC for lane closures on five-lane roads is similar to other multi-lane undivided roads. Figure 6H-32 can be adapted for use on five-lane roads. Figure 6H-35 can be used on a five-lane road for short duration and mobile operations.

Section 6G.13 Work Within the Traveled Way at an Intersection

Support:

- 01 Chapter 6D and Sections 6F.74 and 6G.05 contain additional information regarding the steps to follow when pedestrian or bicycle facilities are affected by the worksite.

- 02 The typical applications for intersections are classified according to the location of the work space with respect to the intersection area (as defined by the extension of the curb or edge lines). The three classifications are near side, far side, and in-the-intersection. Work spaces often extend into more than one portion of the intersection. For example, work in one quadrant often creates a near-side work space on one street and a far-side work space on the cross street. In such instances, an appropriate TTC plan is obtained by combining features shown in two or more of the intersection and pedestrian typical applications.

- 03 TTC zones in the vicinity of intersections might block movements and interfere with normal road user flows. Such conflicts frequently occur at more complex signalized intersections having such features as traffic signal heads over particular lanes, lanes allocated to specific movements, multiple signal phases, signal detectors for actuated control, and accessible pedestrian signals and detectors.

Guidance:

- 04 *The effect of the work upon signal operation should be considered, and temporary corrective actions should be taken, if necessary, such as revising signal phasing and/or timing to provide adequate capacity, maintaining or adjusting signal detectors, and relocating signal heads to provide adequate visibility as described in Part 4.*

Standard:

- 05 **When work will occur near an intersection where operational, capacity, or pedestrian accessibility problems are anticipated, the highway agency having jurisdiction shall be contacted.**

Guidance:

- 06 *For work at an intersection, advance warning signs, devices, and markings should be used on all cross streets, as appropriate. The typical applications depict urban intersections on arterial streets. Where the posted speed limit, the off-peak 85th-percentile speed prior to the work starting, or the anticipated speed exceeds 40 mph, additional warning signs should be used in the advance warning area.*

- 07 *Pedestrian crossings near TTC sites should be separated from the worksite by appropriate barriers that maintain the accessibility and detectability for pedestrians with disabilities.*

Support:

- 08 Near-side work spaces, as depicted in Figure 6H-21, are simply handled as a midblock lane closure. A problem that might occur with near-side lane closure is a reduction in capacity, which during certain hours of operation could result in congestion and backups.

Option:

- 09 When near-side work spaces are used, an exclusive turn lane may be used for through vehicular traffic.

10 Where space is restricted in advance of near-side work spaces, as with short block spacings, two warning signs may be used in the advance warning area, and a third action-type warning or a regulatory sign (such as Keep Left) may be placed within the transition area.

Support:

11 Far-side work spaces, as depicted in Figures 6H-22 through 6H-25, involve additional treatment because road users typically enter the activity area by straight-through and left- or right-turning movements.

Guidance:

12 *When a lane through an intersection must be closed on the far side, it should also be closed on the near-side approach to preclude merging movements within the intersection.*

Option:

13 If there are a significant number of vehicles turning from a near-side lane that is closed on the far side, the near-side lane may be converted to an exclusive turn lane.

Support:

14 Figures 6H-26 and 6H-27 provide guidance on applicable procedures for work performed within the intersection.

Option:

15 If the work is within the intersection, any of the following strategies may be used:

- A. A small work space so that road users can move around it, as shown in Figure 6H-26;
- B. Flaggers or uniformed law enforcement officers to direct road users, as shown in Figure 6H-27;
- C. Work in stages so the work space is kept to a minimum; and
- D. Road closures or upstream diversions to reduce road user volumes.

Guidance:

16 *Depending on road user conditions, a flagger(s) and/or a uniformed law enforcement officer(s) should be used to control road users.*

Section 6G.14 Work Within the Traveled Way of a Freeway or Expressway

Support:

01 Problems of TTC might occur under the special conditions encountered where vehicular traffic must be moved through or around TTC zones on high-speed, high-volume roadways. Although the general principles outlined in the previous Sections of this Manual are applicable to all types of highways, high-speed, access-controlled highways need special attention in order to accommodate vehicular traffic while also protecting road users and workers. The road user volumes, road vehicle mix (buses, trucks, cars, and bicycles, if permitted), and speed of vehicles on these facilities require that careful TTC procedures be implemented, for example, to induce critical merging maneuvers well in advance of work spaces and in a manner that creates minimum turbulence and delay in the vehicular traffic stream. These situations often require more conspicuous devices than specified for normal rural highway or urban street use. However, the same important basic considerations of uniformity and standardization of general principles apply for all roadways.

02 Work under high-speed, high-volume vehicular traffic on a controlled access highway is complicated by the roadway design and operational features. The presence of a median that establishes separate roadways for directional vehicular traffic flow might prohibit the closing of one of the roadways or the diverting of vehicular traffic to the other roadway. Lack of access to and from adjacent roadways prohibits rerouting of vehicular traffic away from the work space in many cases. Other conditions exist where work must be limited to night hours, thereby necessitating increased use of warning lights, illumination of work spaces, and advance warning systems.

03 TTC for a typical lane closure on a divided highway is shown in Figure 6H-33. Temporary traffic controls for short duration and mobile operations on freeways are shown in Figure 6H-35. A typical application for shifting vehicular traffic lanes around a work space is shown in Figure 6H-36. TTC for multiple and interior lane closures on a freeway is shown in Figures 6H-37 and 6H-38.

Guidance:

- 04 *The method for closing an interior lane when the open lanes have the capacity to carry vehicular traffic should be as shown in Figure 6H-37. When the capacity of the other lanes is needed, the method shown in Figure 6H-38 should be used.*

Section 6G.15 Two-Lane, Two-Way Traffic on One Roadway of a Normally Divided Highway**Support:**

- 01 Two-lane, two-way operation on one roadway of a normally divided highway is a typical procedure that requires special consideration in the planning, design, and work phases, because unique operational problems (for example, increasing the risk of head-on crashes) can arise with the two-lane, two-way operation.

Standard:

- 02 **When two-lane, two-way traffic control must be maintained on one roadway of a normally divided highway, opposing vehicular traffic shall be separated with either temporary traffic barriers (concrete safety-shape or approved alternate), channelizing devices, or a temporary raised island throughout the length of the two-way operation. The use of markings and complementary signing, by themselves, shall not be used.**

Support:

- 03 Figure 6H-39 shows the procedure for two-lane, two-way operation. Treatments for entrance and exit ramps within the two-way roadway segment of this type of work are shown in Figures 6H-40 and 6H-41.

Section 6G.16 Crossovers*Guidance:*

- 01 *The following are considered good guiding principles for the design of crossovers:*
- A. *Tapers for lane drops should be separated from the crossovers, as shown in Figure 6H-39.*
 - B. *Crossovers should be designed for speeds no lower than 10 mph below the posted speed, the off-peak 85th-percentile speed prior to the work starting, or the anticipated operating speed of the roadway, unless unusual site conditions require that a lower design speed be used.*
 - C. *A good array of channelizing devices, delineators, and full-length, properly placed pavement markings should be used to provide drivers with a clearly defined travel path.*
 - D. *The design of the crossover should accommodate all vehicular traffic, including trucks and buses.*

Support:

- 02 Temporary traffic barriers and the excessive use of TTC devices cannot compensate for poor geometric and roadway cross-section design of crossovers.

Section 6G.17 Interchanges*Guidance:*

- 01 *Access to interchange ramps on limited-access highways should be maintained even if the work space is in the lane adjacent to the ramps. Access to exit ramps should be clearly marked and delineated with channelizing devices. For long-term projects, conflicting pavement markings should be removed and new ones placed. Early coordination with officials having jurisdiction over the affected cross streets and providing emergency services should occur before ramp closings.*

Option:

- 02 If access is not possible, ramps may be closed by using signs and Type 3 barricades. As the work space changes, the access area may be changed, as shown in Figure 6H-42. A TTC zone in the exit ramp may be handled as shown in Figure 6H-43.
- 03 When a work space interferes with an entrance ramp, a lane may need to be closed on the freeway (see Figure 6H-44). A TTC zone in the entrance ramp may require shifting ramp vehicular traffic (see Figure 6H-44).

Section 6G.18 Work in the Vicinity of a Grade Crossing

Standard:

- 01 **When grade crossings exist either within or in the vicinity of a TTC zone, lane restrictions, flagging, or other operations shall not create conditions where vehicles can be queued across the tracks. If the queuing of vehicles across the tracks cannot be avoided, a uniformed law enforcement officer or flagger shall be provided at the crossing to prevent vehicles from stopping on the tracks, even if automatic warning devices are in place.**

Support:

- 02 Figure 6H-46 shows work in the vicinity of a grade crossing.
- 03 Section 8A.08 contains additional information regarding temporary traffic control zones in the vicinity of grade crossings.

Guidance:

- 04 *Early coordination with the railroad company or light rail transit agency should occur before work starts.*

Section 6G.19 Temporary Traffic Control During Nighttime Hours

Support:

- 01 Chapter 6D and Sections 6F.74 and 6G.05 contain additional information regarding the steps to follow when pedestrian or bicycle facilities are affected by the worksite.

- 02 Conducting highway construction and maintenance activities during night hours could provide an advantage when traditional daytime traffic control strategies cannot achieve an acceptable balance between worker and public safety, traffic and community impact, and constructability. The two basic advantages of working at night are reduced traffic congestion and less involvement with business activities. However, the two basic conditions that must normally be met for night work to offer any advantage are reduced traffic volumes and easy set up and removal of the traffic control patterns on a nightly basis.

- 03 Shifting work activities to night hours, when traffic volumes are lower and normal business is less active, might offer an advantage in some cases, as long as the necessary work can be completed and the work site restored to essentially normal operating conditions to carry the higher traffic volume during non-construction hours.

- 04 Although working at night might offer advantages, it also includes safety issues. Reduced visibility inherent in night work impacts the performance of both drivers and workers. Because traffic volumes are lower and congestion is minimized, speeds are often higher at night necessitating greater visibility at a time when visibility is reduced. Finally, the incidence of impaired (alcohol or drugs), fatigued, or drowsy drivers might be higher at night.

- 05 Working at night also involves other factors, including construction productivity and quality, social impacts, economics, and environmental issues. A decision to perform construction or maintenance activities at night normally involves some consideration of the advantages to be gained compared to the safety and other issues that might be impacted.

Guidance:

- 06 *Considering the safety issues inherent to night work, consideration should be given to enhancing traffic controls (see Section 6G.04) to provide added visibility and driver guidance, and increased protection for workers.*

- 07 *In addition to the enhancements listed in Section 6G.04, consideration should be given to providing additional lights and retroreflective markings to workers, work vehicles, and equipment.*

Option:

- 08 Where reduced traffic volumes at night make it feasible, the entire roadway may be closed by detouring traffic to alternate facilities, thus removing the traffic risk from the activity area.

Guidance:

- 09 *Consideration should be given to stationing uniformed law enforcement officers and lighted patrol cars at night work locations where there is a concern that high speeds or impaired drivers might result in undue risks for workers or other drivers.*

Standard:

- 10 **Except in emergencies, temporary lighting shall be provided at all flagger stations.**

Support:

- 11 Desired illumination levels vary depending upon the nature of the task involved. An average horizontal luminance of 5 foot candles can be adequate for general activities. An average horizontal luminance of 10 foot candles can be adequate for activities around equipment. Tasks requiring high levels of precision and extreme care can require an average horizontal luminance of 20 foot candles.

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CHAPTER 6H. TYPICAL APPLICATIONS

Section 6H.01 Typical Applications

Support:

01 Chapter 6G contains discussions of typical TTC activities. This Chapter presents typical applications for a variety of situations commonly encountered. While not every situation is addressed, the information illustrated can generally be adapted to a broad range of conditions. In many instances, an appropriate TTC plan is achieved by combining features from various typical applications. For example, work at an intersection might present a near-side work zone for one street and a far-side work zone for the other street. These treatments are found in two different typical applications, while a third typical application shows how to handle pedestrian crosswalk closures. For convenience in using the typical application diagrams, Tables 6C-1 and 6C-4 are reproduced in this Chapter as Tables 6H-3 and 6H-4, respectively.

02 Procedures for establishing TTC zones vary with such conditions as road configuration, location of the work, work activity, duration of work, road user volumes, road vehicle mix (buses, trucks, cars, motorcycles, and bicycles), and road user speeds.

03 In general, the procedures illustrated represent minimum solutions for the situations depicted. Except for the notes (which are clearly classified using headings as being Standard, Guidance, Option, or Support), the information presented in the typical applications can generally be regarded as Guidance.

Option:

04 Other devices may be added to supplement the devices and device spacing may be adjusted to provide additional reaction time or delineation. Fewer devices may be used based on field conditions.

Support:

05 Figures and tables found throughout Part 6 provide information for the development of TTC plans. Also, Table 6H-3 is used for the determination of sign spacing and other dimensions for various area and roadway types.

06 Table 6H-1 is an index of the 46 typical applications. Typical applications are shown on the right-hand page with notes on the facing page to the left. The legend for the symbols used in the typical applications is provided in Table 6H-2. In many of the typical applications, sign spacings and other dimensions are indicated by letters using the criteria provided in Table 6H-3. The formulas for determining taper lengths are provided in Table 6H-4.

07 Most of the typical applications show TTC devices for only one direction.

Table 6H-1. Index to Typical Applications (Sheet 1 of 2)

Typical Application Description	Typical Application Number
Work Outside of the Shoulder (see Section 6G.06 and 6G.09)	
Work Beyond the Shoulder	TA-1
Blasting Zone	TA-2
Work on the Shoulder (see Sections 6G.07 and 6G.08)	
Work on the Shoulders	TA-3
Short-Duration or Mobile Operation on a Shoulder	TA-4
Shoulder Closure on a Freeway	TA-5
Shoulder Work with Minor Encroachment	TA-6
Work Within the Traveled Way of a Two-Lane Highway (see Section 6G.10)	
Road Closure with a Diversion	TA-7
Road Closure with an Off-Site Detour	TA-8
Overlapping Routes with a Detour	TA-9
Lane Closure on a Two-Lane Road Using Flaggers	TA-10
Lane Closure on a Two-Lane Road with Low Traffic Volumes	TA-11
Lane Closure on a Two-Lane Road Using Traffic Control Signals	TA-12
Temporary Road Closure	TA-13
Haul Road Crossing	TA-14
Work in the Center of a Road with Low Traffic Volumes	TA-15
Surveying Along the Center Line of a Road with Low Traffic Volumes	TA-16
Mobile Operations on a Two-Lane Road	TA-17
Work Within the Traveled Way of an Urban Street (see Section 6G.11)	
Lane Closure on a Minor Street	TA-18
Detour for One Travel Direction	TA-19
Detour for a Closed Street	TA-20
Work Within the Traveled Way at an Intersection and on Sidewalks (see Section 6G.13)	
Lane Closure on the Near Side of an Intersection	TA-21
Right-Hand Lane Closure on the Far Side of an Intersection	TA-22
Left-Hand Lane Closure on the Far Side of an Intersection	TA-23
Half Road Closure on the Far Side of an Intersection	TA-24
Multiple Lane Closures at an Intersection	TA-25
Closure in the Center of an Intersection	TA-26
Closure at the Side of an Intersection	TA-27
Sidewalk Detour or Diversion	TA-28
Crosswalk Closures and Pedestrian Detours	TA-29

Table 6H-1. Index to Typical Applications (Sheet 2 of 2)

Typical Application Description	Typical Application Number
Work Within the Traveled Way of a Multi-Lane, Non-Access Controlled Highway (see Section 6G.12)	
Interior Lane Closure on a Multi-lane Street	TA-30
Lane Closure on a Street with Uneven Directional Volumes	TA-31
Half Road Closure on a Multi-lane, High-Speed Highway	TA-32
Stationary Lane Closure on a Divided Highway	TA-33
Lane Closure with a Temporary Traffic Barrier	TA-34
Mobile Operation on a Multi-lane Road	TA-35
Work Within the Traveled Way of a Freeway or Expressway (see Section 6G.14)	
Lane Shift on a Freeway	TA-36
Double Lane Closure on a Freeway	TA-37
Interior Lane Closure on a Freeway	TA-38
Median Crossover on a Freeway	TA-39
Median Crossover for an Entrance Ramp	TA-40
Median Crossover for an Exit Ramp	TA-41
Work in Vicinity of an Exit Ramp	TA-42
Partial Exit Ramp Closure	TA-43
Work in the Vicinity of an Entrance Ramp	TA-44
Temporary Reversible Lane Using Movable Barriers	TA-45
Work in the Vicinity of a Grade Crossing (see Section 6G.18)	
Work in the Vicinity of a Grade Crossing	TA-46

Table 6H-2. Meaning of Symbols on Typical Application Diagrams

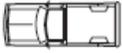
	Arrow board		Shadow vehicle
	Arrow board support or trailer (shown facing down)		Sign (shown facing left)
	Changeable message sign or trailer		Surveyor
	Channelizing device		Temporary barrier
	Crash cushion		Temporary barrier with warning light
	Direction of temporary traffic detour		Traffic or pedestrian signal
	Direction of traffic		Truck-mounted attenuator
	Flagger		Type 3 barricade
	High-level warning device (Flag tree)		Warning light
	Longitudinal channelizing device		Work space
	Luminaire		Work Vehicle
	Pavement markings that should be removed for a long-term project		

Table 6H-3. Meaning of Letter Codes on Typical Application Diagrams

Road Type	Distance Between Signs (Feet) **		
	A	B	C
Urban (low speed) *	100	100	100
Urban (high speed) *	350	350	350
Rural	500	500	500
Expressway / Freeway	1,000	1,500	2,640

* Speed category to be determined by highway agency.

** The column headings A, B, and C are the dimensions shown in Figures 6H-1 through 6H-46. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The "first sign" is the sign in a three-sign series that is closest to the TTC zone. The "third sign" is the sign that is furthest upstream from the TTC zone.)

Table 6H-4. Formulas for Determining Taper Lengths

Speed (S)	Taper Length (L) in Feet
40 mph or less	$L = \frac{WS^2}{60}$
45 mph or more	$L = WS$

Where: L = taper length in feet
W = width of offset in feet
S = posted speed limit, or off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

Notes for Figure 6H-1—Typical Application 1

Work Beyond the Shoulder

Guidance:

1. *If the work space is in the median of a divided highway, an advance warning sign should also be placed on the left side of the directional roadway.*

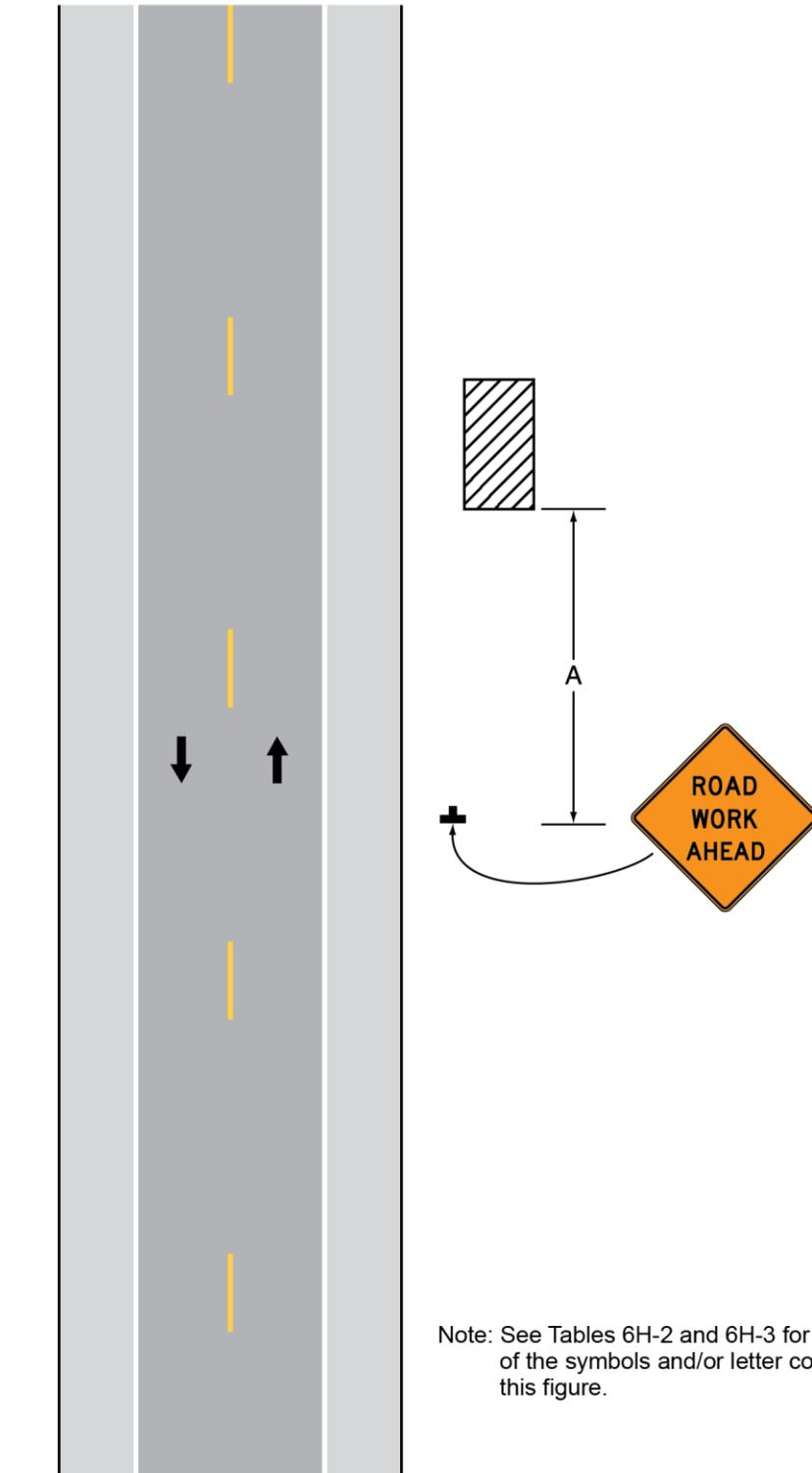
Option:

2. The ROAD WORK AHEAD sign may be replaced with other appropriate signs such as the SHOULDER WORK sign. The SHOULDER WORK sign may be used for work adjacent to the shoulder.
3. The ROAD WORK AHEAD sign may be omitted where the work space is behind a barrier, more than 24 inches behind the curb, or 15 feet or more from the edge of any roadway.
4. For short-term, short-duration or mobile operation, all signs and channelizing devices may be eliminated if a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.
5. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

6. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Figure 6H-1. Work Beyond the Shoulder (TA-1)



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 1

Notes for Figure 6H-2—Typical Application 2
Blasting Zone

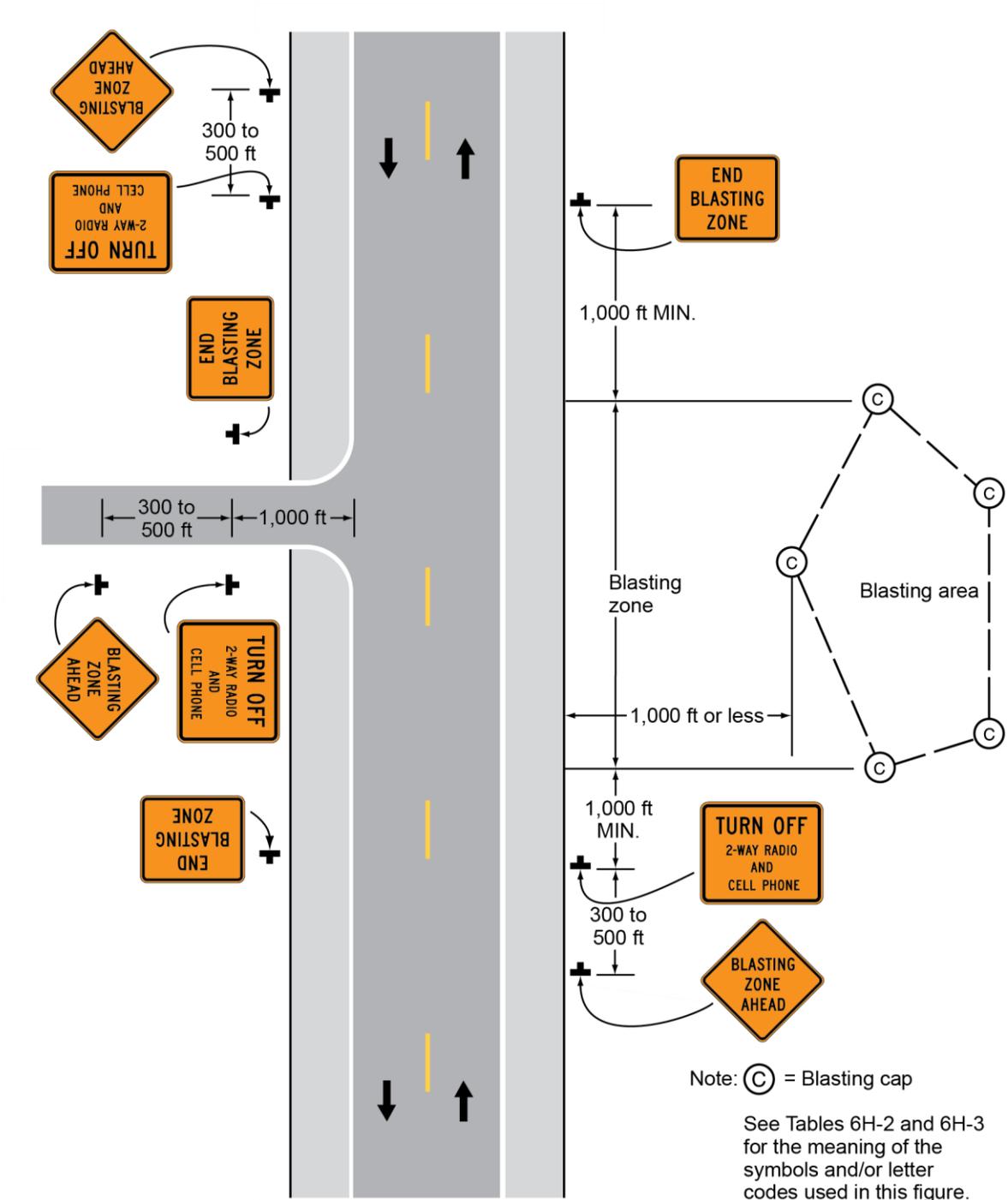
Standard:

1. Whenever blasting caps are used within 1,000 feet of a roadway, the signing shown shall be used.
2. The signs shall be covered or removed when there are no explosives in the area or the area is otherwise secure.
3. Whenever a side road intersects the roadway between the **BLASTING ZONE AHEAD** sign and the **END BLASTING ZONE** sign, or a side road is within 1,000 feet of any blasting cap, similar signing, as on the mainline, shall be installed on the side road.
4. Prior to blasting, the blaster in charge shall determine whether road users in the blasting zone will be endangered by the blasting operation. If there is danger, road users shall not be permitted to pass through the blasting zone during blasting operations.

Guidance:

5. *On a divided highway, the signs should be mounted on both sides of the directional roadways.*

Figure 6H-2. Blasting Zone (TA-2)



Typical Application 2

Notes for Figure 6H-3—Typical Application 3

Work on the Shoulders

Guidance:

1. A *SHOULDER WORK* sign should be placed on the left side of the roadway for a divided or one-way street only if the left shoulder is affected.

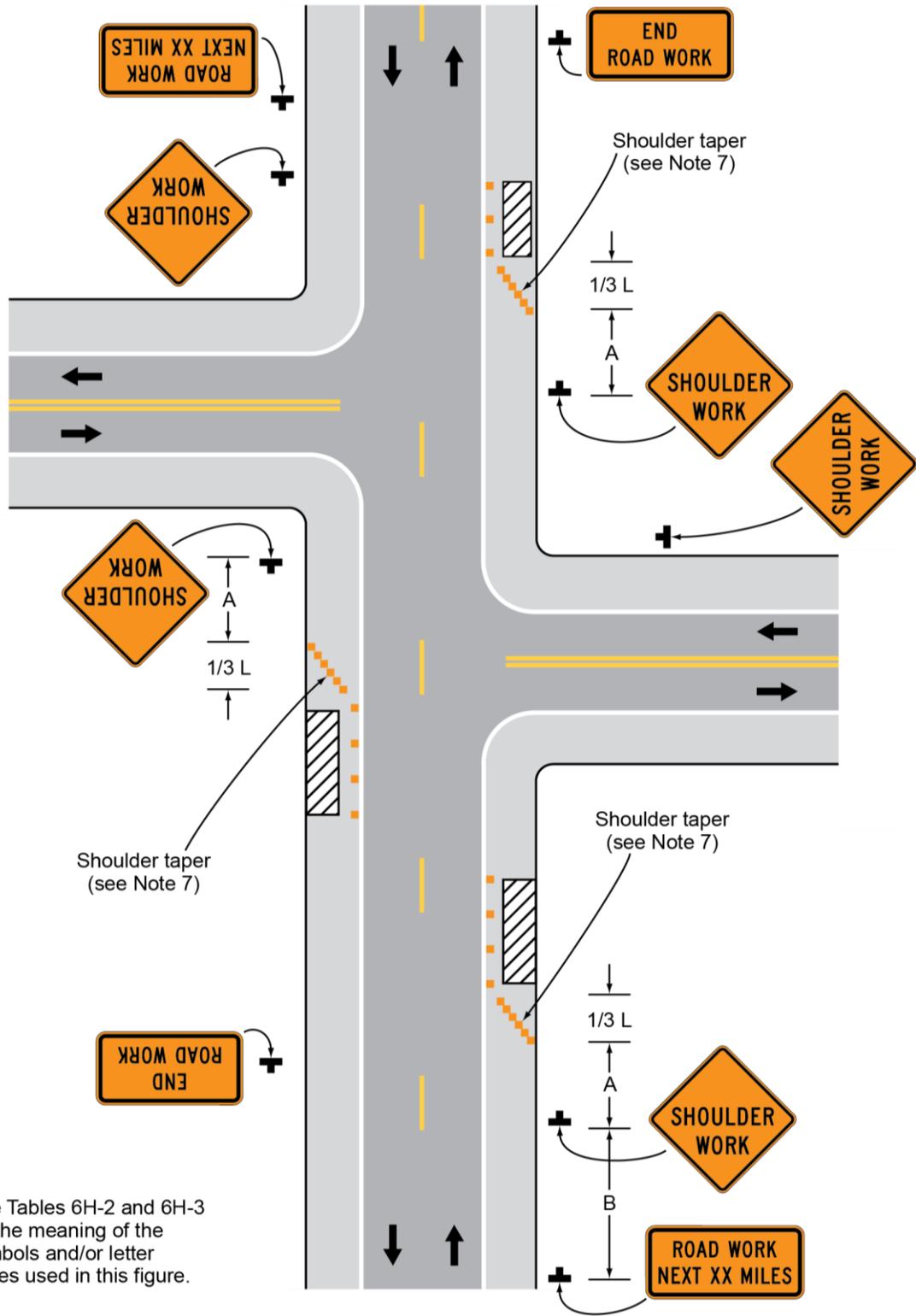
Option:

2. The Workers symbol signs may be used instead of *SHOULDER WORK* signs.
3. The *SHOULDER WORK AHEAD* sign on an intersecting roadway may be omitted where drivers emerging from that roadway will encounter another advance warning sign prior to this activity area.
4. For short-duration operations of 60 minutes or less, all signs and channelizing devices may be eliminated if a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.
5. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

6. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**
7. **When paved shoulders having a width of 8 feet or more are closed, at least one advance warning sign shall be used. In addition, channelizing devices shall be used to close the shoulder in advance to delineate the beginning of the work space and direct vehicular traffic to remain within the traveled way.**

Figure 6H-3. Work on the Shoulders (TA-3)



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 3

Notes for Figure 6H-4—Typical Application 4
Short-Duration or Mobile Operation on a Shoulder

Guidance:

1. *In those situations where multiple work locations within a limited distance make it practical to place stationary signs, the distance between the advance warning sign and the work should not exceed 5 miles.*
2. *In those situations where the distance between the advance signs and the work is 2 miles to 5 miles, a Supplemental Distance plaque should be used with the ROAD WORK AHEAD sign.*

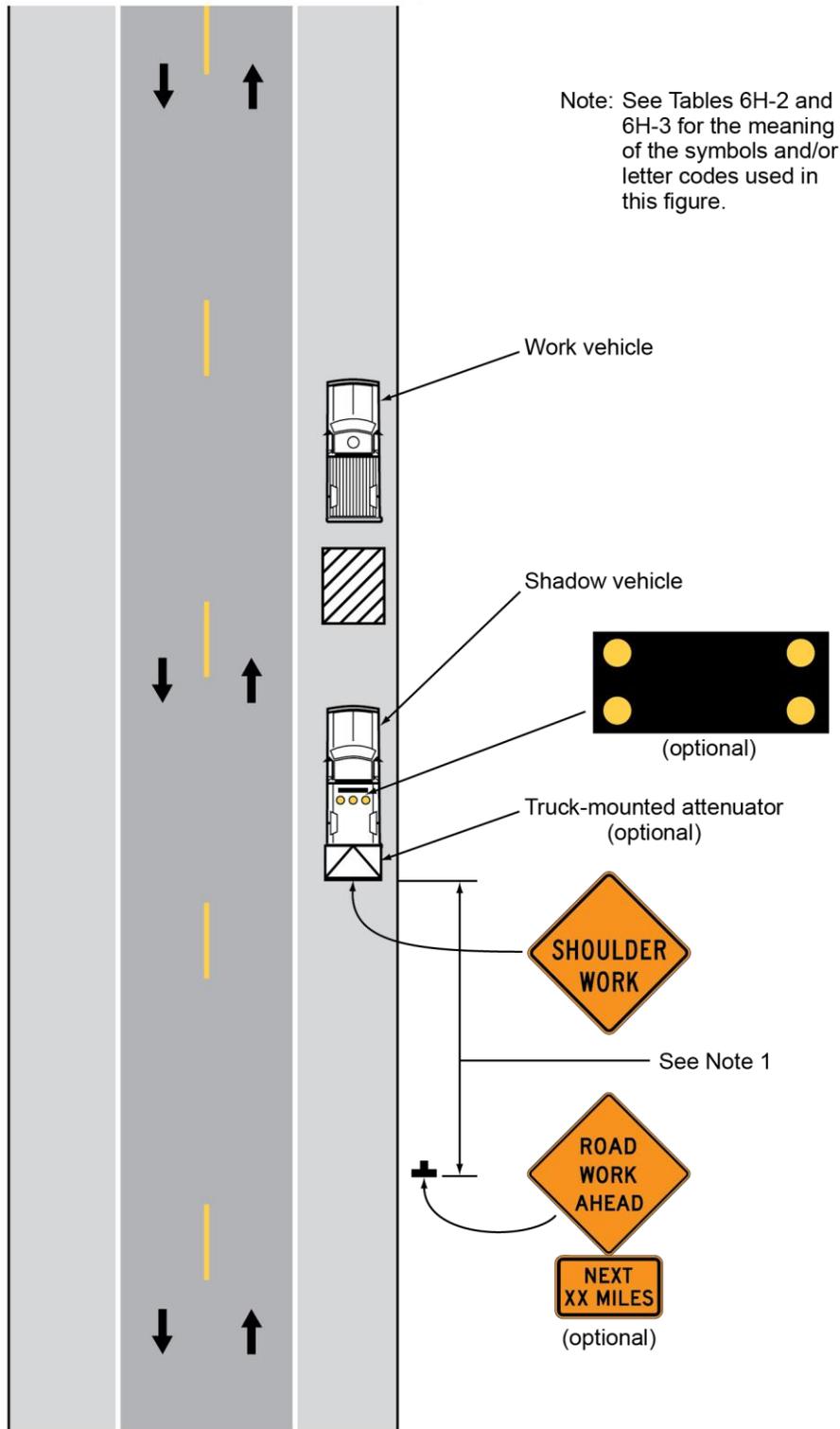
Option:

3. The ROAD WORK NEXT XX MILES sign may be used instead of the ROAD WORK AHEAD sign if the work locations occur over a distance of more than 2 miles.
4. Stationary warning signs may be omitted for short-duration or mobile operations if the work vehicle displays high-intensity rotating, flashing, oscillating, or strobe lights.
5. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

6. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**
7. **If an arrow board is used for an operation on the shoulder, the caution mode shall be used.**
8. **Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.**

Figure 6H-4. Short-Duration or Mobile Operation on a Shoulder (TA-4)



Typical Application 4

Notes for Figure 6H-5—Typical Application 5
Shoulder Closure on a Freeway

Guidance:

1. *SHOULDER CLOSED* signs should be used on limited-access highways where there is no opportunity for disabled vehicles to pull off the roadway.
2. If drivers cannot see a pull-off area beyond the closed shoulder, information regarding the length of the shoulder closure should be provided in feet or miles, as appropriate.
3. The use of a temporary traffic barrier should be based on engineering judgment.

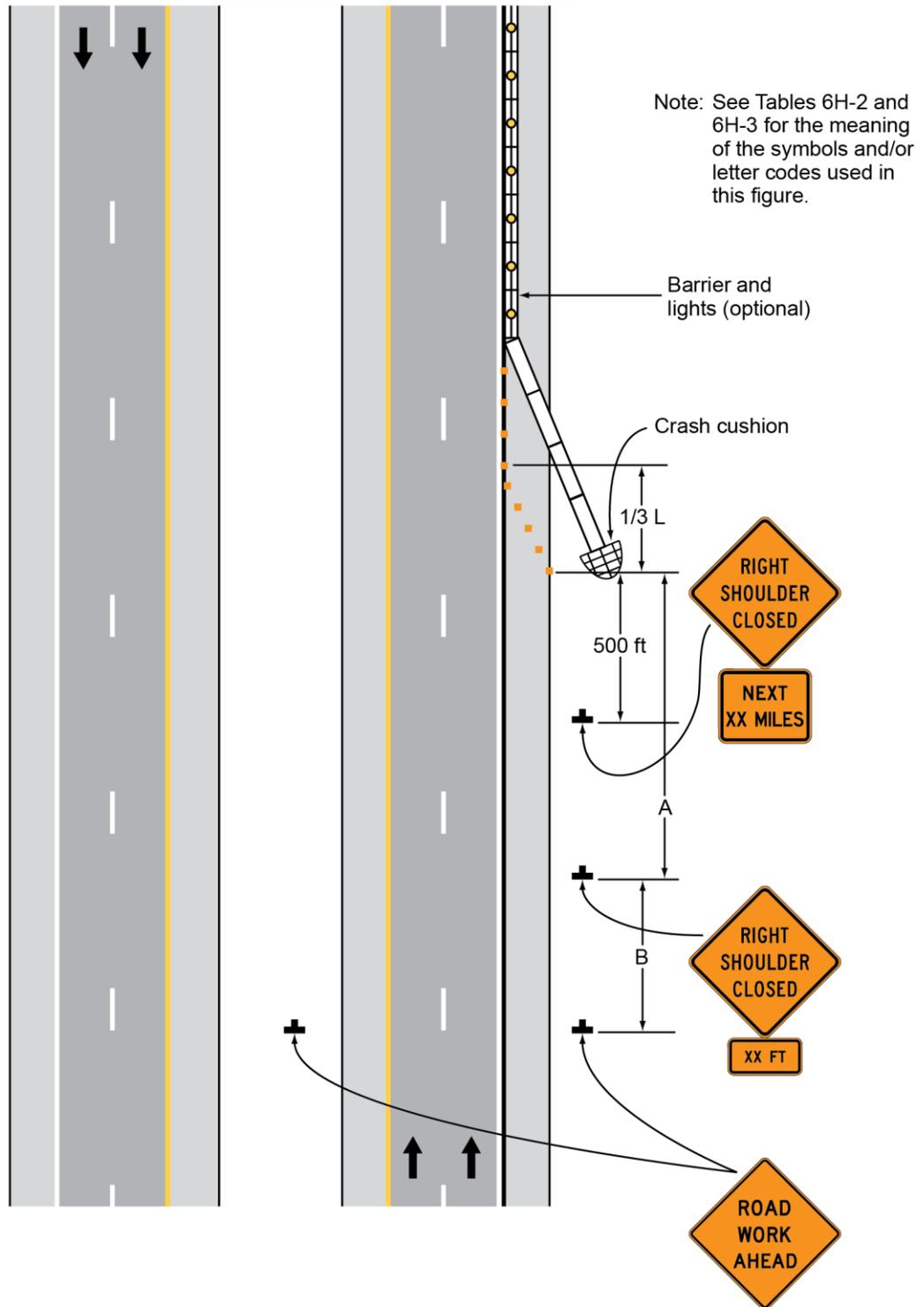
Standard:

- 4. Temporary traffic barriers, if used, shall comply with the provisions of Section 6F.85.**

Option:

5. The barrier shown in this typical application is an example of one method that may be used to close a shoulder of a long-term project.
6. The warning lights shown on the barrier may be used.

Figure 6H-5. Shoulder Closure on a Freeway (TA-5)



Typical Application 5

Notes for Figure 6H-6—Typical Application 6

Shoulder Work with Minor Encroachment

Guidance:

1. All lanes should be a minimum of 10 feet in width as measured to the near face of the channelizing devices.
2. The treatment shown should be used on a minor road having low speeds. For higher-speed traffic conditions, a lane closure should be used.

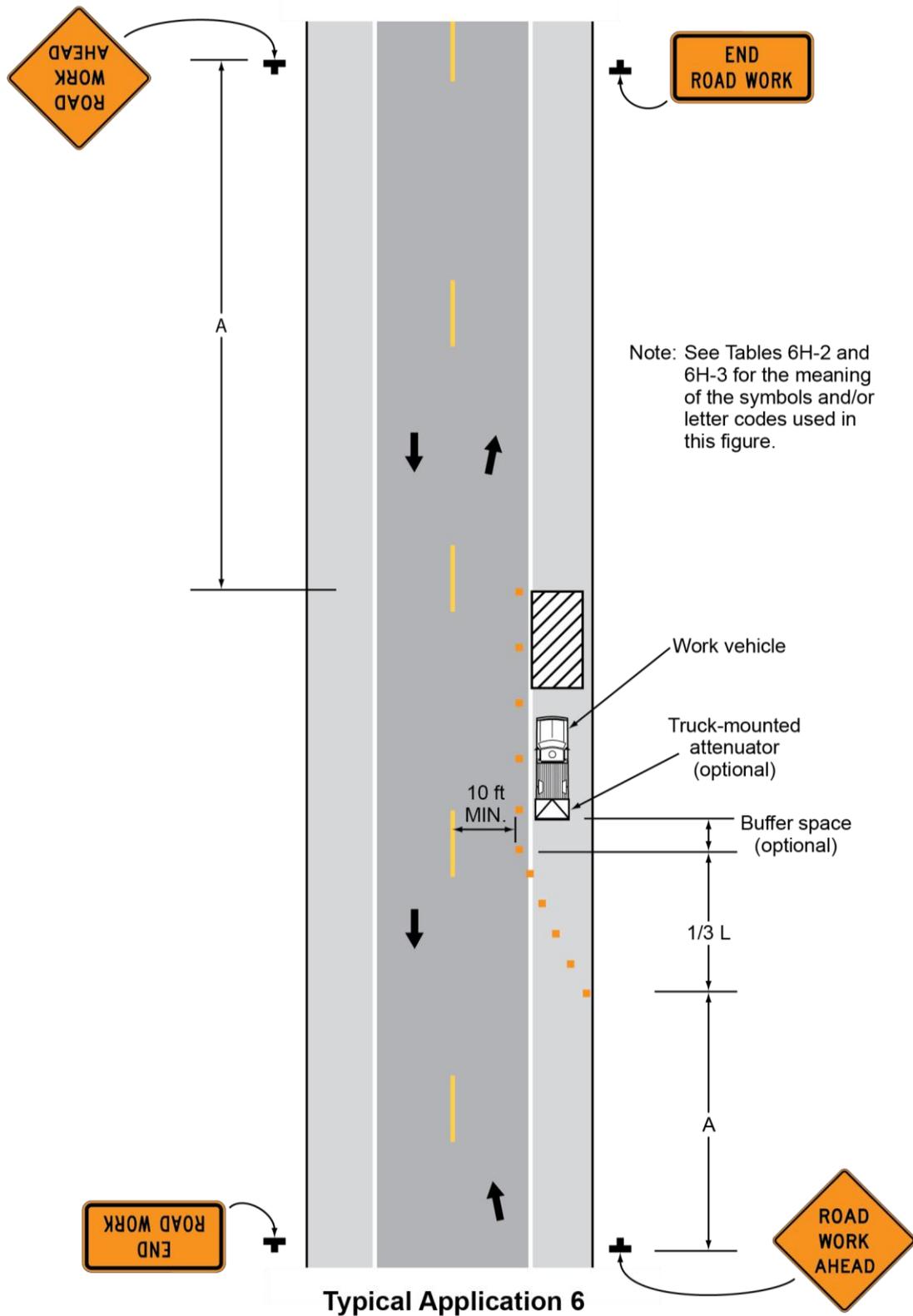
Option:

3. For short-term use on low-volume, low-speed roadways with vehicular traffic that does not include longer and wider heavy commercial vehicles, a minimum lane width of 9 feet may be used.
4. Where the opposite shoulder is suitable for carrying vehicular traffic and of adequate width, lanes may be shifted by use of closely spaced channelizing devices, provided that the minimum lane width of 10 feet is maintained.
5. Additional advance warning may be appropriate, such as a ROAD NARROWS sign.
6. Temporary traffic barriers may be used along the work space.
7. The shadow vehicle may be omitted if a taper and channelizing devices are used.
8. A truck-mounted attenuator may be used on the shadow vehicle.
9. For short-duration work, the taper and channelizing devices may be omitted if a shadow vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.
10. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

11. Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.
12. Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.
13. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.

Figure 6H-6. Shoulder Work with Minor Encroachment (TA-6)



Notes for Figure 6H-7—Typical Application 7
Road Closure with a Diversion

Support:

1. Signs and object markers are shown for one direction of travel only.

Standard:

2. **Devices similar to those depicted shall be placed for the opposite direction of travel.**
3. **Pavement markings no longer applicable to the traffic pattern of the roadway shall be removed or obliterated before any new traffic patterns are open to traffic.**
4. **Temporary barriers and end treatments shall be crashworthy.**

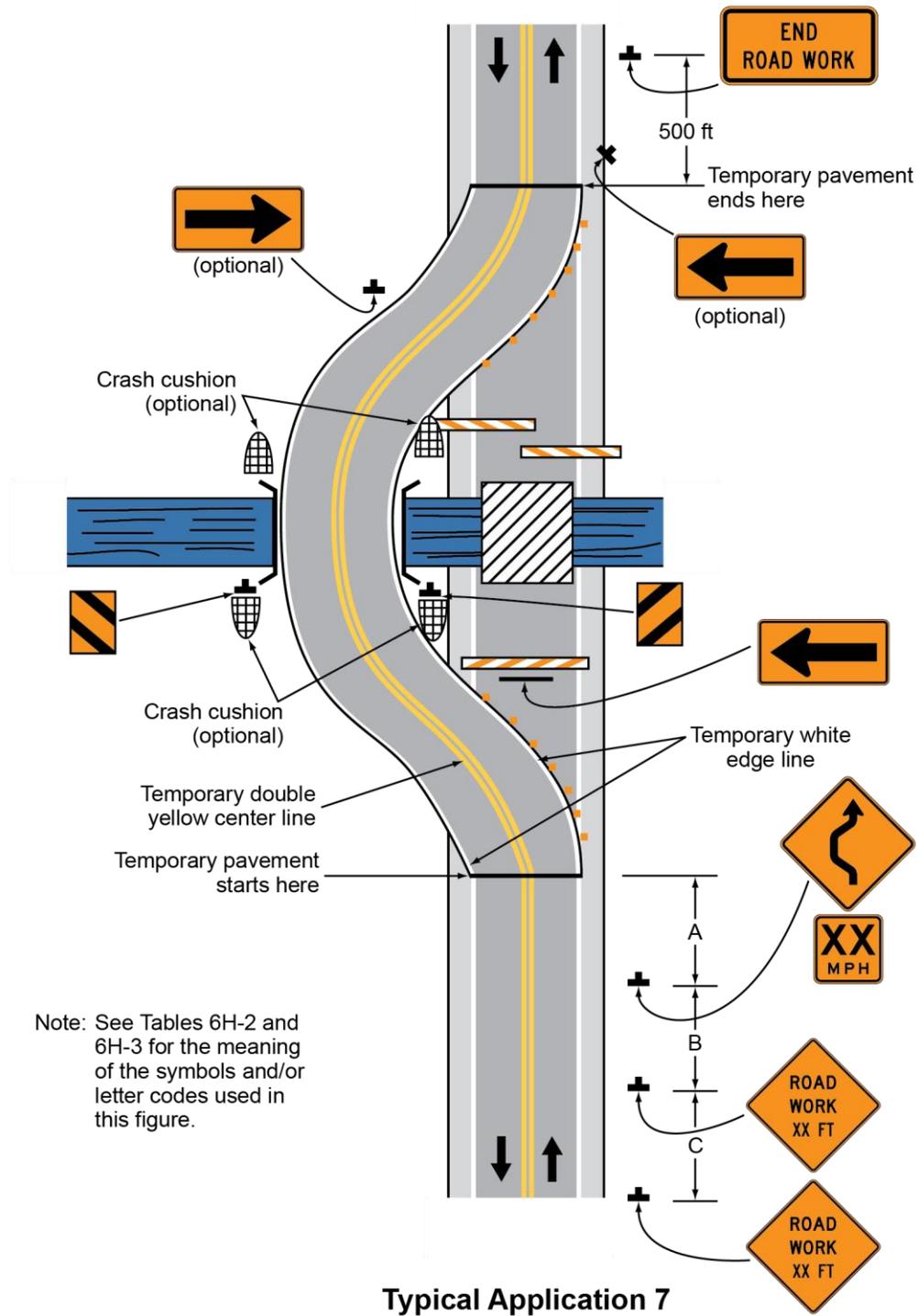
Guidance:

5. *If the tangent distance along the temporary diversion is more than 600 feet, a Reverse Curve sign, left first, should be used instead of the Double Reverse Curve sign, and a second Reverse Curve sign, right first, should be placed in advance of the second reverse curve back to the original alignment.*
6. *When the tangent section of the diversion is more than 600 feet, and the diversion has sharp curves with recommended speeds of 30 mph or less, Reverse Turn signs should be used.*
7. *Where the temporary pavement and old pavement are different colors, the temporary pavement should start on the tangent of the existing pavement and end on the tangent of the existing pavement.*

Option:

8. Flashing warning lights and/or flags may be used to call attention to the warning signs.
9. On sharp curves, large arrow signs may be used in addition to other advance warning signs.
10. Delineators or channelizing devices may be used along the diversion.

Figure 6H-7. Road Closure with a Diversion (TA-7)



Notes for Figure 6H-8—Typical Application 8

Road Closure with an Off-Site Detour

Guidance:

1. *Regulatory traffic control devices should be modified as needed for the duration of the detour.*
2. *If the road is opened for some distance beyond the intersection and/or there are significant origin/destination points beyond the intersection, the ROAD CLOSED and DETOUR signs on Type 3 Barricades should be located at the edge of the traveled way.*

Option:

3. If the road is closed a short distance beyond the intersection and there are few origin/destination points beyond (for example, a few residences), the Type 3 Barricade shown in the figure may be moved to the center of the traveled lanes.

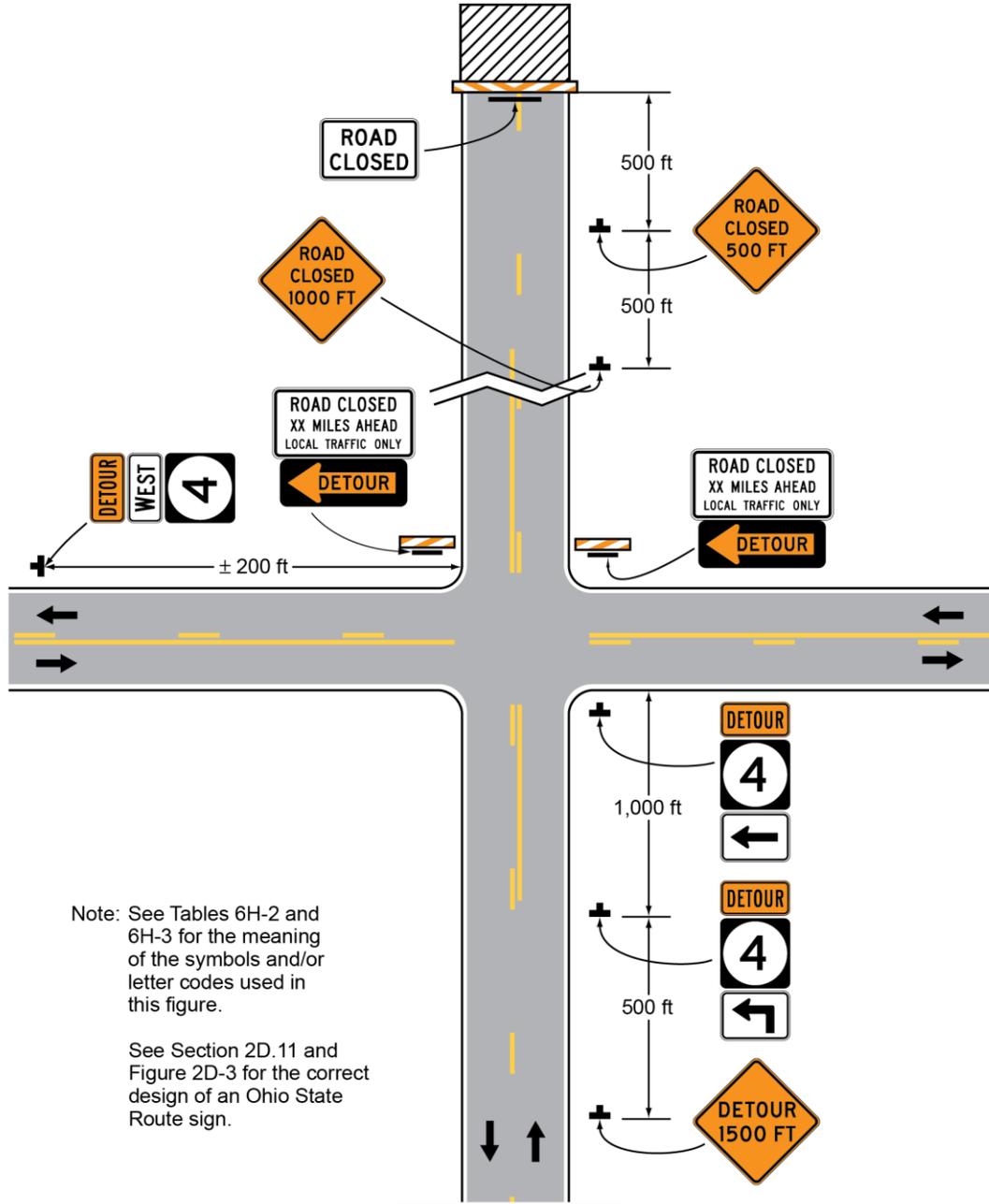
Standard:

4. **If the barricades are located as in Item 3 above, the ROAD CLOSED and DETOUR signs shall be placed only on the barricade centered in the lane of travel of traffic approaching the closure. The barricade centered in the lane of travel of departing traffic shall not be signed. The barricades in adjacent lanes shall be offset longitudinally from each other an adequate distance in order to permit traffic to travel around the barricades (the barricade in the road user's lane located in advance of the barricade located left of the center line).**

Option:

5. A Route Sign Directional assembly may be placed on the far left corner of the intersection to augment or replace the one shown on the near right corner.
6. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
7. Cardinal direction plaques may be used with route signs.

Figure 6H-8. Road Closure with an Off-Site Detour (TA-8)



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

See Section 2D.11 and Figure 2D-3 for the correct design of an Ohio State Route sign.

Typical Application 8

Notes for Figure 6H-9—Typical Application 9
Overlapping Routes with a Detour

Support:

1. TTC devices are shown for one direction of travel only.

Standard:

2. **Devices similar to those depicted shall be placed for the opposite direction of travel.**

Guidance:

3. *STOP or YIELD signs displayed to side roads should be installed as needed along the temporary route.*

Option:

4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
5. Flashing warning lights may be used on the Type 3 Barricades.
6. Cardinal direction plaques may be used with route signs.

Notes for Figure 6H-10—Typical Application 10
Lane Closure on a Two-Lane Road Using Flaggers

Option:

1. For low-volume situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger, positioned to be visible to road users approaching from both directions, may be used (see Chapter 6E).
2. The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short-duration operations.
3. Flashing warning lights and/or flags may be used to call attention to the advance warning signs. A BE PREPARED TO STOP sign may be added to the sign series.

Guidance:

4. *The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped vehicles.*

Standard:

5. **At night, flagger stations shall be illuminated, except in emergencies.**

Guidance:

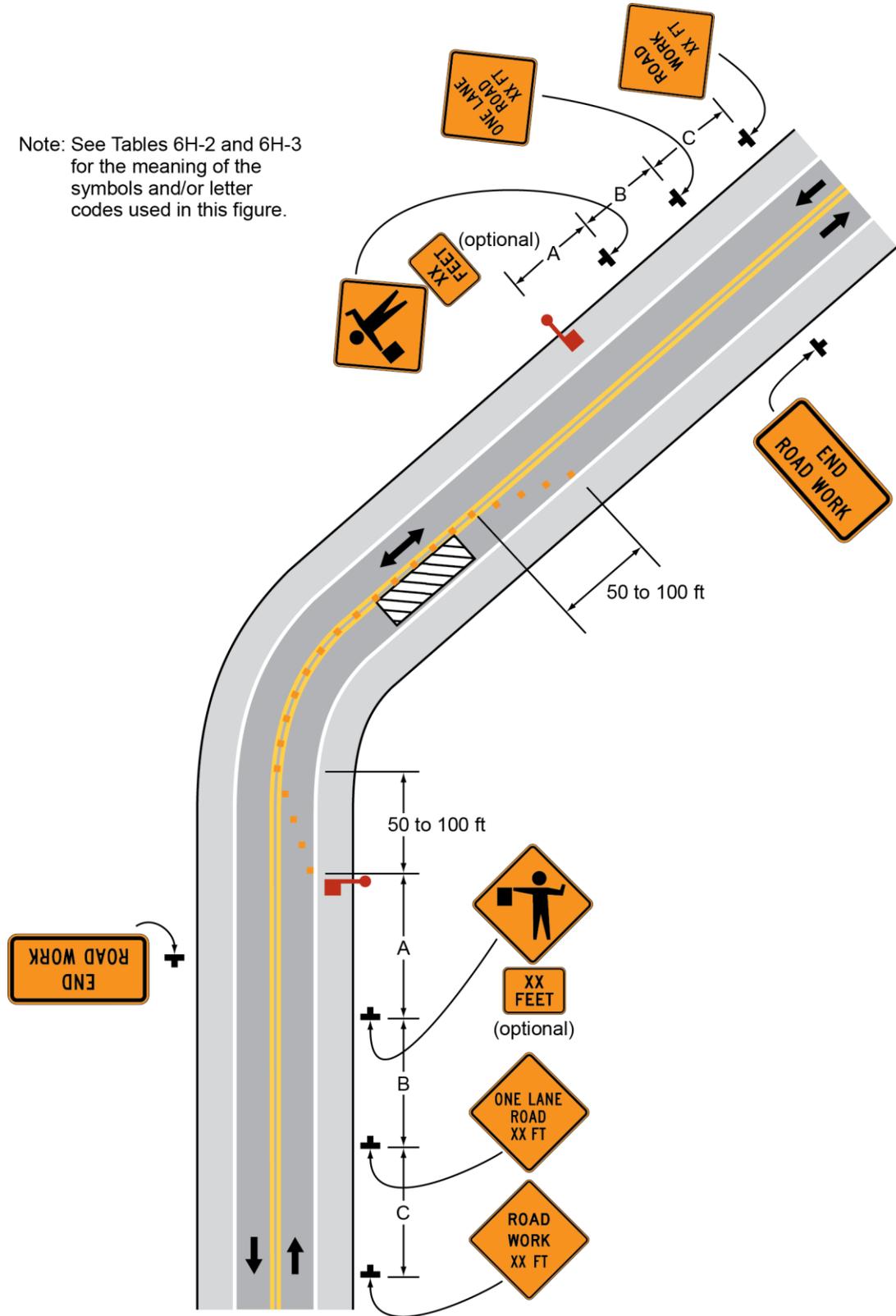
6. *When used, the BE PREPARED TO STOP sign should be located between the Flagger sign and the ONE LANE ROAD sign.*
7. *When a grade crossing exists within or upstream of the transition area and it is anticipated that queues resulting from the lane closure might extend through the grade crossing, the TTC zone should be extended so that the transition area precedes the grade crossing.*
8. *When a grade crossing equipped with active warning devices exists within the activity area, provisions should be made for keeping flaggers informed as to the activation status of these warning devices.*
9. *When a grade crossing exists within the activity area, drivers operating on the left-hand side of the normal center line should be provided with comparable warning devices as for drivers operating on the right-hand side of the normal center line.*
10. *Early coordination with the railroad company or light rail transit agency should occur before work starts.*

Option:

11. A flagger or a uniformed law enforcement officer may be used at the grade crossing to minimize the probability that vehicles are stopped within 15 feet of the grade crossing, measured from both sides of the outside rails.

Figure 6H-10. Lane Closure on a Two-Lane Road Using Flaggers (TA-10)

Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.



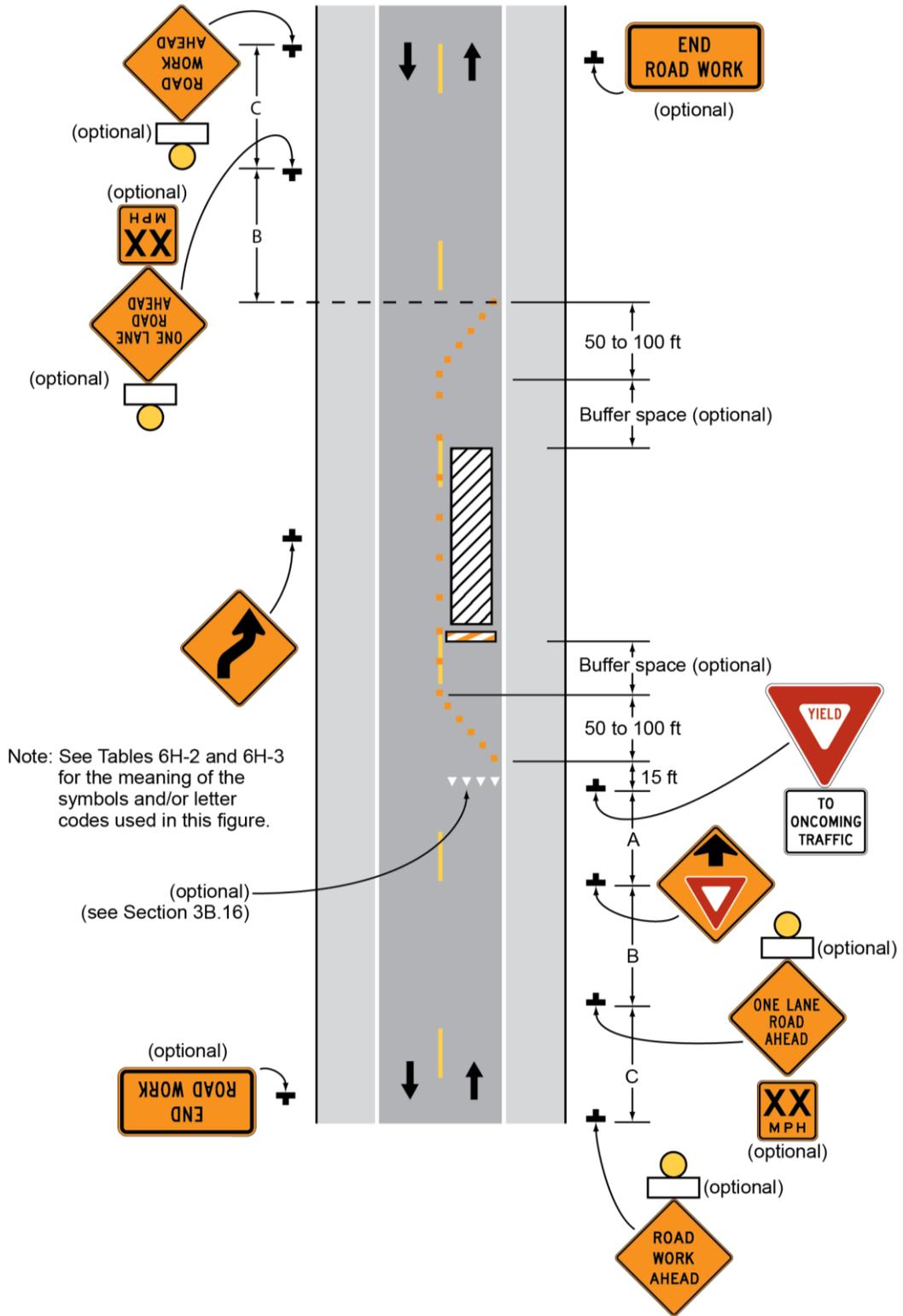
Typical Application 10

Notes for Figure 6H-11—Typical Application 11
Lane Closure on a Two-Lane Road with Low Traffic Volumes

Option:

1. This TTC zone application may be used as an alternate to the TTC application shown in Figure 6H-10 (using flaggers) when the following conditions exist:
 - a. Vehicular traffic volume is such that sufficient gaps exist for vehicular traffic that must yield.
 - b. Road users from both directions are able to see approaching vehicular traffic through and beyond the work site and have sufficient visibility of approaching vehicles.
2. The Type B flashing warning lights may be placed on the ROAD WORK AHEAD and the ONE LANE ROAD AHEAD signs whenever a night lane closure is necessary. For additional information on proper use of warning lights, see Section 6F.83.

Figure 6H-11. Lane Closure on a Two-Lane Road with Low Traffic Volumes (TA-11)



Typical Application 11

Notes for Figure 6H-12—Typical Application 12
Lane Closure on a Two-Lane Road Using Traffic Control Signals

Standard:

1. Temporary traffic control signals shall be installed and operated in accordance with the provisions of Part 4. Temporary traffic control signals shall meet the physical display and operational requirements of conventional traffic control signals.
2. Temporary traffic control signal timing shall be established by authorized officials. Durations of red clearance intervals shall be adequate to clear the one-lane section of conflicting vehicles.
3. When the temporary traffic control signal is changed to the flashing mode, either manually or automatically, red signal indications shall be flashed to both approaches.
4. Stop lines shall be installed with temporary traffic control signals for intermediate and long-term closures. Existing conflicting pavement markings and raised pavement marker reflectors between the activity area and the stop line shall be removed. After the temporary traffic control signal is removed, the stop lines and other temporary pavement markings shall be removed and the permanent pavement markings restored.
5. Safeguards shall be incorporated to avoid the possibility of conflicting signal indications at each end of the TTC zone.

Guidance:

6. *Where no-passing lines are not already in place, they should be added.*
7. *Adjustments in the location of the advance warning signs should be made as needed to accommodate the horizontal or vertical alignment of the roadway, recognizing that the distances shown for sign spacings are minimums. Adjustments in the height of the signal heads should be made as needed to conform to the vertical alignment.*

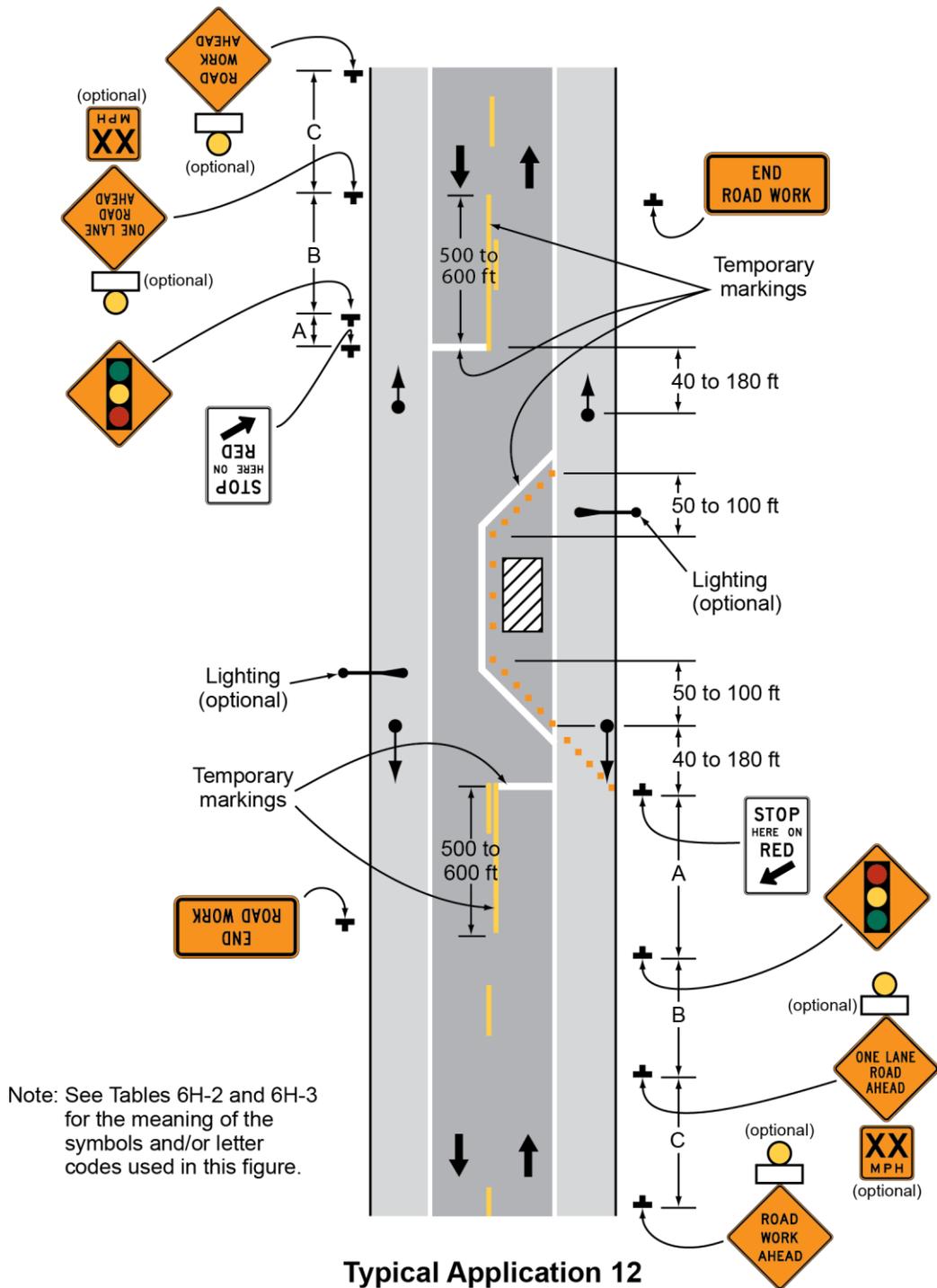
Option:

8. Flashing warning lights shown on the ROAD WORK AHEAD and the ONE LANE ROAD AHEAD signs may be used.
9. Removable pavement markings may be used.

Support:

10. Temporary traffic control signals are preferable to flaggers for long-term projects and other activities that would require flagging at night.
11. The maximum length of activity area for one-way operation under temporary traffic control signal control is determined by the capacity required to handle the peak demand.

Figure 6H-12. Lane Closure on a Two-Lane Road Using Traffic Control Signals (TA-12)



Notes for Figure 6H-13—Typical Application 13

Temporary Road Closure

Support:

1. Conditions represented are a planned closure not exceeding 20 minutes during the daytime.

Standard:

2. **A flagger or uniformed law enforcement officer shall be used for this application. The flagger, if used for this application, shall follow the procedures provided in Sections 6E.07 and 6E.08.**

Guidance:

3. *The uniformed law enforcement officer, if used for this application, should follow the procedures provided in Sections 6E.07 and 6E.08.*

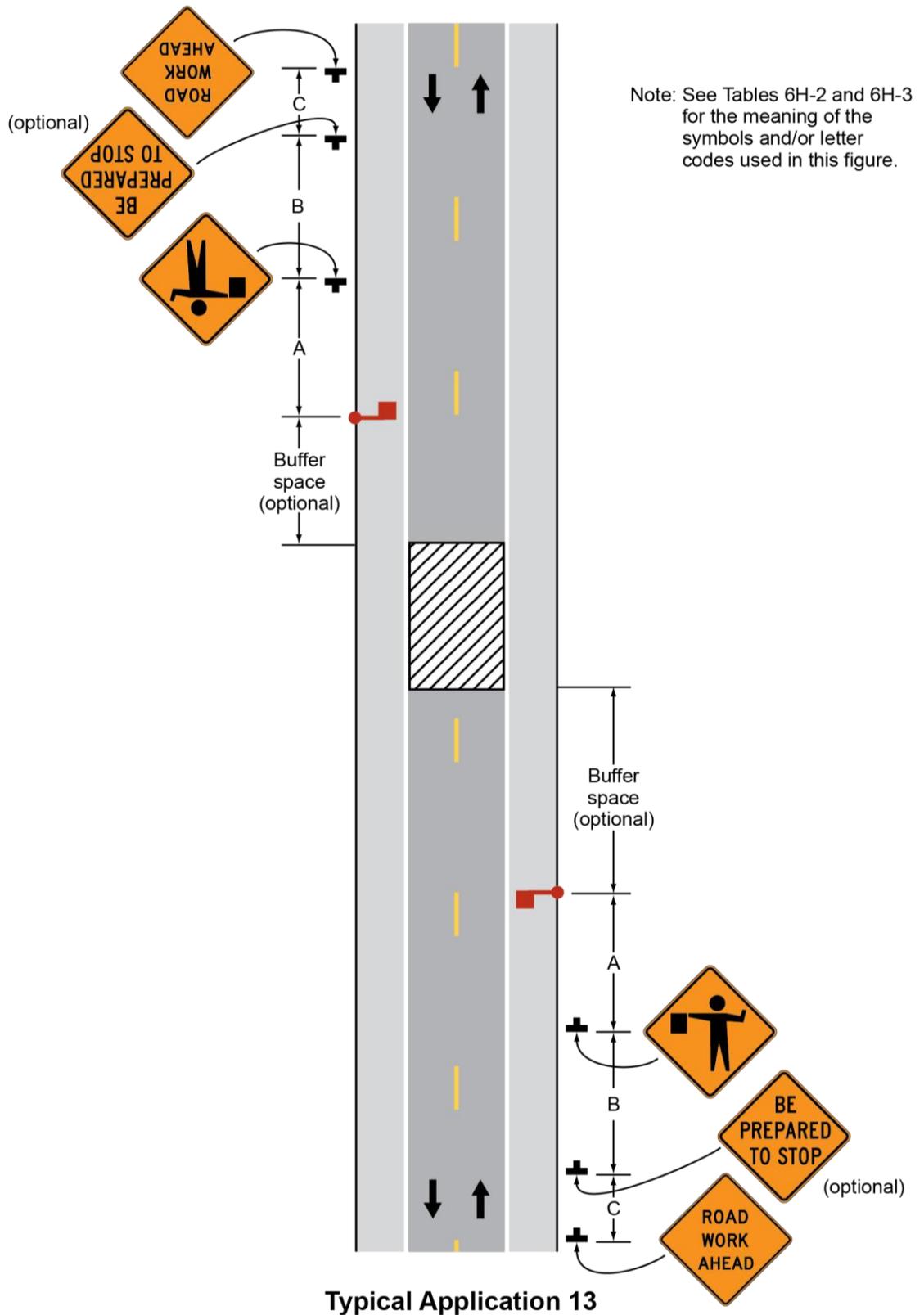
Option:

4. A BE PREPARED TO STOP sign may be added to the sign series.

Guidance:

5. *When used, the BE PREPARED TO STOP sign should be located before the Flagger symbol sign.*

Figure 6H-13. Temporary Road Closure (TA-13)



Typical Application 13

Notes for Figure 6H-14—Typical Application 14

Haul Road Crossing

Guidance:

1. Floodlights should be used to illuminate haul road crossings where existing light is inadequate.
2. Where no-passing lines are not already in place, they should be added.

Standard:

3. The traffic control method selected shall be used in both directions.

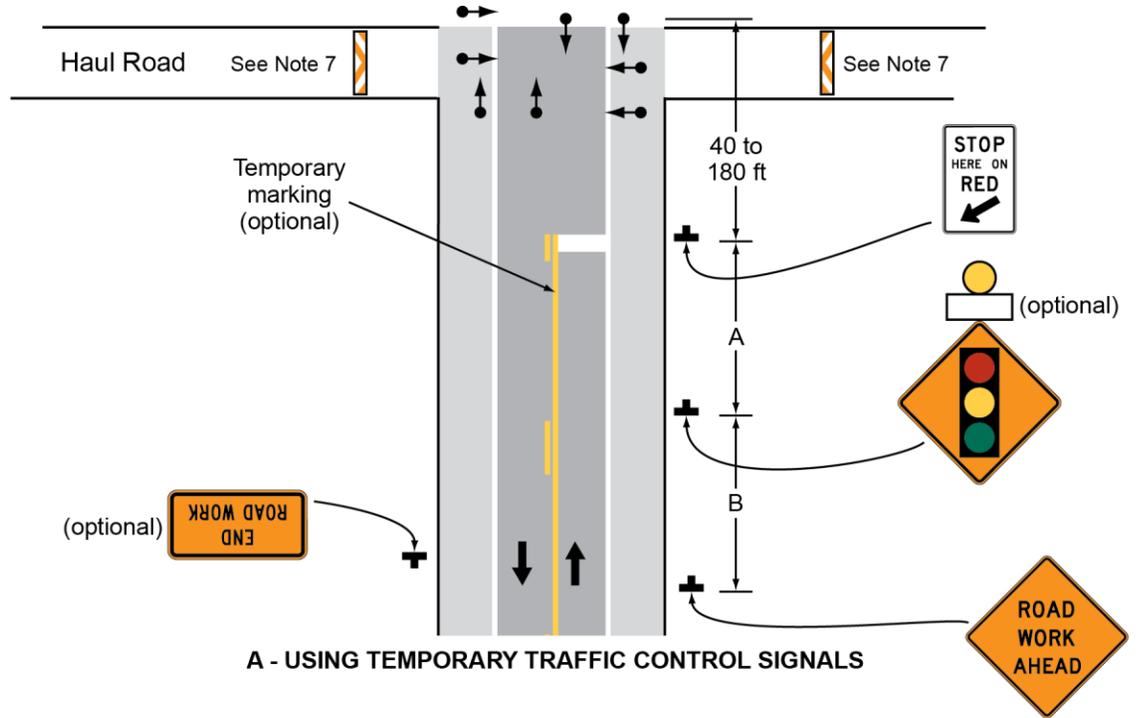
Flagging Method

4. When a road used exclusively as a haul road is not in use, the haul road shall be closed with Type 3 Barricades and the Flagger symbol signs covered.
5. The flagger shall follow the procedures provided in Sections 6E.07 and 6E.08.
6. At night, flagger stations shall be illuminated, except in emergencies.

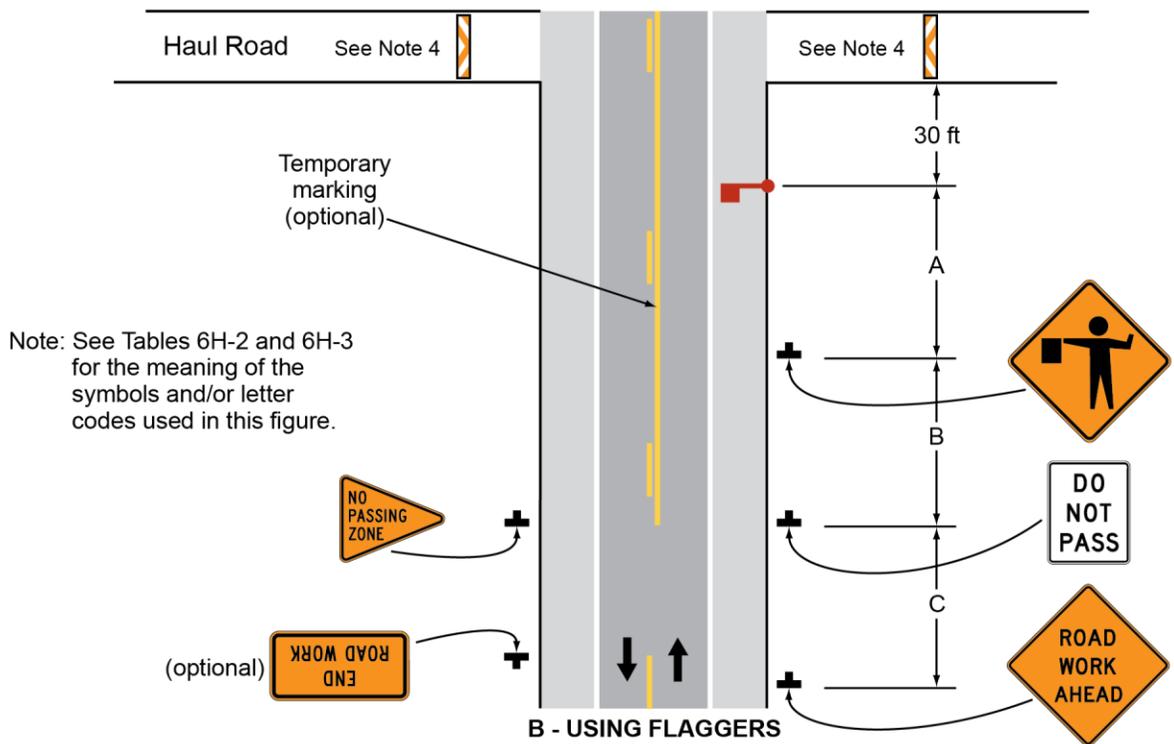
Signalized Method

7. When a road used exclusively as a haul road is not in use, the haul road shall be closed with Type 3 Barricades. The signals shall either flash yellow on the main road or be covered, and the Signal Ahead and STOP HERE ON RED signs shall be covered or hidden from view.
8. The temporary traffic control signals shall control both the highway and the haul road and shall meet the physical display and operational requirements of conventional traffic control signals as described in Part 4. Traffic control signal timing shall be established by authorized officials.
9. Stop lines shall be used on existing highway with temporary traffic control signals.
10. Existing conflicting pavement markings between the stop lines shall be removed. After the temporary traffic control signal is removed, the stop lines and other temporary pavement markings shall be removed and the permanent pavement markings restored.

Figure 6H-14. Haul Road Crossing (TA-14)



A - USING TEMPORARY TRAFFIC CONTROL SIGNALS



B - USING FLAGGERS

Typical Application 14

Notes for Figure 6H-15—Typical Application 15
Work in the Center of a Road with Low Traffic Volumes

Guidance:

1. *The lanes on either side of the center work space should have a minimum width of 10 feet as measured from the near edge of the channelizing devices to the edge of pavement or the outside edge of paved shoulder.*
2. *The shifting taper should be approximately L in length where speeds are 50 mph or greater (see Table 6C-3).*

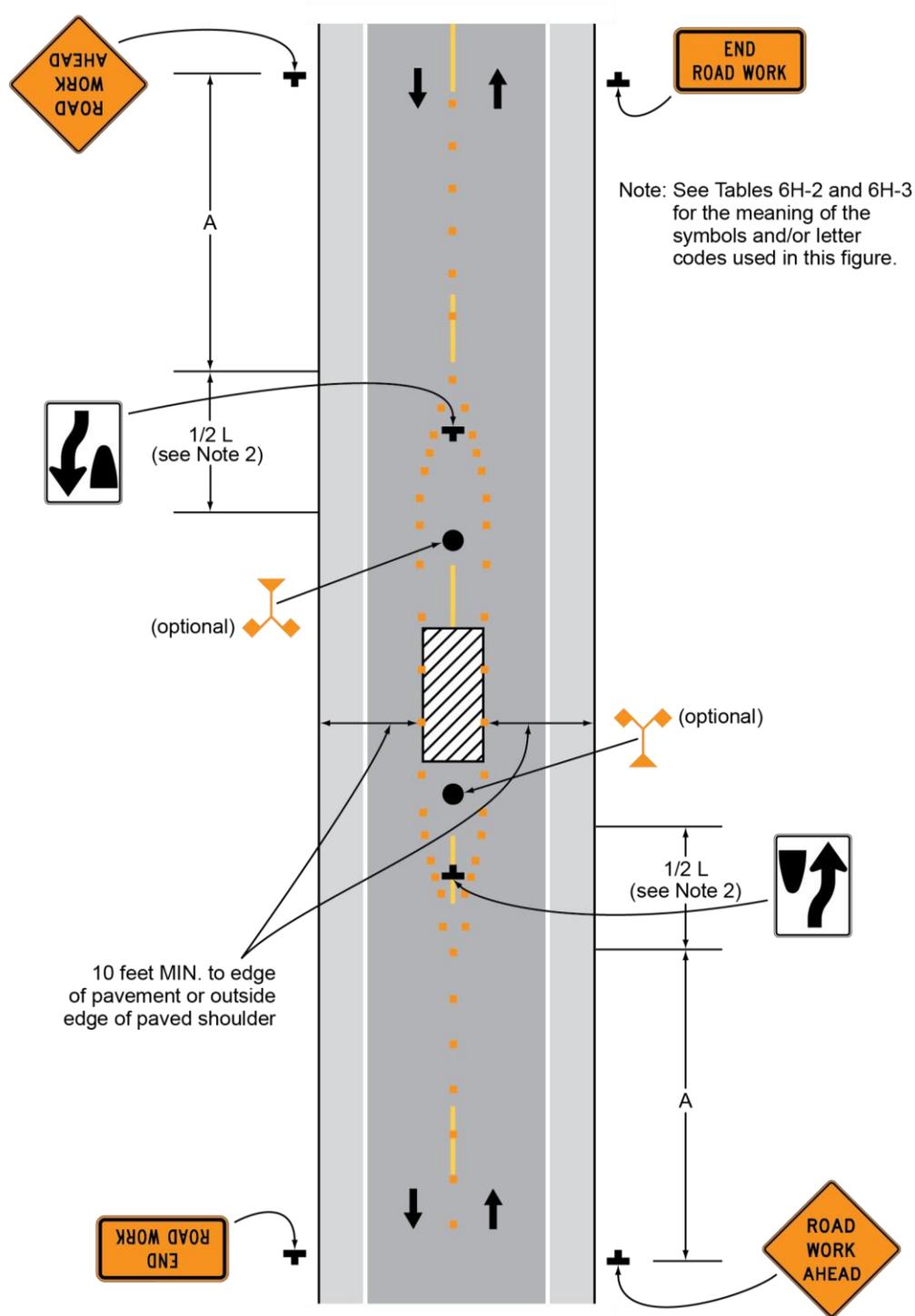
Option:

3. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
4. If the closure continues overnight, warning lights may be used on the channelizing devices.
5. A lane width of 9 feet may be used for short-term stationary work on low-volume, low-speed roadways when motor vehicle traffic does not include longer and wider heavy commercial vehicles.
6. A work vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights may be used instead of the channelizing devices forming the tapers or the high-level warning devices.
7. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

8. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Figure 6H-15. Work in the Center of a Road with Low Traffic Volumes (TA-15)



Typical Application 15

Notes for Figure 6H-16—Typical Application 16
Surveying Along the Center Line of a Road with Low Traffic Volumes

Guidance:

1. *The lanes on either side of the center work space should have a minimum width of 10 feet as measured from the near edge of the channelizing devices to the edge of the pavement or the outside edge of the paved shoulder.*
2. *Cones should be placed 6 to 12 inches on either side of the center line.*
3. *A flagger should be used to warn workers who cannot watch road users.*

Standard:

- 4. For surveying on the center line of a high-volume road, one lane shall be closed using the information illustrated in Figure 6H-10.**

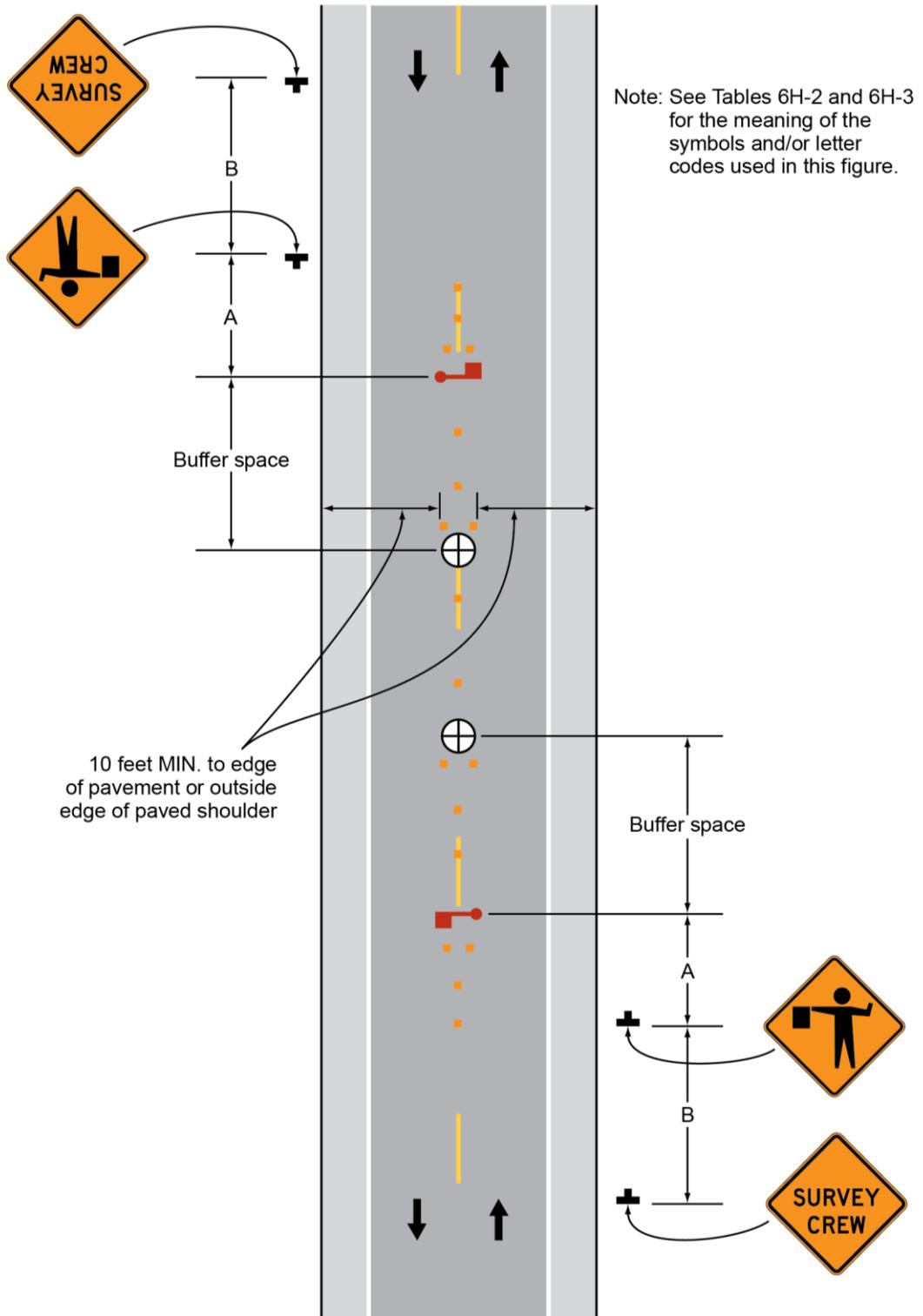
Option:

5. A high-level warning device may be used to protect a surveying device, such as a target on a tripod.
6. Cones may be omitted for a cross-section survey.
7. ROAD WORK AHEAD signs may be used in place of the SURVEY CREW signs.
8. Flags may be used to call attention to the advance warning signs.
9. If the work is along the shoulder, the flagger may be omitted.
10. For a survey along the edge of the road or along the shoulder, cones may be placed along the edge line.
11. A BE PREPARED TO STOP sign may be added to the sign series.

Guidance:

12. *When used, the BE PREPARED TO STOP sign should be located before the Flagger symbol sign.*

Figure 6H-16. Surveying Along the Center Line of a Road with Low Traffic Volumes (TA-16)



Typical Application 16

Notes for Figure 6H-17—Typical Application 17

Mobile Operations on a Two-Lane Road

Standard:

1. **Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.**
2. **Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.**
3. **If an arrow board is used, it shall be used in the caution mode.**

Guidance:

4. *Where practical and when needed, the work and shadow vehicles should pull over periodically to allow vehicular traffic to pass.*
5. *Whenever adequate stopping sight distance exists to the rear, the shadow vehicle should maintain the minimum distance from the work vehicle and proceed at the same speed. The shadow vehicle should slow down in advance of vertical or horizontal curves that restrict sight distance.*
6. *The shadow vehicles should also be equipped with two high-intensity flashing lights mounted on the rear, adjacent to the sign.*

Option:

7. The distance between the work and shadow vehicles may vary according to terrain, paint drying time, and other factors.
8. Additional shadow vehicles to warn and reduce the speed of oncoming or opposing vehicular traffic may be used. Law enforcement vehicles may be used for this purpose.
9. A truck-mounted attenuator may be used on the shadow vehicle or on the work vehicle.
10. If the work and shadow vehicles cannot pull over to allow vehicular traffic to pass frequently, a DO NOT PASS sign may be placed on the rear of the vehicle blocking the lane.

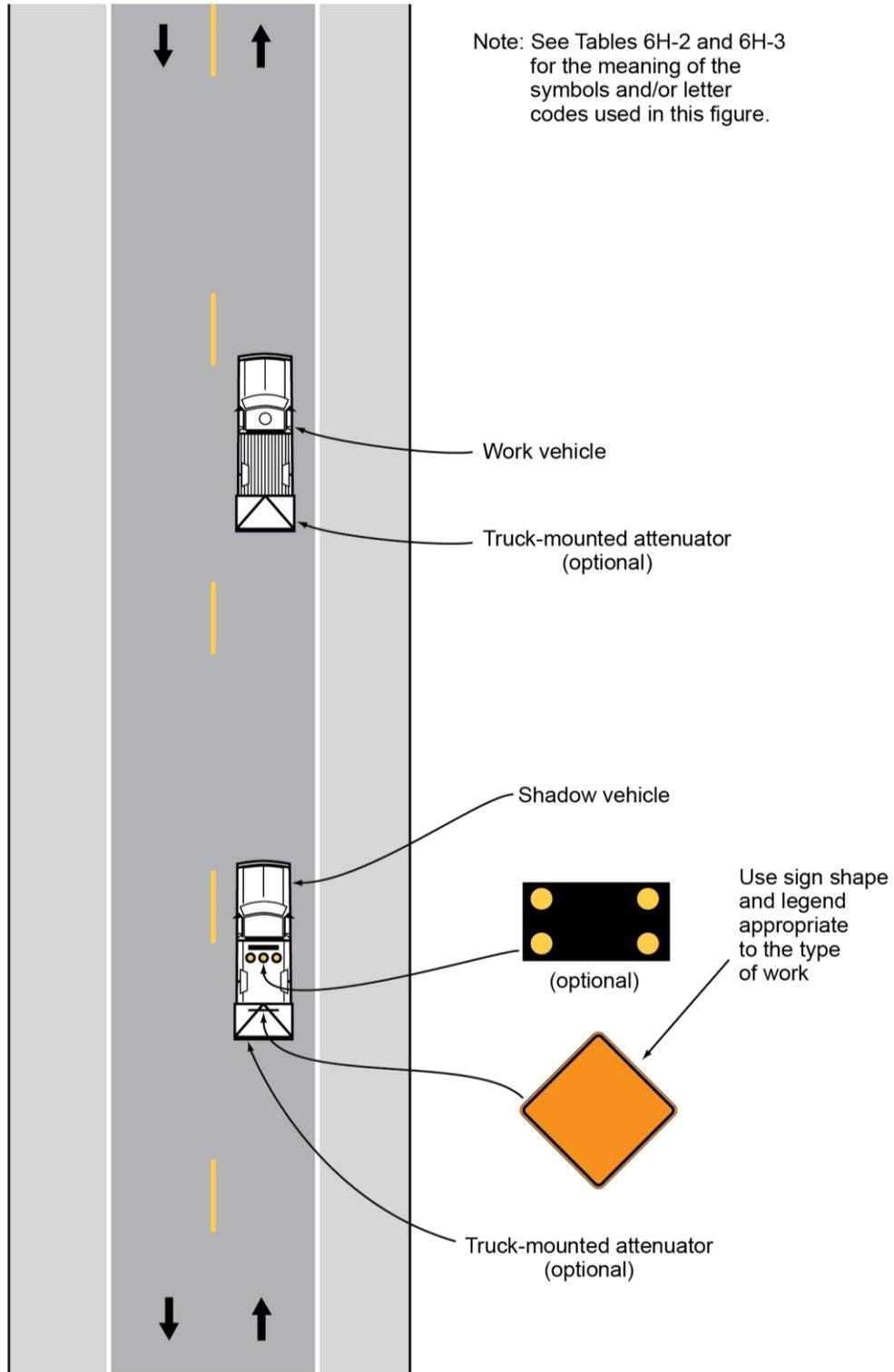
Support:

11. Shadow vehicles are used to warn motor vehicle traffic of the operation ahead.

Standard:

12. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Figure 6H-17. Mobile Operations on a Two-Lane Road (TA-17)



Typical Application 17

Notes for Figure 6H-18—Typical Application 18
Lane Closure on a Minor Street

Standard:

- 1. This TTC shall be used only for low-speed facilities having low traffic volumes.**

Option:

2. Where the work space is short, where road users can see the roadway beyond, and where volume is low, vehicular traffic may be self-regulating.

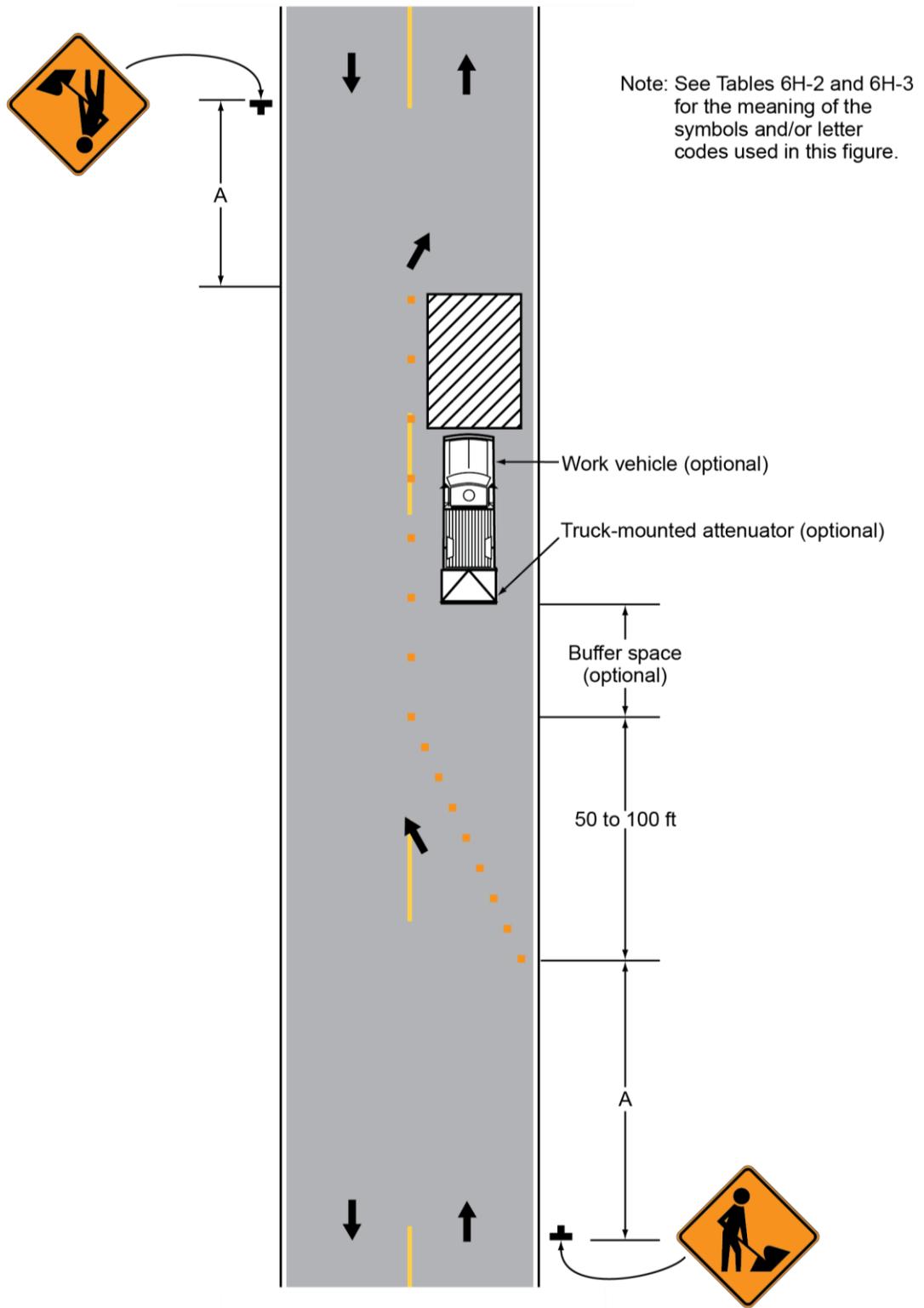
Standard:

- 3. Where vehicular traffic cannot effectively self-regulate, one or two flaggers shall be used as illustrated in Figure 6H-10.**

Option:

4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
5. A truck-mounted attenuator may be used on the work vehicle and the shadow vehicle.

Figure 6H-18. Lane Closure on a Minor Street (TA-18)



Typical Application 18

Notes for Figure 6H-19—Typical Application 19
Detour for One Travel Direction

Guidance:

1. *This plan should be used for streets without posted route numbers.*
2. *On multi-lane streets, Detour signs with an Advance Turn Arrow should be used in advance of a turn.*

Option:

3. The STREET CLOSED legend may be used in place of ROAD CLOSED.
4. Additional DO NOT ENTER signs may be used at intersections with intervening streets.
5. Warning lights may be used on Type 3 Barricades.
6. Detour signs may be located on the far side of intersections.
7. A Street Name sign may be mounted with the Detour sign. The Street Name sign may be either white on green or black on orange.

Standard:

8. **When used, the Street Name sign shall be placed above the Detour sign.**

Notes for Figure 6H-20—Typical Application 20
Detour for a Closed Street

Guidance:

1. *This plan should be used for streets without posted route numbers.*
2. *On multi-lane streets, Detour signs with an Advance Turn Arrow should be used in advance of a turn.*

Option:

3. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
4. Flashing warning lights may be used on Type 3 Barricades.
5. Detour signs may be located on the far side of intersections. A Detour sign with an advance arrow may be used in advance of a turn.
6. A Street Name sign may be mounted with the Detour sign. The Street Name sign may be either white on green or black on orange.

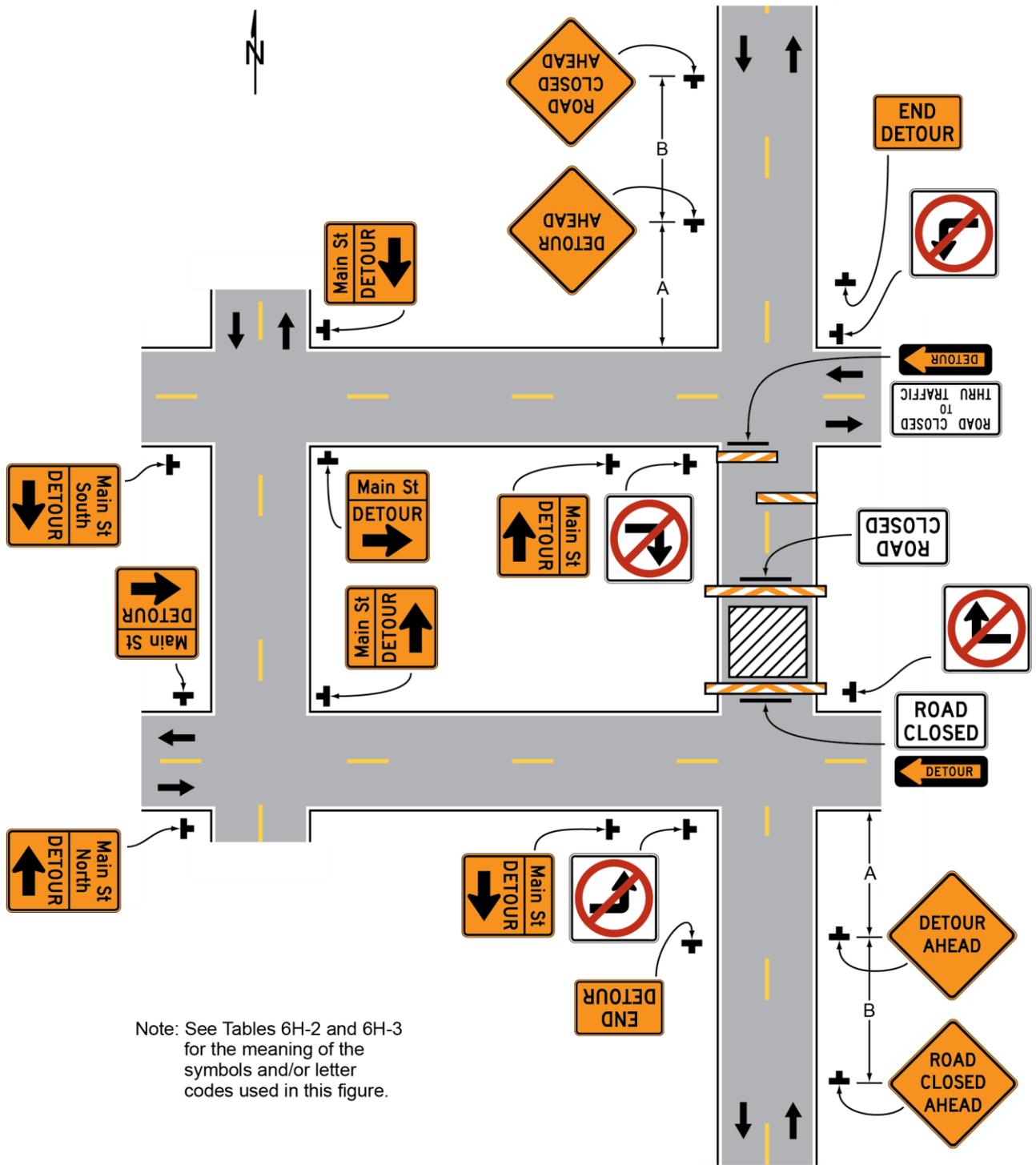
Standard:

- 7. When used, the Street Name sign shall be placed above the Detour sign.**

Support:

8. See Figure 6H-9 for the information for detouring a numbered highway.

Figure 6H-20. Detour for a Closed Street (TA-20)



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 20

Notes for Figure 6H-21—Typical Application 21

Lane Closure on the Near Side of an Intersection

Standard:

1. **The merging taper shall direct vehicular traffic into either the right-hand or left-hand lane, but not both.**

Guidance:

2. *In this typical application, a left taper should be used so that right-turn movements will not impede through vehicular traffic. However, the reverse should be true for left-turn movements.*
3. *If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure 6H-29.*

Option:

4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
5. A shadow vehicle with a truck-mounted attenuator may be used.
6. A work vehicle with high-intensity rotating, flashing, oscillating, or strobe lights may be used with the high-level warning device.
7. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

8. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Notes for Figure 6H-22—Typical Application 22
Right-Hand Lane Closure on the Far Side of an Intersection

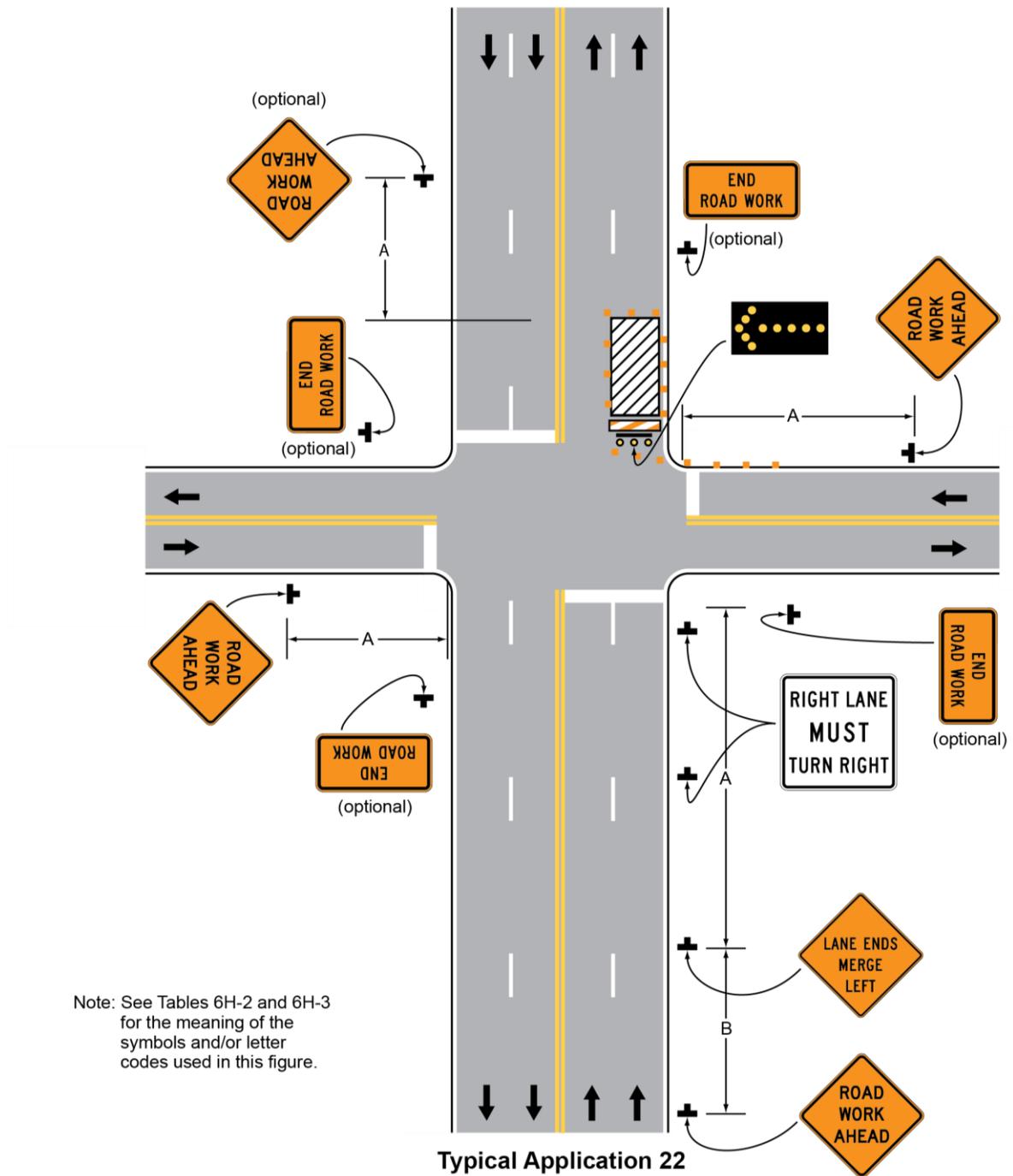
Guidance:

1. *If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure 6H-29.*

Option:

2. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. However, when this results in the closure of a right-hand lane having significant right turning movements, then the right-hand lane may be restricted to right turns only, as shown. This procedure increases the through capacity by eliminating right turns from the open through lane.
3. For intersection approaches reduced to a single lane, left-turning movements may be prohibited to maintain capacity for through vehicular traffic.
4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
5. Where the turning radius is large, it may be possible to create a right-turn island using channelizing devices or pavement markings.

Figure 6H-22. Right-Hand Lane Closure on the Far Side of an Intersection (TA-22)



Notes for Figure 6H-23—Typical Application 23
Left Lane Closure on the Far Side of an Intersection

Guidance:

1. *If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure 6H-29.*

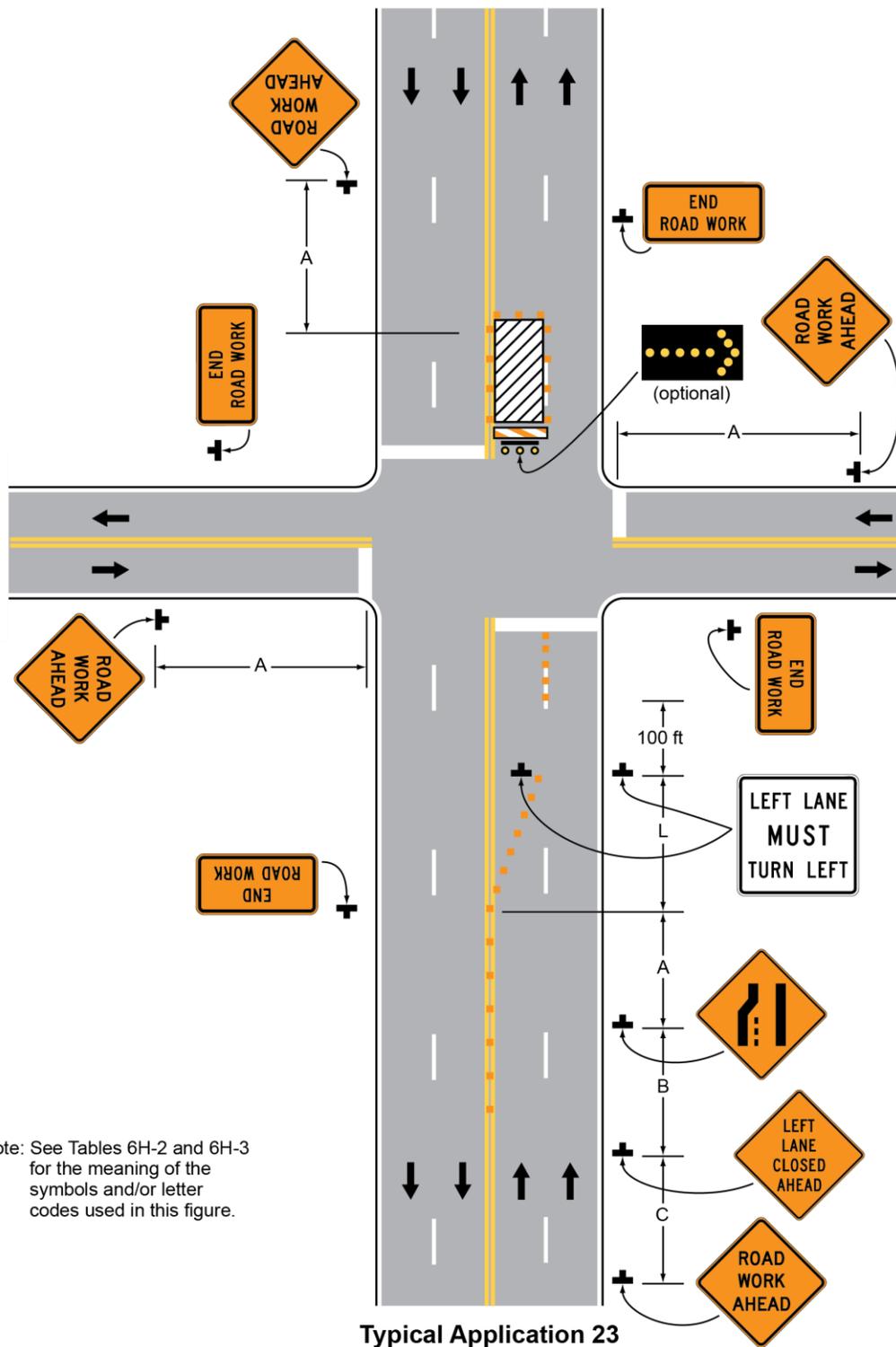
Option:

2. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
3. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. However, when this results in the closure of a left lane having significant left-turning movements, then the left lane may be reopened as a turn bay for left turns only, as shown.

Support:

4. By first closing off the left lane and then reopening it as a turn bay, the left-turn bay allows storage of turning vehicles so that the movement of through traffic is not impeded. A left-turn bay that is long enough to accommodate all turning vehicles during a traffic cycle will provide the maximum benefit for through traffic. Also, an island is created with channelizing devices that allows the LEFT LANE MUST TURN LEFT sign to be repeated on the left adjacent to the lane that it controls.

Figure 6H-23. Left Lane Closure on the Far Side of an Intersection (TA-23)



Notes for Figure 6H-24—Typical Application 24

Half Road Closure on the Far Side of an Intersection

Guidance:

1. *If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure 6H-29.*
2. *When turn prohibitions are implemented, two turn prohibition signs should be used, one on the near side and, space permitting, one on the far side of the intersection.*
3. *The shifting taper should be approximately L in length where speeds are 50 mph or greater (see Table 6C-3).*

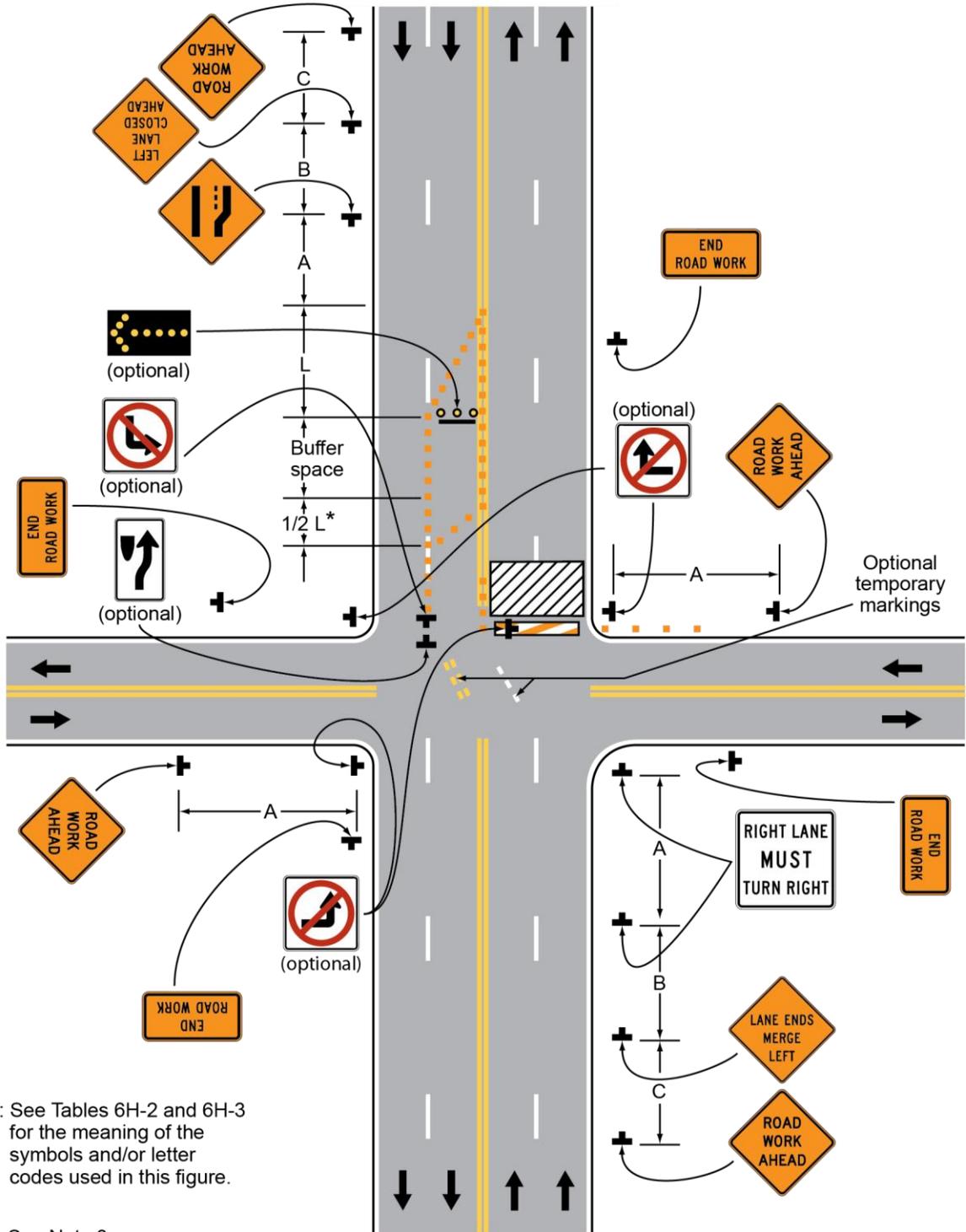
Option:

4. A buffer space may be used between opposing directions of vehicular traffic as shown in this application.
5. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. However, if there is a significant right-turning movement, then the right-hand lane may be restricted to right turns only, as shown.
6. Where the turning radius is large, a right-turn island using channelizing devices or pavement markings may be used.
7. There may be insufficient space to place the back-to-back Keep Right sign and No Left Turn symbol signs at the end of the row of channelizing devices separating opposing vehicular traffic flows. In this situation, the No Left Turn symbol sign may be placed on the right and the Keep Right sign may be omitted.
8. For intersection approaches reduced to a single lane, left-turning movements may be prohibited to maintain capacity for through vehicular traffic.
9. Flashing warning lights and/or flags may be used to call attention to advance warning signs.
10. Temporary pavement markings may be used to delineate the travel path through the intersection.

Support:

11. Keeping the right-hand lane open increases the through capacity by eliminating right turns from the open through lane.
12. A temporary turn island reinforces the nature of the temporary exclusive right-turn lane and enables a second RIGHT LANE MUST TURN RIGHT sign to be placed in the island.

Figure 6H-24. Half Road Closure on the Far Side of an Intersection (TA-24)



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

* See Note 3.

Typical Application 24

Notes for Figure 6H-25—Typical Application 25**Multiple Lane Closures at an Intersection***Guidance:*

1. *If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure 6H-29.*
2. *If the left through lane is closed on the near-side approach, the **LEFT LANE MUST TURN LEFT** sign should be placed in the median to discourage through vehicular traffic from entering the left-turn bay.*
3. *The shifting taper should be approximately L in length where speeds are 50 mph or greater (see Table 6C-3).*

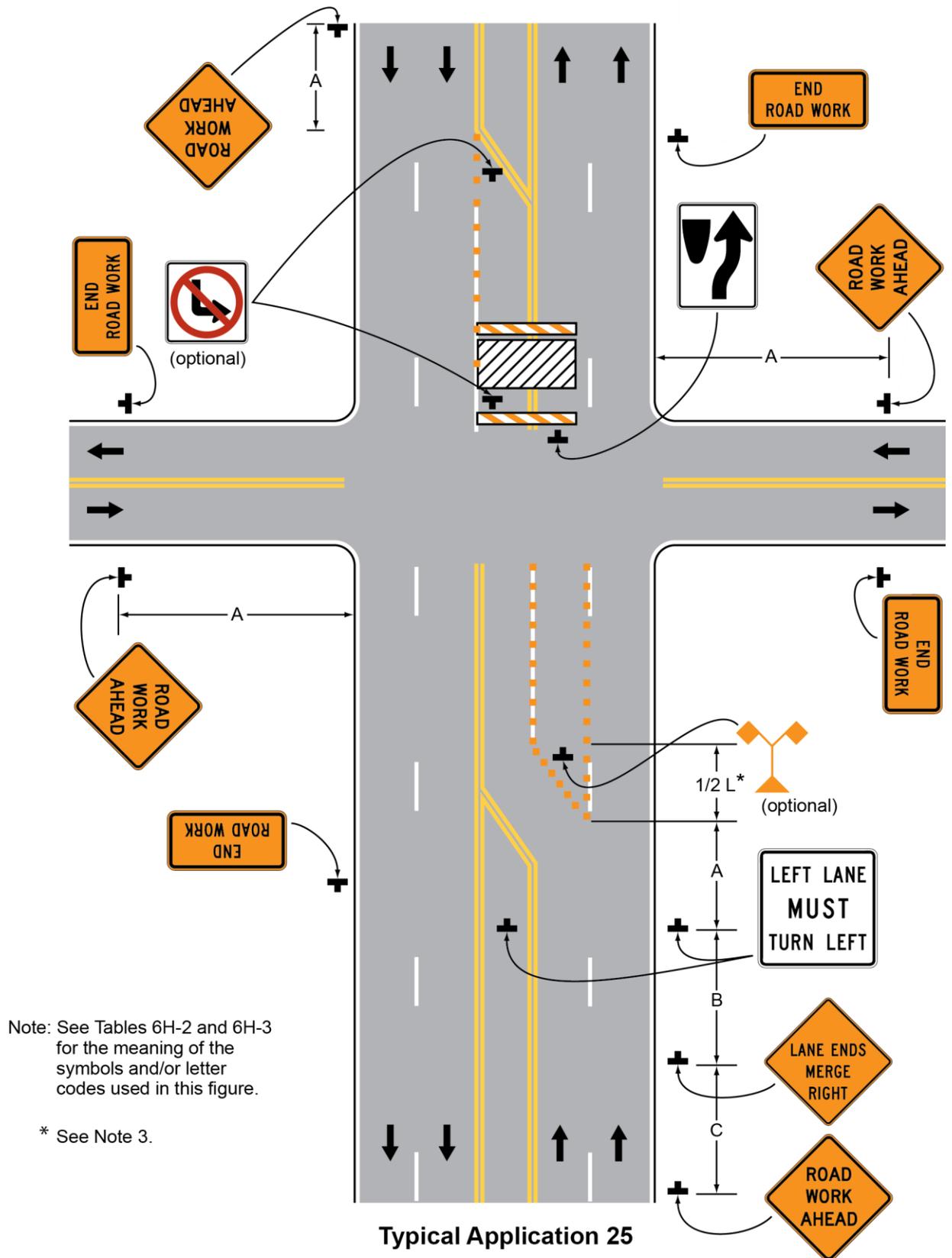
Support:

4. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection.

Option:

5. If the left-turning movement that normally uses the closed turn bay is small and/or the gaps in opposing vehicular traffic are frequent, left turns may be permitted on that approach.
6. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

Figure 6H-25. Multiple Lane Closures at an Intersection (TA-25)



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

* See Note 3.

Notes for Figure 6H-26—Typical Application 26
Closure in the Center of an Intersection

Guidance:

1. *All lanes should be a minimum of 10 feet in width as measured to the near face of the channelizing devices.*
2. *The shifting taper should be approximately L in length where speeds are 50 mph or greater (see Table 6C-3).*

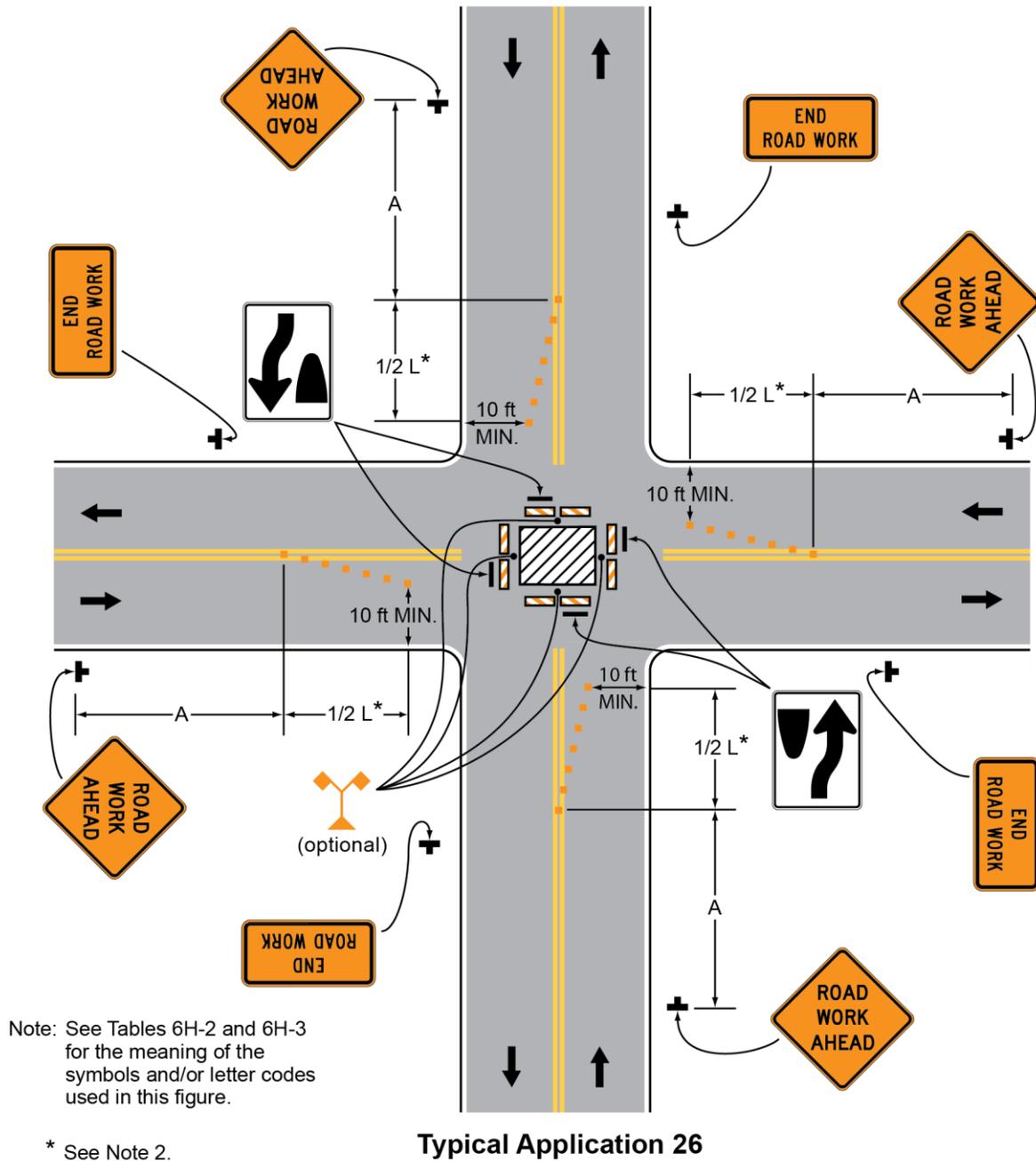
Option:

3. A high-level warning device may be placed in the work space, if there is sufficient room.
4. For short-term use on low-volume, low-speed roadways with vehicular traffic that does not include longer and wider heavy commercial vehicles, a minimum lane width of 9 feet may be used.
5. Flashing warning lights and/or flags may be used to call attention to advance warning signs.
6. Unless the streets are wide, it may be physically impossible to turn left, especially for large vehicles. Left turns may be prohibited as required by geometric conditions.
7. For short-duration work operations, the channelizing devices may be eliminated if a vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights is positioned in the work space.
8. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

- 9. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Figure 6H-26. Closure in the Center of an Intersection (TA-26)



Notes for Figure 6H-27—Typical Application 27
Closure at the Side of an Intersection

Guidance:

1. *The situation depicted can be simplified by closing one or more of the intersection approaches. If this cannot be done, and/or when capacity is a problem, through vehicular traffic should be directed to other roads or streets.*
2. *Depending on road user conditions, flagger(s) or uniformed law enforcement officer(s) should be used to direct road users within the intersection.*

Standard:

- 3. At night, flagger stations shall be illuminated, except in emergencies.**

Option:

4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
5. For short-duration work operations, the channelizing devices may be eliminated if a vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights is positioned in the work space.
6. A BE PREPARED TO STOP sign may be added to the sign series.

Guidance:

7. *When used, the BE PREPARED TO STOP sign should be located before the Flagger symbol sign.*
8. *ONE LANE ROAD AHEAD signs should also be used to provide adequate advance warning.*

Support:

9. Turns can be prohibited as required by vehicular traffic conditions. Unless the streets are wide, it might be physically impossible to make certain turns, especially for large vehicles.

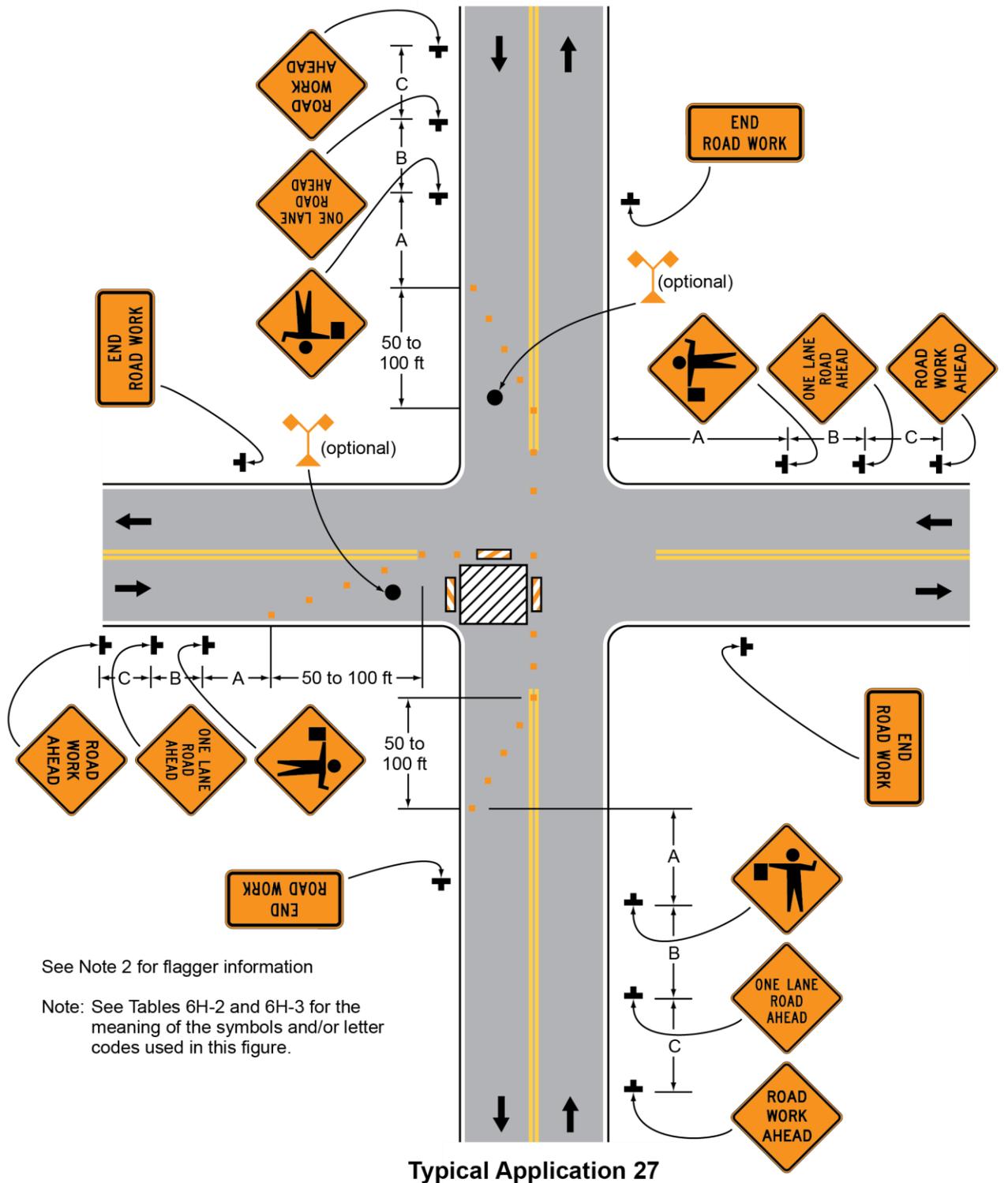
Option:

10. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

- 11. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Figure 6H-27. Closure at the Side of an Intersection (TA-27)



Notes for Figure 6H-28—Typical Application 28
Sidewalk Detour or Diversion

Standard:

1. **When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.**

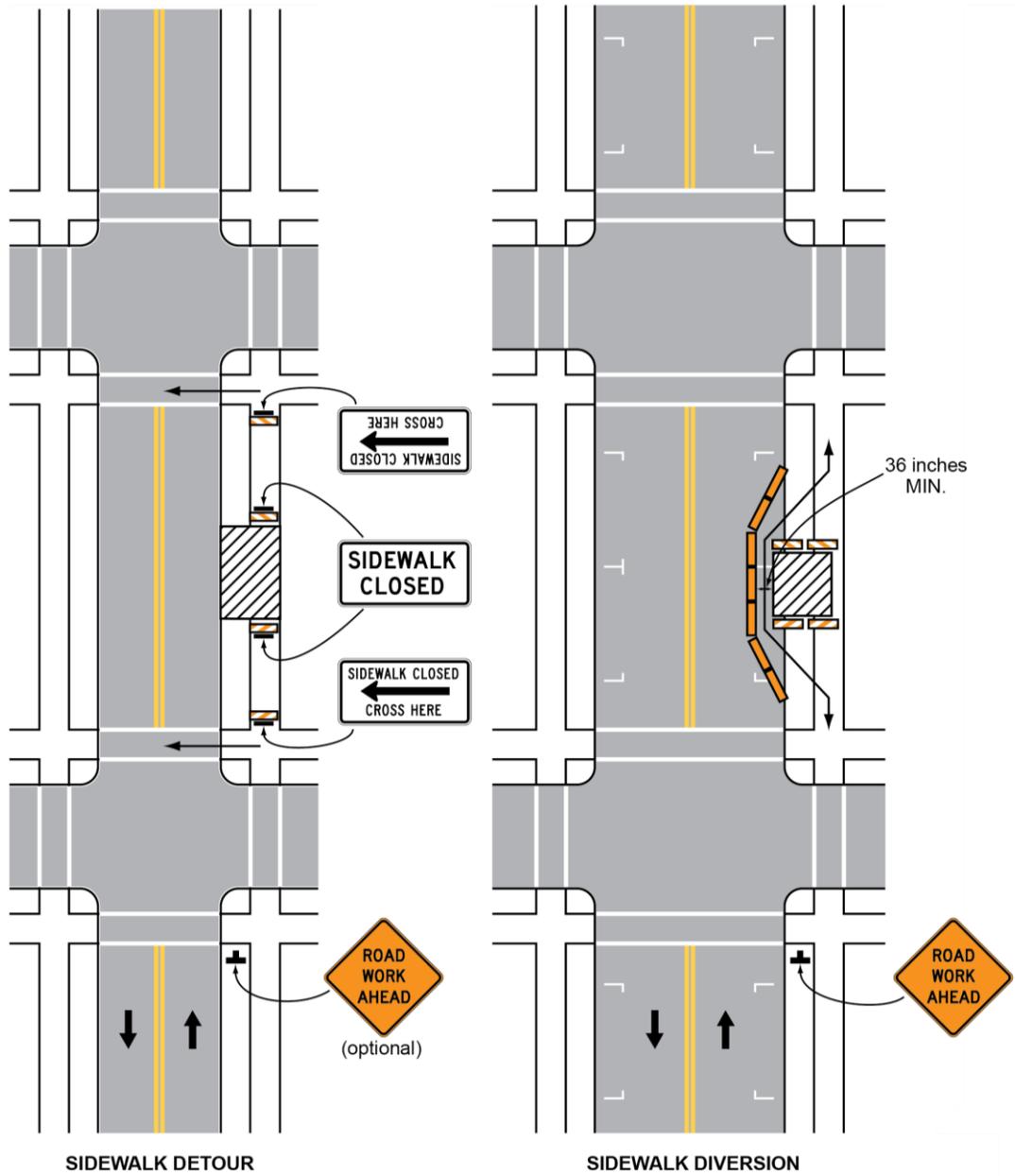
Guidance:

2. *Where high speeds are anticipated, a temporary traffic barrier and, if necessary, a crash cushion should be used to separate the temporary sidewalks from vehicular traffic.*
3. *Audible information devices should be considered where midblock closings and changed crosswalk areas cause inadequate communication to be provided to pedestrians who have visual disabilities.*

Option:

4. Street lighting may be considered.
5. Only the TTC devices related to pedestrians are shown. Other devices, such as lane closure signing or ROAD NARROWS signs, may be used to control vehicular traffic.
6. For nighttime closures, Type A Flashing warning lights may be used on barricades that support signs and close sidewalks.
7. Type C Steady-Burn or Type D 360-degree Steady-Burn warning lights may be used on channelizing devices separating the temporary sidewalks from vehicular traffic flow.
8. Signs, such as KEEP RIGHT (LEFT), may be placed along a temporary sidewalk to guide or direct pedestrians.

Figure 6H-28. Sidewalk Detour or Diversion (TA-28)



Typical Application 28

Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Notes for Figure 6H-29—Typical Application 29
Crosswalk Closures and Pedestrian Detours

Standard:

- 1. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.**
- 2. Curb parking shall be prohibited for at least 50 feet in advance of the midblock crosswalk.**

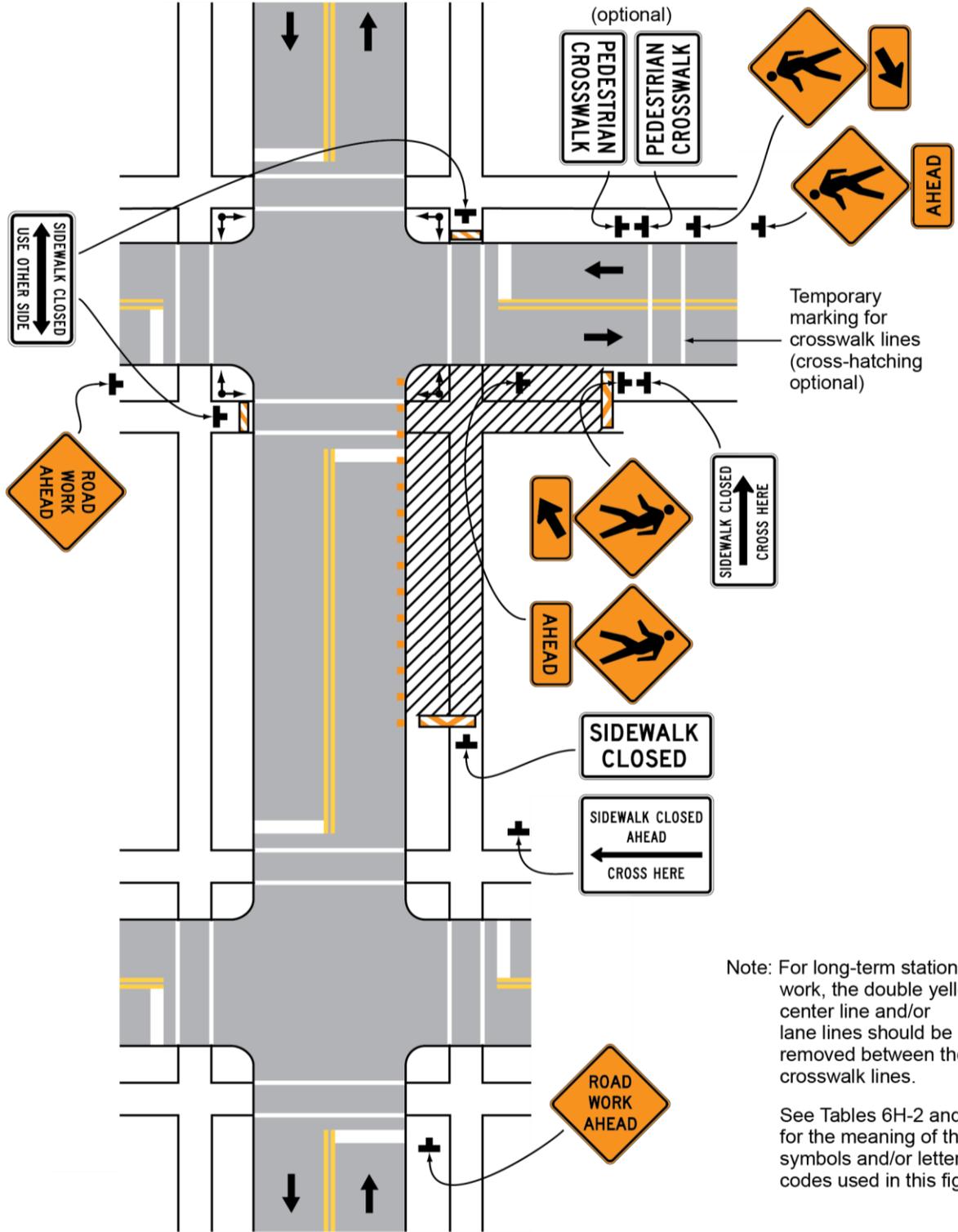
Guidance:

- 3. Audible information devices should be considered where midblock closings and changed crosswalk areas cause inadequate communication to be provided to pedestrians who have visual disabilities.*
- 4. Pedestrian traffic signal displays controlling closed crosswalks should be covered or deactivated.*

Option:

5. Street lighting may be considered.
6. Only the TTC devices related to pedestrians are shown. Other devices, such as lane closure signing or ROAD NARROWS signs, may be used to control vehicular traffic.
7. For nighttime closures, Type A Flashing warning lights may be used on barricades supporting signs and closing sidewalks.
8. Type C Steady-Burn or Type D 360-degree Steady-Burn warning lights may be used on channelizing devices separating the work space from vehicular traffic.
9. In order to maintain the systematic use of the fluorescent yellow-green background for pedestrian, bicycle, and school warning signs in a jurisdiction, the fluorescent yellow-green background for pedestrian, bicycle, and school warning signs may be used in TTC zones.

Figure 6H-29. Crosswalk Closures and Pedestrian Detours (TA-29)



Typical Application 29

Note: For long-term stationary work, the double yellow center line and/or lane lines should be removed between the crosswalk lines.

See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Notes for Figure 6H-30—Typical Application 30
Interior Lane Closure on a Multi-lane Street

Guidance:

1. *This information applies to low-speed, low-volume urban streets. Where speed or volume is higher, additional signing such as Lane Ends (W4-2) should be used.*

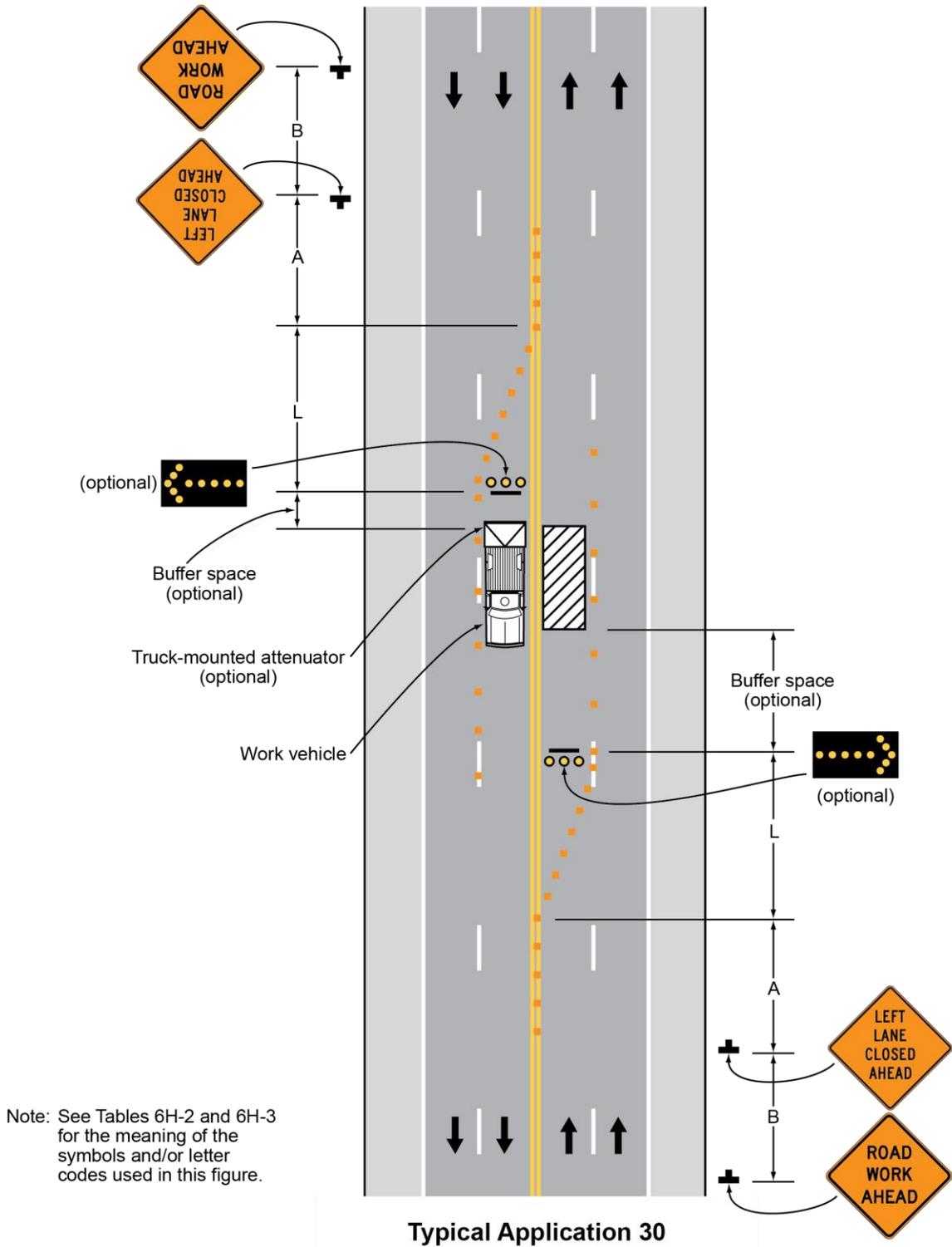
Option:

2. The closure of the adjacent interior lane in the opposing direction may not be necessary, depending upon the activity being performed and the work space needed for the operation.
3. Shadow vehicles with a truck-mounted attenuator may be used.

Standard:

4. **When an additional sign is used (see Note 1), the signs shown shall be relocated to accommodate standard sign spacing for the added sign.**

Figure 6H-30. Interior Lane Closure on a Multi-lane Street (TA-30)



Notes for Figure 6H-31—Typical Application 31
Lane Closure on a Street with Uneven Directional Volumes

Standard:

1. **The illustrated information shall be used only when the vehicular traffic volume indicates that two lanes of vehicular traffic shall be maintained in the direction of travel for which one lane is closed.**

Option:

2. The procedure may be used during a peak period of vehicular traffic and then changed to provide two lanes in the other direction for the other peak.

Guidance:

3. *For high speeds, a RIGHT/LEFT LANE CLOSED AHEAD sign should be added for vehicular traffic approaching the lane closure, as shown in Figure 6H-32. Also, where speeds are 50 mph or greater, a shifting taper should be approximately L in length (see Table 6C-3).*
4. *Conflicting pavement markings should be removed for long-term projects. For short-term and intermediate-term projects where this is not practical, the channelizing devices in the area where the pavement markings conflict should be placed at a maximum spacing of $1/2 S$ feet where S is the speed in mph. Temporary markings should be installed where needed.*
5. *If the lane shift has curves with recommended speeds of 30 mph or less, Reverse Turn signs should be used.*
6. *Where the shifted section is long, a Reverse Curve sign should be used to show the initial shift and a second sign should be used to show the return to the normal alignment.*
7. *If the tangent distance along the temporary diversion is less than 600 feet, the Double Reverse Curve sign should be used at the location of the first Two Lane Reverse Curve sign. The second Two Lane Reverse Curve sign should be omitted.*

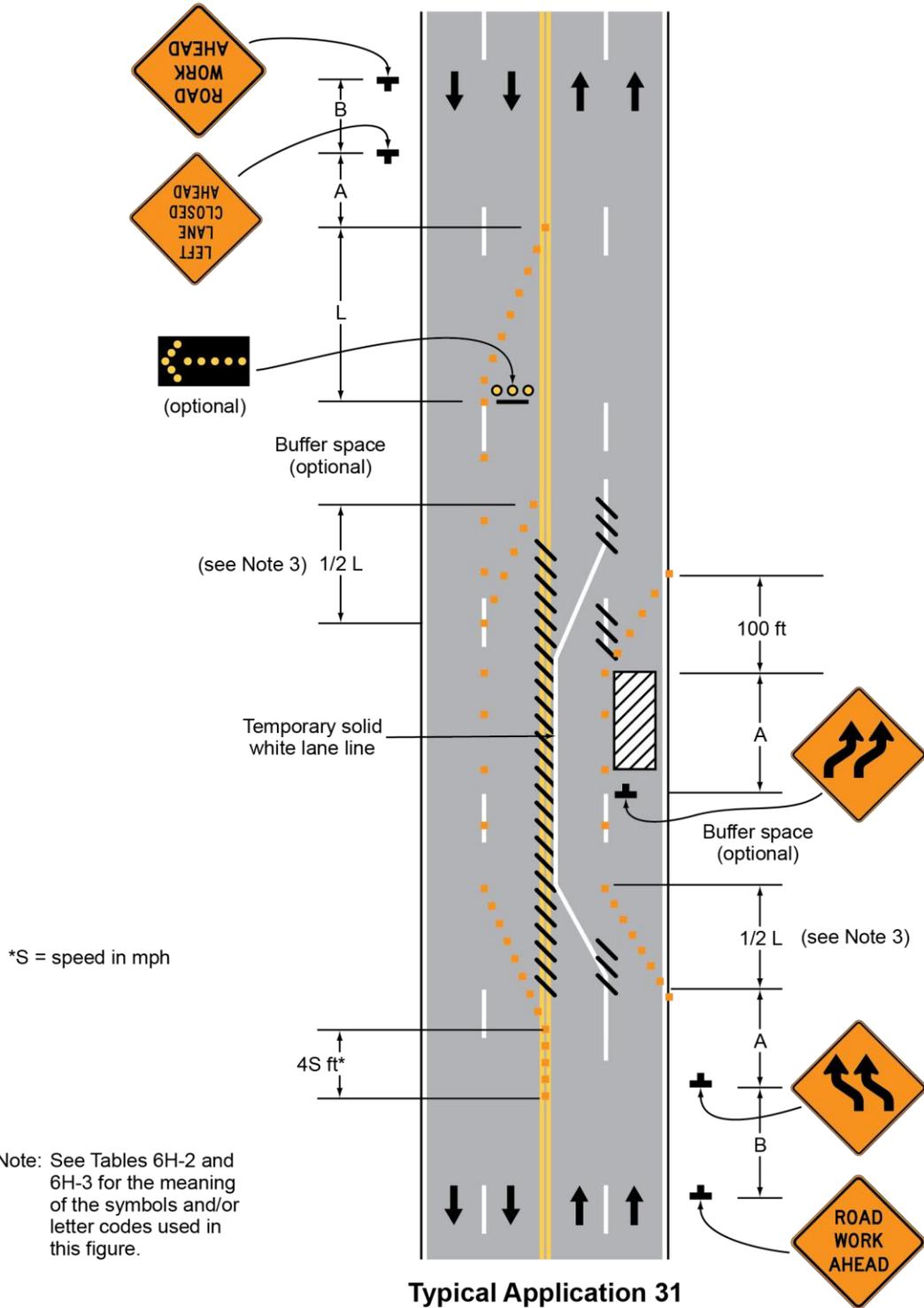
Standard:

8. **The number of lanes illustrated on the Reverse Curve or Double Reverse Curve signs shall be the same as the number of through lanes available to road users, and the direction of the reverse curves shall be appropriately illustrated.**

Option:

9. A longitudinal buffer space may be used in the activity area to separate opposing vehicular traffic.
10. 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.
11. Where more than three lanes are being shifted, the Reverse Curve (or Turn) sign may be rectangular.
12. A work vehicle or a shadow vehicle may be equipped with a truck-mounted attenuator.
13. The Construction Arrow (W1-H16) sign may be used to accent the lane shift condition.

Figure 6H-31. Lane Closures on a Street with Uneven Directional Volumes (TA-31)



Notes for Figure 6H-32—Typical Application 32
Half Road Closure on a Multi-lane, High-Speed Highway

Standard:

1. **Pavement markings no longer applicable shall be removed or obliterated as soon as practical. Except for intermediate-term and short-term situations, temporary markings shall be provided to clearly delineate the temporary travel path. For short-term and intermediate-term situations where it is not feasible to remove and restore pavement markings, channelization shall be made dominant by using a very close device spacing.**

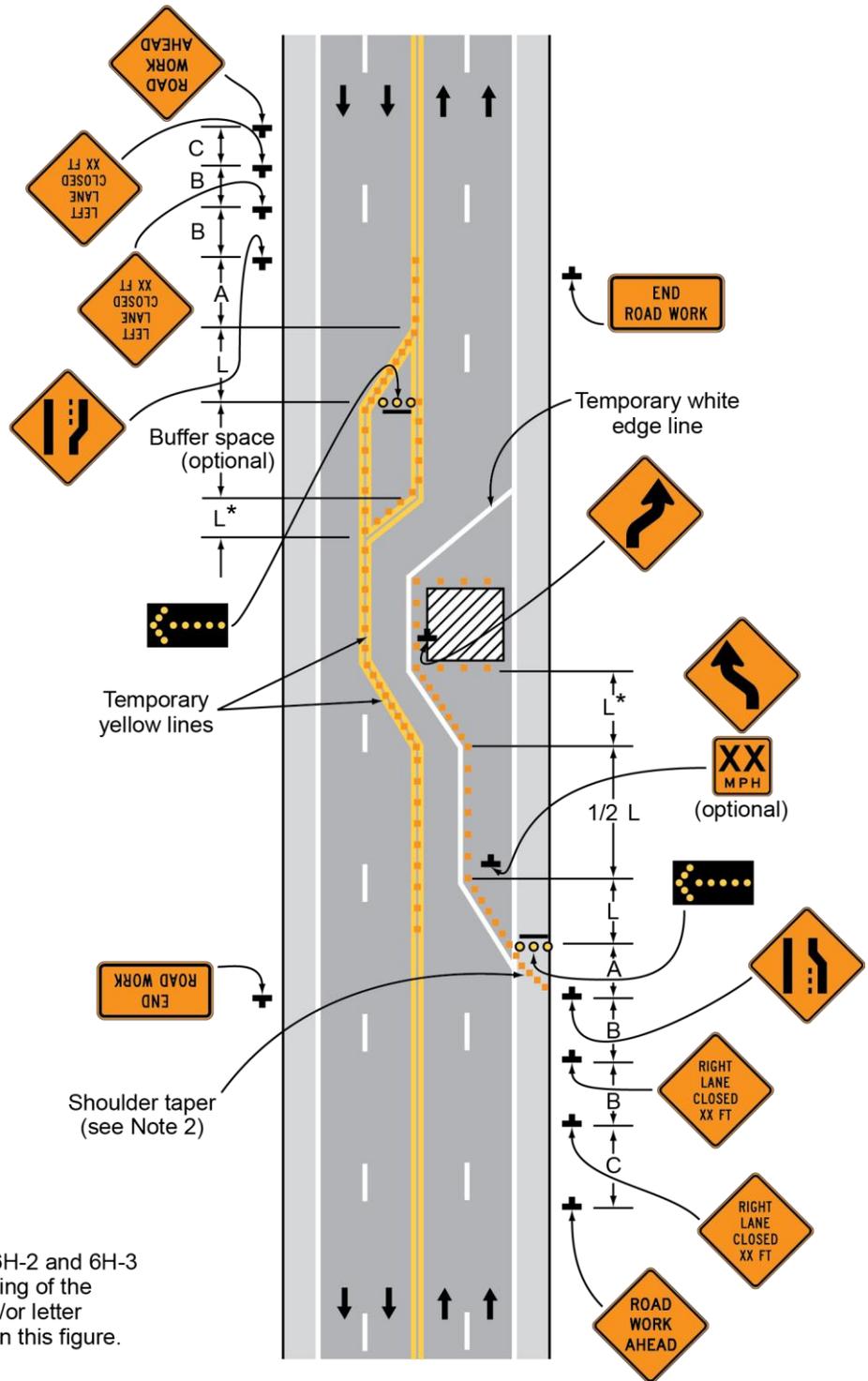
Guidance:

2. *When paved shoulders having a width of 8 feet or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.*
3. *Where channelizing devices are used instead of pavement markings, the maximum spacing should be $1/2 S$ feet where S is the speed in mph.*
4. *If the tangent distance along the temporary diversion is less than 600 feet, a Double Reverse Curve sign should be used instead of the first Reverse Curve sign, and the second Reverse Curve sign should be omitted.*

Option:

5. Warning lights may be used to supplement channelizing devices at night.
6. A truck-mounted attenuator may be used on the work vehicle and/or the shadow vehicle.
7. The Construction Arrow (W1-H16) sign may be used to accent the lane shift condition.
8. The shifting taper may be approximately $1/2 L$ in length where speeds are less than 50 mph (see Table 6C-3).

Figure 6H-32. Half Road Closure on a Multi-lane, High-Speed Highway (TA-32)



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

* See Note 8.

Typical Application 32

Notes for Figure 6H-33—Typical Application 33
Stationary Lane Closure on a Divided Highway

Standard:

1. This information also shall be used when work is being performed in the lane adjacent to the median on a divided highway. In this case, the LEFT LANE CLOSED signs and the corresponding Lane Ends signs shall be substituted.
2. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed as needed.

Guidance:

3. *When paved shoulders having a width of 8 feet or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.*

Option:

4. A truck-mounted attenuator may be used on the work vehicle and/or shadow vehicle.

Support:

5. Where conditions permit, restricting all vehicles, equipment, workers, and their activities to one side of the roadway might be advantageous.

Standard:

6. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

Notes for Figure 6H-34—Typical Application 34

Lane Closure with a Temporary Traffic Barrier

Standard:

1. This information also shall be used when work is being performed in the lane adjacent to the median on a divided highway. In this case, the LEFT LANE CLOSED signs and the corresponding Lane Ends signs shall be substituted.

Guidance:

2. For long-term lane closures on facilities with permanent edge lines, a temporary edge line should be installed from the upstream end of the merging taper to the downstream end of the downstream taper, and conflicting pavement markings should be removed.
3. The use of a barrier should be based on engineering judgment.

Standard:

4. Temporary traffic barriers, if used, shall comply with the provisions of Section 6F.85.
5. The barrier shall not be placed along the merging taper. The lane shall first be closed using channelizing devices and pavement markings.

Option:

6. Type C Steady-Burn warning lights may be placed on channelizing devices and the barrier parallel to the edge of pavement for nighttime lane closures.
7. The barrier shown in this typical application is an example of one method that may be used to close a lane for a long-term project. If the work activity permits, a movable barrier may be used and relocated to the shoulder during non-work periods or peak-period vehicular traffic conditions, as appropriate.

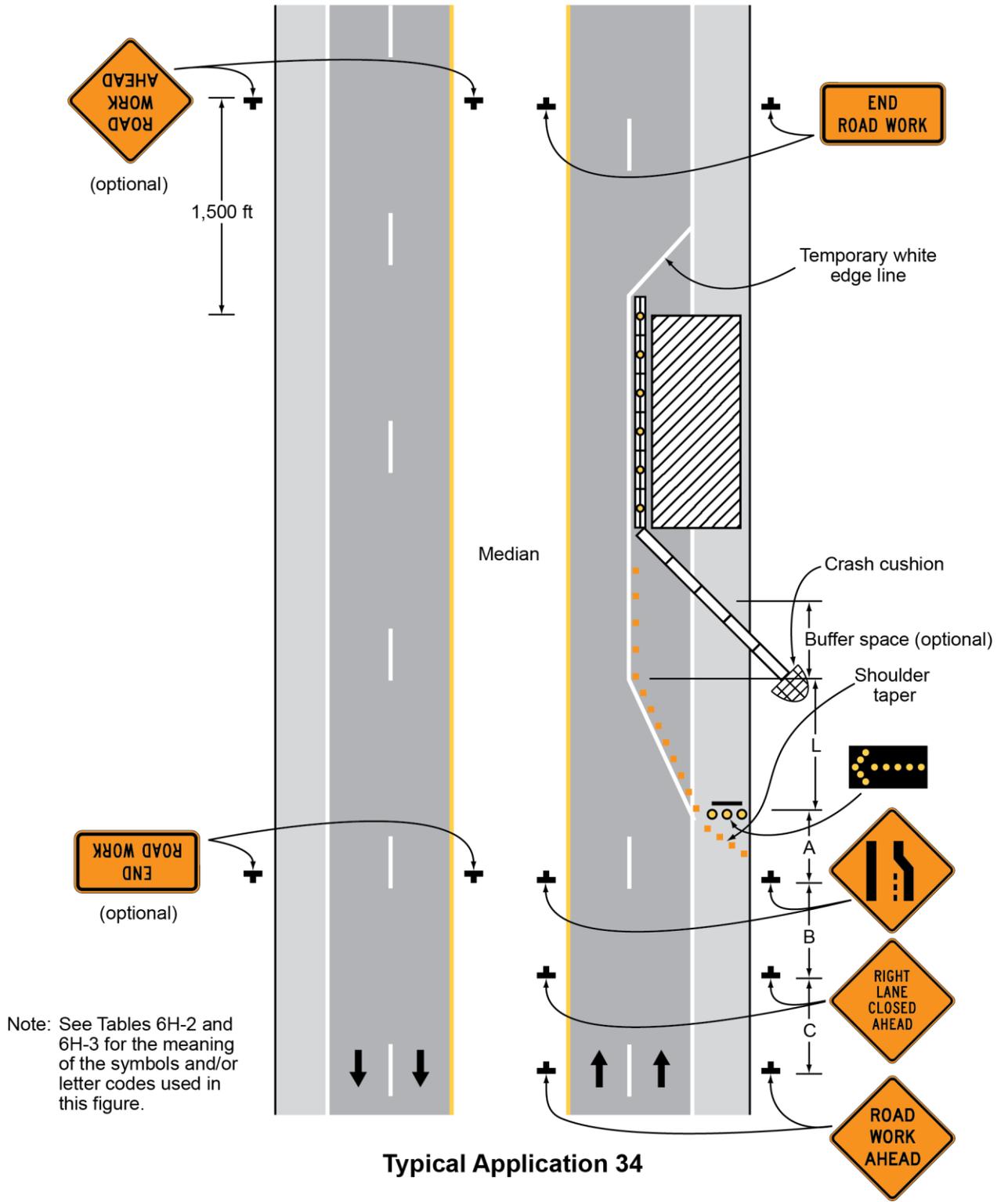
Standard:

8. If a movable barrier is used, the temporary white edge line shown in the typical application shall not be used. During the period when the right-hand lane is opened, the sign legends and the channelization shall be changed to indicate that only the shoulder is closed, as illustrated in Figure 6H-5. The arrow board, if used, shall be placed at the downstream end of the shoulder taper and shall display the caution mode.

Guidance:

9. If a movable barrier is used, the shift should be performed in the following manner. When closing the lane, the lane should be initially closed with channelizing devices placed along a merging taper using the same information employed for a stationary lane closure. The lane closure should then be extended with the movable-barrier transfer vehicle moving with vehicular traffic. When opening the lane, the movable-barrier transfer vehicle should travel against vehicular traffic from the termination area to the transition area. The merging taper should then be removed using the same information employed for a stationary lane closure.

Figure 6H-34. Lane Closure with a Temporary Traffic Barrier (TA-34)



Notes for Figure 6H-35—Typical Application 35**Mobile Operation on a Multi-lane Road****Standard:**

1. Arrow boards shall, as a minimum, be Type B, with a size of 60 x 30 inches.
2. Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.
3. Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.
4. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.

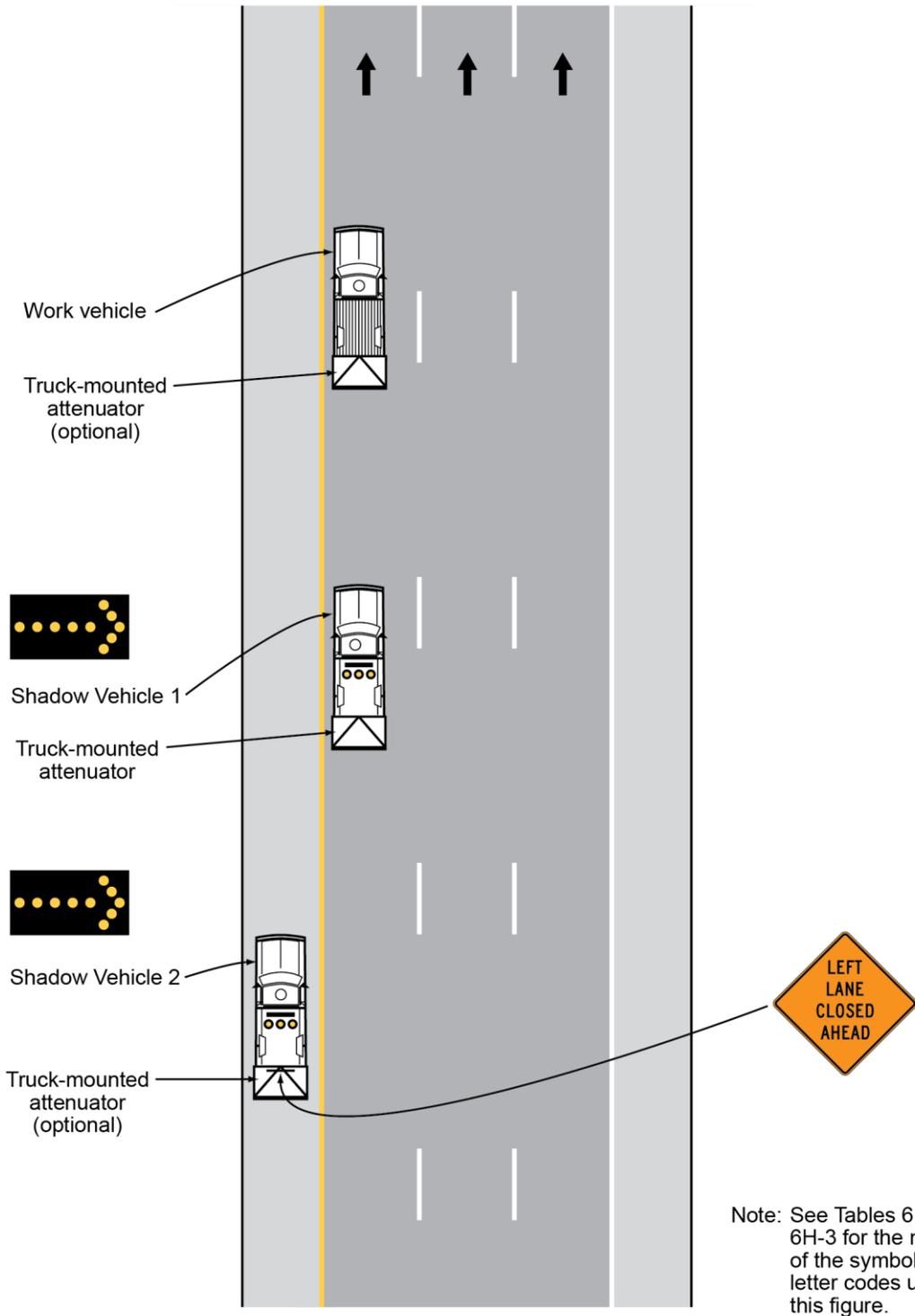
Guidance:

5. *Vehicles used for these operations should be made highly visible with appropriate equipment, such as flags, signs, or arrow boards.*
6. *Shadow Vehicle 1 should be equipped with an arrow board and truck-mounted attenuator.*
7. *Shadow Vehicle 2 should be equipped with an arrow board. An appropriate lane closure sign should be placed on Shadow Vehicle 2 so as not to obscure the arrow board.*
8. *Shadow Vehicle 2 should travel at a varying distance from the work operation so as to provide adequate sight distance for vehicular traffic approaching from the rear.*
9. *The spacing between the work vehicles and the shadow vehicles, and between each shadow vehicle should be minimized to deter road users from driving in between.*
10. *Work should normally be accomplished during off-peak hours.*
11. *When the work vehicle occupies an interior lane (a lane other than the far right or far left) of a directional roadway having a right-hand shoulder 10 feet or more in width, Shadow Vehicle 2 should drive the right-hand shoulder with a sign indicating that work is taking place in the interior lane.*

Option:

12. A truck-mounted attenuator may be used on Shadow Vehicle 2.
13. On high-speed roadways, a third shadow vehicle (not shown) may be used with Shadow Vehicle 1 in the closed lane, Shadow Vehicle 2 straddling the edge line, and Shadow Vehicle 3 on the shoulder.
14. Where adequate shoulder width is not available, Shadow Vehicle 3 may also straddle the edge line.

Figure 6H-35. Mobile Operation on a Multi-lane Road (TA-35)



Typical Application 35

Notes for Figure 6H-36—Typical Application 36

Lane Shift on a Freeway

Guidance:

1. *The lane shift should be used when the work space extends into either the right-hand or left-hand lane of a divided highway and it is not practical, for capacity reasons, to reduce the number of available lanes.*

Option:

2. The shifting taper may be approximately 1/2 L in length where speeds are less than 50 mph (see Table 6C-3).

Support:

3. When a lane shift is accomplished by using (1) geometry that meets the design speed at which the permanent highway was designed, (2) full normal cross-section (full lane width and full shoulders), and (3) complete pavement markings, then only the initial general work-zone warning sign is required.

Guidance:

4. *When the conditions in Note 3 are not met, the information shown in the typical application should be employed and all the following notes apply.*

Standard:

5. **Temporary traffic barriers, if used, shall comply with the provisions of Section 6F.85.**
6. **The barrier shall not be placed along the shifting taper. The lane shall first be shifted using channelizing devices and pavement markings.**

Guidance:

7. *A warning sign should be used to show the changed alignment.*

Standard:

8. **The number of lanes illustrated on the Reverse Curve signs shall be the same as the number of through lanes available to road users, and the direction of the reverse curves shall be appropriately illustrated.**

Option:

9. 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.
10. Where more than three lanes are being shifted, the Reverse Curve (or Turn) sign may be rectangular.

Guidance:

11. *Where the shifted section is longer than 600 feet, one set of Reverse Curve signs should be used to show the initial shift and a second set should be used to show the return to the normal alignment. If the tangent distance along the temporary diversion is less than 600 feet, a Double Reverse Curve sign should be used instead of the first Reverse Curve sign. and the second Reverse Curve sign should be omitted.*
12. *If a STAY IN LANE sign is used, then solid white lane lines should be used.*

Standard:

13. **The minimum width of the shoulder lane shall be 10 feet.**
14. **For long-term stationary work, existing conflicting pavement markings shall be removed and temporary markings shall be installed before traffic patterns are changed.**

Option:

15. For short-term stationary work, lanes may be delineated by channelizing devices or removable pavement markings instead of temporary markings.

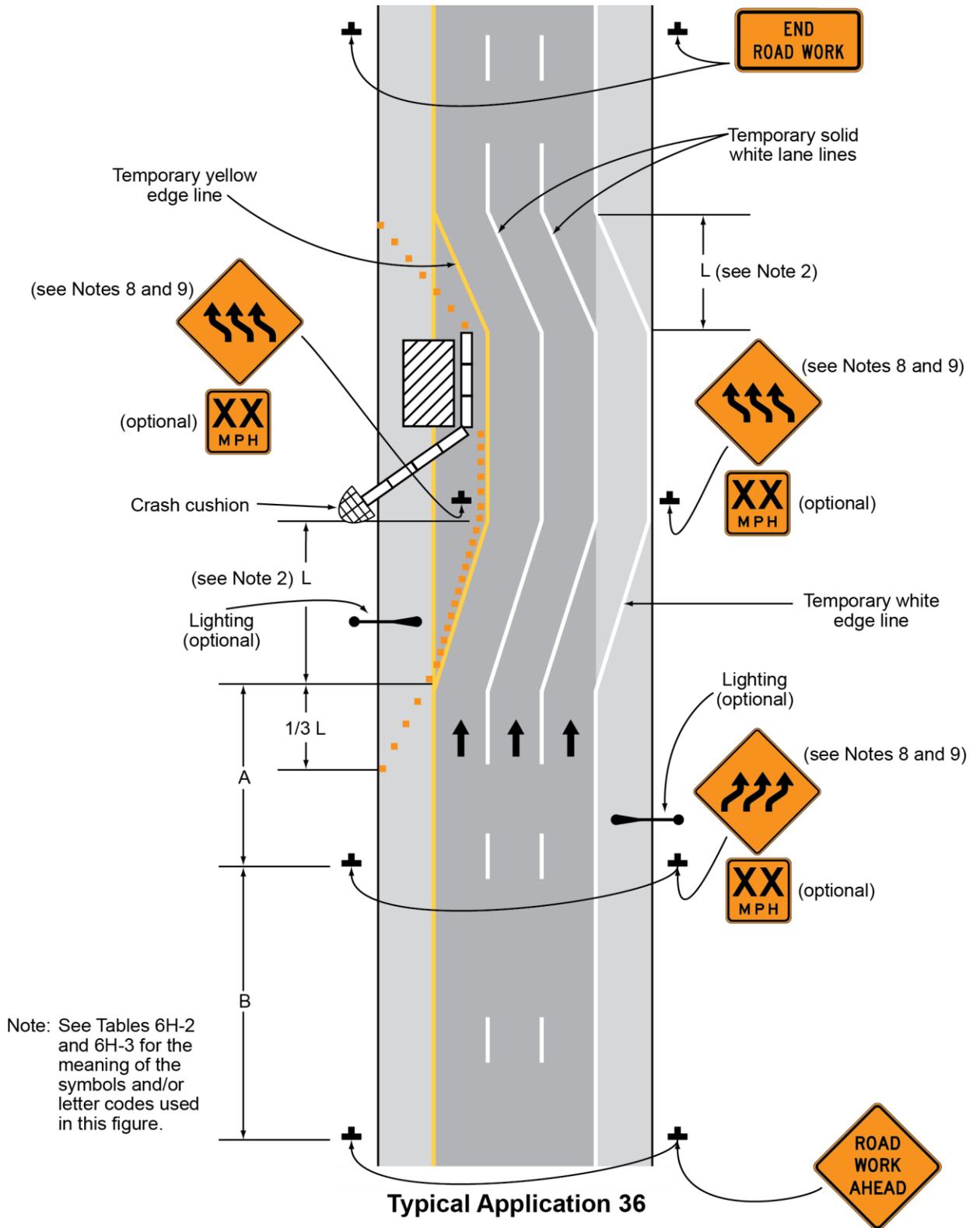
Guidance:

16. *If the shoulder cannot adequately accommodate trucks, trucks should be directed to use the travel lanes.*
17. *The use of a barrier should be based on engineering judgment.*

Option:

18. Type C Steady-Burn warning lights may be placed on channelizing devices and the barrier parallel to the edge of pavement for nighttime lane closures.
19. The Construction Arrow (W1-H16) sign may be used to accent the lane shift condition.

Figure 6H-36. Lane Shift on a Freeway (TA-36)



Notes for Figure 6H-37—Typical Application 37**Double Lane Closure on a Freeway****Standard:**

1. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

Guidance:

2. *Ordinarily, the preferred position for the second arrow board is in the closed exterior lane at the upstream end of the second merging taper. However, the second arrow board should be placed in the closed interior lane at the downstream end of the second merging taper in the following situations:*
 - a. *When a shadow vehicle is used in the interior closed lane, and the second arrow board is mounted on the shadow vehicle;*
 - b. *If alignment or other conditions create any confusion as to which lane is closed by the second arrow board; and*
 - c. *When the first arrow board is placed in the closed exterior lane at the downstream end of the first merging taper (the alternative position when the shoulder is narrow).*

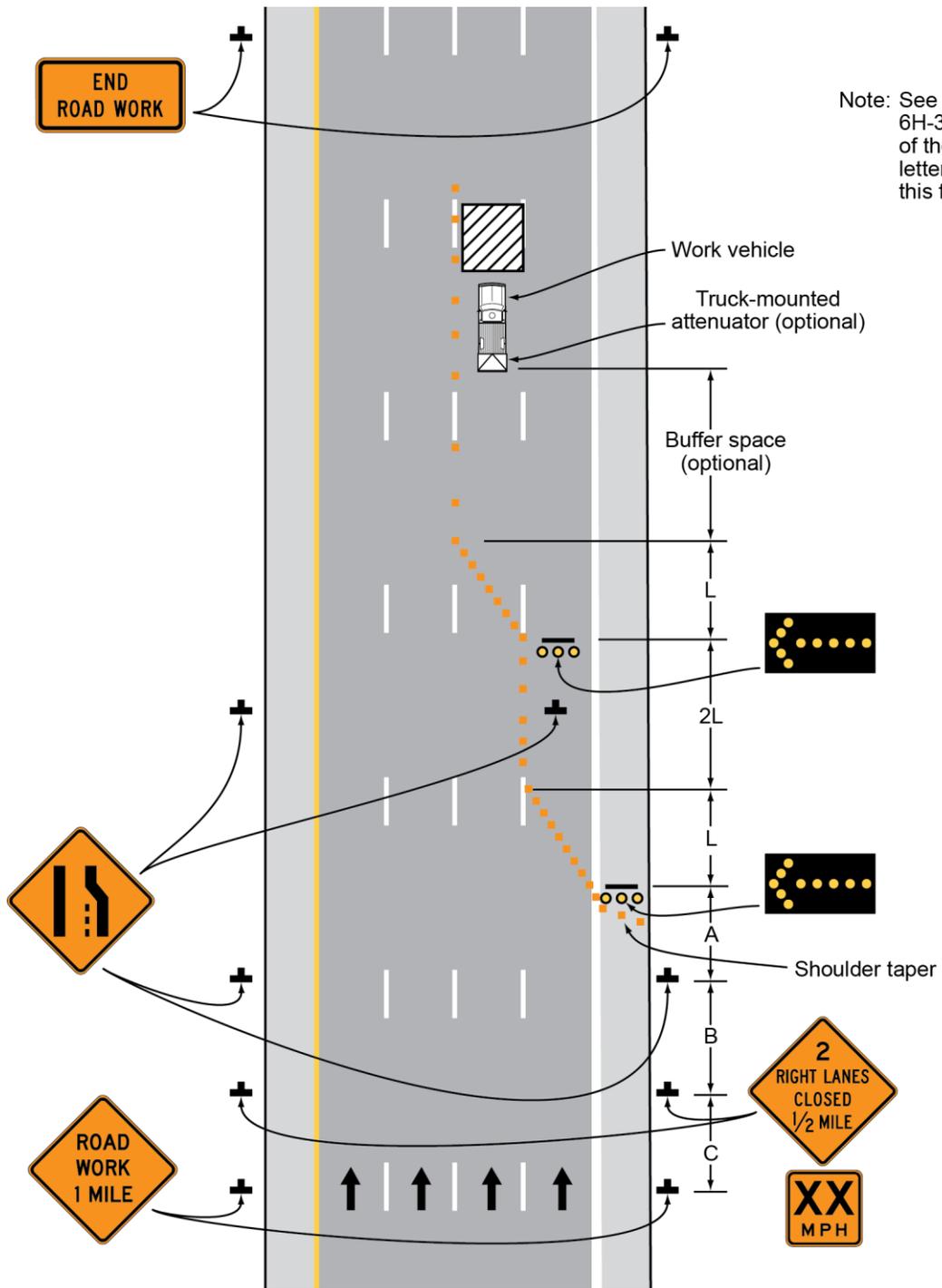
Option:

3. Flashing warning lights and/or flags may be used to call attention to the initial warning signs.
4. A truck-mounted attenuator may be used on the shadow vehicle.
5. If a paved shoulder having a minimum width of 10 feet and sufficient strength is available, the left and adjacent interior lanes may be closed and vehicular traffic carried around the work space on the right-hand lane and a right-hand shoulder.

Guidance:

6. *When a shoulder lane is used that cannot adequately accommodate trucks, trucks should be directed to use the normal travel lanes.*

Figure 6H-37. Double Lane Closure on a Freeway (TA-37)



Typical Application 37

Notes for Figure 6H-38—Typical Application 38**Interior Lane Closure on a Freeway****Standard:**

- 1. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**
- 2. If temporary traffic barriers are installed, they shall comply with the provisions and requirements in Section 6F.85.**
- 3. The barrier shall not be placed along the shifting taper. The lane shall first be shifted using channelizing devices and pavement markings.**
- 4. For long-term stationary work, existing conflicting pavement markings shall be removed and temporary markings shall be installed before traffic patterns are changed.**

Guidance:

- 5. For a long-term closure, a barrier should be used to provide additional safety to the operation in the closed interior lane. A buffer space should be used at the upstream end of the closed interior lane.*
- 6. The first arrow board displaying an arrow pointing to the right should be on the left-hand shoulder at the beginning of the taper. The arrow board displaying a double arrow should be centered in the closed interior lane and placed at the downstream end of the shifting taper.*
- 7. If the two arrow boards create confusion, the 2L distance between the end of the merging taper and beginning of the shift taper should be extended so that road users can focus on one arrow at a time.*
- 8. The placement of signs should not obstruct or obscure arrow boards.*
- 9. For long-term use, the dashed lane lines should be made solid white in the two-lane section.*

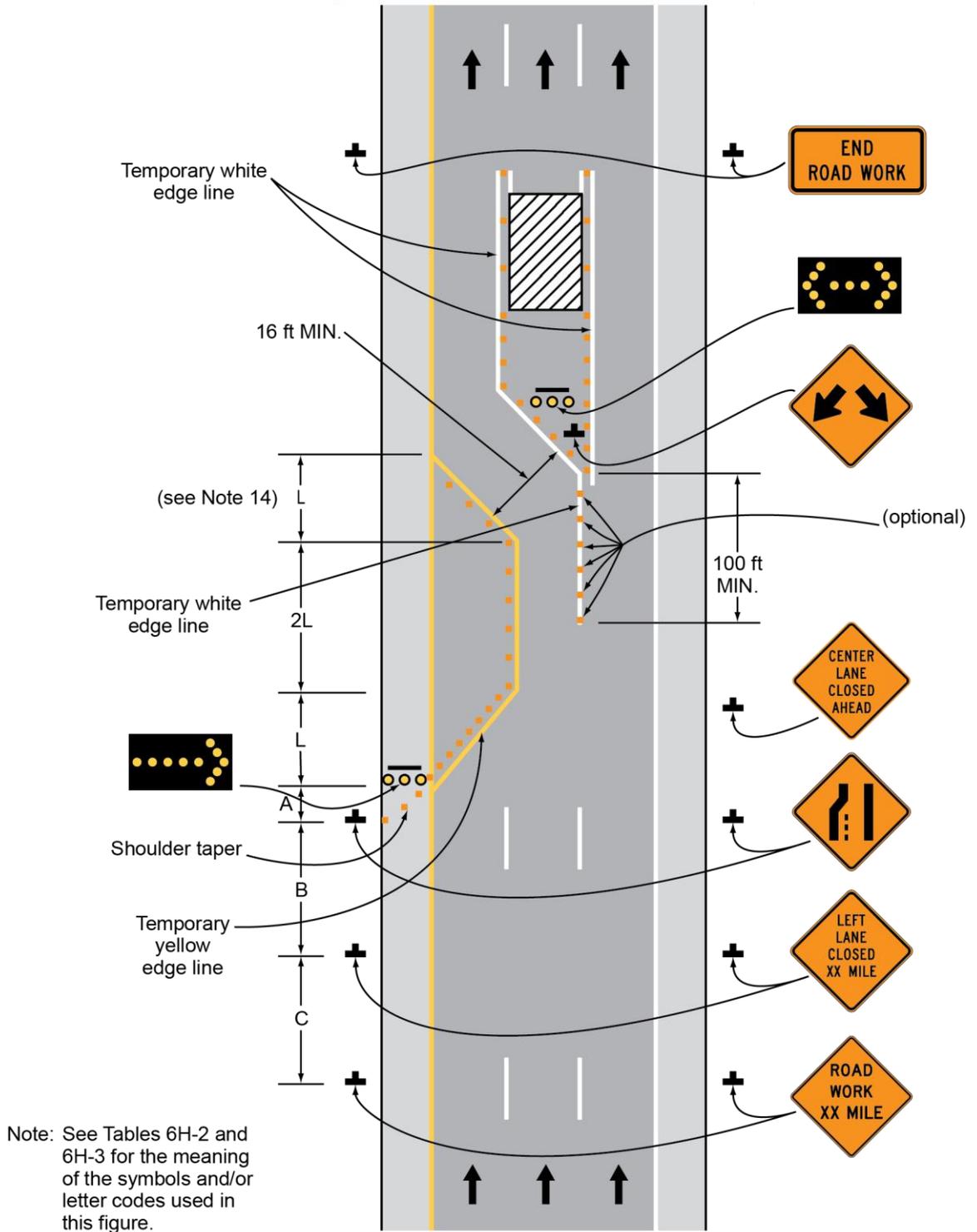
Option:

10. As an alternative to initially closing the left-hand lane, as shown in the typical application, the right-hand lane may be closed in advance of the interior lane closure with appropriate channelization and signs.
11. A short, single row of channelizing devices in advance of the vehicular traffic split to restrict vehicular traffic to their respective lanes may be added.
12. DO NOT PASS signs may be used.
13. If a paved shoulder having a minimum width of 10 feet and sufficient strength is available, the left-hand and center lanes may be closed and vehicular traffic carried around the work space on the right lane and a right shoulder.
14. The shifting taper may be approximately $1/2 L$ in length where speeds are less than 50 mph (see Table 6C-3).

Guidance:

- 15. When a shoulder lane is used that cannot adequately accommodate trucks, trucks should be directed to use the normal travel lanes.*

Figure 6H-38. Interior Lane Closure on a Freeway (TA-38)



Typical Application 38

Notes for Figure 6H-39—Typical Application 39**Median Crossover on a Freeway****Standard:**

1. **Channelizing devices or temporary traffic barriers shall be used to separate opposing vehicular traffic.**
2. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

Guidance:

3. *For long-term work on high-speed, high-volume highways, consideration should be given to using a temporary traffic barrier to separate opposing vehicular traffic.*

Option:

4. When a temporary traffic barrier is used to separate opposing vehicular traffic, the Two-Way Traffic, DO NOT PASS, KEEP RIGHT, and DO NOT ENTER signs may be eliminated.
5. The alignment of the crossover may be designed as a reverse curve.
6. The shifting taper may be approximately 1/2 L in length where speeds are less than 50 mph (see Table 6C-3).

Guidance:

7. *When the crossover follows a curved alignment, the design criteria contained in the AASHTO "Policy on the Geometric Design of Highways and Streets" (see Section 1A.11) should be used.*
8. *When channelizing devices have the potential of leading vehicular traffic out of the intended traffic space, the channelizing devices should be extended a distance in feet of 2 times the speed limit in mph beyond the downstream end of the transition area as depicted.*
9. *Where channelizing devices are used, the Two-Way Traffic signs should be repeated every 1 mile.*

Option:

10. NEXT XX MILES Supplemental Distance plaques may be used with the Two-Way Traffic signs, where XX is the distance to the downstream end of the two-way section.

Support:

11. When the distance is sufficiently short that road users entering the section can see the downstream end of the section, they are less likely to forget that there is opposing vehicular traffic.
12. The sign legends for the four pairs of signs approaching the lane closure for the non-crossover direction of travel are not shown. They are similar to the series shown for the crossover direction, except that the left lane is closed.

Notes for Figure 6H-40—Typical Application 40
Median Crossover for an Entrance Ramp

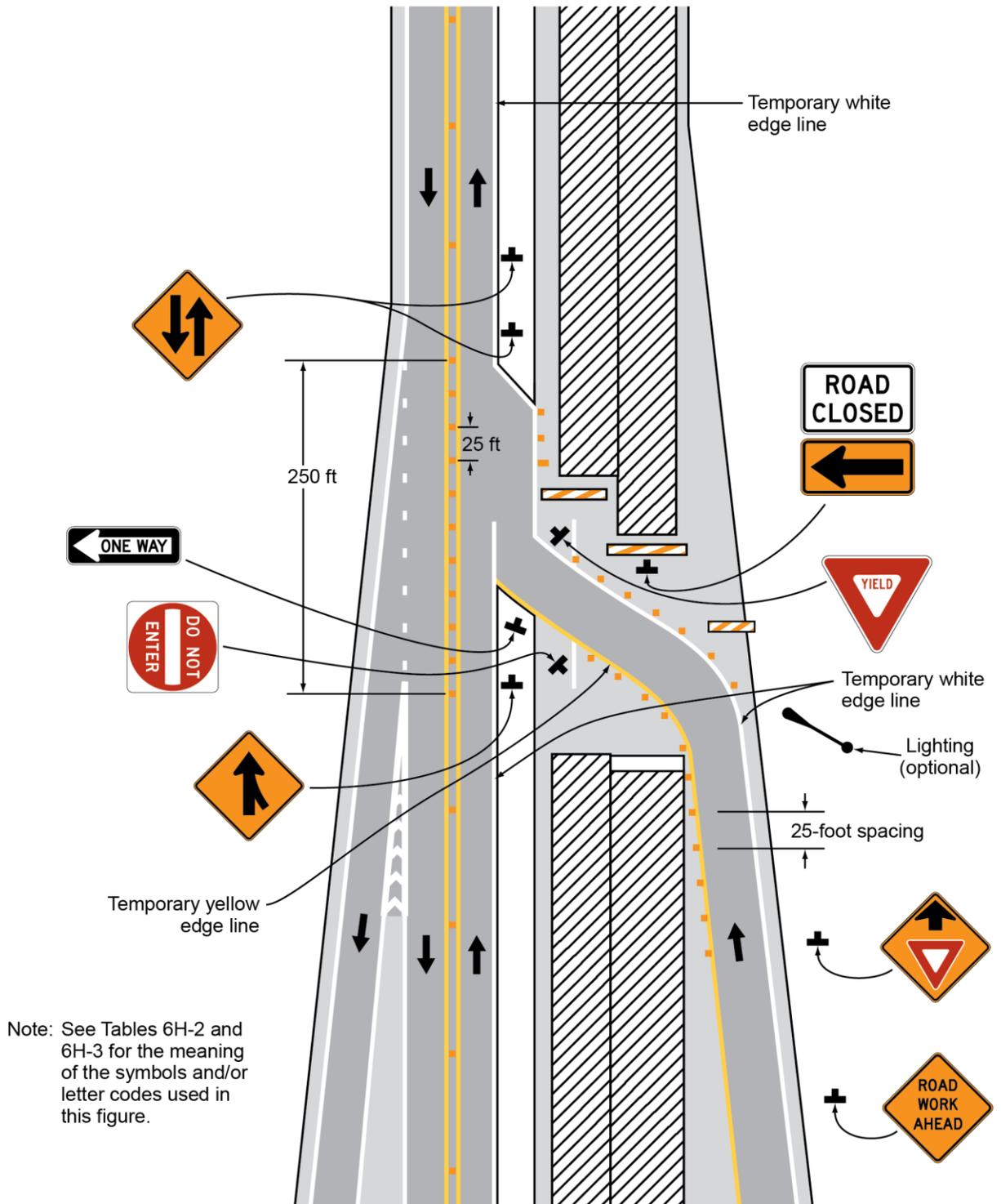
Guidance:

1. *The typical application illustrated should be used for carrying an entrance ramp across a closed directional roadway of a divided highway.*
2. *A temporary acceleration lane should be used to facilitate merging.*
3. *When used, the YIELD or STOP sign should be located far enough forward to provide adequate sight distance of oncoming mainline vehicular traffic to select an acceptable gap, but should not be located so far forward that motorists will be encouraged to stop in the path of the mainline traffic. If needed, yield or stop lines should be installed across the ramp to indicate the point at which road users should yield or stop. Also, a longer acceleration lane should be provided beyond the sign to reduce the gap size needed.*

Option:

4. If vehicular traffic conditions allow, the ramp may be closed.
5. A broken edge line may be carried across the temporary entrance ramp to assist in defining the through vehicular traffic lane.
6. When a temporary traffic barrier is used to separate opposing vehicular traffic, the Two-Way Traffic signs and the DO NOT ENTER signs may be eliminated.

Figure 6H-40. Median Crossover for an Entrance Ramp (TA-40)



Typical Application 40

Notes for Figure 6H-41—Typical Application 41**Median Crossover for an Exit Ramp***Guidance:*

1. *This typical application should be used for carrying an exit ramp across a closed directional roadway of a divided highway. The design criteria contained in the AASHTO “Policy on the Geometric Design of Highways and Streets” (see Section 1A.11) should be used for determining the curved alignment.*
2. *The guide signs should indicate that the ramp is open, and where the temporary ramp is located. Conversely, if the ramp is closed, guide signs should indicate that the ramp is closed.*
3. *When the exit is closed, a black on orange EXIT CLOSED panel should be placed diagonally across the interchange/intersection guide signs.*
4. *In the situation (not shown) where channelizing devices are placed along the mainline roadway, the devices’ spacing should be reduced in the vicinity of the off ramp to emphasize the opening at the ramp itself. Channelizing devices and/or temporary pavement markings should be placed on both sides of the temporary ramp where it crosses the median and the closed roadway.*
5. *Advance guide signs providing information related to the temporary exit should be relocated or duplicated adjacent to the temporary roadway.*

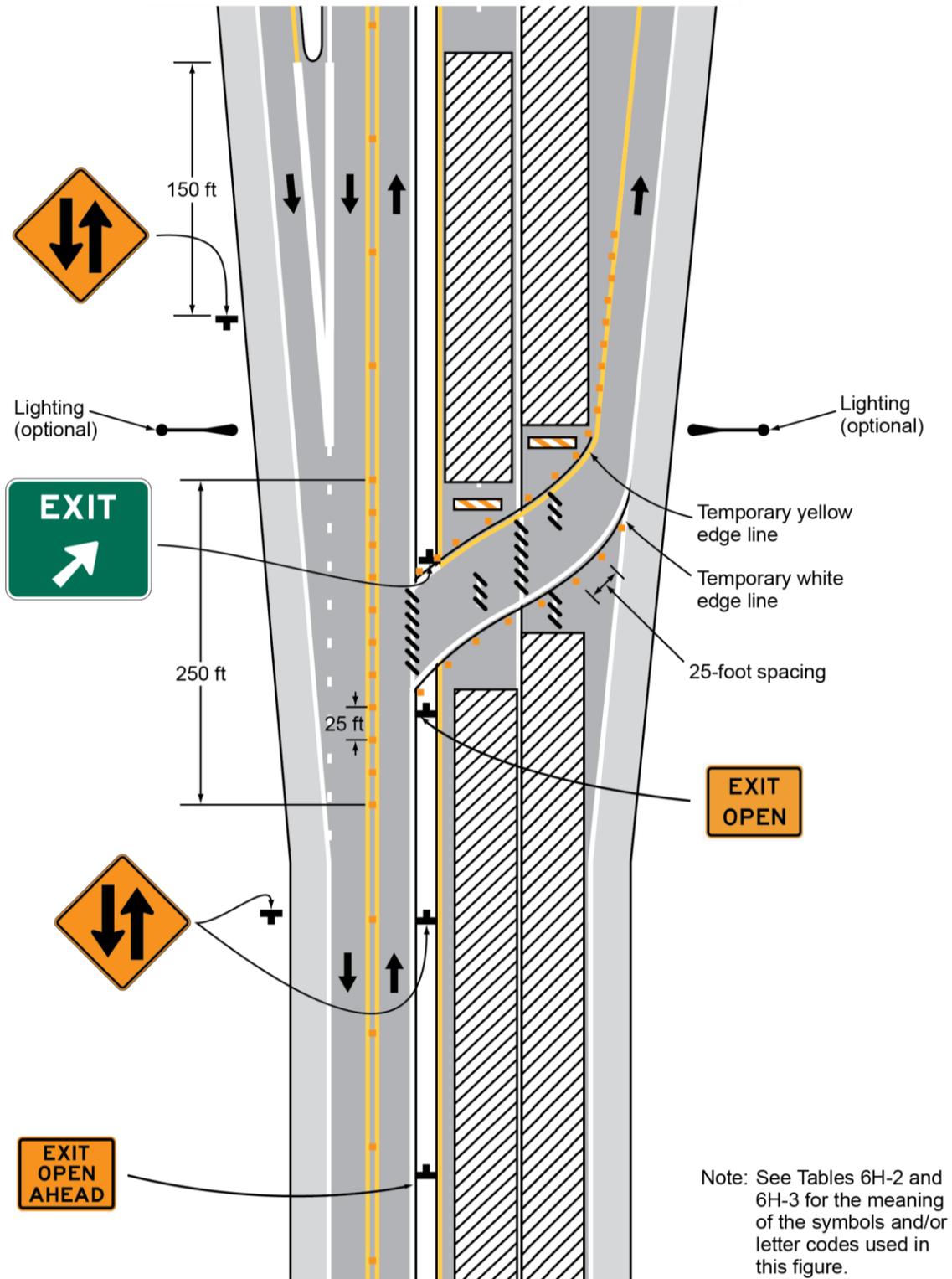
Standard:

6. **A temporary EXIT sign shall be located in the temporary gore. For better visibility, it shall be mounted a minimum of 7 feet from the pavement surface to the bottom of the sign.**

Option:

7. Guide signs referring to the exit may need to be relocated to the median.
8. The temporary EXIT sign placed in the temporary gore may be either black on orange or white on green.
9. In some instances, a temporary deceleration lane may be useful in facilitating the exiting maneuver.
10. When a temporary traffic barrier is used to separate opposing vehicular traffic, the Two-Way Traffic signs may be omitted.

Figure 6H-41. Median Crossover for an Exit Ramp (TA-41)



Typical Application 41

Notes for Figure 6H-42—Typical Application 42**Work in the Vicinity of an Exit Ramp***Guidance:*

1. *The guide signs should indicate that the ramp is open, and where the temporary ramp is located. However, if the ramp is closed, guide signs should indicate that the ramp is closed.*
2. *When the exit ramp is closed, a black on orange EXIT CLOSED panel should be placed diagonally across the interchange/intersection guide signs.*
3. *The design criteria contained in the AASHTO “Policy on the Geometric Design of Highways and Streets”(see Section 1A.11) should be used for determining the alignment.*

Standard:

4. **A temporary EXIT sign shall be located in the temporary gore. For better visibility, it shall be mounted a minimum of 7 feet from the pavement surface to the bottom of the sign.**

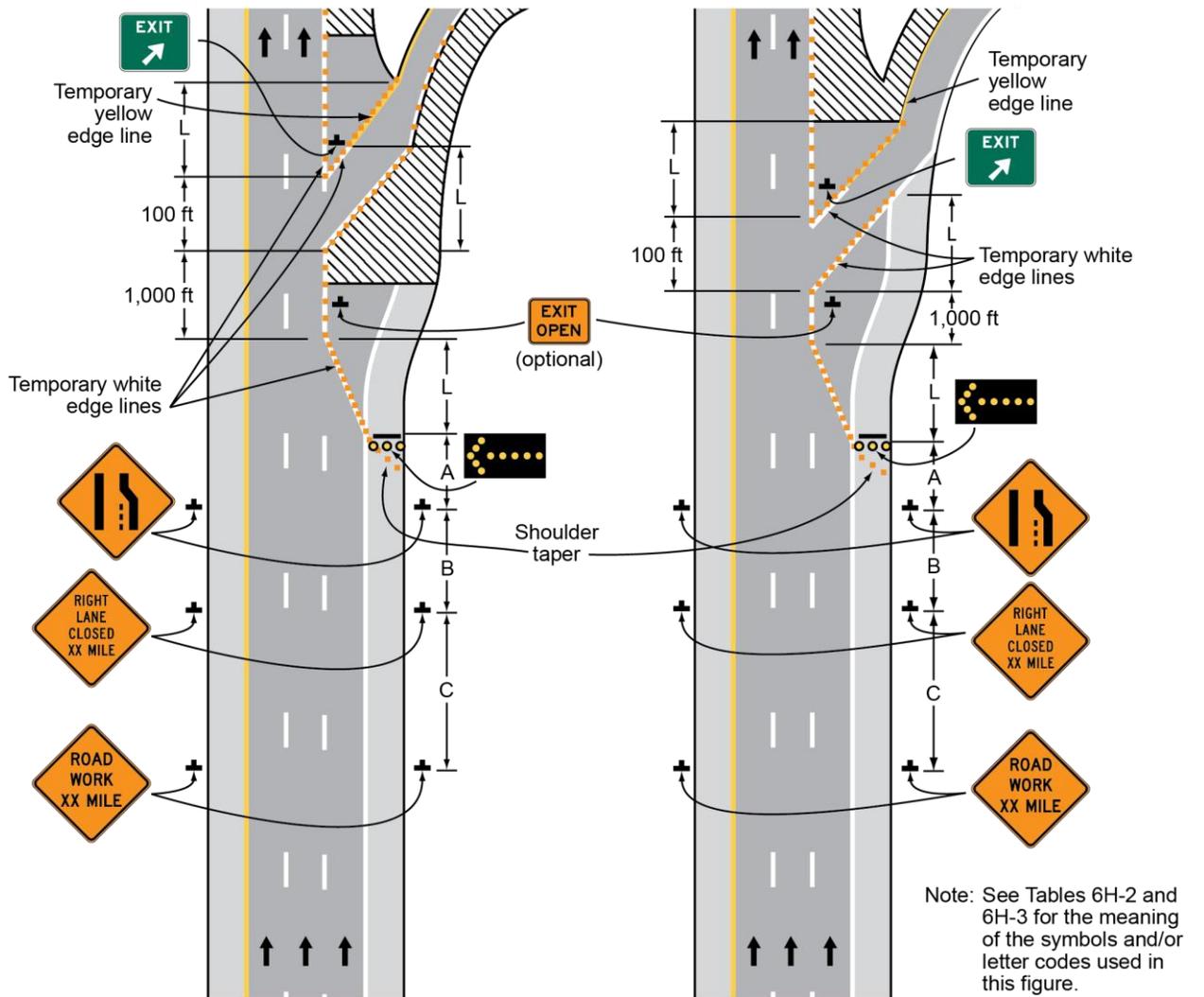
Option:

5. *The temporary EXIT sign placed in the temporary gore may be either black on orange or white on green.*
6. *An alternative procedure that may be used is to channelize exiting vehicular traffic onto the right shoulder and close the lane as necessary.*

Standard:

7. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

Figure 6H-42. Work in the Vicinity of an Exit Ramp (TA-42)



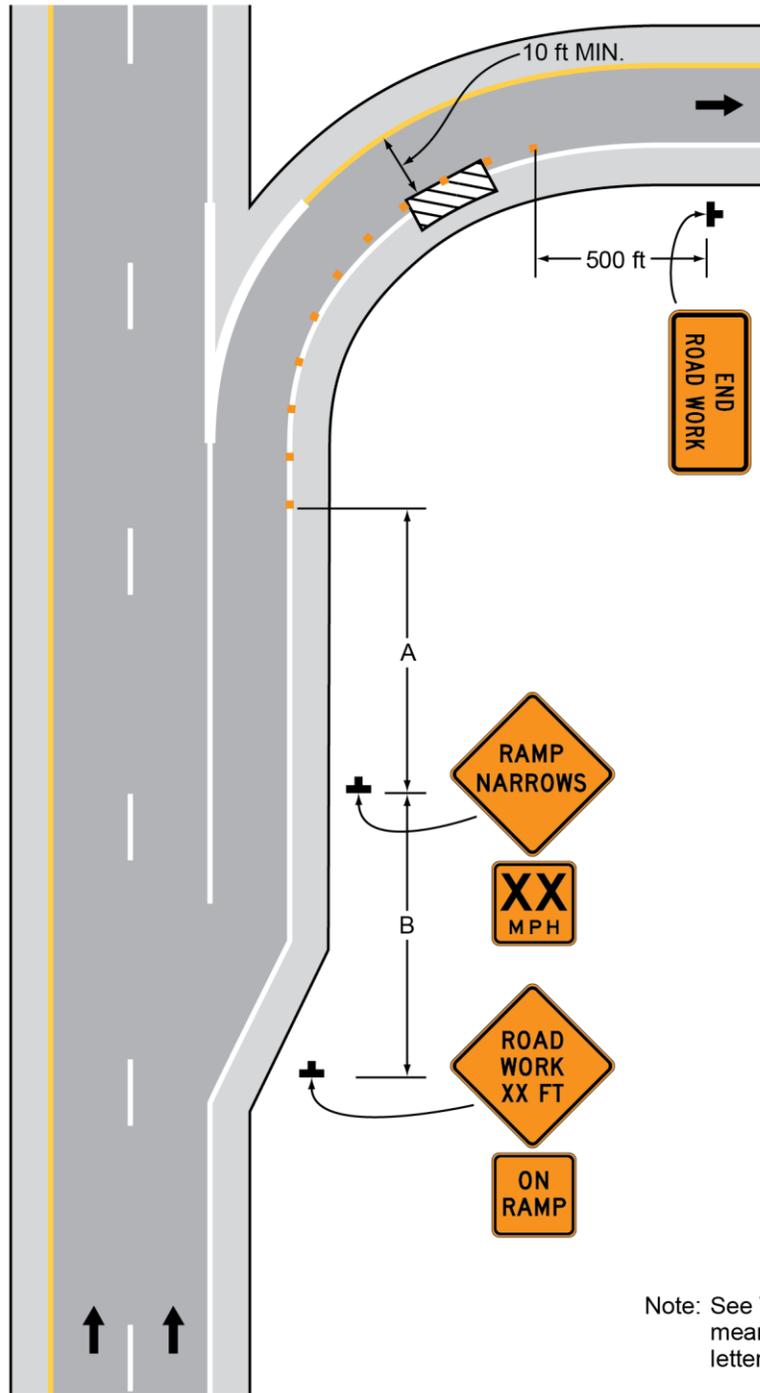
Typical Application 42

Notes for Figure 6H-43—Typical Application 43
Partial Exit Ramp Closure

Guidance:

1. Truck off-tracking should be considered when determining whether the minimum lane width of 10 ft. is adequate (see Section 6G.08).

Figure 6H-43. Partial Exit Ramp Closure (TA-43)



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 43

Notes for Figure 6H-44—Typical Application 44**Work in the Vicinity of an Entrance Ramp****Guidance:**

1. *An acceleration lane of sufficient length should be provided whenever possible as shown on the left diagram.*

Standard:

2. **For the information shown on the diagram on the right side of the typical application, where inadequate acceleration distance exists for the temporary entrance, the YIELD sign shall be replaced with STOP signs (one on each side of the approach).**

Guidance:

3. *When used, the YIELD or STOP sign should be located so that ramp vehicular traffic has adequate sight distance of oncoming mainline vehicular traffic to select an acceptable gap in the mainline vehicular traffic flow, but should not be located so far forward that motorists will be encouraged to stop in the path of the mainline traffic. Also, a longer acceleration lane should be provided beyond the sign to reduce the gap size needed. If insufficient gaps are available, consideration should be given to closing the ramp.*
4. *Where STOP signs are used, a temporary stop line should be placed across the ramp at the desired stop location.*
5. *The mainline merging taper with the arrow panel at its starting point should be located sufficiently in advance so that the arrow panel is not confusing to drivers on the entrance ramp, and so that the mainline merging vehicular traffic from the lane closure has the opportunity to stabilize before encountering the vehicular traffic merging from the ramp.*
6. *If the ramp curves sharply to the right, warning signs with advisory speed limits located in advance of the entrance terminal should be placed in pairs (one on each side of the ramp).*

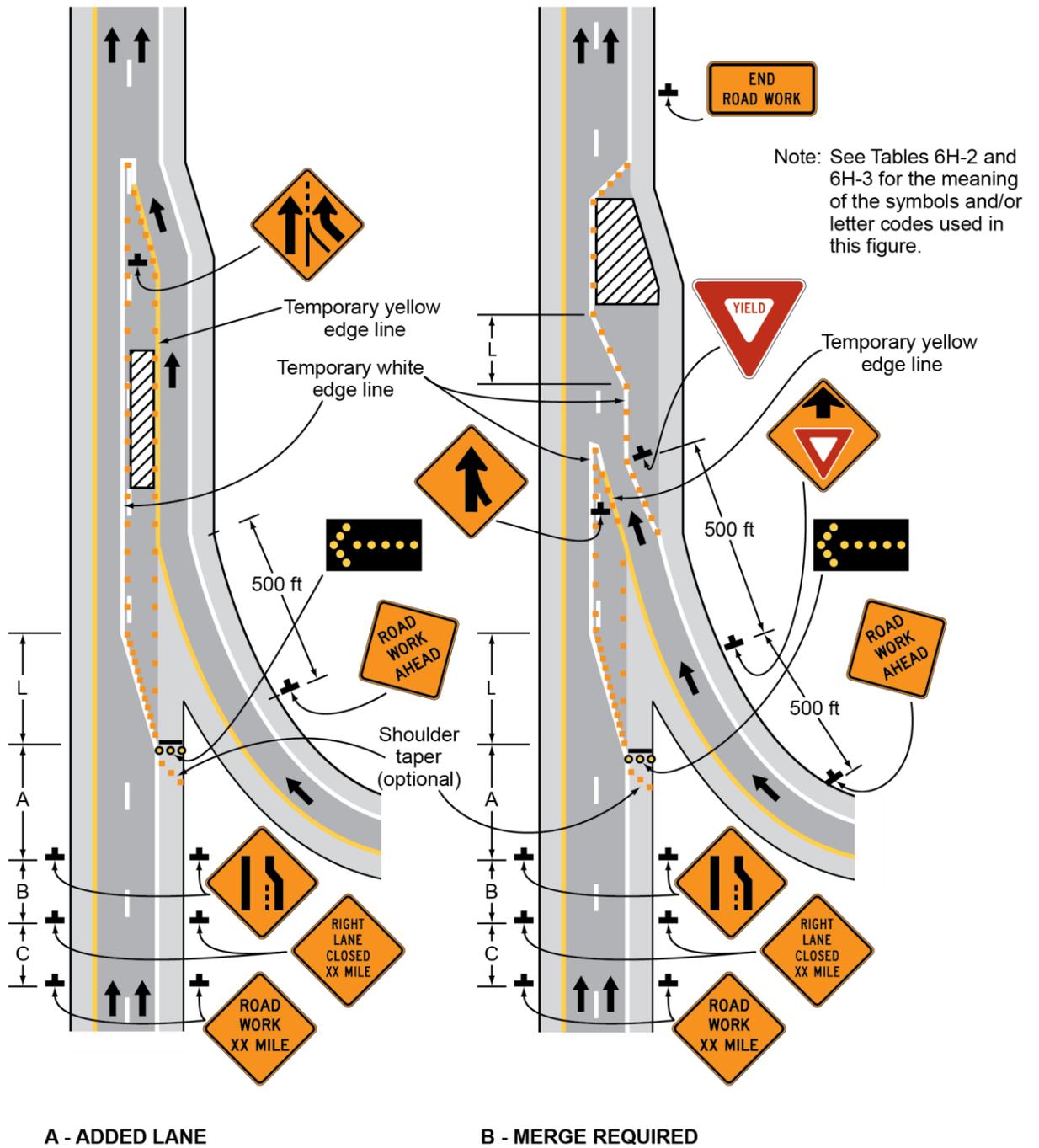
Option:

7. A Stop Beacon (see Section 4L.05) or a Type B high-intensity warning flasher with a red lens may be placed above the STOP sign.
8. Where the acceleration distance is significantly reduced, a supplemental plaque may be placed below the YIELD AHEAD sign reading NO MERGE AREA.

Standard:

9. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

Figure 6H-44. Work in the Vicinity of an Entrance Ramp (TA-44)



Typical Application 44

Notes for Figure 6H-45—Typical Application 45

Temporary Reversible Lane Using Movable Barriers

Support:

1. This application addresses one of several uses for movable barriers (see Section 6F.85) in highway work zones. In this example, one side of a 6-lane divided highway is closed to perform the work operation, and vehicular traffic is carried in both directions on the remaining 3-lane roadway by means of a median crossover.

To accommodate unbalanced peak-period vehicular traffic volumes, the direction of travel in the center lane is switched to the direction having the greater volume, with the transfer typically being made twice daily. Thus, there are four vehicular traffic phases described as follows:

- a. Phase A—two travel lanes northbound and one lane southbound;
- b. Transition A to B—one travel lane in each direction;
- c. Phase B—one travel lane northbound and two lanes southbound; and
- d. Transition B to A—one travel lane in each direction.

The typical application on the left illustrates the placement of devices during Phase A. The typical application on the right shows conditions during the transition (Transition A to B) from Phase A to Phase B.

Guidance:

2. *For the reversible-lane situation depicted, the ends of the movable barrier should terminate in a protected area or a crash cushion should be provided. During Phase A, the transfer vehicle should be parked behind the downstream end of the movable barrier for southbound traffic as shown in the typical application on the left. During Phase B, the transfer vehicle should be parked behind between the downstream ends of the movable barriers at the north end of the TTC zone as shown in the typical application on the right.*

The transition shift from Phase A to B should be as follows:

- a. *Change the signs in the northbound advance warning area and transition area from a LEFT LANE CLOSED AHEAD to a 2 LEFT LANES CLOSED AHEAD. Change the mode of the second northbound arrow panel from Caution to Right Arrow.*
 - b. *Place channelizing devices to close the northbound center lane.*
 - c. *Move the transfer vehicle from south to north to shift the movable barrier from the west side to the east side of the reversible lane.*
 - d. *Remove the channelizing devices closing the southbound center lane.*
 - e. *Change the signs in the southbound transition area and advance warning area from a 2 LEFT LANES CLOSED AHEAD to LEFT LANE CLOSED AHEAD. Change the mode of the second southbound arrow panel from Right Arrow to Caution.*
3. *Where the lane to be opened and closed is an exterior lane (adjacent to the edge of the traveled way or the work space), the lane closure should begin by closing the lane with channelizing devices placed along a merging taper using the same information employed for a stationary lane closure. The lane closure should then be extended with the movable-barrier transfer vehicle moving with vehicular traffic. When opening the lane, the transfer vehicle should travel against vehicular traffic. The merging taper should be removed in a method similar to a stationary lane closure.*

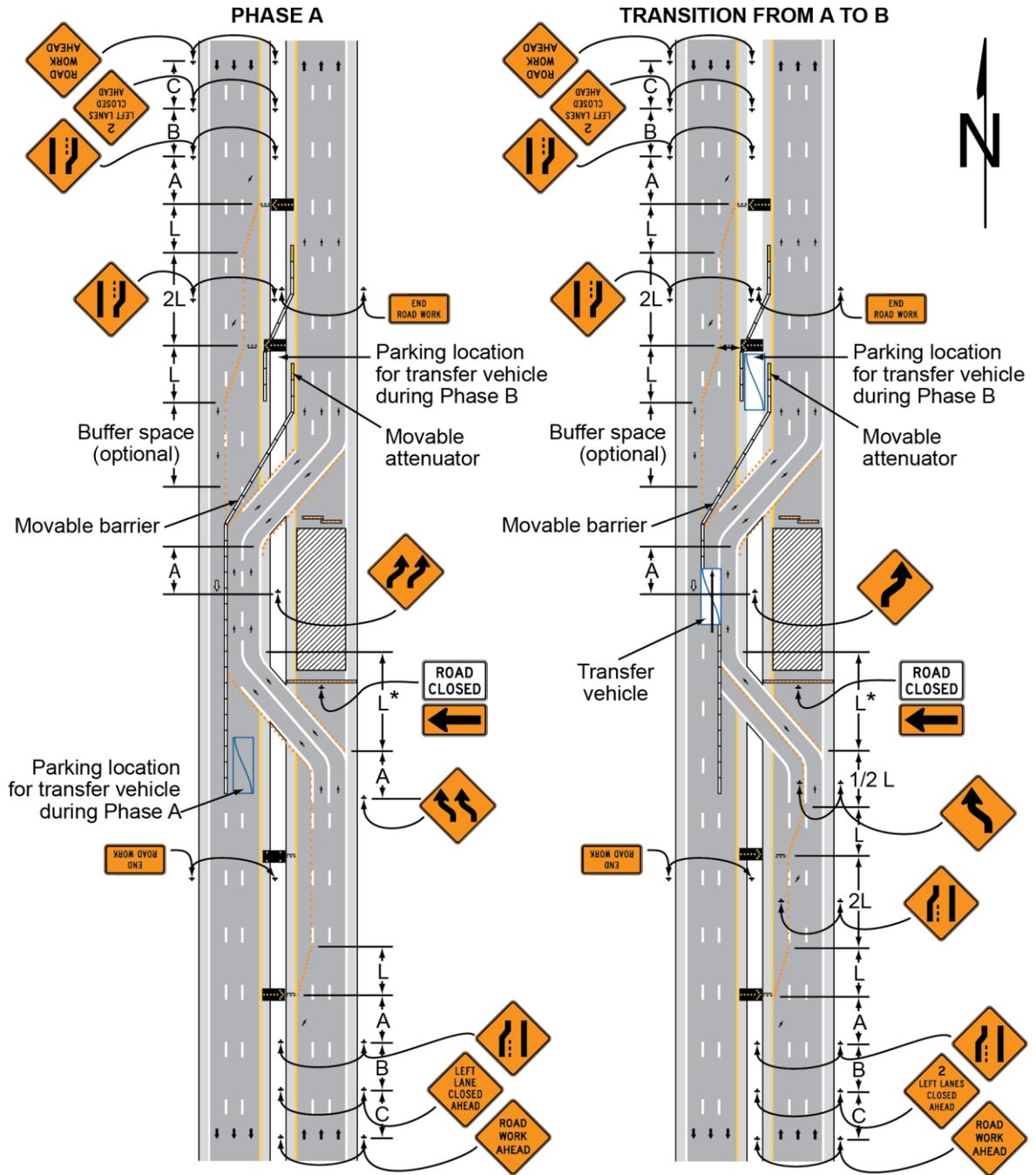
Option:

4. The procedure may be used during a peak period of vehicular traffic and then changed to provide two lanes in the other direction for the other peak.
5. A longitudinal buffer space may be used in the activity area to separate opposing vehicular traffic.
6. A work vehicle or a shadow vehicle may be equipped with a truck-mounted attenuator.
7. The shifting taper may be approximately 1/2 L in length where speeds are less than 50 mph (see Table 6C-3).

Standard:

8. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

Figure 6H-45. Temporary Reversible Lane Using Movable Barriers (TA-45)



Typical Application 45

Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure. Although leader lines point to the signs on the right-hand side of the roadway, most of these signs should be installed on both sides of the roadway.

* See Note 7.

Notes for Figure 6H-46—Typical Application 46**Work in the Vicinity of a Grade Crossing***Guidance:*

1. *When grade crossings exist either within or in the vicinity of roadway work activities, extra care should be taken to minimize the probability of conditions being created, by lane restrictions, flagging, or other operations, where vehicles might be stopped within the grade crossing, considered as being 15 ft on either side of the closest and farthest rail.*

Standard:

2. **If the queuing of vehicles across active rail tracks cannot be avoided, a uniformed law enforcement officer or flagger shall be provided at the highway-rail grade crossing to prevent vehicles from stopping within the grade crossing (as described in Note 1), even if automatic warning devices are in place.**

Guidance:

3. *Early coordination with the railroad company or light rail transit agency should occur before work starts.*
4. *In the example depicted, the buffer space of the activity area should be extended upstream of the grade crossing (as shown) so that a queue created by the flagging operation will not extend across the grade crossing.*
5. *The DO NOT STOP ON TRACKS sign should be used on all approaches to a highway-rail grade crossing within the limits of a TTC zone.*

Option:

6. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
7. A BE PREPARED TO STOP sign may be added to the sign series.

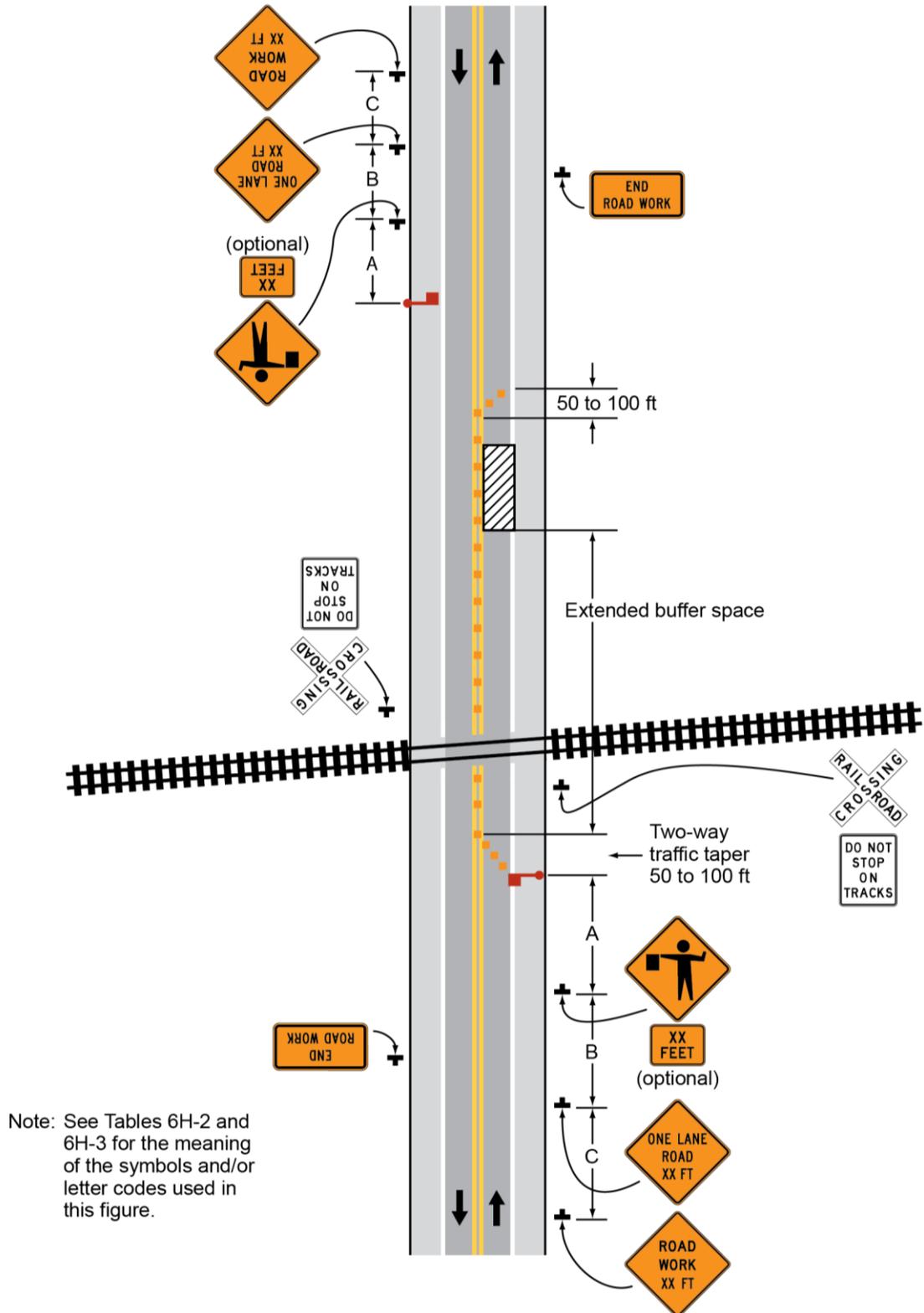
Guidance:

8. *When used, the BE PREPARED TO STOP sign should be located before the Flagger symbol sign.*

Standard:

9. **At night, flagger stations shall be illuminated, except in emergencies.**

Figure 6H-46. Work in the Vicinity of a Grade-Crossing (TA-46)



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 46

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CHAPTER 6I. CONTROL OF TRAFFIC THROUGH TRAFFIC INCIDENT MANAGEMENT AREAS

Section 6I.01 General

Support:

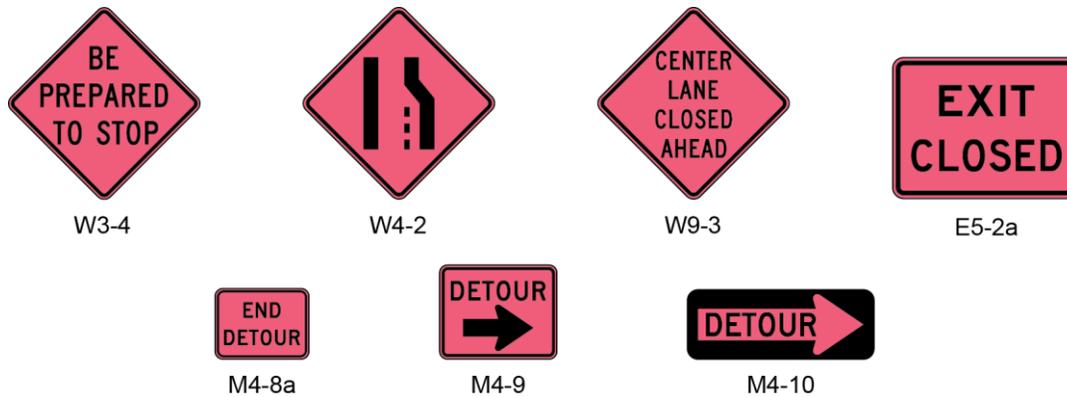
- 01 The National Incident Management System (NIMS) requires the use of the Incident Command System (ICS) at traffic incident management scenes.
- 02 A traffic incident is an emergency road user occurrence, a natural disaster, or other unplanned event that affects or impedes the normal flow of traffic.
- 03 A traffic incident management area is an area of a highway where temporary traffic controls are installed as authorized by a public authority or the official having jurisdiction of the roadway, in response to a road user incident, natural disaster, hazardous material spill, or other unplanned incident. It is a type of TTC zone and extends from the first warning device (such as a sign, light, or cone) to the last TTC device or to a point where vehicles return to the original lane alignment and are clear of the incident.
- 04 Traffic incidents can be divided into three general classes of duration, each of which has unique traffic control characteristics and needs. These classes are:
- A. Major—expected duration of more than 2 hours;
 - B. Intermediate—expected duration of 30 minutes to 2 hours; and
 - C. Minor—expected duration under 30 minutes.
- 05 The primary functions of TTC at a traffic incident management area are to inform road users of the incident and to provide guidance information on the path to follow through the incident area. Alerting road users and establishing a well defined path to guide road users through the incident area will serve to protect the incident responders and those involved in working at the incident scene and will aid in moving road users expeditiously past or around the traffic incident, will reduce the likelihood of secondary traffic crashes, and will preclude unnecessary use of the surrounding local road system. Examples include a stalled vehicle blocking a lane, a traffic crash blocking the traveled way, a hazardous material spill along a highway, and natural disasters such as floods and severe storm damage.

Guidance:

- 06 *In order to reduce response time for traffic incidents, highway agencies, appropriate public safety agencies (law enforcement, fire and rescue, emergency communications, emergency medical, and other emergency management), and private sector responders (towing and recovery and hazardous materials contractors) should mutually plan for occurrences of traffic incidents along the major and heavily traveled highway and street system.*
- 07 *On-scene responder organizations should train their personnel in TTC practices for accomplishing their tasks in and near traffic and in the requirements for traffic incident management contained in this Manual. On-scene responders should take measures to move the incident off the traveled roadway or to provide for appropriate warning. All on-scene responders and news media personnel should constantly be aware of their visibility to oncoming traffic and wear high-visibility apparel.*
- 08 *Emergency vehicles should be safe-positioned (see definition in Section 1A.13) such that traffic flow through the incident scene is optimized. All emergency vehicles that subsequently arrive should be positioned in a manner that does not interfere with the established temporary traffic flow.*
- 09 *Responders arriving at a traffic incident should estimate the magnitude of the traffic incident, the expected time duration of the traffic incident, and the expected vehicle queue length, and then should set up the appropriate temporary traffic controls for these estimates.*

Option:

- 10 Warning and guide signs used for TTC traffic incident management situations may have a black legend and border on a fluorescent pink background (see Figure 6I-1).

Figure 6I-1. Examples of Traffic Incident Management Area Signs**Support:**

11 While some traffic incidents might be anticipated and planned for, emergencies and disasters might pose more severe and unpredictable problems. The ability to quickly install proper temporary traffic controls might greatly reduce the effects of an incident, such as secondary crashes or excessive traffic delays. An essential part of fire, rescue, spill clean-up, highway agency, and enforcement activities is the proper control of road users through the traffic incident management area in order to protect responders, victims, and other personnel at the site. These operations might need corroborating legislative authority for the implementation and enforcement of appropriate road user regulations, parking controls, and speed zoning. It is desirable for these statutes to provide sufficient flexibility in the authority for, and implementation of, TTC to respond to the needs of changing conditions found in traffic incident management areas.

Option:

12 For traffic incidents, particularly those of an emergency nature, TTC devices on hand may be used for the initial response as long as they do not themselves create unnecessary additional hazards.

Section 6I.02 Major Traffic Incidents**Support:**

01 Major traffic incidents are typically traffic incidents involving hazardous materials, fatal traffic crashes involving numerous vehicles, and other natural or man-made disasters. These traffic incidents typically involve closing all or part of a roadway facility for a period exceeding 2 hours.

Guidance:

02 *If the traffic incident is anticipated to last more than 24 hours, applicable procedures and devices set forth in other Chapters of Part 6 should be used.*

Support:

03 A road closure can be caused by a traffic incident such as a road user crash that blocks the traveled way. Road users are usually diverted through lane shifts or detoured around the traffic incident and back to the original roadway. A combination of traffic engineering and enforcement preparations is needed to determine the detour route and to install, maintain or operate, and then to remove the necessary traffic control devices when the detour is terminated. Large trucks are a significant concern in such a detour, especially when detouring them from a controlled-access roadway onto local or arterial streets.

04 During traffic incidents, large trucks might need to follow a route separate from that of automobiles because of bridge, weight, clearance, or geometric restrictions. Also, vehicles carrying hazardous material might need to follow a different route from other vehicles.

05 Some traffic incidents such as hazardous material spills might require closure of an entire highway. Through road users must have adequate guidance around the traffic incident. Maintaining good public relations is desirable. The cooperation of the news media in publicizing the existence of, and reasons for,

traffic incident management areas and their TTC can be of great assistance in keeping road users and the general public well informed.

- 06 The establishment, maintenance, and prompt removal of lane diversions can be effectively managed by interagency planning that includes representatives of highway and public safety agencies.

Guidance:

- 07 *All traffic control devices needed to set up the TTC at a traffic incident should be available so that they can be readily deployed for all major traffic incidents. The TTC should include the proper traffic diversions, tapered lane closures, and upstream warning devices to alert traffic approaching the queue and to encourage early diversion to an appropriate alternative route.*

- 08 *Attention should be paid to the upstream end of the traffic queue such that warning is given to road users approaching the back of the queue.*

- 09 *If manual traffic control is needed, it should be provided by qualified flaggers or uniformed law enforcement officers.*

Option:

- 10 If flaggers are used to provide traffic control for an incident management situation, the flaggers may use appropriate traffic control devices that are readily available or that can be brought to the traffic incident scene on short notice.

Guidance:

- 11 *When light sticks or flares are used to establish the initial traffic control at incident scenes, channelizing devices (see Section 6F.63) should be installed as soon thereafter as practical.*

Option:

- 12 The light sticks or flares may remain in place if they are being used to supplement the channelizing devices.

Guidance:

- 13 *The light sticks, flares, and channelizing devices should be removed after the incident is terminated.*

Section 6I.03 Intermediate Traffic Incidents

Support:

- 01 Intermediate traffic incidents typically affect travel lanes for a time period of 30 minutes to 2 hours, and usually require traffic control on the scene to divert road users past the blockage. Full roadway closures might be needed for short periods during traffic incident clearance to allow traffic incident responders to accomplish their tasks.

- 02 The establishment, maintenance, and prompt removal of lane diversions can be effectively managed by interagency planning that includes representatives of highway and public safety agencies.

Guidance:

- 03 *All traffic control devices needed to set up the TTC at a traffic incident should be available so that they can be readily deployed for intermediate traffic incidents. The TTC should include the proper traffic diversions, tapered lane closures, and upstream warning devices to alert traffic approaching the queue and to encourage early diversion to an appropriate alternative route.*

- 04 *Attention should be paid to the upstream end of the traffic queue such that warning is given to road users approaching the back of the queue.*

- 05 *If manual traffic control is needed, it should be provided by qualified flaggers or uniformed law enforcement officers.*

Option:

- 06 If flaggers are used to provide traffic control for an incident management situation, the flaggers may use appropriate traffic control devices that are readily available or that can be brought to the traffic incident scene on short notice.

Guidance:

07 *When light sticks or flares are used to establish the initial traffic control at incident scenes, channelizing devices (see Section 6F.63) should be installed as soon thereafter as practical.*

Option:

08 The light sticks or flares may remain in place if they are being used to supplement the channelizing devices.

Guidance:

09 *The light sticks, flares, and channelizing devices should be removed after the incident is terminated.*

Section 6I.04 Minor Traffic Incidents

Support:

01 Minor traffic incidents are typically disabled vehicles and minor crashes that result in lane closures of less than 30 minutes. On-scene responders are typically law enforcement and towing companies, and occasionally highway agency service patrol vehicles.

02 Diversion of traffic into other lanes is often not needed or is needed only briefly. It is not generally possible or practical to set up a lane closure with traffic control devices for a minor traffic incident. Traffic control is the responsibility of on-scene responders.

Guidance:

03 *When a minor traffic incident blocks a travel lane, it should be removed from that lane to the shoulder as quickly as possible.*

Section 6I.05 Use of Emergency-Vehicle Lighting

Support:

01 The use of emergency-vehicle lighting (such as high-intensity rotating, flashing, oscillating, or strobe lights) is essential, especially in the initial stages of a traffic incident, for the safety of emergency responders and persons involved in the traffic incident, as well as road users approaching the traffic incident. Emergency-vehicle lighting, however, provides warning only and provides no effective traffic control. The use of too many lights at an incident scene can be distracting and can create confusion for approaching road users, especially at night. Road users approaching the traffic incident from the opposite direction on a divided facility are often distracted by emergency-vehicle lighting and slow their vehicles to look at the traffic incident posing a hazard to themselves and others traveling in their direction.

02 The use of emergency-vehicle lighting can be reduced if good traffic control has been established at a traffic incident scene. This is especially true for major traffic incidents that might involve a number of emergency vehicles. If good traffic control is established through placement of advanced warning signs and traffic control devices to divert or detour traffic, then public safety agencies can perform their tasks on scene with minimal emergency-vehicle lighting.

Guidance:

03 *Public safety agencies should examine their policies on the use of emergency-vehicle lighting, especially after a traffic incident scene is secured, with the intent of reducing the use of this lighting as much as possible while not endangering those at the scene. Special consideration should be given to reducing or extinguishing forward facing emergency-vehicle lighting, especially on divided roadways, to reduce distractions to on-coming road users.*

04 *Because the glare from floodlights or vehicle headlights can impair the nighttime vision of approaching road users, and floodlights or vehicle headlights that are not needed for illumination, or to provide notice to other road users of an incident response vehicle being in an unexpected location, should be turned off at night.*

PART 7. TRAFFIC CONTROLS FOR SCHOOL AREAS

CHAPTER 7A. GENERAL

Section 7A.01 Need for Standards

Support:

- 01 Regardless of the school location, the best way to achieve effective traffic control is through the uniform application of realistic policies, practices, and standards developed through engineering judgment or studies.
- 02 Pedestrian safety depends upon public understanding of accepted methods for efficient traffic control. This principle is especially important in the control of pedestrians, bicycles, and other vehicles in the vicinity of schools. Neither pedestrians on their way to or from school nor other road users can be expected to move safely in school areas unless they understand both the need for traffic controls and how these controls function for their benefit.
- 03 Procedures and devices that are not uniform might cause confusion among pedestrians and other road users, prompt wrong decisions, and contribute to crashes. To achieve uniformity of traffic control in school areas, comparable traffic situations need to be treated in a consistent manner. Each traffic control device and control method described in Part 7 fulfills a specific function related to specific traffic conditions.
- 04 A uniform approach to school area traffic controls assures the use of similar controls for similar situations which promotes appropriate and uniform behavior on the part of motorists, pedestrians, and bicyclists.
- 05 A school traffic control plan permits the orderly review of school area traffic control needs, and the coordination of school/pedestrian safety education and engineering measures. Engineering measures alone do not always result in the intended change in student and road user behavior.

Guidance:

- 06 *A school route plan, or pedestrian plan, for each school serving elementary to high school students should be prepared in order to develop uniformity in the use of school area traffic controls and to serve as the basis for a school traffic control plan for each school.*
- 07 *The school route plan, developed in a systematic manner by the school, law enforcement, and traffic officials responsible for school pedestrian safety, should consist of a map (see Figure 7A-1) showing streets, the school, existing traffic controls, established school walk routes, and established school crossings.*
- 08 *The type(s) of school area traffic control devices used, either warning or regulatory, should be related to the volume and speed of vehicular traffic, street width, and the number and age of the students using the crossing.*
- 09 *School area traffic control devices should be included in a school traffic control plan.*

Support:

- 10 “School” and “school zone” are defined in Section 1A.13.
- 11 Additional information about Safe Route to School programs and bicycle and pedestrian safety around schools is available from the ODOT website at <http://www.dot.state.oh.us/SafeRoutes>.

Section 7A.02 School Routes and Established School Crossings

Support:

- 01 To establish a safer route to and from school for schoolchildren, the application of planning criterion for school walk routes might make it necessary for children to walk an indirect route to an established school crossing located where there is existing traffic control and to avoid the use of a direct crossing where there is no existing traffic control.

Guidance:

- 02 *School walk routes should be planned to take advantage of existing traffic controls.*
- 03 *The following factors should be considered when determining the feasibility of requiring children to walk a longer distance to a crossing with existing traffic control:*
- A. *The availability of adequate sidewalks or other pedestrian walkways to and from the location with existing control,*

- B. *The number of students using the crossing,*
- C. *The age levels of the students using the crossing, and*
- D. *The total extra walking distance.*

Section 7A.03 School Crossing Control Criteria

Support:

- 01 The frequency of gaps in the traffic stream that are sufficient for student crossing is different at each crossing location. When the delay between the occurrence of adequate gaps becomes excessive, students might become impatient and endanger themselves by attempting to cross the street during an inadequate gap. In these instances, the creation of sufficient gaps needs to be considered to accommodate the crossing demand.
- 02 A recommended method for determining the frequency and adequacy of gaps in the traffic stream is given in the “Traffic Control Devices Handbook” (see Section 1A.11).

Section 7A.04 Scope

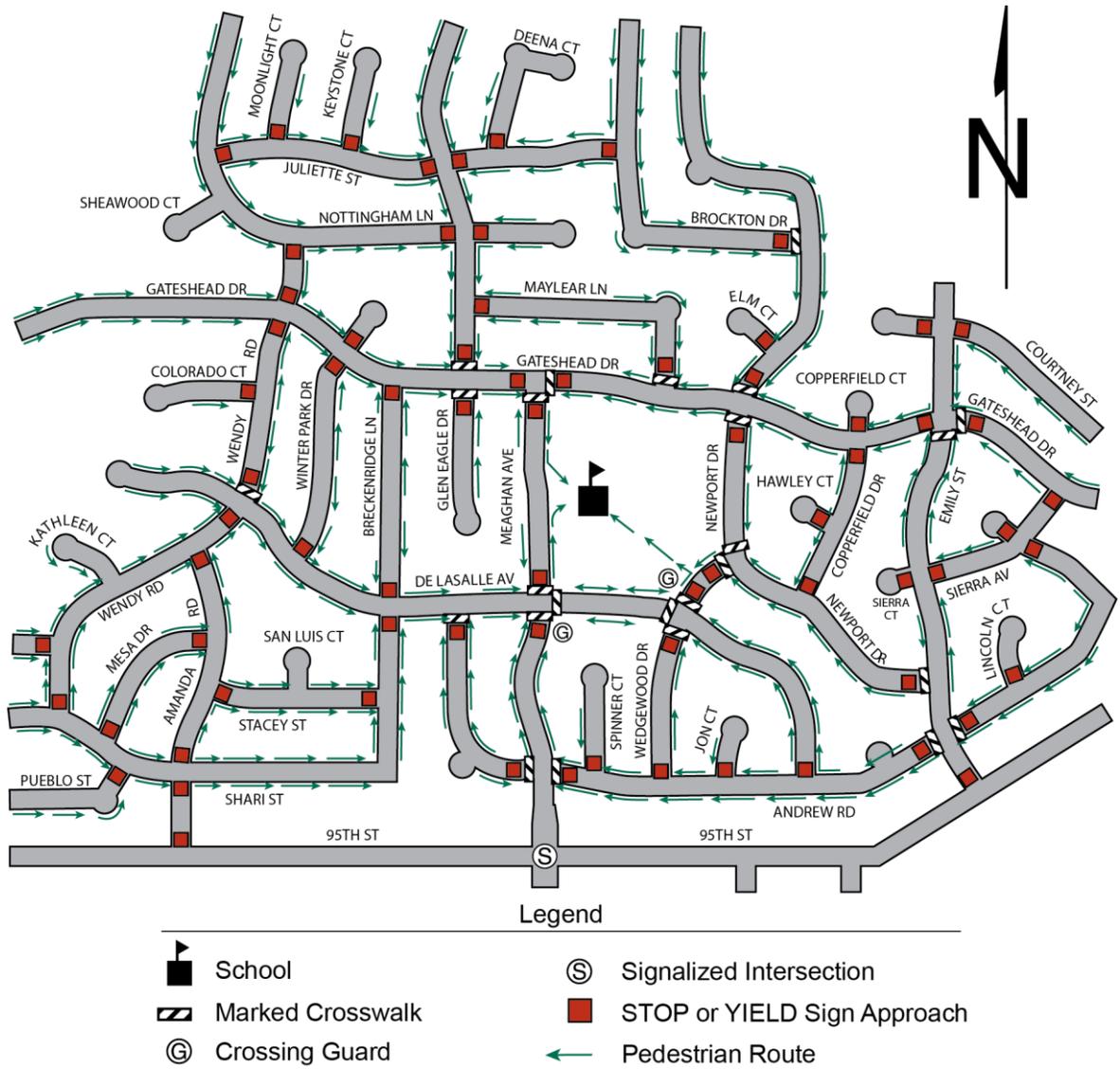
Standard:

- 01 **Part 7 sets forth basic principles and prescribes standards that shall be followed in the design, application, installation, and maintenance of all traffic control devices (including signs, signals, and markings) and other controls (including adult crossing guards) required for the special pedestrian conditions in school areas.**

Support:

- 02 Sections 1A.01 and 1A.08 contain information regarding unauthorized devices and messages. Sections 1A.02 and 1A.07 contain information regarding the application of standards. Section 1A.05 contains information regarding the maintenance of traffic control devices. Section 1A.08 contains information regarding placement authority for traffic control devices. Section 1A.09 contains information regarding engineering studies and the assistance that is available to jurisdictions that do not have engineers on their staffs who are trained and/or experienced in traffic control devices.
- 03 Provisions contained in Chapter 2A and Section 2B.05 are applicable in school areas.
- 04 Part 3 contains provisions regarding pavement markings that are applicable in school areas.
- 05 Part 4, contains provisions regarding highway traffic signals that are applicable in school areas. The School Crossing signal warrant is described in Section 4C.06.
- 06 As noted in Section 7A.01, Paragraph 11, additional information on Safe Routes to School Programs and related materials is available on-line from ODOT’s website.

Figure 7A-1. Example of School Route Plan Map



CHAPTER 7B. SIGNS

Section 7B.01 Size of School Signs

Standard:

01 Except as provided in Section 2A.11, the sizes of signs and plaques to be used on conventional roadways in school areas shall be as shown in Table 7B-1.

02 The sizes in the Conventional Road column shall be used unless engineering judgment determines that a minimum or oversized sign size would be more appropriate.

03 The sizes in the Minimum column shall be used only where traffic volumes are low and speeds are 30 mph or lower, as determined by engineering judgment.

04 The sizes in the Oversized column shall be used on expressways.

Guidance:

05 The sizes in the Oversized column should be used on roadways that have four or more lanes with posted speed limits of 40 mph or higher.

Option:

06 The sizes in the Oversized column may also be used at other locations that require increased emphasis, improved recognition, or increased legibility.

07 Signs and plaques larger than those shown in Table 7B-1 may be used (see Section 2A.11).

Section 7B.02 Illumination and Reflectorization

Standard:

01 The signs used for school area traffic control shall be retroreflectorized or illuminated.

Section 7B.03 Position of Signs

Support:

01 Sections 2A.16 and 2A.17 contain provisions regarding the placement and locations of signs.

02 Section 2A.19 contains provisions regarding the lateral offsets of signs.

Option:

03 In-roadway signs for school traffic control areas may be used consistent with the requirements of Sections 2B.12, 7B.12, and 7B.13.

Section 7B.04 Height of Signs

Support:

01 Section 2A.18 contains provisions regarding the mounting height of signs.

Section 7B.05 Installation of Signs

Support:

01 Section 2A.16 contains provisions regarding the installation of signs.

Section 7B.06 Lettering

Support:

01 The "Sign Designs and Markings Manual" (SDMM) (see Section 1A.11) contains information regarding sign lettering.

Section 7B.07 Sign Color for School Warning Signs

Standard:

01 School warning signs, including the "SCHOOL" portion of the School Speed Limit (S5-H1) sign and including any supplemental plaques used in association with these warning signs, shall have a fluorescent yellow-green background with a black legend and border unless otherwise provided in this Manual for a specific sign.

Table 7B-1. School Area Sign and Plaque Sizes

Sign	Sign Designation	Section	Conventional Road		Minimum	Oversized
			Single Lane	Multi-Lane		
School	S1-1	7B.08	36 x 36	36 x 36	30 x 30	48 x 48
School Bus Stop Ahead	S3-1	7B.14	36 x 36	36 x 36	30 x 30	48 x 48
SCHOOL BUS TURN AHEAD	S3-2	7B.15	36 x 36	36 x 36	30 x 30	48 x 48
School Speed Limit Ahead	S4-5 S4-5a	7B.16	36 x 36	36 x 36	30 x 30	48 x 48
School Speed Limit (During Restricted Hours/Hours)	S5-H1	7B.10	24 x 48	30 x 60	—	36 x 72
END SCHOOL SPEED LIMIT	S5-3	7B.10	24 x 30	30 x 60	—	36 x 48
In-Street Pedestrian Crossing	R1-6, R1-6b	7B.12, 7B-13	12 x 36	12 X 36	—	—
Overhead Pedestrian Crossing	R1-9	7B-13	90 x 24	90 X 24	—	—
Speed Limit (School Use)	R2-1	7B.15	24 x 30	30 x 36	—	36 x 48
BEGIN HIGHER FINES ZONE	R2-10	7B.11	24 x 30	30 x 36	—	36 x 48
END HIGHER FINES ZONE	R2-11	7B.11	24 x 30	30 x 36	—	36 x 48
STOP FOR SCHOOL BUS LOADING OR UNLOADING...	R16-H3	7B.18	30 x 30	42 x 42	—	42 x 42

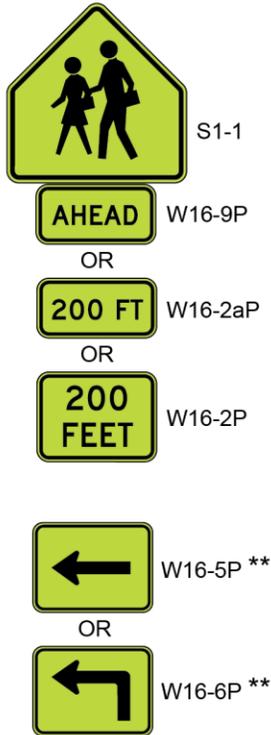
Plaque	Sign Designation	Section	Conventional Road		Minimum	Oversized
			Single Lane	Multi-Lane		
X:XX - X:XX AM X:XX - X:XX PM	S4-1P	7B.10	24 x 10	30 x 12	—	36 x 18
SCHOOL	S4-3P	7B.09, 7B.10	24 x 8	30 x 10	—	36 x 12
MON - FRI	S4-6P	7B.10	24 x 10	30 x 12	—	36 x 18
ALL YEAR	S4-7P	7B.10	24 x 12	30 x 15	—	30 x 18
DURING RESTRICTED HOURS	S4-H8P	7B.10	24 x 10	30 x 12	—	36 x 18
FINES HIGHER	R2-6P	7B.11	24 x 18	30 x 24	—	36 x 24
XXX FEET	W16-2P	7B.08, 7B.09, 7B.12	24 x 18	24 x 18	—	30 x 24
XXX FT	W16-2aP	7B.08, 7B.09, 7B.12	24 x 12	24 x 18	—	30 x 18
Turn Arrow	W16-5P	7B.08, 7B.09, 7B.12	24 x 12	24 x 12	—	30 x 18
Advance Turn Arrow	W16-6P	7B.08, 7B.09, 7B.12	24 x 12	24 x 12	—	30 x 18
Diagonal Arrow	W16-7P	7B.13	24 x 12	24 x 12	—	30 x 18
Diagonal Arrow (Optional Size)	W16-7P	7B.13	21 x 15	21 x 15	—	—
AHEAD	W16-9P	7B.09, 7B.12	24 x 12	24 x 12	—	30 x 18

Notes:

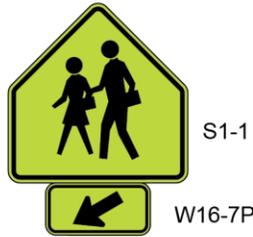
1. Larger sizes may be used when appropriate.
2. Dimensions are shown in inches and are shown as width x height.

Figure 7B-1. School Area Signs

School Zone Ahead* and School Crossing Ahead Assembly



School Crossing Assembly



School Speed Limit Assembly



* The S4-3P may also be used to supplement the School Zone Ahead assembly.

** The W16-5P or W16-6P may be used to supplement the S-1 on each approach to an intersection when a school zone or school crossing is located on a cross street in close proximity to the intersection.



S3-1



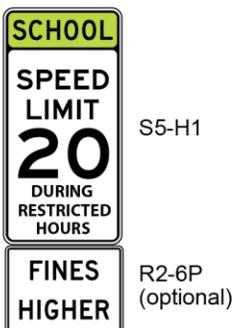
S3-2



S4-5



S4-5a



S5-H1

R2-6P (optional)



S5-3



R2-10



R2-11



R16-H3

Section 7B.08 School Sign (S1-1) and Plaques**Support:**

- 01 The School (S1-1) sign (see Figure 7B-1) has the following applications:
- A. School Zone Ahead – as part of a School Zone Ahead Assembly, the S1-1 sign can be used to provide advance notice of a designated school zone (see Section 7B.09).
 - B. School Crossing Ahead – as part of a School Crossing Ahead assembly, the S1-1 sign can be used to warn road users that they are approaching a crossing where schoolchildren cross the roadway (see Section 7B.12).
 - C. School Crossing – if combined with a diagonal downward pointing arrow (W16-7P) plaque to comprise the School Crossing assembly, the S1-1 sign can be used to warn approaching road users of the location of a crossing where schoolchildren cross the roadway (see Section 7B.13).

Option:

- 02 If a school area is located on a cross street in close proximity to the intersection, a School (S1-1) sign with a supplemental arrow (W16-5P or W16-6P) plaque may be installed on each approach of the street or highway to warn road users making a turn onto the cross street that they will encounter a school area soon after making the turn.

Section 7B.09 School Zone Ahead Assembly (S1-1, S4-3P, W16-2P, W16-2aP, W16-5P, W16-6P, W16-9P)**Support:**

- 01 Section 4511.21(B)(1)(a) of the Ohio Revised Code (ORC) establishes a 20 mile per hour speed limit for School Zones, and establishes when that speed limit is in effect (see Appendix B2).
- 02 Section 4511.21(B)(1)(c) of the ORC defines a traditional School Zone as “that portion of a street or highway passing a school fronting upon the street or highway that is encompassed by projecting the school property lines to the fronting street or highway, and also includes that portion of a state highway.” This ORC Section also establishes a means by which the Ohio Department of Transportation (ODOT), upon request from a local authority, may approve extensions of the traditional School Zone boundaries or designate a School Zone on a portion of a state route for certain crosswalks customarily used by children going to or leaving a school.
- 03 Complete instructions and a form for submitting an application for approval of a non-traditional School Zone are available from the ODOT Office of Traffic Engineering and each ODOT District Office.

Guidance:

- 04 *Requests for changes in the traditional School Zone boundaries should be submitted to the ODOT District Deputy Director in accordance with the procedure described in Part 7 of the ODOT “Traffic Engineering Manual” (TEM) (see Section 1A.11).*

Standard:

- 05 **A School Zone Ahead assembly consisting of a School (S1-1) sign supplemented with an AHEAD (W16-9P) or XX Feet (W16-2P or W16-2aP) plaque (see Figure 7B-1) shall be installed in advance of the designated school zone (see Figures 7B-2 and 7B-4).**

Option:

- 06 A School (S1-1) sign may be supplemented with a SCHOOL (S4-3P) plaque (see Figure 7B-1).
- 07 If a school zone is located on a cross street in close proximity to the intersection, a School (S1-1) sign with a supplemental arrow (W16-5P or W16-6P) plaque may be installed on each approach of the street or highway to warn road users making a turn onto the cross street that they will encounter a school zone soon after making the turn.

Section 7B.10 School Speed Limit Assembly (S4-1P, S4-3P, S4-H8P, S4-6P), School Speed Limit Sign (S5-H1), and END SCHOOL SPEED LIMIT Sign (S5-3)**Standard:**

- 01 **A School Speed Limit assembly (see Figure 7B-1) or a School Speed Limit (S5-H1) sign (see Figure 7B-1) shall be used to indicate the speed limit where a school zone has been established. The School Speed Limit assembly or School Speed Limit sign shall be placed at or as near as practical to the point where the school zone begins (see Figures 7B-2 and 7B-4).**

A School Zone Ahead assembly (Section 7B.09) shall be installed in advance (see Table 2C-4 for advance placement guidelines) of the School Speed Limit assembly or S5-H1 sign that is encountered in each direction as traffic approaches the school zone (see Figures 7B-2 and 7B-4).

Except as provided in Paragraph 10, the downstream end of a school zone shall be identified with an END SCHOOL SPEED LIMIT (S5-3) sign or a standard Speed Limit sign showing the speed limit for the section of highway that is downstream (see Figures 7B-1 and 7B-4).

Guidance:

There should be no Speed Limit signs erected or in place within the limits of the School Zone.

There should also be no Speed Limit signs within the space between either the School Zone Ahead assembly (Section 7B.09) or the School Speed Limit Ahead sign (Section 7B.16) and the beginning of the School Zone, or closer than 500 feet in advance of the School Zone Ahead or the School Speed Limit Ahead sign.

Where a side street intersects the highway within the School Zone, additional School Speed Limit assemblies/signs should be erected on the highway as needed to notify motorists entering the school zone from the side street of the School Zone speed limit. The School Speed Limit assembly/sign should be mounted along the right-hand side of the roadway.

Standard:

The School Speed Limit assembly shall be either a fixed-message sign assembly or a changeable message sign.

The fixed-message School Speed Limit assembly shall consist of a top plaque (S4-3P) with the legend SCHOOL, a Speed Limit (R2-1) sign, and a bottom plaque (S4-1P, S4-H8P, or S4-6P) indicating when the school speed limit is in effect (see Figure 7B-1).

Option:

A School Speed Limit assembly may be supplemented with an ALL YEAR (S4-7P) plaque (see Figure 7B-1) if the school operates on a 12-month schedule.

At the downstream end of a school zone, an END SCHOOL SPEED LIMIT sign and a Speed Limit sign may be mounted together on the same post.

Changeable message signs (see Chapter 2L and Section 6F.60) may be used to inform drivers of the school speed limit. If the sign is internally illuminated, it may have a white legend on a black background. Changeable message signs with flashing beacons may be used for situations where greater emphasis of the school speed limit is needed.

Guidance:

Even though it might not always be practical because of special features to make changeable message signs conform in all respects to the standards in this Manual for fixed-message signs, during the periods that the school speed limit is in effect, their basic shape, message, legend layout, and colors should comply with the standards for fixed-message signs.

A confirmation light or device to indicate that the speed limit message is in operation should be considered for inclusion on the back of the changeable message sign.

Standard:

Fluorescent yellow-green pixels shall be used when the SCHOOL message is displayed on a changeable message sign for a school speed limit.

Option:

Changeable message signs may use blank-out messages or other methods in order to display the school speed limit only during the periods it applies.

Changeable message signs that display the speed of approaching drivers (see Section 2B.13) may be used in a school speed limit zone.

A Speed Limit Sign Beacon (see Section 4L.04) also may be used to identify the periods that the school speed limit is in effect. .

Option:

Where side mounting does not provide adequate sight distance or is otherwise impractical, the School Speed Limit assembly or the School Speed Limit (S5-H1) sign may be mounted overhead.

Section 7B.11 Higher Fines Zone Signs (R2-10, R2-11) and Plaques

Standard:

- 01 Where increased fines are imposed for traffic violations within a designated school zone, a **BEGIN HIGHER FINES ZONE (R2-10) sign** (see Figure 7B-1) or a **FINES HIGHER (R2-6P), FINES DOUBLE (R2-6aP), or \$XX FINE (R2-6bP) plaque** (see Figure 2B-3) shall be installed as a supplement to the **School Speed Limit assembly** or the **School Speed Limit (S5-H1) sign** to identify the beginning point of the higher fines zone (see Figure 7B-2).

Option:

- 02 For advance notice, a **FINES HIGHER (R2-6P), FINES DOUBLE (R2-6aP), or \$XX FINE (R2-6bP) plaque** may be used to supplement the **School Zone Ahead assembly**.
- 03 Where appropriate, one of the following plaques may be mounted below the sign that identifies the beginning point of the higher fines zone:
- A. An **S4-1P plaque** (see Figure 7B-1) specifying the times that the higher fines are in effect,
 - B. A **WHEN CHILDREN ARE PRESENT plaque**, or
 - C. A **WHEN FLASHING plaque** if used in conjunction with a yellow flashing beacon.

Standard:

- 04 Where **Higher Fines Zone signs and plaques have been posted to notify road users of increased fines for traffic violations**, an **END HIGHER FINES ZONE (R2-11) sign** (see Figure 7B-1) or an **END SCHOOL SPEED LIMIT (S5-3) sign** shall be installed at the downstream end of the zone to notify road users of the termination of the increased fines zone (see Figure 7B-2).

Section 7B.12 School Crossing Ahead Assembly

Standard:

- 01 The **School Crossing Ahead assembly** shall consist of a **School (S1-1) sign** supplemented with an **AHEAD (W16-9P) plaque** or an **XX FEET (W16-2P or W16-2aP) plaque** (see Figure 7B-1).
- 02 Except as provided in Paragraph 3, a **School Crossing Ahead assembly** shall be used in advance (see Table 2C-4 for advance placement guidelines) of the first **School Crossing assembly** (see Section 7B.13) that is encountered in each direction as traffic approaches a school crosswalk (see Figure 7B-3).

Option:

- 03 The **School Crossing Ahead assembly** may be omitted (see Figure 7B-4) where a **School Speed Limit assembly** or the **School Speed Limit (S5-H1) sign** (see Section 7B.10) is installed to identify the beginning of a school zone in advance of the **School Crossing assembly**.
- 05 If a school crosswalk is located on a cross street in close proximity to an intersection, a **School (S1-1) sign** with a supplemental **arrow (W16-5P or W16-6P) plaque** may be installed on each approach of the street or highway to warn road users making a turn onto the cross street that they will encounter a school crosswalk soon after making the turn.
- 06 A 12-inch reduced size in-street **School (S1-1) sign** (see Figure 7B-5), installed in compliance with the mounting height and special mounting support requirements for **In-Street Pedestrian Crossing (R1-6) signs** (see Section 2B.12), may be used in advance of a school crossing to supplement the post-mounted school warning signs. A 12 x 6-inch reduced size **AHEAD (W16-9P) plaque** may be mounted below the reduced size in-street **School (S1-1) sign**.

Section 7B.13 School Crossing Assembly

Standard:

- 01 If used, the **School Crossing assembly** (see Figure 7B-1) shall be installed at the school crossing (see Figures 7B-3 and 7B-4), or as close to it as possible, and shall consist of a **School (S1-1) sign** supplemented with a **diagonal downward pointing arrow (W16-7P) plaque** to show the location of the crossing.
- 02 The **School Crossing assembly** shall not be used at crossings other than those adjacent to schools and those on established school pedestrian routes.

03 **The School Crossing assembly shall not be installed on approaches controlled by a STOP or YIELD sign.**

Option:

04 The In-Street Pedestrian Crossing (R1-6) sign (see Section 2B.12 and Figure 7B-5) or the In-Street Schoolchildren Crossing (R1-6b) sign (see Figure 7B-5) may be used at unsignalized school crossings. If used at a school crossing, a 12 x 4-inch SCHOOL (S4-3P) plaque (see Figure 7B-5) may be mounted above the sign. The STATE LAW legend on the R1-6 series signs may be omitted.

05 The Overhead Pedestrian Crossing (R1-9) sign (see Section 2B.12 and Figure 2B-2) may be modified to replace the standard pedestrian symbol with the standard schoolchildren symbol and may be used at unsignalized school crossings. The STATE LAW legend on the R1-9 series signs may be omitted.

06 A 12-inch reduced size in-street School (S1-1) sign (see Figure 7B-5) may be used at an unsignalized school crossing instead of the In-Street Pedestrian Crossing (R1-6) sign. A 12 x 6-inch reduced size diagonal downward pointing arrow (W16-7P) plaque may be mounted below the reduced size in-street School (S1-1) sign.

Standard:

07 **If an In-Street Pedestrian Crossing sign, an In-Street Schoolchildren Crossing sign, or a reduced size in-street School (S1-1) sign is placed in the roadway, the sign support shall comply with the mounting height and special mounting support requirements for In-Street Pedestrian Crossing (R1-6) signs (see Section 2B.12).**

08 **The In-Street Pedestrian Crossing sign, the In-Street Schoolchildren Crossing, the Overhead Pedestrian Crossing sign, and the reduced size in-street School (S1-1) sign shall not be used at signalized locations.**

Section 7B.14 School Bus Stop Ahead Sign (S3-1)

Guidance:

01 *The School Bus Stop Ahead (S3-1) sign (see Figure 7B-1) should be installed in advance of locations where a school bus, when stopped to pick up or discharge passengers, is not visible to road users for an adequate distance and where there is no opportunity to relocate the school bus stop to provide adequate sight distance.*

Standard:

02 **These signs shall be erected only on the basis of a traffic engineering study and after the school transportation officials have confirmed the need for the stop.**

Guidance:

03 *The need for these signs at existing locations should be reevaluated periodically.*

Section 7B.15 SCHOOL BUS TURN AHEAD Sign (S3-2)

Option:

01 The SCHOOL BUS TURN AHEAD (S3-2) sign (see Figure 7B-1) may be installed in advance of locations where a school bus turns around on a roadway at a location not visible to approaching road users for a distance as determined by the "0" column under Condition B of Table 2C-4, and where there is no opportunity to relocate the school bus turn around to provide the distance provided in Table 2C-4.

Standard:

02 **These signs shall be erected only after the school transportation officials have confirmed the need for the turn.**

Guidance:

03 *The need for these signs at existing locations should be reevaluated periodically.*

Section 7B.16 School Speed Limit Ahead Sign (S4-5, S4-5a)

Guidance:

01 *A School Speed Limit Ahead (S4-5, S4-5a) sign (see Figure 7B-1) should be used to inform road users of a school zone where the speed limit is being reduced by more than 10 miles per hour, or where engineering judgment indicates that advance notice would be appropriate.*

Standard:

- 02 **If used, the School Speed Limit Ahead sign shall be followed by a School Speed Limit (S5-H1) sign or a School Speed Limit assembly (Section 7B.10).**
- 03 **The speed limit displayed on the School Speed Limit Ahead sign shall be the School Zone speed limit.**

Section 7B.17 Parking and Stopping Signs (R7 and R8 Series)

Option:

- 01 Parking and stopping regulatory signs may be used to prevent parked or waiting vehicles from blocking pedestrians' views, and drivers' views of pedestrians, and to control vehicles as a part of the school traffic plan.

Support:

- 02 Parking signs and other signs governing the stopping and standing of vehicles in school areas cover a wide variety of regulations. Typical examples of regulations are as follows:
- A. No Parking X:XX AM to X:XX PM School Days Only;
 - B. No Stopping X:XX AM to X:XX PM School Days Only;
 - C. XX Min Loading X:XX AM to X:XX PM School Days Only; and
 - D. No Standing X:XX AM to X:XX PM School Days Only.

- 03 Sections 2B.46, 2B.47, and 2B.48 contain information regarding the signing of parking regulations in school zone areas.

Section 7B.18 STOP FOR SCHOOL BUS LOADING OR UNLOADING Sign (R16-H3)

Option:

- 01 The STOP FOR SCHOOL BUS LOADING OR UNLOADING (R16-H3) sign (see Figure 7B-1) may be used to remind road users of the provisions of Section 4511.75 of the Ohio Revised Code (see Appendix B2) prohibiting passing of school buses in either direction on undivided highways when loading or unloading schoolchildren.

Figure 7B-2. Example of Signing for a Higher Fines School Zone

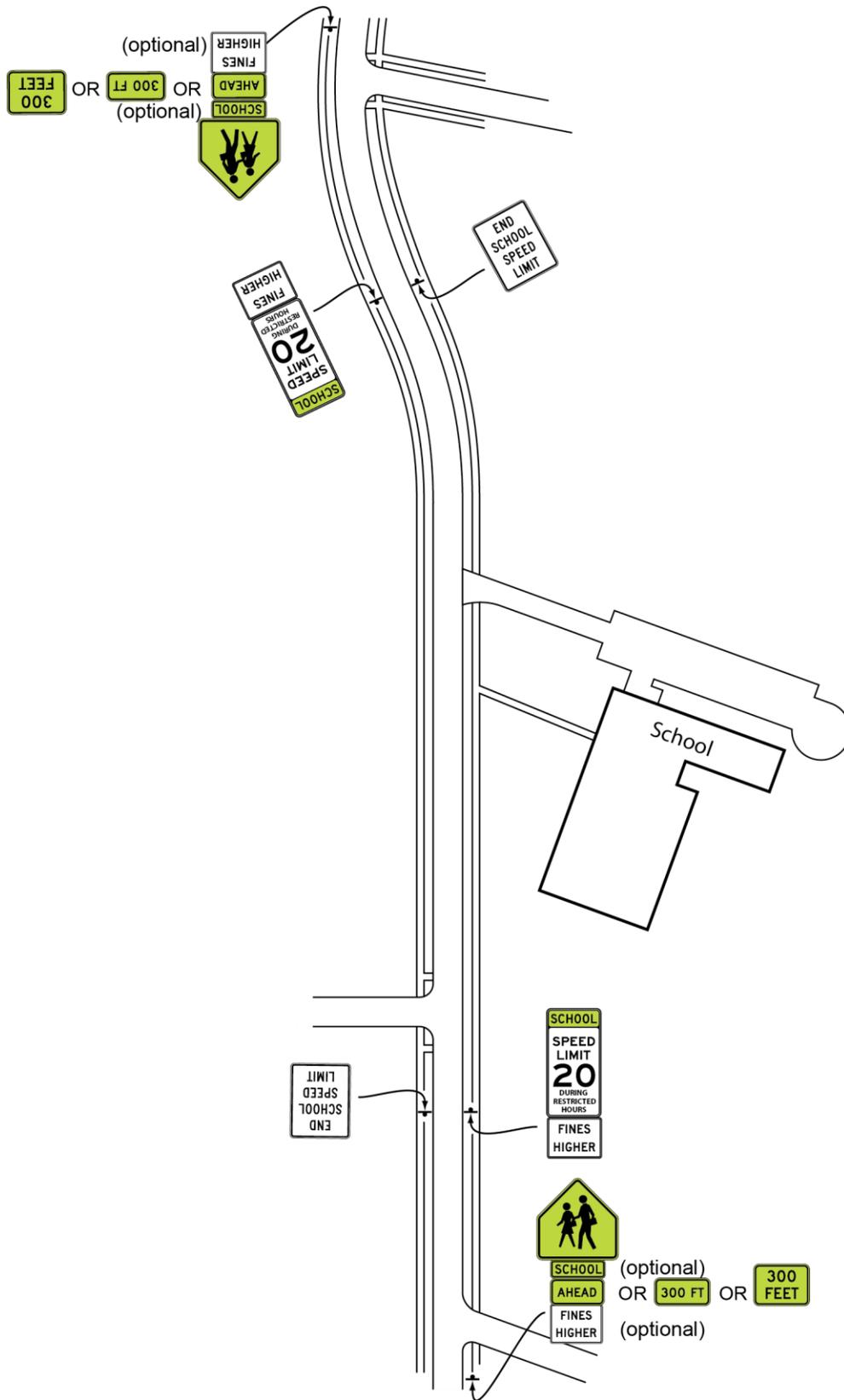


Figure 7B-3. Examples of Signing for a School Crossing Outside of a School Zone

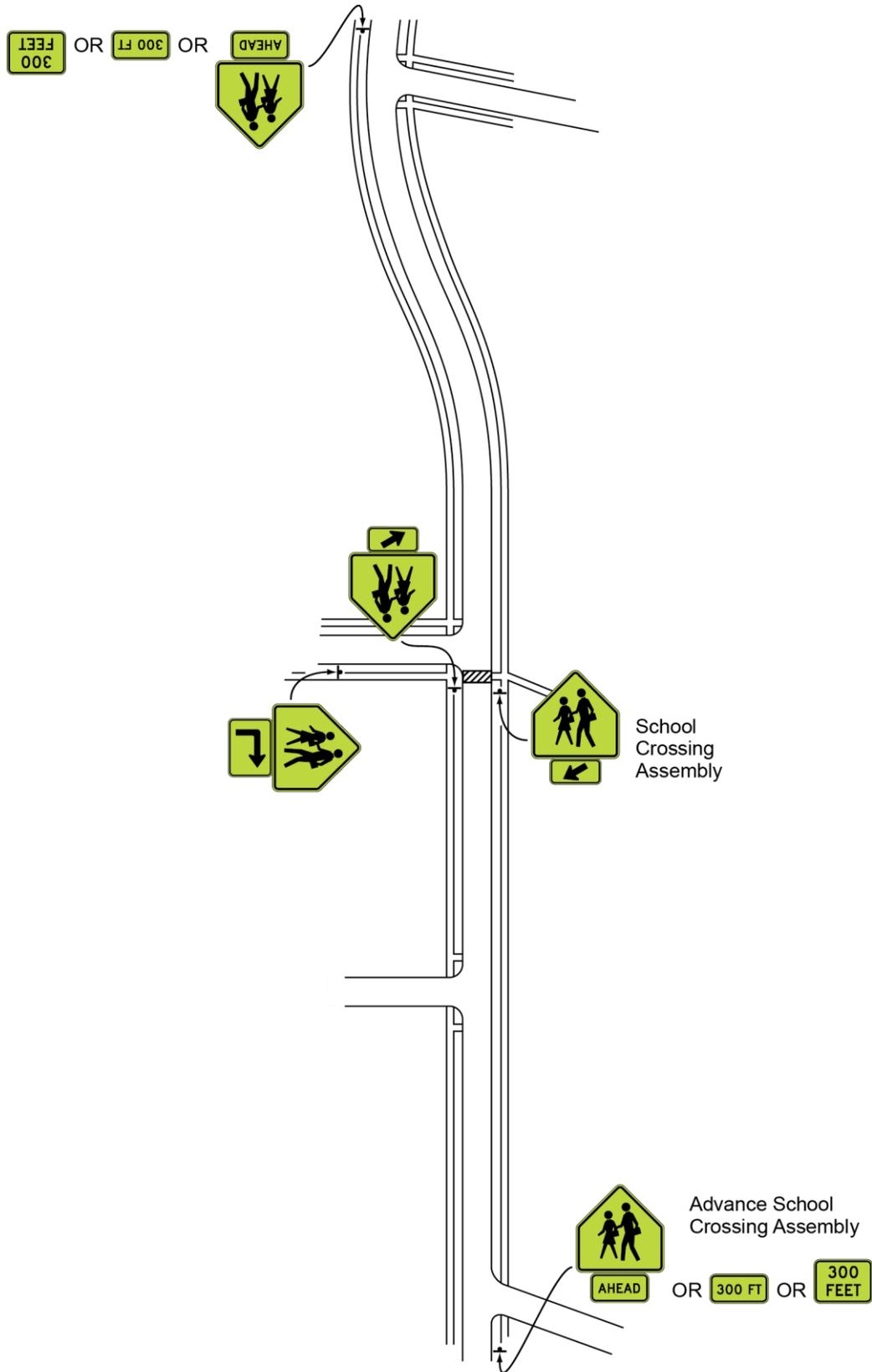


Figure 7B-4. Examples of Signing for a School Zone with a School Crossing

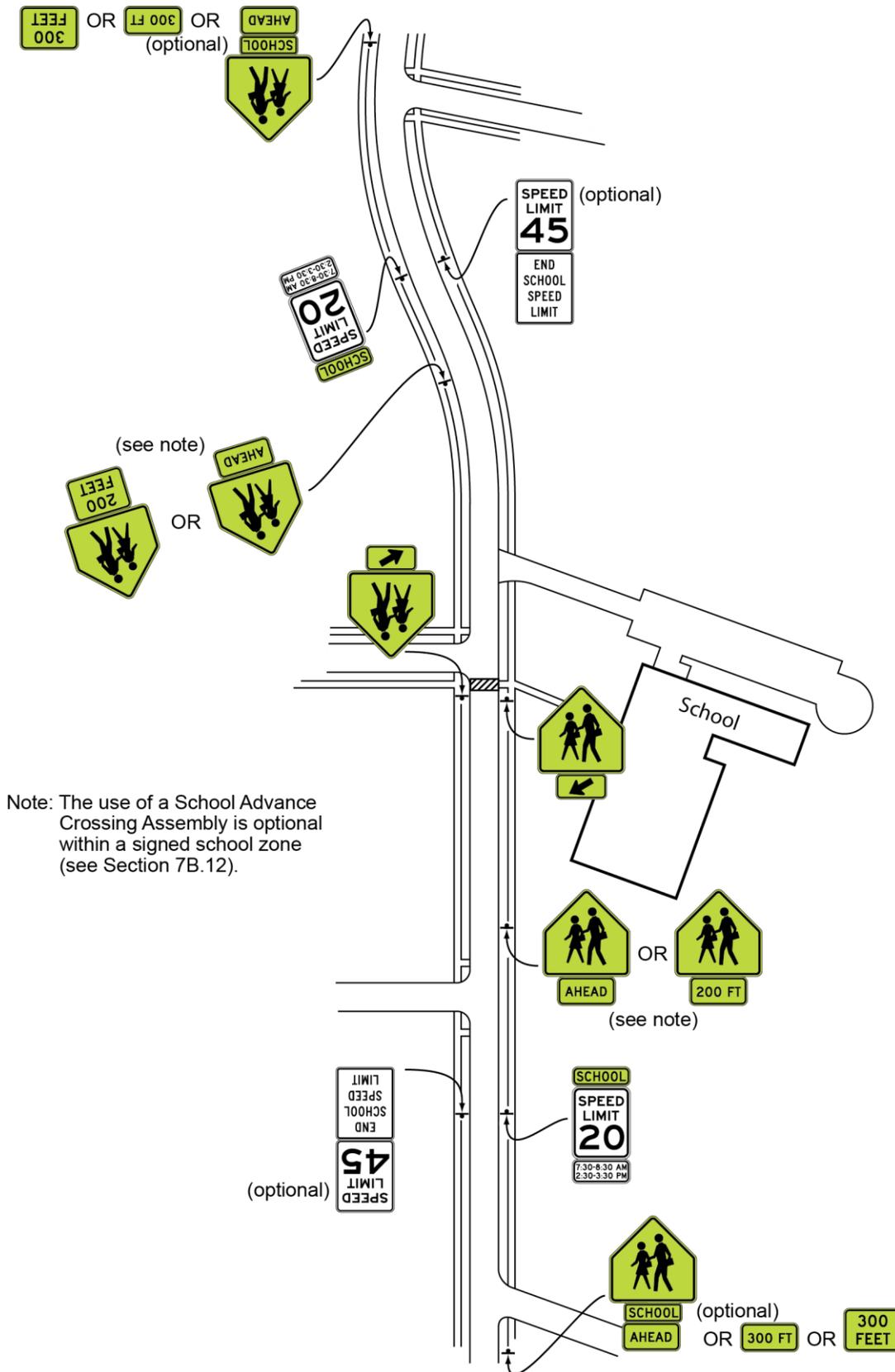
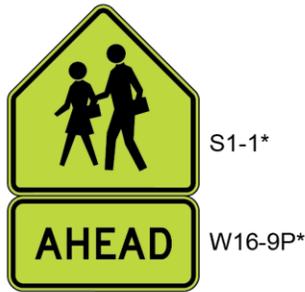


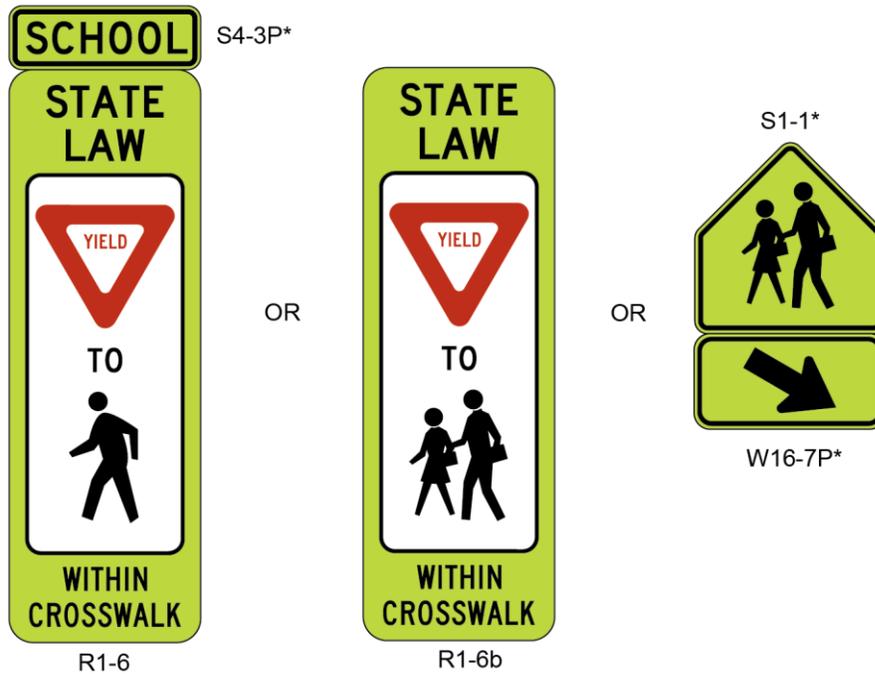
Figure 7B-5. In-Street Signs in School Areas

A - In advance of the school crossing



* Reduced size signs:
 S1-1 12 x 12 inches
 S4-3P 12 x 4 inches
 W16-7P 12 x 6 inches
 W16-9P 12 x 6 inches

B - At the school crossing



Notes:

1. The use of the STATE LAW legend is optional on the R1-6 series signs (see Section 7B.13).
2. The use of the SCHOOL plaque above the R1-6 sign is optional.

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CHAPTER 7C. MARKINGS

Section 7C.01 Functions and Limitations

Support:

- 01 Markings have definite and important functions in a proper scheme of school area traffic control. In some cases, they are used to supplement the regulations or warnings provided by other devices, such as traffic signs or signals. In other instances, they are used alone and produce results that cannot be obtained by the use of any other device. In such cases they serve as an effective means of conveying certain regulations, guidance, and warnings that could not otherwise be made clearly understandable.
- 02 Pavement markings have some potential limitations. They might be obscured by snow, might not be clearly visible when wet, and might not be durable when subjected to heavy traffic. In spite of these potential limitations, they have the advantage, under favorable conditions, of conveying warnings or information to the road user without diverting attention from the road.

Section 7C.02 Crosswalk Markings

Guidance:

- 01 *Crosswalks should be marked at all intersections on established routes to a school where there is substantial conflict between motorists, bicyclists, and student movements; where students are encouraged to cross between intersections; where students would not otherwise recognize the proper place to cross; or where motorists or bicyclists might not expect students to cross (see Figure 7A-1).*
- 02 *Crosswalk lines should not be used indiscriminately. An engineering study considering factors described in Section 3B.18 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.*
- 03 *Because non-intersection school crossings are generally unexpected by the road user, warning signs (see Sections 7B.12 and 7B.13) should be installed for all marked school crosswalks at non-intersection locations. Adequate visibility of students by approaching motorists and of approaching motorists by students should be provided by parking prohibitions or other appropriate measures.*

Support:

- 04 Section 3B.18 contains provisions regarding the placement and design of crosswalks, and Section 3B.16 contains provisions regarding the placement and design of the stop lines and yield lines that are associated with them. Provisions regarding the curb markings that can be used to establish parking regulations on the approaches to crosswalks are contained in Section 3B.23.

Section 7C.03 Pavement Word, Symbol, and Arrow Markings

Guidance:

- 01 *When the SCHOOL marking is used, it should be placed at least 100 feet in advance of the School Zone.*

Option:

- 02 If used, the SCHOOL word marking may extend to the width of two approach lanes (see Figure 7C-1).

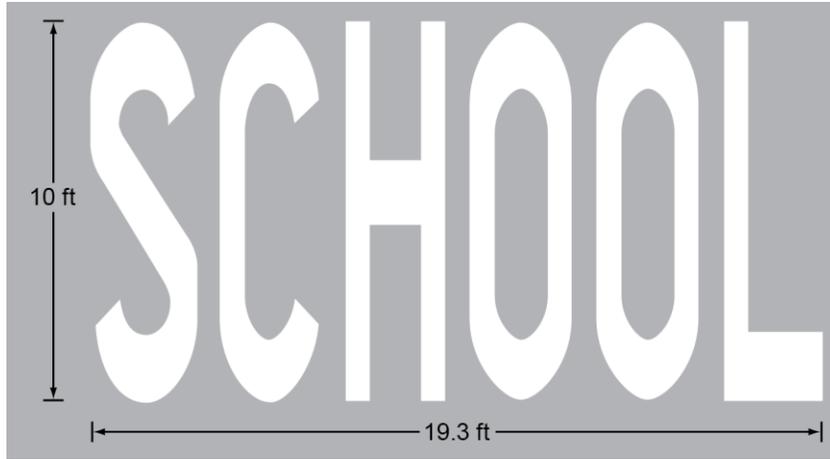
Guidance:

- 03 *If the two-lane SCHOOL word marking is used, the letters should be 10 feet or more in height.*

Support:

- 04 Section 3B.20 contains provisions regarding other word, symbol, and arrow pavement markings that can be used to guide, warn, or regulate traffic.

Figure 7C-1. Two-Lane Pavement Marking of “SCHOOL”



CHAPTER 7D. CROSSING SUPERVISION

Section 7D.01 Types of Crossing Supervision

Support:

- 01 There are three types of school crossing supervision:
- A. Adult control of pedestrians and vehicles by adult crossing guards,
 - B. Adult control of pedestrians and vehicles by uniformed law enforcement officers, and
 - C. Student and/or parent control of only pedestrians with student and/or parent patrols.
- 02 Information regarding the organization, administration and operation of a school safety patrol program is contained in the “AAA School Safety Patrol Operations Manual” (see Section 1A.11).

Section 7D.02 Adult Crossing Guards

Option:

- 01 Adult crossing guards may be used to provide gaps in traffic at school crossings where an engineering study has shown that adequate gaps need to be created (see Section 7A.03), and where authorized by law.

Section 7D.03 Qualifications of Adult Crossing Guards

Support:

- 01 High standards for selection of adult crossing guards are essential because they are responsible for the safety of and the efficient crossing of the street by schoolchildren within and in the immediate vicinity of school crosswalks.

Guidance:

- 02 *Adult crossing guards should possess the following minimum qualifications:*
- A. *Average intelligence;*
 - B. *Good physical condition, including sight, hearing, and ability to move and maneuver quickly in order to avoid danger from errant vehicles;*
 - C. *Ability to control a STOP paddle effectively to provide approaching road users with a clear, fully direct view of the paddle’s STOP message during the entire crossing movement;*
 - D. *Ability to communicate specific instructions clearly, firmly, and courteously;*
 - E. *Ability to recognize potentially dangerous traffic situations and warn and manage students in sufficient time to avoid injury;*
 - F. *Mental alertness;*
 - G. *Neat appearance;*
 - H. *Good character;*
 - I. *Dependability; and*
 - J. *An overall sense of responsibility for the safety of students.*

Section 7D.04 Uniform of Adult Crossing Guards

Standard:

- 01 **Law enforcement officers performing school crossing supervision and adult crossing guards shall wear high-visibility retroreflective safety apparel labeled as ANSI 107-2004 standard performance for Class 2 as described in Section 6E.02.**

Section 7D.05 Operating Procedures for Adult Crossing Guards

Standard:

- 01 **Adult crossing guards shall not direct traffic in the usual law enforcement regulatory sense. In the control of traffic, they shall pick opportune times to create a sufficient gap in the traffic flow. At these times, they shall stand in the roadway to indicate that pedestrians are about to use or are using the crosswalk, and that all vehicular traffic must stop.**
- 02 **Adult crossing guards shall use a STOP paddle. The STOP paddle shall be the primary hand-signaling device.**
- 03 **The STOP (R1-1) paddle shall be an octagonal shape. The background of the STOP face shall be red with at least 6-inch series upper-case white letters and border. The paddle shall be at least 18**

inches in size and have the word message STOP on both sides. The paddle shall be retroreflectorized or illuminated when used during hours of darkness.

Option:

04 The STOP paddle may be modified to improve conspicuity by incorporating white or red flashing lights on both sides of the paddle. Among the types of flashing lights that may be used are individual LEDs or groups of LEDs.

05 The white or red flashing lights or LEDs may be arranged in any of the following patterns:

- A. Two white or red lights centered vertically above and below the STOP legend;
- B. Two white or red lights centered horizontally on each side of the STOP legend;
- C. One white or red light centered below the STOP legend; or
- D. A series of eight or more small white or red lights having a diameter of $\frac{1}{4}$ inch or less along the outer edge of the paddle, arranged in an octagonal pattern at the eight corners of the STOP paddle (more than eight lights may be used only if the arrangement of the lights is such that it clearly conveys the octagonal shape of the STOP paddle), or
- E. A series of white lights forming the shapes of the letters in the legend.

Standard:

06 **If flashing lights are used on the STOP paddle, the flash rate shall be at least 50, but no more than 60, flash periods per minute.**

**PART 8. TRAFFIC CONTROLS FOR RAILROAD AND LIGHT RAIL TRANSIT
GRADE CROSSINGS**

CHAPTER 8A. GENERAL

Section 8A.01 Introduction

Support:

- 01 Whenever the acronym “LRT” is used in Part 8, it refers to “light rail transit.”
- 02 Part 8 describes the traffic control devices that are used at highway-rail and highway-LRT grade crossings. Unless otherwise provided in the text or on a figure or table, the provisions of Part 8 are applicable to both highway-rail and highway-LRT grade crossings. When the phrase “grade crossing” is used by itself without the prefix “highway-rail” or “highway-LRT,” it refers to both highway-rail and highway-LRT grade crossings.
- 03 Traffic control for grade crossings includes all signs, signals, markings, other warning devices, and their supports along highways approaching and at grade crossings. The function of this traffic control is to promote safety and provide effective operation of rail and/or LRT and highway traffic at grade crossings.
- 04 For purposes of design, installation, operation, and maintenance of traffic control devices at grade crossings, it is recognized that the crossing of the highway and rail tracks is situated on a right-of-way available for the joint use of both highway traffic and railroad or LRT traffic.
- 05 The highway agency or authority with jurisdiction and the regulatory agency with statutory authority, if applicable, jointly determine the need and selection of devices at a grade crossing.
- 06 In Part 8, the combination of devices selected or installed at a specific grade crossing is referred to as a “traffic control system.”

Standard:

- 07 **The traffic control devices, systems, and practices described in this Manual shall be used at all grade crossings open to public travel, consistent with Federal, State, and local laws and regulations.**

Support:

- 08 Part 8 also describes the traffic control devices that are used in locations where light rail LRT vehicles are operating along streets and highways in mixed traffic.
- 09 LRT is a mode of metropolitan transportation that employs LRT vehicles (commonly known as light rail vehicles, streetcars, or trolleys) that operate on rails in the pavement in mixed traffic, and LRT traffic that operates in semi-exclusive rights-of-way, or in exclusive rights-of-way. Grade crossings with LRT can occur at intersections or at midblock locations, including public and private driveways.
- 10 An initial educational campaign along with an ongoing program to continue to educate new drivers is beneficial when introducing LRT operations to an area and, hence, new traffic control devices.
- 11 LRT alignments can be grouped into one of the following three types:
- A. Exclusive: An LRT right-of-way that is grade-separated or protected by a fence or traffic barrier. Motor vehicles, pedestrians, and bicycles are prohibited within the right-of-way. Subways and aerial structures are included within this group. This type of alignment does not have grade crossings and is not further addressed in Part 8.
 - B. Semi-exclusive: An LRT alignment that is in a separate right-of-way or along a street or railroad right-of-way where motor vehicles, pedestrians, and bicycles have limited access and cross at designated locations only.
 - C. Mixed-Use: An alignment where LRT operates in mixed traffic with all types of road users. This includes streets, transit malls, and pedestrian malls where the right-of-way is shared.

Standard:

- 12 **Where LRT and railroads use the same tracks or adjacent tracks, the traffic control devices, systems, and practices for highway-rail grade crossings shall be used.**

13 To promote an understanding of common terminology between highway and railroad and LRT signaling issues, definitions and acronyms pertaining to Part 8 are provided in Sections 1A.13 and 1A.14.

Section 8A.02 Use of Standard Devices, Systems, and Practices at Highway-Rail Grade Crossings

Support:

01 Because of the large number of significant variables to be considered, no single standard system of traffic control devices is universally applicable for all highway-rail grade crossings.

Standard:

02 **The highway agency or authority with jurisdiction, the regulatory agency with statutory authority and the railroad, as applicable, shall, based on an engineering study, determine the need and selection of devices, or the modification of devices, at a highway-rail grade crossing in accordance with Sections 4511.61, 4513.40, 4907.47, 4907.471, 4907.476, 4907.48, 4907.49, 4907.52 and 4955.33 of the Ohio Revised Code.**

Option:

03 The engineering study may include the Highway-Rail Intersection (HRI) components of the National Intelligent Transportation Systems (ITS) architecture, which is a USDOT accepted method for linking the highway, vehicles, and traffic management systems with rail operations and wayside equipment.

Support:

04 More detail on Highway-Rail Intersection components is available from USDOT's Federal Railroad Administration, 1200 New Jersey Avenue, SE, Washington, DC 20590, or www.fra.dot.gov.

Standard:

05 **Traffic control devices, systems, and practices shall be consistent with the design and application of the Standards contained in this Manual.**

Guidance:

06 *To stimulate effective responses from road users, these devices, systems, and practices should use the five basic considerations employed generally for traffic control devices and described fully in Section 1A.02: design, placement, operation, maintenance, and uniformity.*

Support:

07 Many other details of highway-rail grade crossing traffic control systems that are not set forth in Part 8 are contained in the publications listed in Section 1A.11, including the "2009 AREMA Communications & Signals Manual" published by the American Railway Engineering & Maintenance-of-Way Association (AREMA) and the 2006 edition of "Preemption of Traffic Signals Near Railroad Crossings" published by the Institute of Transportation Engineers (ITE).

Section 8A.03 Use of Standard Devices, Systems, and Practices at Highway-LRT Grade Crossings

Support:

01 The combination of devices selected or installed at a specific highway-LRT grade crossing is referred to as a Light Rail Transit Traffic Control System.

02 Because of the large number of significant variables to be considered, no single standard system of traffic control devices is universally applicable for all highway-LRT grade crossings.

03 For the safety and integrity of operations by highway and LRT users, the highway agency with jurisdiction, the regulatory agency with statutory authority, if applicable, and the LRT authority jointly determine the need and selection of traffic control devices and the assignment of priority to LRT at a highway-LRT grade crossing.

04 The normal rules of the road and traffic control priority identified in the Ohio Revised Code (ORC) govern the order assigned to the movement of vehicles at an intersection unless the local agency determines that it is appropriate to assign a higher priority to LRT. Examples of different types of LRT priority control include separate traffic control signal phases for LRT movements, restriction of movement of roadway

vehicles in favor of LRT operations, and preemption of highway traffic signal control to accommodate LRT movements (see Section 8B.08).

Guidance:

05 *The appropriate traffic control system to be used at a highway-LRT grade crossing should be determined by an engineering study conducted by the transit or highway agency in cooperation with other appropriate State and local organizations.*

Standard:

06 **Traffic control devices, systems, and practices shall be consistent with the design and application of the Standards contained in this Manual.**

07 **The traffic control devices, systems, and practices described in this Manual shall be used at all highway-LRT grade crossings.**

08 **Before any new highway-LRT grade crossing traffic control system is installed or modifications are made to an existing system, approval shall be obtained from the highway agency with the jurisdictional and/or statutory authority, and from the LRT agency (see ORC Sections 4951.02 and 4951.14 (Appendix B2)) .**

Guidance:

09 *To stimulate effective responses from road users, these devices, systems, and practices should use the five basic considerations employed generally for traffic control devices and described fully in Section 1A.02: design, placement, operation, maintenance, and uniformity.*

Support:

10 Many other details of highway-LRT grade crossing traffic control systems that are not set forth in Part 8 are contained in the publications listed in Section 1A.11.

Standard:

11 **Highway-LRT grade crossings in semi-exclusive alignments shall be equipped with a combination of automatic gates and flashing-light signals, or flashing-light signals only, or traffic control signals, unless an engineering study indicates that the use of Crossbuck Assemblies, STOP signs, or YIELD signs alone would be adequate.**

Option:

12 Highway-LRT grade crossings in mixed-use alignments may be equipped with traffic control signals unless an engineering study indicates that the use of Crossbuck Assemblies, STOP signs, or YIELD signs alone would be adequate.

Support:

13 Sections 8B.03 and 8B.04 contain provisions regarding the use and placement of Crossbuck signs and Crossbuck Assemblies. Section 8B.05 describes the appropriate conditions for the use of STOP or YIELD signs alone at a highway-LRT grade crossing. Sections 8C.10 and 8C.11 contain provisions regarding the use of traffic control signals at highway-LRT grade crossings.

Section 8A.04 Uniform Provisions

Standard:

01 **All signs used in grade crossing traffic control systems shall be retroreflectorized or illuminated as described in Section 2A.07 to show the same shape and similar color to an approaching road user during both day and night.**

02 **No sign or signal shall be located in the center of an undivided highway, unless it is crashworthy (breakaway, yielding, or shielded with a longitudinal barrier or crash cushion) or unless it is placed on a raised island.**

Guidance:

03 *Any signs or signals placed on a raised island in the center of an undivided highway should be installed with a clearance of at least 2 feet from the outer edge of the raised island to the nearest edge of the sign or signal, except as permitted in Section 2A.19.*

04 *Where the distance between tracks, measured along the highway between the inside rails, exceeds 100 feet, additional signs or other appropriate traffic control devices should be used to inform approaching road users of the long distance to cross the tracks.*

Section 8A.05 Grade Crossing Elimination

Guidance:

01 *Because grade crossings are a potential source of crashes and congestion, agencies should conduct engineering studies to determine the cost and benefits of eliminating these crossings.*

Standard:

02 **When a grade crossing is eliminated, the traffic control devices for the crossing shall be removed.**

03 **If the existing traffic control devices at a multiple-track grade crossing become improperly placed or inaccurate because of the removal of some of the tracks, the existing devices shall be relocated and/or modified.**

Guidance:

04 *Any grade crossing that cannot be justified should be eliminated.*

05 *Where a roadway is removed from a grade crossing, the roadway approaches in the railroad or LRT right-of-way should also be removed and appropriate signs and object markers should be placed at the roadway end in accordance with Section 2C.66.*

06 *Where a railroad or LRT is eliminated at a grade crossing, the tracks should be removed or covered.*

Standard:

07 **When a grade crossing is removed, the space previously occupied by the rail bed shall be filled with the same material that comprises the road or highway at the crossing.**

Option:

08 Based on engineering judgment, the TRACKS OUT OF SERVICE (R8-9) sign (see Figure 8B-1) may be temporarily installed until the tracks are removed or covered. The length of time before the tracks will be removed or covered may be considered in making the decision as to whether to install the sign.

Section 8A.06 Illumination at Grade Crossings

Support:

01 Illumination is sometimes installed at or adjacent to a grade crossing, in order to provide better nighttime visibility of trains or LRT equipment and the grade crossing (for example, where a substantial amount of railroad or LRT operations are conducted at night, where grade crossings are blocked for extended periods of time, or where crash history indicates that road users experience difficulty in seeing trains or LRT equipment or traffic control devices during hours of darkness).

02 Recommended types and locations of luminaires for illuminating grade crossings are contained in the American National Standards Institute's (ANSI) "Practice for Roadway Lighting RP-8" which is available from the Illuminating Engineering Society (see Section 1A.11).

Section 8A.07 Quiet Zone Treatments at Highway-Rail Grade Crossings

Support:

01 49 CFR Part 222 (Use of Locomotive Horns at Highway-Rail Grade Crossings; Final Rule) prescribes Quiet Zone requirements and treatments.

Standard:

02 **Any traffic control device and its application where used as part of a Quiet Zone shall comply with all applicable provisions of this Manual.**

Section 8A.08 Temporary Traffic Control Zones

Support:

01 Temporary traffic control planning provides for continuity of operations (such as movement of traffic, pedestrians and bicycles, transit operations, and access to property/utilities) when the normal function of a roadway at a grade crossing is suspended because of temporary traffic control operations.

Standard:

02 **Traffic controls for temporary traffic control zones that include grade crossings shall be as outlined in Part 6.**

03 **When a grade crossing exists either within or in the vicinity of a temporary traffic control zone, lane restrictions, flagging (see Chapter 6E), or other operations shall not be performed in a manner that would cause highway vehicles to stop on the railroad or LRT tracks, unless a flagger or uniformed law enforcement officer is provided at the grade crossing to minimize the possibility of highway vehicles stopping on the tracks, even if automatic warning devices are in place.**

Guidance:

04 *Public and private agencies, including emergency services, businesses, and railroad or LRT companies, should meet to plan appropriate traffic detours and the necessary signing, marking, and flagging requirements for operations during temporary traffic control zone activities. Consideration should be given to the length of time that the grade crossing is to be closed, the type of rail or LRT and highway traffic affected, the time of day, and the materials and techniques of repair.*

05 *The agencies responsible for the operation of the LRT and highway should be contacted when the initial planning begins for any temporary traffic control zone that might directly or indirectly influence the flow of traffic on mixed-use facilities where LRT and road users operate.*

06 *Temporary traffic control operations should minimize the inconvenience, delay, and crash potential to affected traffic. Prior notice should be given to affected public or private agencies, emergency services, businesses, railroad or LRT companies, and road users before the free movement of road users or rail traffic is infringed upon or blocked.*

07 *Temporary traffic control zone activities should not be permitted to extensively prolong the closing of the grade crossing.*

08 *The width, grade, alignment, and riding quality of the highway surface at a grade crossing should, at a minimum, be restored to correspond with the quality of the approaches to the grade crossing.*

Support:

09 Section 6G.18 contains additional information regarding temporary traffic control zones in the vicinity of grade crossings, and Figure 6H-46 shows an example of a typical situation that might be encountered.

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CHAPTER 8B. SIGNS AND MARKINGS

Section 8B.01 Purpose

Support:

- 01 Passive traffic control systems, consisting of signs and pavement markings only, identify and direct attention to the location of a grade crossing and advise road users to slow down or stop at the grade crossing as necessary in order to yield to any rail traffic occupying, or approaching and in proximity to, the grade crossing.
- 02 Signs and markings regulate, warn, and guide the road users so that they, as well as LRT vehicle operators on mixed-use alignments, can take appropriate action when approaching a grade crossing.

Standard:

- 03 **The design and location of signs shall comply with the provisions of Part 2. The design and location of pavement markings shall comply with the provisions of Part 3.**

Section 8B.02 Sizes of Grade Crossing Signs

Standard:

- 01 **The sizes of grade crossing signs shall be as shown in Table 8B-1.**

Option:

- 02 Signs larger than those shown in Table 8B-1 may be used (see Section 2A.11).

Section 8B.03 Grade Crossing (Crossbuck) Sign (R15-1) and Number of Tracks Plaque (R15-2P) at Active and Passive Grade Crossings

Standard:

- 01 **As provided in Section 4955.33 of the Ohio Revised Code (see Appendix B2):**
- 02 **“At all points where its railroad crosses a public road at a common grade, each company shall erect crossbuck signing at positions at each such crossing that are in accordance with the department of transportation manual for uniform traffic control devices, adopted under section 4511.09 of the Revised Code, to give notice of the proximity of the railroad and warn persons to be on the lookout for the locomotive.”**

Standard:

- 03 **The Grade Crossing (R15-1) sign (see Figure 8B-1), commonly identified as the Crossbuck sign, shall be retroreflectorized white with the words RAILROAD CROSSING in black lettering, mounted as shown in Figure 8B-2.**

Support:

- 04 In Ohio, and most other states, the Crossbuck sign requires road users to yield the right-of-way to rail traffic at a grade crossing.

Standard:

- 05 **As a minimum, one Crossbuck sign shall be used on each highway approach to every highway-rail grade crossing, alone or in combination with other traffic control devices.**

Option:

- 06 A Crossbuck sign may be used on a highway approach to a highway-LRT grade crossing on a semi-exclusive or mixed-use alignment, alone or in combination with other traffic control devices.

Standard:

- 07 **If automatic gates are not present and if there are two or more tracks at a grade crossing, the number of tracks shall be indicated on a supplemental Number of Tracks (R15-2P) plaque (see Figure 8B-1) of inverted T shape mounted below the Crossbuck sign in the manner shown in Figure 8B-2.**

- 08 **On each approach to a highway-rail grade crossing and, if used, on each approach to a highway-LRT grade crossing, the Crossbuck sign shall be installed on the right-hand side of the highway on each approach to the grade crossing. Where restricted sight distance or unfavorable highway geometry exists on an approach to a grade crossing, an additional Crossbuck sign shall be installed on**

Table 8B-1. Sign Sizes for Grade Crossing Signs^{1,2} (Sheet 1 of 2)

Sign or Plaque	Sign Designation	Section	Conventional Road		Expressway	Minimum	Oversized
			Single Lane	Multi-Lane			
STOP	R1-1	8B.04, 8B.05	30 x 30	36 x 36	36 x 36	—	48 x 48
YIELD	R1-2	8B.04, 8B.05	36 x 36 x 36	36 x 36 x 36	48 x 48 x 48	30 x 30 x 30	—
NO RIGHT TURN ACROSS TRACKS	R3-1a	8B.08	24 x 30	30 x 36	—	—	—
NO LEFT TURN ACROSS TRACKS	R3-2a	8B.08	24 x 30	30 x 36	—	—	—
DO NOT STOP ON TRACKS	R8-8	8B.09	24 x 30		36 x 48	—	36 x 48
TRACKS OUT OF SERVICE	R8-9	8B.10	24 x 24		36 x 36	—	36 x 36
STOP HERE WHEN FLASHING (arrow)	R8-10	8B.11	24 x 36		—	—	36 x 48
Stop Here When Flashing	R8-10a	8B.11	24 x 30		—	—	36 x 42
STOP HERE ON RED (arrow)	R10-6	8B.12	24 x 36		—	—	36 x 48
Stop Here On Red	R10-6a	8B.12	24 x 30		—	—	36 x 42
Grade Crossing (Crossbuck)	R15-1	8B.03	48 x 9		48 x 9	—	—
Number of Tracks (plaque)	R15-2P	8B.03	27 x 18		27 x 18	—	—
EXEMPT (plaque)	R15-3P	8B.07	24 x 12		24 x 12	—	—
LIGHT RAIL ONLY RIGHT LANE	R15-4a	8B.13	24 x 30		—	—	—
LIGHT RAIL ONLY LEFT LANE	R15-4b	8B.13	24 x 30		—	—	—
LIGHT RAIL ONLY CENTER LANE	R15-4c	8B.13	24 x 30		—	—	—
LIGHT RAIL DO NOT PASS	R15-5	8B.14	24 x 30		—	—	—
DO NOT PASS STOPPED TRAIN	R15-5a	8B.14	24 x 30		—	—	—
No Motor Vehicles on Tracks Symbol	R15-6	8B.15	24 x 24		—	—	—
DO NOT DRIVE ON TRACKS	R15-6a	8B.15	24 x 30		—	—	—
Divided Highway with LRT Crossing	R15-7	8B.16	24 x 24		—	—	—
Divided Highway with LRT Crossing (T-intersection)	R15-7a	8B.16	24 x 24		—	—	—
LOOK	R15-8	8B.17	36 x 18		—	—	—
Grade Crossing Advance Warning	W10-1	8B.06	36 Dia		48 Dia.	—	48 Dia.
EXEMPT (plaque)	W10-1aP	8B.07	24 x 12		36 x 18	—	—
Grade Crossing and Interseciton Advance Warning	W10-2, 3, 4	8B.06	36 x 36		48 x 48	—	48 x 48
Low Ground Clearance Grade Crossing	W10-5	8B.23	36 x 36		48 x 48	—	48 x 48

Table 8B-1. Sign Sizes for Grade Crossing Signs^{1,2} (Sheet 2 of 2)

Sign or Plaque	Sign Designation	Section	Conventional Road		Expressway	Minimum	Oversized
			Single Lane	Multi-Lane			
LOW GROUND CLEARANCE (plaque)	W10-5P	8B.23	30 x 24		—	—	—
LRT Approaching Activated Blank-Out	W10-7	8B.19	24 x 24		—	—	—
TRAINS MAY EXCEED 80 MPH	W10-8	8B.20	36 x 36		48 x 48	—	48 x 48
NO TRAIN HORN	W10-9	8B.21	36 x 36		48 x 48	—	48 x 48
NO TRAIN HORN (plaque)	W10-9P	8B.21	30 x 24		—	—	—
Storage Space Symbol	W10-11	8B.24	36 x 36		48 x 48	—	48 x 48
XX FEET BETWEEN TRACKS & HIGHWAY	W10-11a	8B.24	30 x 36		—	—	—
XX FEET BETWEEN HIGHWAY & TRACKS BEHIND YOU	W10-11b	8B.24	30 x 36		—	—	—
Skewed Crossing	W10-12	8B.25	36 x 36		48 x 48	—	48 x 48
NO GATES OR LIGHTS (plaque)	W10-13P	8B.22	30 x 24		—	—	—
NEXT CROSSING (plaque)	W10-14P	8B.23	30 x 24		—	—	—
USE NEXT CROSSING (plaque)	W10-14aP	8B.23	30 x 24		—	—	—
ROUGH CROSSING (plaque)	W10-15P	8B.23	30 x 24		—	—	36 x 30

Notes:

1. a.) Larger signs may be used when appropriate;
b.) Dimensions in inches are shown as width x height.
2. Section 2A.11 contains information regarding the applicability of the various columns in this table.
3. Table 9B-1 shows the minimum sizes that may be used for grade-crossing signs and plaques that face shared-use paths and pedestrian facilities.

the left-hand side of the highway, possibly placed back-to-back with the Crossbuck sign for the opposite approach, or otherwise located so that two Crossbuck signs are displayed for that approach.

09 **A strip of retroreflective white material not less than 2 inches in width shall be used on the back of each blade of each Crossbuck sign for the length of each blade, at all grade crossings where Crossbuck signs have been installed, except those where Crossbuck signs have been installed back-to-back.**

Guidance:

10 *Crossbuck signs should be located with respect to the highway pavement or shoulder in accordance with the criteria in Chapter 2A and Figures 2A-2 and 2A-3, and should be located with respect to the nearest track in accordance with Figures 8C-2 and 8D-1.*

11 *The minimum lateral offset for the nearest edge of the Crossbuck sign should be 6 feet from the edge of the shoulder or 12 feet from the edge of the traveled way in rural areas (whichever is greater), and 2 feet from the face of the curb in urban areas.*

12 *Where unusual conditions make variations in location and lateral offset appropriate, engineering judgment should be used to provide the best practical combination of view and safety clearances.*

Figure 8B-1. Regulatory Signs and Plaques for Grade Crossings



R1-1



R1-2



R3-1a
Activated Blank-Out



R3-2a
Activated Blank-Out



R8-8



R8-9



R8-10



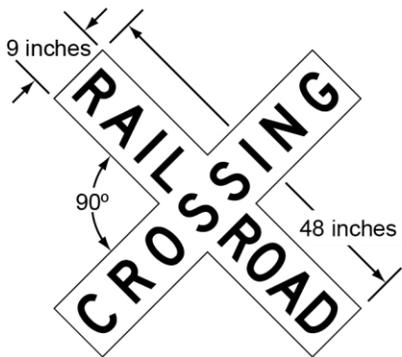
R8-10a



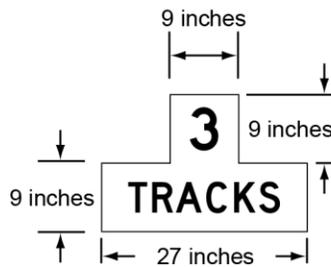
R10-6



R10-6a



R15-1



R15-2P



R15-3P



R15-4a



R15-4b



R15-4c



R15-5



R15-5a



R15-6



R15-6a



R15-7

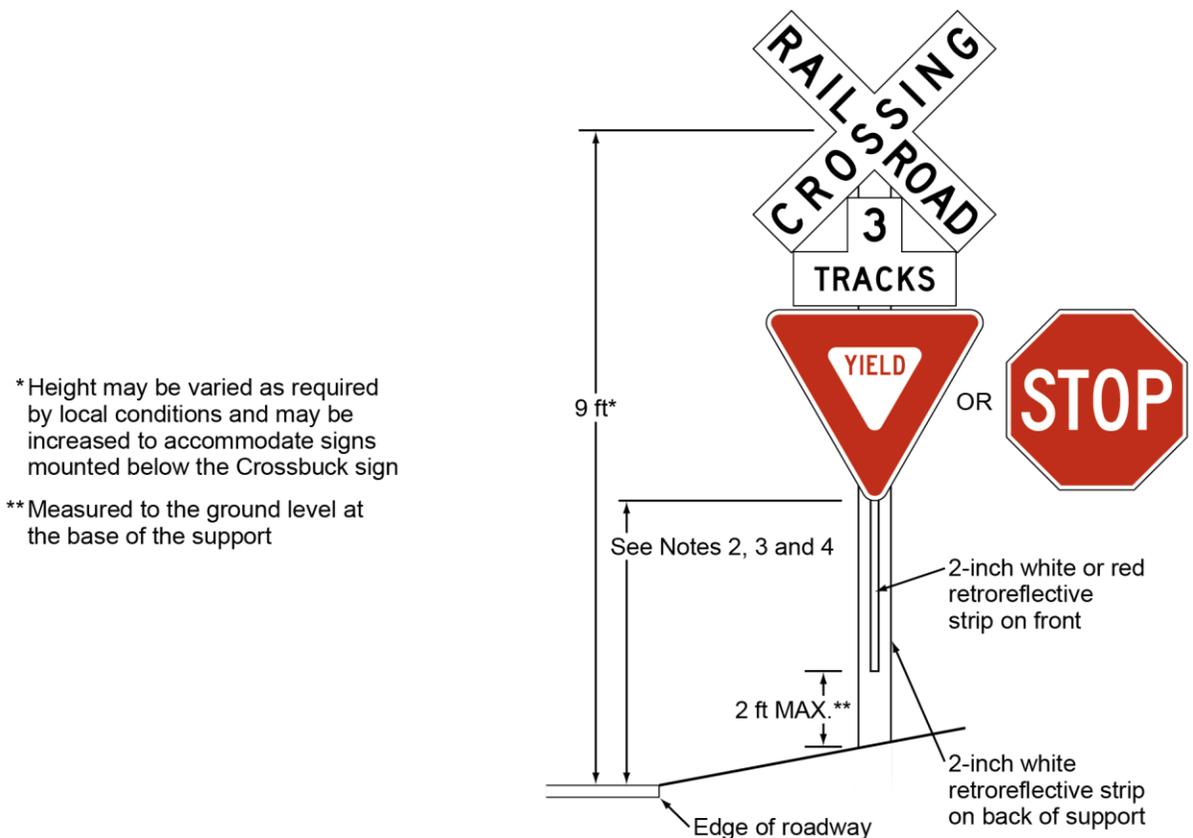


R15-7a



R15-8

Figure 8B-2. Crossbuck Assembly with a YIELD or STOP Sign on the Crossbuck Sign Support



Notes:

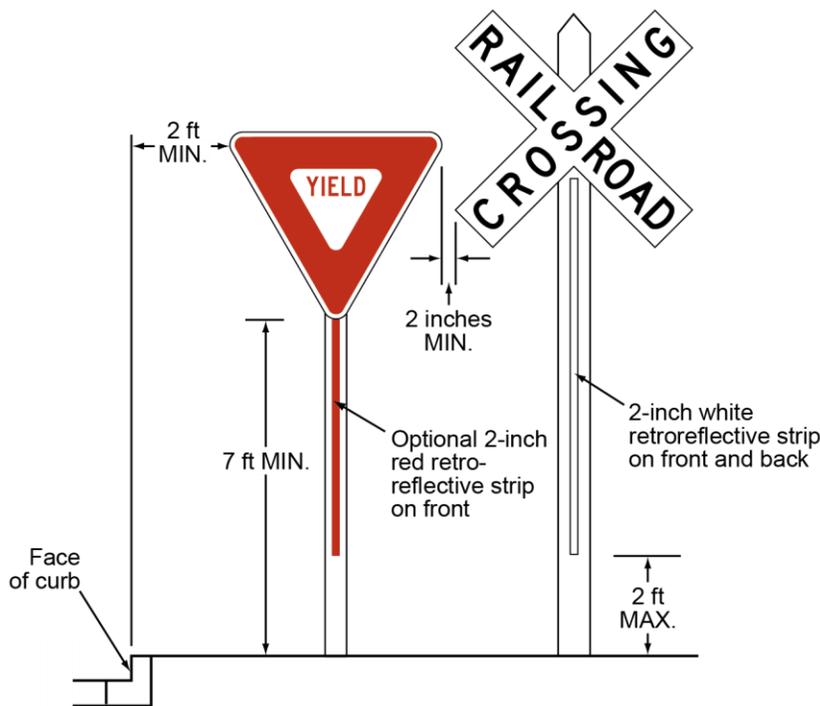
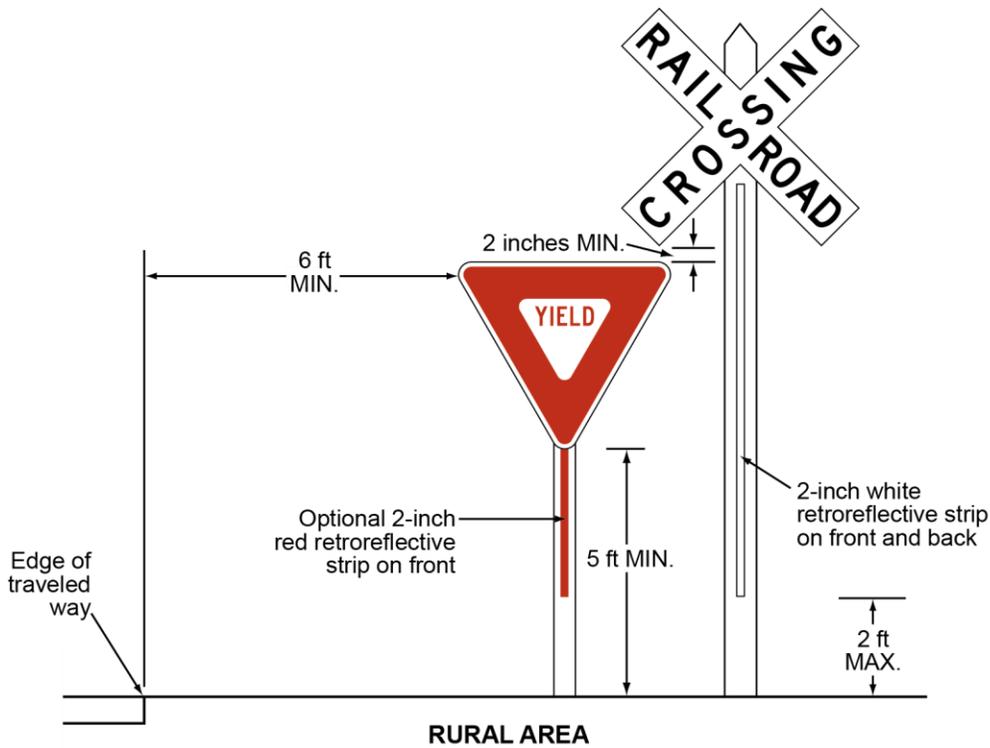
1. YIELD or STOP signs are used only at passive crossings. A STOP sign is used only if an engineering study determines that it is appropriate for that particular approach.
2. Mounting height shall be at least 4 feet for installations of YIELD or STOP signs on existing Crossbuck sign supports.
3. Mounting height shall be at least 7 feet for new installations in areas with pedestrian movements or parking, and on expressways.
4. Mounting height shall be at least 5 feet for new installations on conventional roads in rural areas.

Section 8B.04 Crossbuck Assemblies with YIELD or STOP Signs at Passive Grade Crossings

Standard:

- 01 In accordance with Section 4511.61 of the Ohio Revised Code, STOP signs shall be installed at highway-rail grade crossings only with the approval of the Ohio Department of Transportation.
- 02 A grade crossing Crossbuck Assembly shall consist of a Crossbuck (R15-1) sign, and a Number of Tracks (R15-2P) plaque if two or more tracks are present, that complies with the provisions of Section 8B.03, and either a YIELD (R1-2) or STOP (R1-1) sign installed on the same support, except as provided in Paragraph 9. If used at a passive grade crossing, a YIELD or STOP sign shall be installed in compliance with the provisions of Part 2, Section 2B.10, and Figures 8B-2 and 8B-3.
- 03 At all public highway-rail grade crossings that are not equipped with the active traffic control systems that are described in Chapter 8C, except crossings where road users are directed by an authorized person on the ground to not enter the crossing at all times that an approaching train is about to occupy the crossing, a Crossbuck Assembly shall be installed on the right-hand side of the highway on each approach to the highway-rail grade crossing.
- 04 If a Crossbuck sign is used on a highway approach to a public highway-LRT grade crossing that is not equipped with the active traffic control systems that are described in Chapter 8C, a Crossbuck

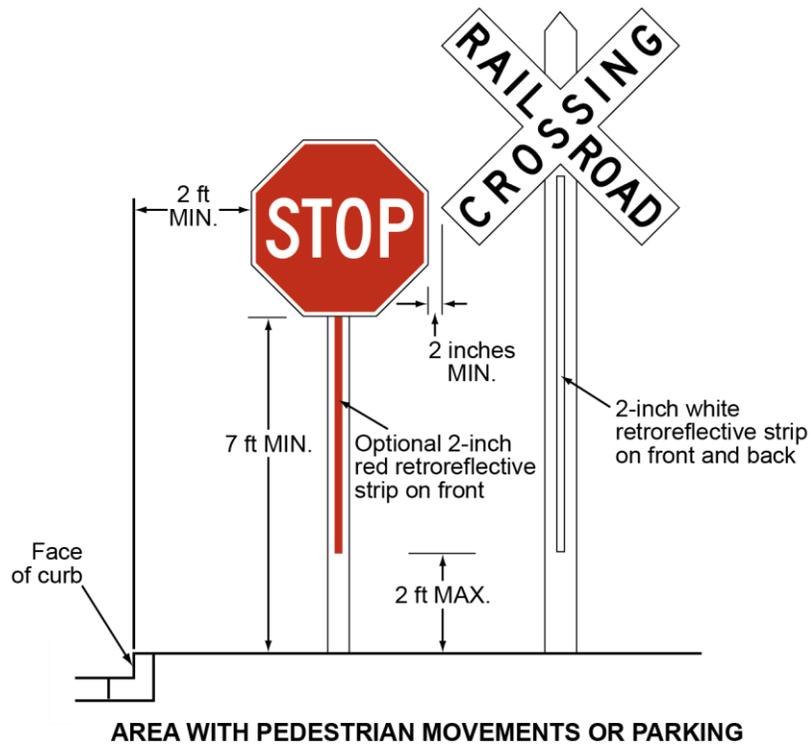
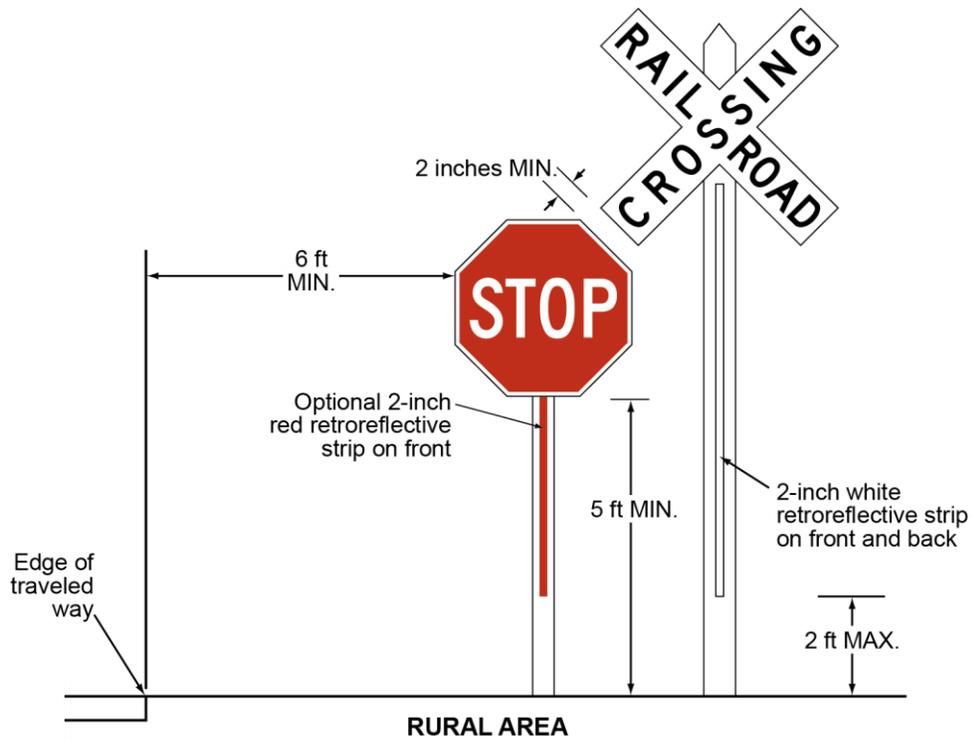
Figure 8B-3. Crossbuck Assembly with a YIELD or STOP Sign on a Separate Sign Support (Sheet 1 of 2)



Notes:

1. YIELD signs are used only at passive crossings.
2. Place the face of the signs in the same plane and place the YIELD sign closest to the traveled way. Provide a 2-inch minimum separation between the edge of the Crossbuck sign and the edge of the YIELD sign.

Figure 8B-3. Crossbuck Assembly with a YIELD or STOP Sign on a Separate Sign Support (Sheet 2 of 2)



Notes:

1. STOP signs are used only at passive crossings and only if an engineering study determines that it is appropriate for that particular approach.
2. Place the face of the signs in the same plane and place the STOP sign closest to the traveled way. Provide a 2-inch minimum separation between the edge of the Crossbuck sign and the edge of the STOP sign.

Assembly shall be installed on the right-hand side of the highway on each approach to the highway-LRT grade crossing.

05 **Where restricted sight distance or unfavorable highway geometry exists on an approach to a grade crossing that has a Crossbuck Assembly, or where there is a one-way multi-lane approach, an additional Crossbuck Assembly shall be installed on the left-hand side of the highway.**

06 **A YIELD sign shall be the default traffic control device for Crossbuck Assemblies on all highway approaches to passive grade crossings unless, per ORC Section 4511.61 (see Paragraph 1), an engineering study performed by the regulatory agency or highway authority having jurisdiction over the roadway approach determines that a STOP sign is appropriate.**

Guidance:

07 *The use of STOP signs at passive grade crossings should be limited to unusual conditions where requiring all highway vehicles to make a full stop is deemed essential by an engineering study. Among the factors that should be considered in the engineering study are the line of sight to approaching rail traffic (giving due consideration to seasonal crops or vegetation beyond both the highway and railroad or LRT rights-of-ways), the number of tracks, the speeds of trains or LRT equipment and highway vehicles, and the crash history at the grade crossing.*

Support:

08 Sections 8A.02 and 8A.03 contain information regarding the responsibilities of the highway agency and the railroad company or LRT agency regarding the selection, design, and operation of traffic control devices placed at grade crossings.

Option:

09 If a YIELD or STOP sign is installed for a Crossbuck Assembly at a grade crossing, it may be installed on the same support as the Crossbuck sign or it may be installed on a separate support at a point where the highway vehicle is to stop, or as near to that point as practical, but in either case, the YIELD or STOP sign is considered to be a part of the Crossbuck Assembly.

Standard:

10 **If a YIELD or STOP sign is installed on an existing Crossbuck sign support, the minimum height, measured vertically from the bottom of the YIELD or STOP sign to the top of the curb, or in the absence of curb, measured vertically from the bottom of the YIELD or STOP sign to the elevation of the near edge of the traveled way, shall be 4 feet (see Figure 8B-2).**

11 **If a Crossbuck Assembly is installed on a new sign support (see Figure 8B-2) or if the YIELD or STOP sign is installed on a separate support (see Figure 8B-3), the minimum height, measured vertically from the bottom of the YIELD or STOP sign to the top of the curb, or in the absence of curb, measured vertically from the bottom of the YIELD or STOP sign to the elevation of the near edge of the traveled way, shall be 7 feet if the Crossbuck Assembly is installed in an area where parking or pedestrian movements are likely to occur.**

Guidance:

12 *If a YIELD or STOP sign is installed for a Crossbuck Assembly at a grade crossing on a separate support than the Crossbuck sign (see Figure 8B-3), the YIELD or STOP sign should be placed at a point where the highway vehicle is to stop, or as near to that point as practical, but no closer than 15 feet measured perpendicular from the nearest rail.*

Support:

13 The meaning of a Crossbuck Assembly that includes a YIELD sign is that a road user approaching the grade crossing needs to be prepared to decelerate, and when necessary, yield the right-of-way to any rail traffic that might be occupying the crossing or might be approaching and in such close proximity to the crossing that it would be unsafe for the road user to cross.

14 Certain commercial motor vehicles and school buses are required to stop at all grade crossings in accordance with 49 CFR 392.10 even if a YIELD sign (or just a Crossbuck sign) is posted (see ORC Section 4511.63 (Appendix B2)).

15 The meaning of a Crossbuck Assembly that includes a STOP sign is that a road user approaching the grade crossing must come to a full and complete stop not less than 15 feet short of the nearest rail, and remain stopped while the road user determines if there is rail traffic either occupying the crossing or

approaching and in such close proximity to the crossing that the road user must yield the right-of-way to rail traffic. The road user is permitted to proceed when it is safe to cross.

Standard:

- 16 **A vertical strip of retroreflective white material, not less than 2 inches in width, shall be used on each Crossbuck support at passive grade crossings for the full length of the back of the support from the Crossbuck sign or Number of Tracks plaque to within 2 feet above the ground, except as provided in Paragraph 17.**

Option:

- 17 The vertical strip of retroreflective material may be omitted from the back sides of Crossbuck sign supports installed on one-way streets.
- 18 If a YIELD or STOP sign is installed on the same support as the Crossbuck sign, a vertical strip of red (see Section 2A.21) or white retroreflective material that is at least 2 inches wide may be used on the front of the support from the YIELD or STOP sign to within 2 feet above the ground.

Standard:

- 19 **If a Crossbuck sign support at a passive grade crossing does not include a YIELD or STOP sign (either because the YIELD or STOP sign is placed on a separate support or because a YIELD or STOP sign is not present on the approach), a vertical strip of retroreflective white material, not less than 2 inches in width, shall be used for the full length of the front of the support from the Crossbuck sign or Number of Tracks plaque to within 2 feet above the ground.**

- 20 **At all grade crossings where YIELD or STOP signs are installed, Yield Ahead (W3-2) or Stop Ahead (W3-1) signs shall also be installed if the criteria for their installation in Section 2C.36 is met.**

Support:

- 21 Section 8B.28 contains provisions regarding the use of stop lines or yield lines at grade crossings.

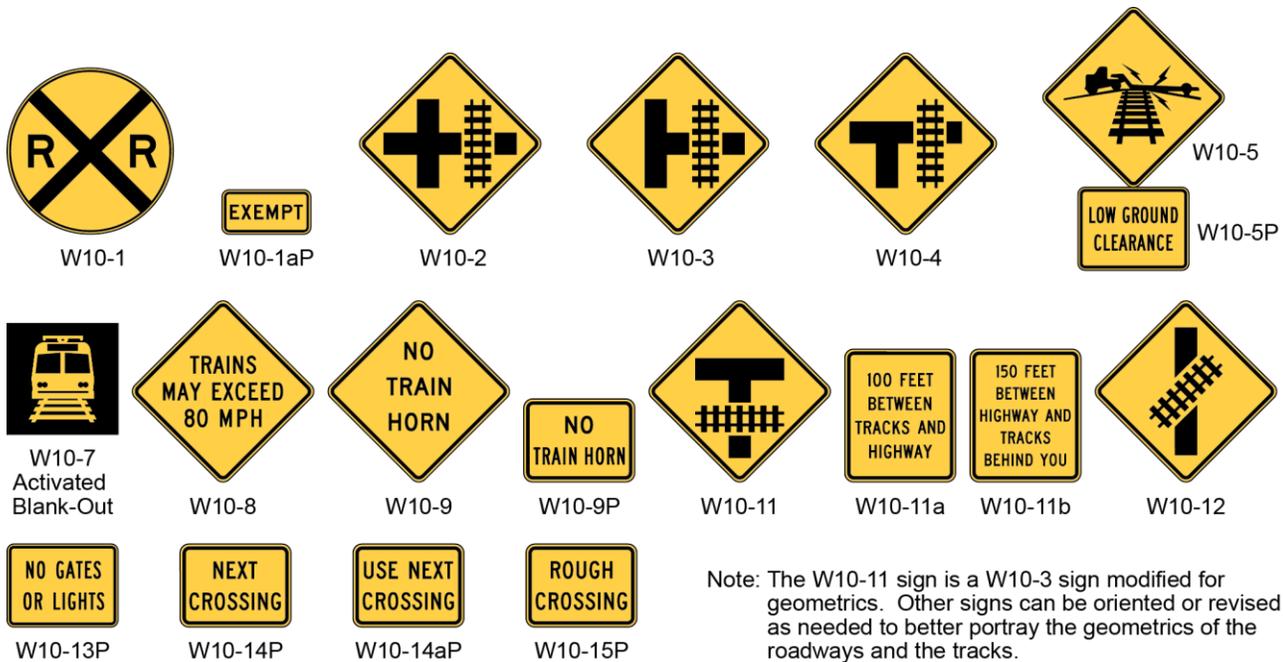
Section 8B.05 Use of STOP (R1-1) or YIELD (R1-2) Signs without Crossbuck Signs at Highway-LRT Grade Crossings

Standard:

- 01 **For all highway-LRT grade crossings where only STOP (R1-1) or YIELD (R1-2) signs are installed, the placement shall comply with the requirements of Section 2B.10. Stop Ahead (W3-1) or Yield Ahead (W3-2) Advance Warning signs (see Figure 2C-6) shall also be installed if the criteria for their installation given in Section 2C.36 is met.**

Guidance:

- 02 *The use of only STOP or YIELD signs for road users at highway-LRT grade crossings should be limited to those crossings where the need and feasibility is established by an engineering study. Such crossings should have all of the following characteristics:*
- A. *The crossing roadways should be secondary in character (such as a minor street with one lane in each direction, an alley, or a driveway) with low traffic volumes and low speed limits. The specific thresholds of traffic volumes and speed limits should be determined by the local agencies.*
 - B. *LRT speeds do not exceed 25 mph.*
 - C. *The line of sight for an approaching LRT operator is adequate from a sufficient distance such that the operator can sound an audible signal and bring the LRT equipment to a stop before arriving at the crossing.*
 - D. *The road user has sufficient sight distance at the stop line to permit the vehicle to cross the tracks before the arrival of the LRT equipment.*
 - E. *If at an intersection of two roadways, the intersection does not meet the warrants for a traffic control signal as provided in Chapter 4C.*
 - F. *The LRT tracks are located such that highway vehicles are not likely to stop on the tracks while waiting to enter a cross street or highway.*

Figure 8B-4. Warning Signs and Plaques for Grade Crossings**Section 8B.06 Grade Crossing Advance Warning Signs (W10 Series)****Standard:**

01 A Grade Crossing Advance Warning (W10-1) sign (see Figure 8B-4) shall be used on each highway in advance of every highway-rail grade crossing, and every highway-LRT grade crossing in semi-exclusive alignments, except in the following circumstances:

- A. On an approach to a grade crossing from a T-intersection with a parallel highway, if the distance from the edge of the track to the edge of the parallel roadway is less than 100 ft, and W10-3 signs are used on both approaches of the parallel highway; or
- B. On low-volume, low-speed highways crossing minor spurs or other tracks that are infrequently used and road users are directed by an authorized person on the ground to not enter the crossing at all times that approaching rail traffic is about to occupy the crossing; or
- C. In business or commercial areas where active grade crossing traffic control devices are in use; or
- D. Where physical conditions do not permit even a partially effective display of the sign.

02 The placement of the Grade Crossing Advance Warning sign shall be in accordance with Section 2C.05 and Table 2C-4.

03 A Yield Ahead (W3-2) or Stop Ahead (W3-1) Advance Warning sign (see Figure 2C-6) shall also be installed if the criteria for their installation given in Section 2C.36 is met. If a Yield Ahead or Stop Ahead sign is installed on the approach to the crossing, the W10-1 sign shall be installed upstream from the Yield Ahead or Stop Ahead sign. The Yield Ahead or Stop Ahead sign shall be located in accordance with Table 2C-4. The minimum distance between the signs shall be in accordance with Section 2C.05 and Table 2C-4.

Option:

04 On divided highways and one-way streets, an additional W10-1 sign may be installed on the left-hand side of the roadway.

05 If a grade crossing is rough, a ROUGH CROSSING (W10-15P) plaque may be used with the Grade Crossing Advance Warning sign.

Standard:

06 **If the distance between the tracks and a parallel highway, from the edge of the tracks to the edge of the parallel roadway, is less than 100 feet, W10-2, W10-3, or W10-4 signs (see Figure 8B-4) shall be installed on each approach of the parallel highway to warn road users making a turn that they will encounter a grade crossing soon after making a turn, and a W10-1 sign for the approach to the tracks shall not be required to be between the tracks and the parallel highway.**

07 **If the W10-2, W10-3, or W10-4 signs are used, sign placement in accordance with the guidelines for Intersection Warning signs in Table 2C-4 using the speed of through traffic shall be measured from the highway intersection.**

Guidance:

08 *If the distance between the tracks and the parallel highway, from the edge of the tracks to the edge of the parallel roadway, is 100 ft or more, a W10-1 sign should be installed in advance of the grade crossing, and the W10-2, W10-3, or W10-4 signs should not be used on the parallel highway.*

Section 8B.07 EXEMPT Grade Crossing Plaques (R15-3P, W10-1aP)*Option:*

01 When authorized by the Public Utilities Commission of Ohio, a supplemental EXEMPT (R15-3P) plaque (see Figure 8B-1) with a white background may be used below the Crossbuck sign or Number of Tracks plaque, if present, at the grade crossing, and a supplemental EXEMPT (W10-1aP) plaque (see Figure 8B-4) with a yellow background may be used below the Grade Crossing Advance Warning (W10 series) sign.

02 Where neither the Crossbuck sign nor the advance warning signs exist for a particular highway-LRT grade crossing, an EXEMPT (R15-3P) plaque with a white background may be placed on its own post on the near right-hand side of the approach to the crossing.

Support:

03 Section 4511.63 of the Ohio Revised Code (O.R.C.) requires certain vehicles to stop, look and listen at highway-rail grade crossings (see Appendix B2). Supplemental EXEMPT signs (R15-3, W10-1a) inform drivers of these vehicles that a stop is not required at certain designated grade crossings, except when rail traffic is approaching or occupying the grade crossing, or the driver's view is blocked.

Section 8B.08 Turn Restrictions During Preemption*Guidance:*

01 *At a signalized intersection where the intersection traffic control signals are preempted by the approach of a train, all existing turning movements toward the highway-rail grade crossing should be prohibited during the signal preemption sequences. (See Section 8C.09 for additional information about preemption of traffic control signals near grade crossings.)*

Option:

02 A blank-out or changeable message sign and/or appropriate highway traffic signal indication or other similar type sign may be used to prohibit turning movements toward the highway-rail grade crossing during preemption. The R3-1a and R3-2a signs shown in Figure 8B-1 may be used for this purpose.

Support:

03 LRT operations can include the use of activated blank-out sign technology for turn prohibition signs. The signs are typically used on roads paralleling a semi-exclusive or mixed-use LRT alignment where road users might turn across the LRT tracks. A blank-out sign displays its message only when activated. When not activated, the sign face is blank.

Guidance:

04 *An LRT-activated blank-out turn prohibition (R3-1a or R3-2a) sign should be used where an intersection adjacent to a highway-LRT crossing is controlled by STOP signs, or is controlled by traffic control signals with permissive turn movements for road users crossing the tracks.*

Option:

05 An LRT-activated blank-out turn prohibition (R3-1a or R3-2a) sign may be used for turning movements that cross the tracks.

06 As an alternative to LRT-activated blank-out turn prohibition signs at intersections with traffic control signals, exclusive traffic control signal phases such that all movements that cross the tracks have a steady red indication may be used in combination with NO TURN ON RED (R10-11, R10-11a, or R10-11b) signs (see Section 2B.54).

Standard:

07 **Turn prohibition signs that are associated with preemption shall be visible or activated only when the grade crossing restriction is in effect.**

Section 8B.09 DO NOT STOP ON TRACKS Sign (R8-8)

Guidance:

01 *A DO NOT STOP ON TRACKS (R8-8) sign (see Figure 8B-1) should be installed whenever an engineering study determines that the potential for highway vehicles stopping on the tracks at a grade crossing is significant. Placement of the R8-8 sign should be determined as part of the engineering study. The sign, if used, should be located on the right-hand side of the highway on either the near or far side of the grade crossing, depending upon which position provides better visibility to approaching drivers.*

02 *If a STOP or YIELD sign is installed at a location, including at a circular intersection, that is downstream from the grade crossing such that highway vehicle queues are likely to extend beyond the tracks, a DO NOT STOP ON TRACKS sign (R8-8) should be used.*

Option:

03 DO NOT STOP ON TRACKS signs may be placed on both sides of the track.

04 On divided highways and one-way streets, a second DO NOT STOP ON TRACKS sign may be placed on the near or far left-hand side of the highway at the grade crossing to further improve visibility of the sign.

Section 8B.10 TRACKS OUT OF SERVICE Sign (R8-9)

Option:

01 The TRACKS OUT OF SERVICE (R8-9) sign (see Figure 8B-1) may be used at a grade crossing instead of a Crossbuck (R15-1) sign and a Number of Tracks (R15-2P) plaque when the abandonment of the railroad tracks has been approved by the regulatory authority with statutory authority, but only until such time that the tracks are removed or covered and the space previously occupied by the rails filled with the same material that comprises the road or highway at the crossing.

Standard:

02 **When tracks are abandoned, traffic control devices, signal heads and gate arms shall be removed.**

03 **The R8-9 sign shall be removed when the tracks have been removed and the space previously occupied by the rail bed filled with the same material that comprises the road or highway at the crossing or when the grade crossing is returned to service.**

Section 8B.11 STOP HERE WHEN FLASHING Signs (R8-10, R8-10a)

Option:

01 *The STOP HERE WHEN FLASHING (R8-10, R8-10a) sign (see Figure 8B-1) may be used at a grade crossing to inform drivers of the location of the stop line or the point at which to stop when the flashing-light signals (see Section 8C.02) are activated.*

Section 8B.12 STOP HERE ON RED Signs (R10-6, R10-6a)

Support:

01 The STOP HERE ON RED (R10-6, R10-6a) sign (see Figure 8B-1) defines and facilitates observance of stop lines at traffic control signals.

Option:

02 A STOP HERE ON RED sign may be used at locations where highway vehicles frequently violate the stop line or where it is not obvious to road users where to stop.

Guidance:

03 *If possible, stop lines should be placed at a point where the highway vehicle driver has adequate sight distance along the track.*

Section 8B.13 Light Rail Transit Only Lane Signs (R15-4 Series)**Support:**

01 The Light Rail Transit Only Lane (R15-4 series) signs (see Figure 8B-1) are used for multi-lane operations, where road users might need additional guidance on lane use and/or restrictions.

Option:

02 Light Rail Transit Only Lane signs may be used on a roadway lane limited to only LRT use to indicate the restricted use of a lane in semi-exclusive and mixed alignments.

Guidance:

03 *If used, the R15-4a, R15-4b, and R15-4c signs should be installed on posts adjacent to the roadway containing the LRT tracks or overhead above the LRT only lane.*

Option:

04 If the trackway is paved, preferential lane markings (see Chapter 3D) may be installed but only in combination with Light Rail Transit Only Lane signs.

Support:

05 The trackway is the continuous way designated for LRT, including the entire dynamic envelope. Section 8B.29 contains more information regarding the dynamic envelope.

Section 8B.14 Do Not Pass Light Rail Transit Signs (R15-5, R15-5a)**Support:**

01 A Do Not Pass Light Rail Transit (R15-5) sign (see Figure 8B-1) is used to indicate that motor vehicles are not allowed to pass LRT vehicles that are loading or unloading passengers where there is no raised platform or physical separation from the lanes upon which other motor vehicles are operating.

Option:

02 The R15-5 sign may be used in mixed-use alignments and may be mounted overhead where there are multiple lanes.

03 Instead of the R15-5 symbol sign, a regulatory sign with the word message DO NOT PASS STOPPED TRAIN (R15-5a) may be used (see Figure 8B-1).

Guidance:

04 *If used, the R15-5 sign should be located immediately before the LRT boarding area.*

Section 8B.15 No Motor Vehicles On Tracks Signs (R15-6, R15-6a)**Support:**

01 The No Motor Vehicles On Tracks (R15-6) sign (see Figure 8B-1) is used where there are adjacent traffic lanes separated from the LRT lane by a curb or pavement markings.

Guidance:

02 *The DO NOT ENTER (R5-1) sign should be used where a road user could wrongly enter an LRT only street.*

Option:

03 A No Motor Vehicles On Tracks sign may be used to deter motor vehicles from driving on the trackway. It may be installed on a 3-foot flexible post between double tracks, on a post alongside the tracks, or overhead.

04 Instead of the R15-6 symbol sign, a regulatory sign with the word message DO NOT DRIVE ON TRACKS (R15-6a) may be used (see Figure 8B-1).

05 A reduced size of 12 x 12 inches may be used if the R15-6 sign is installed between double tracks.

Standard:

06 **The smallest size for the R15-6 sign shall be 12 x 12 inches.**

Section 8B.16 Divided Highway with Light Rail Transit Crossing Signs (R15-7 Series)

Option:

- 01 The Divided Highway with Light Rail Transit Crossing (R15-7) sign (see Figure 8B-1) may be used as a supplemental sign on the approach legs of a roadway that intersects with a divided highway where LRT equipment operates in the median. The sign may be placed beneath a STOP sign or mounted separately.

Guidance:

- 02 *The number of tracks displayed on the R15-7 sign should be the same as the actual number of tracks.*

Standard:

- 03 **When the Divided Highway with Light Rail Transit Crossing sign is used at a four-legged intersection, the R15-7 sign shall be used. When used at a T-intersection, the R15-7a sign shall be used.**

Section 8B.17 LOOK Sign (R15-8)

Option:

- 01 At grade crossings, the LOOK (R15-8) sign (see Figure 8B-1) may be mounted as a supplemental plaque on the Crossbuck (R15-1) support, or on a separate post in the immediate vicinity of the grade crossing on the railroad or LRT right-of-way.

Guidance:

- 02 *A LOOK sign should not be mounted as a supplemental plaque on a Crossbuck Assembly that has a YIELD or STOP sign mounted on the same support as the Crossbuck.*

Section 8B.18 Emergency Notification Sign (I-13)

Guidance:

- 01 *Emergency Notification (I-13) signs (see Figure 8B-5) should be installed at all highway-rail grade crossings, and at all highway-LRT grade crossings on semi-exclusive alignments, to provide information to road users so that they can notify the railroad company or LRT agency about emergencies or malfunctioning traffic control devices.*

Standard:

- 02 **When Emergency Notification signs are used at a highway-rail grade crossing, they shall, at a minimum, include the USDOT grade crossing inventory number and the emergency contact telephone number.**

- 03 **When Emergency Notification signs are used at a highway-LRT grade crossing, they shall, at a minimum, include a unique crossing identifier and the emergency contact telephone number.**

- 04 **Emergency Notification Signs shall have a white legend and border on a blue background.**

- 05 **The Emergency Notification signs shall be positioned so as to not obstruct any traffic control devices or limit the view of rail traffic approaching the grade crossing.**

Guidance:

- 06 *Emergency Notification signs should be retroreflective.*

- 07 *Emergency Notification signs should be oriented so as to face highway vehicles stopped on or at the grade crossing or on the traveled way near the grade crossing.*

- 08 *At station crossings, Emergency Notification signs or information should be posted in a conspicuous location.*

- 09 *Emergency Notification signs mounted on Crossbuck Assemblies or signal masts should only be large enough to provide the necessary contact information. Use of larger signs that might obstruct the view of rail traffic or other highway vehicles should be avoided.*

Figure 8B-5. Example of an Emergency Notification Sign



I-13

Section 8B.19 Light Rail Transit Approaching-Activated Blank-Out Warning Sign (W10-7)**Support:**

- 01 The Light Rail Transit Approaching-Activated Blank-Out (W10-7) warning sign (see Figure 8B-4) supplements the traffic control devices to warn road users crossing the tracks of approaching LRT equipment.

Option:

- 02 A Light Rail Transit Approaching-Activated Blank-Out warning sign may be used at signalized intersections near highway-LRT grade crossings or at crossings controlled by STOP signs or automatic gates.

Section 8B.20 TRAINS MAY EXCEED 80 MPH Sign (W10-8)**Guidance:**

- 01 *Where trains are permitted to travel at speeds exceeding 80 mph, a TRAINS MAY EXCEED 80 MPH (W10-8) sign (see Figure 8B-4) should be installed facing road users approaching the grade crossing.*
- 02 *If used, the TRAINS MAY EXCEED 80 MPH signs should be installed between the Grade Crossing Advance Warning (W10 series) sign (see Figure 8B-4) and the highway-rail grade crossing on all approaches to the highway-rail grade crossing. The locations should be determined based on specific site conditions.*

Section 8B.21 NO TRAIN HORN Sign or Plaque (W10-9, W10-9P)**Standard:**

- 01 **Either a NO TRAIN HORN (W10-9) sign (see Figure 8B-4) or a NO TRAIN HORN (W10-9P) plaque shall be installed in each direction at each highway-rail grade crossing where a quiet zone has been established in compliance with 49 CFR Part 222. If a W10-9P plaque is used, it shall supplement and be mounted directly below the Grade Crossing Advance Warning (W10 series) sign (see Figure 8B-4).**

Section 8B.22 NO GATES OR LIGHTS Plaque (W10-13P)**Option:**

- 01 The NO GATES OR LIGHTS (W10-13P) plaque (see Figure 8B-4) may be mounted below the Grade Crossing Advance Warning (W10 series) sign at grade crossings that are not equipped with automated signals.

Section 8B.23 Low Ground Clearance Grade Crossing Sign (W10-5)**Guidance:**

- 01 *If the highway profile conditions are sufficiently abrupt to create a hang-up situation for long wheelbase vehicles or for trailers with low ground clearance, the Low Ground Clearance Grade Crossing (W10-5) sign (see Figure 8B-4) should be installed in advance of the grade crossing.*

Standard:

- 02 **Because this symbol might not be readily recognizable by the public, the Low Ground Clearance Grade Crossing (W10-5) warning sign shall be accompanied by an educational plaque, LOW GROUND CLEARANCE. The LOW GROUND CLEARANCE educational plaque shall remain in place for at least 3 years after the initial installation of the W10-5 sign (see Section 2A.12).**

Guidance:

- 03 *Auxiliary plaques such as AHEAD, NEXT CROSSING, or USE NEXT CROSSING (with appropriate arrows), or a supplemental distance plaque should be placed below the W10-5 sign at the nearest intersecting highway where a vehicle can detour or at a point on the highway wide enough to permit a U-turn.*
- 04 *If engineering judgment of roadway geometric and operating conditions confirms that highway vehicle speeds across the tracks should be below the posted speed limit, a W13-1P advisory speed plaque should be posted.*

Option:

- 05 If the grade crossing is rough, word message signs such as BUMP, DIP, or ROUGH CROSSING may be installed. A W13-1P advisory speed plaque may be installed below the word message sign in advance of rough crossings.

Support:

- 06 Information on ground clearance requirements at grade crossings is available in the “American Railway Engineering and Maintenance-of-Way Association’s Engineering Manual,” or the American Association of State Highway and Transportation Officials’ “A Policy on Geometric Design of Highways and Streets” (see Section 1A.11).

Section 8B.24 Storage Space Signs (W10-11, W10-11a, W10-11b)*Guidance:*

- 01 *A Storage Space (W10-11) sign supplemented by a word message storage distance (W10-11a) sign (see Figure 8B-4) should be used where there is a highway intersection in close proximity to the grade crossing and an engineering study determines that adequate space is not available to store a design vehicle(s) between the highway intersection and the train or LRT equipment dynamic envelope.*
- 02 *The Storage Space (W10-11 and W10-11a) signs should be mounted in advance of the grade crossing at an appropriate location to advise drivers of the space available for highway vehicle storage between the highway intersection and the grade crossing.*

Option:

- 03 A Storage Space (W10-11b) sign (see Figure 8B-4) may be mounted beyond the grade crossing at the highway intersection under the STOP or YIELD sign or just prior to the signalized intersection to remind drivers of the storage space between the tracks and the highway intersection.

Section 8B.25 Skewed Crossing Sign (W10-12)

Option:

- 01 The Skewed Crossing (W10-12) sign (see Figure 8B-4) may be used at a skewed grade crossing to warn road users that the tracks are not perpendicular to the highway.

Guidance:

- 02 *If the Skewed Crossing sign is used, the symbol should show the direction of the crossing (near left to far right as shown in Figure 8B-4, or the mirror image if the track goes from far left to near right). If the Skewed Crossing sign is used where the angle of the crossing is significantly different than 45 degrees, the symbol should show the approximate angle of the crossing.*

Standard:

- 03 **The Skewed Crossing sign shall not be used as a replacement for the required Advance Warning (W10-1) sign. If used, the Skewed Crossing sign shall supplement the W10-1 sign and shall be mounted on a separate post.**

Section 8B.26 Light Rail Transit Station Sign (I-12)

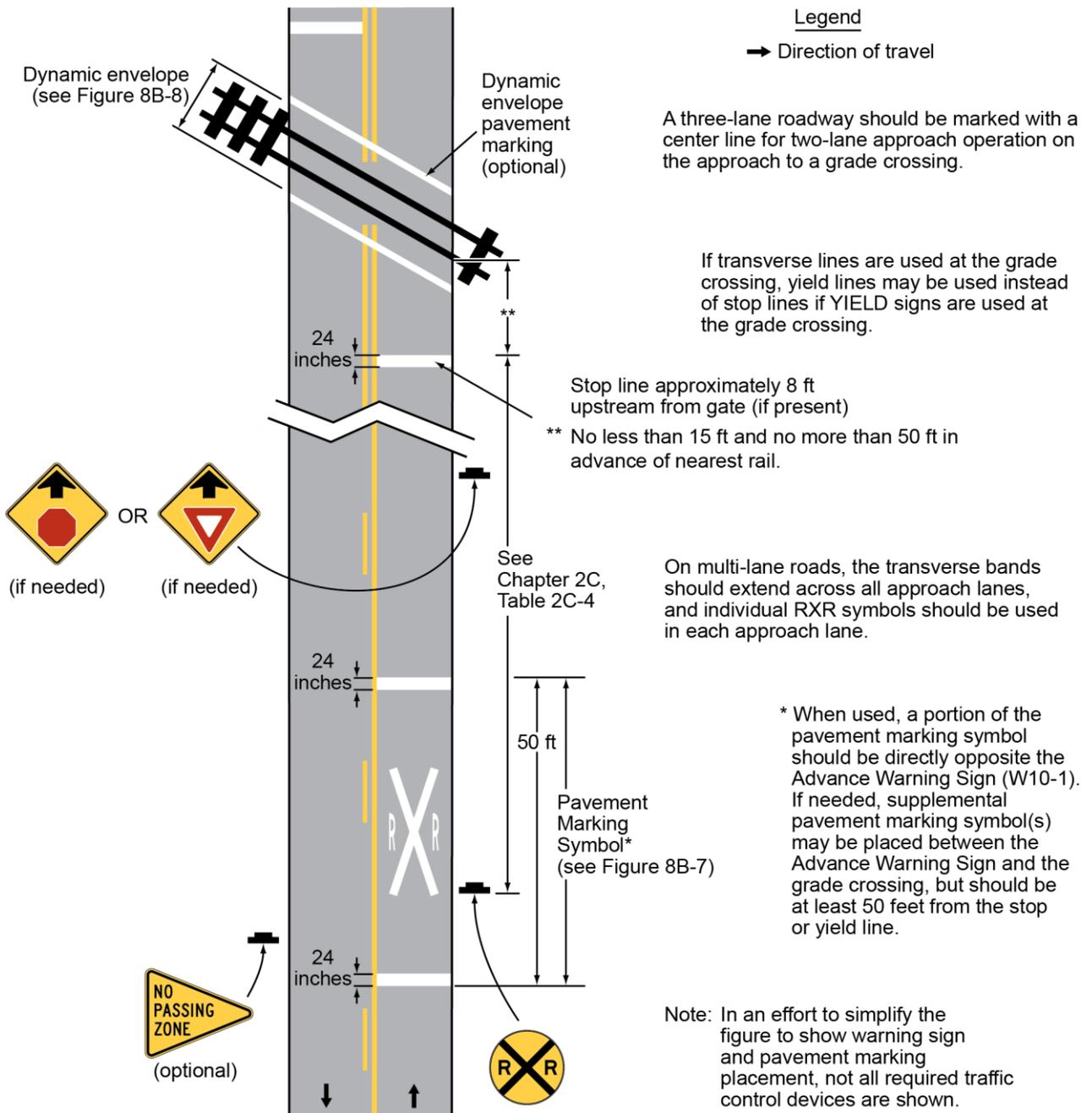
Option:

- 01 The Light Rail Transit Station (I-12) sign (see Figure 2H-1) may be used to direct road users to an LRT station or boarding location. It may be supplemented by the name of the transit system and by arrows as provided in Section 2D.08.

Section 8B.27 Pavement Markings**Standard:**

- 01 **All grade crossing pavement markings shall be retroreflectorized white. All other markings shall be in accordance with Part 3.**
- 02 **On paved roadways, pavement markings in advance of a grade crossing shall consist of an X, the letters RR, a no-passing zone marking (on two-lane, two-way highways with center line markings in compliance with Section 3B.01), and certain transverse lines as shown in Figures 8B-6 and 8B-7.**

Figure 8B-6. Example of Placement of Warning Signs and Pavement Markings at Highway-Rail Grade Crossings

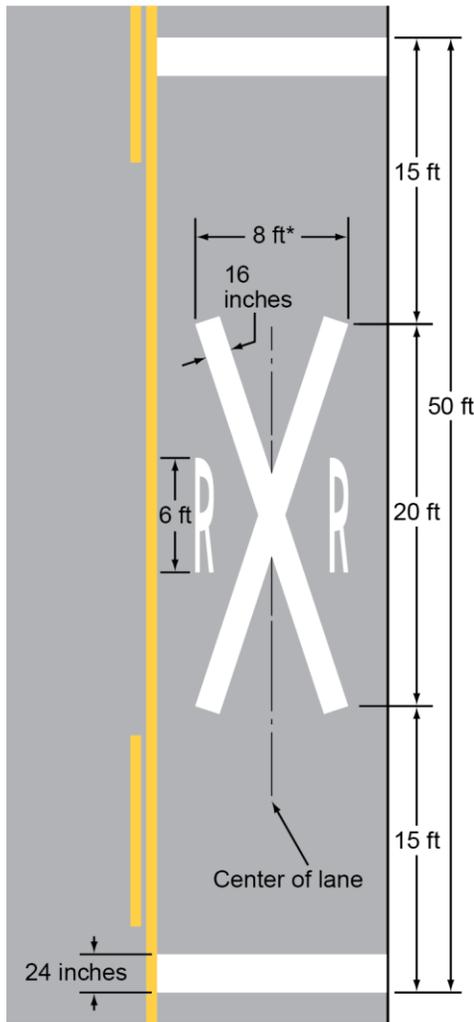


03 **Identical markings shall be placed in each approach lane on all paved approaches to grade crossings where signals or automatic gates are located, and at all other grade crossings where the posted or statutory highway speed is 40 mph or greater.**

04 **Pavement markings shall not be required at grade crossings where the posted or statutory highway speed is less than 40 mph if an engineering study indicates that other installed devices provide suitable warning and control. Pavement markings shall not be required at grade crossings in urban areas if an engineering study indicates that other installed devices provide suitable warning and control. Pavement markings at grade crossings on shared-use paths shall be in accordance with Section 8D.27.**

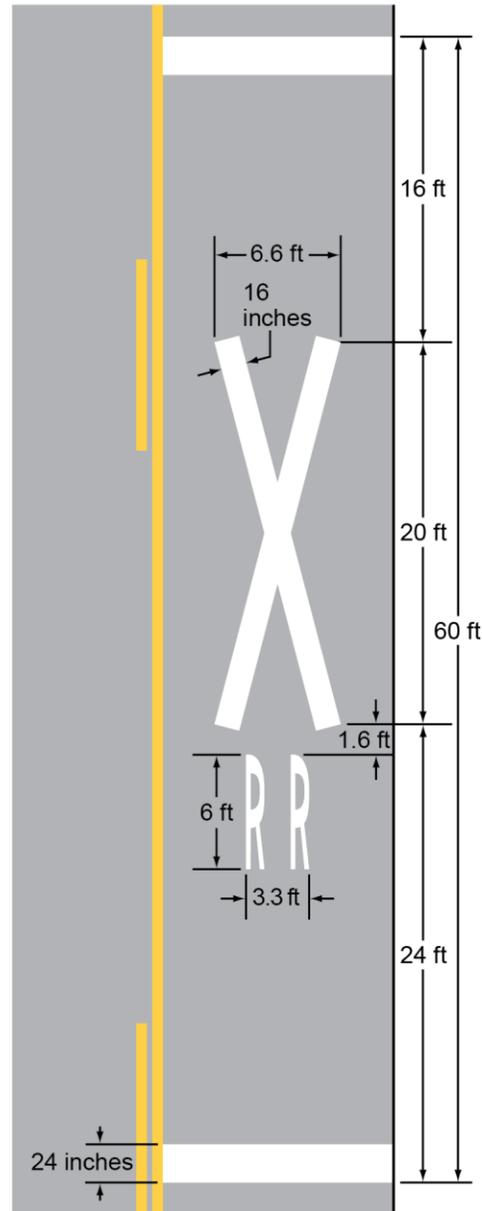
Figure 8B-7. Grade Crossing Pavement Markings

A - Grade crossing pavement marking symbol



*Width may vary according to lane width.

B - Grade crossing alternative (narrow) pavement marking symbol



Note: Refer to Figure 8B-6 for placement.

Guidance:

- 05 When pavement markings are used, a portion of the X symbol should be directly opposite the Grade Crossing Advance Warning sign. The X symbol and letters should be elongated to allow for the low angle at which they will be viewed.

Option:

- 06 When justified by engineering judgment, supplemental pavement marking symbol(s) may be placed between the Grade Crossing Advance Warning sign and the grade crossing.

Section 8B.28 Stop and Yield Lines

Standard:

- 01 On paved roadways at grade crossings that are equipped with active control devices such as flashing-light signals, gates, or traffic control signals, a stop line (see Section 3B.16) shall be installed to indicate the point behind which highway vehicles are or might be required to stop.

02 On paved roadway approaches to passive grade crossings where a STOP sign is installed in conjunction with the Crossbuck sign, a stop line should be installed to indicate the point behind which highway vehicles are required to stop or as near to that point as practical.

03 If a stop line is used, it should be a transverse line at a right angle to the traveled way and should be placed approximately 8 feet in advance of the gate (if present), but no closer than 15 feet nor more than 50 feet in advance of the nearest rail.

Option:

04 On paved roadway approaches to passive grade crossing where a YIELD sign is installed in conjunction with the Crossbuck sign, a yield line (See Section 3B.16) or a stop line may be installed to indicate the point behind which highway vehicles are required to yield or stop or as near to that point as practical.

Guidance:

05 If a yield line is used, it should be a transverse line (see Figure 3B-16) at a right angle to the traveled way and should be placed no closer than 15 feet nor more than 50 feet in advance of the nearest rail (see Figure 8B-6).

Section 8B.29 Dynamic Envelope Markings

Support:

01 The dynamic envelope (see Figures 8B-8 and 8B-9) markings indicate the clearance required for the train or LRT equipment overhang resulting from any combination of loading, lateral motion, or suspension failure.

Option:

02 Dynamic envelope markings may be installed at all grade crossings, unless a Four-Quadrant Gate system (see Section 8C.06) is used.

Figure 8B-8. Example of Dynamic Envelope Pavement Markings at Grade Crossings

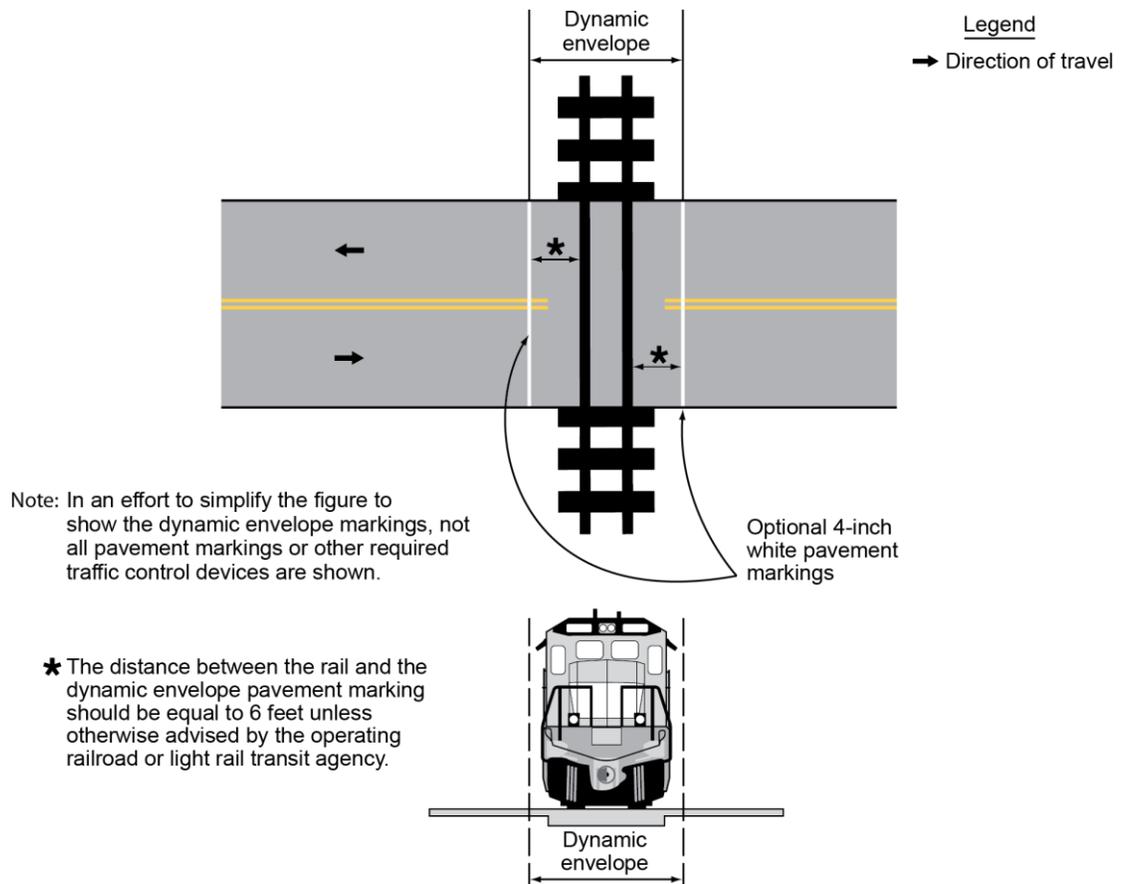
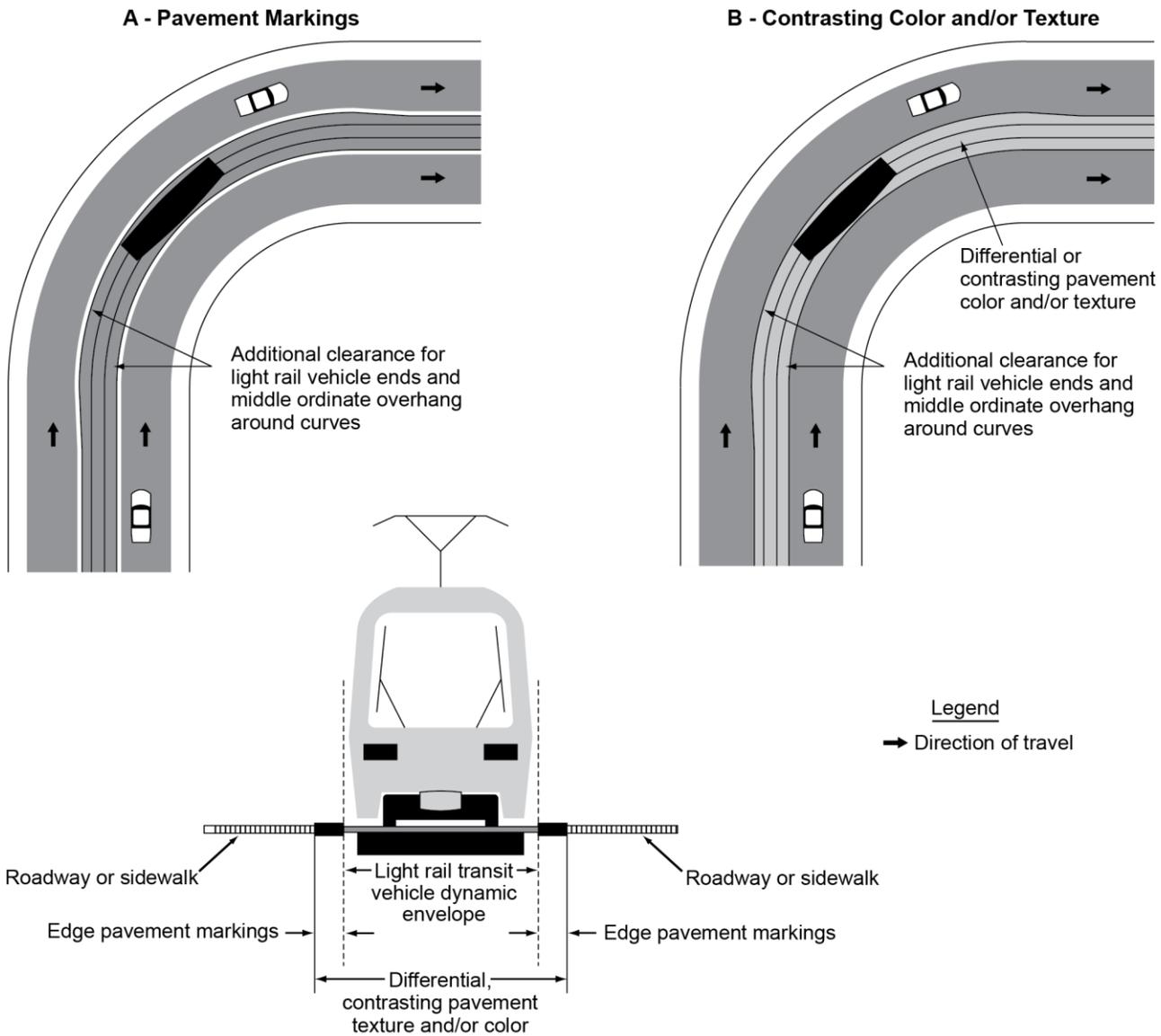


Figure 8B-9. Examples of Light Rail Transit Vehicle Dynamic Envelope Markings for Mixed-Use Alignments



Standard:

- 03 **If used, pavement markings for indicating the dynamic envelope shall comply with the provisions of Part 3 and shall be a 4-inch normal solid white line or contrasting pavement color and/or contrasting pavement texture.**

Guidance:

- 04 *If pavement markings are used to convey the dynamic envelope, they should be placed completely outside of the dynamic envelope. If used, dynamic envelope pavement markings should be placed on the highway 6 feet from and parallel to the nearest rail, unless the operating railroad company or LRT agency advises otherwise. The pavement markings should extend across the roadway as shown in Figure 8B-8. The dynamic envelope pavement markings should not be placed perpendicular to the roadway at skewed grade crossings.*

Option:

- 05 **In semi-exclusive LRT alignments, the dynamic envelope markings may be along the LRT trackway between intersections where the trackway is immediately adjacent to travel lanes and no physical barrier is present.**

- 06 In mixed-use LRT alignments, the dynamic envelope markings may be continuous between intersections (see Figure 8B-9).
- 07 In mixed-use LRT alignments, pavement markings for adjacent travel or parking lanes may be used instead of dynamic markings if the lines are outside the dynamic envelope.

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CHAPTER 8C. FLASHING-LIGHT SIGNALS, GATES, AND TRAFFIC CONTROL SIGNALS

Section 8C.01 Introduction

Support:

- 01 Active traffic control systems inform road users of the approach or presence of rail traffic at grade crossings. These systems include four-quadrant gate systems, automatic gates, flashing-light signals, traffic control signals, actuated blank-out and variable message signs, and other active traffic control devices.
- 02 A composite drawing (see Figure 8C-1) shows a post-mounted flashing-light signal (two light units mounted in a horizontal line), a flashing-light signal mounted on an overhead structure, and an automatic gate assembly.

Option:

- 03 Post-mounted and overhead flashing-light signals may be used separately or in combination with each other as determined by an engineering study. Also, flashing-light signals may be used without automatic gate assemblies, as determined by an engineering study.

Standard:

- 04 **The meaning of flashing-light signals and gates shall be as defined in Section 4511.62 and 4511.64 of the Ohio Revised Code. Requirements for the erection and operation of the signal equipment, gates, bells and related traffic control devices at railroad grade crossings are contained in Sections, 4513.40, 4907.47, 4907.48, 4907.49, 4907.52 and 4907.476 of the Ohio Revised Code (see Appendix B2).**
- 05 **Location and clearance dimensions for flashing-light signals and gates shall be as shown in Figure 8C-1.**
- 06 **When there is a curb, a horizontal offset of at least 2 feet shall be provided from the face of the vertical curb to the closest part of the signal or gate arm in its upright position. When a cantilevered-arm flashing-light signal is used, the vertical clearance shall be at least 17 feet above the crown of the highway to the lowest point of the signal unit.**
- 07 **Where there is a shoulder, but no curb, a horizontal offset of at least 2 feet from the edge of a paved or surfaced shoulder shall be provided, with an offset of at least 6 feet from the edge of the traveled way.**
- 08 **Where there is no curb or shoulder, the minimum horizontal offset shall be 6 feet from the edge of the traveled way.**

Guidance:

- 09 *Equipment housings (controller cabinets) should have a lateral offset of at least 30 ft from the edge of the highway, and where railroad or LRT property and conditions allow, at least 25 feet from the nearest rail.*
- 10 *If a pedestrian route is provided, sufficient clearance from supports, posts, and gate mechanisms should be maintained for pedestrian travel.*
- 11 *When determined by an engineering study, a lateral escape route to the right of the highway in advance of the grade crossing traffic control devices should be kept free of guardrail or other ground obstructions. Where guardrail is not deemed necessary or appropriate, barriers should not be used for protecting signal supports.*
- 12 *The same lateral offset and roadside safety features should apply to flashing-light signal and automatic gate locations on both the right-hand and left-hand sides of the roadway.*

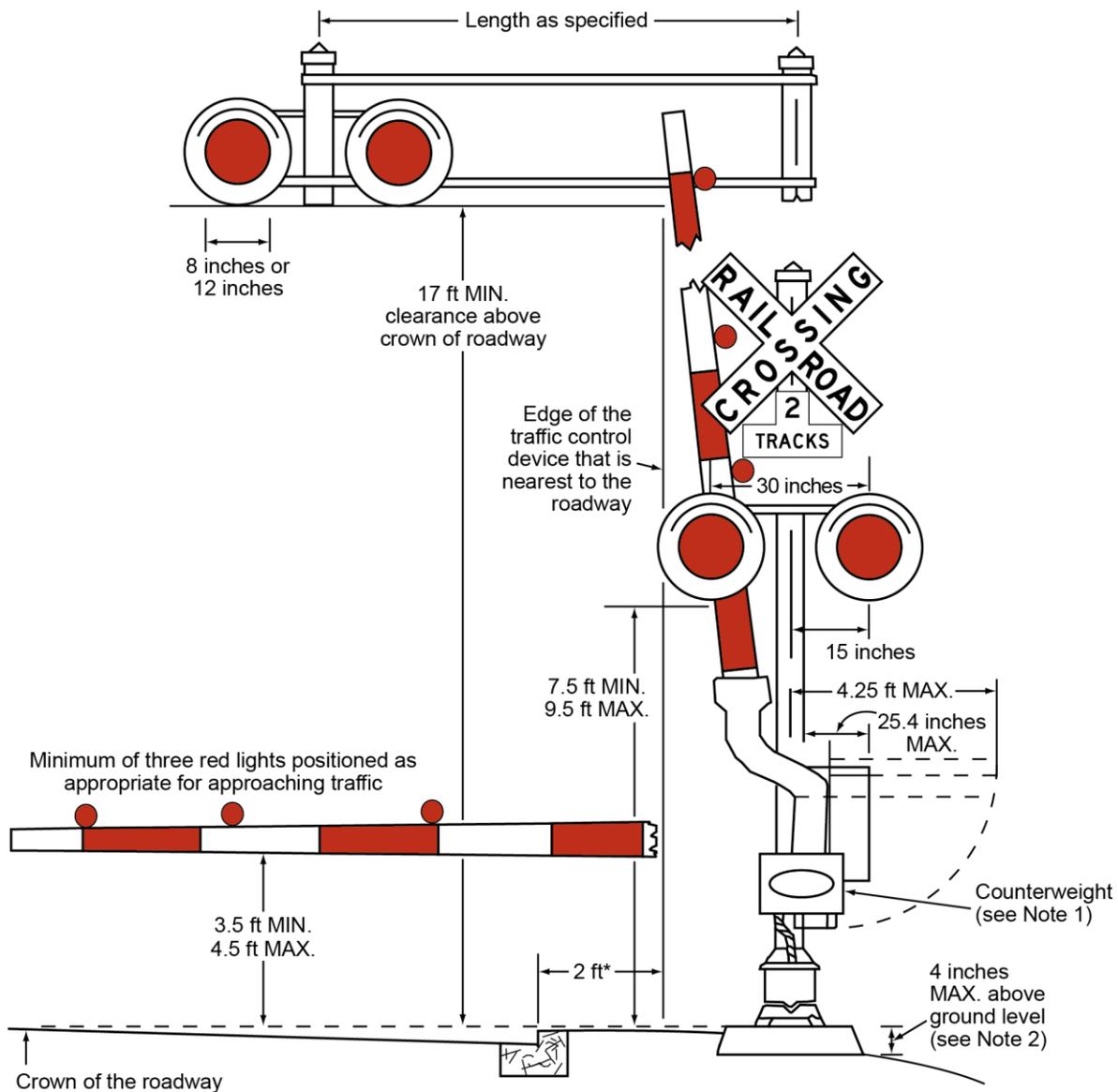
Option:

- 13 In industrial or other areas involving only low-speed highway traffic or where signals are vulnerable to damage by turning truck traffic, guardrail may be installed to provide protection for the signal assembly.

Guidance:

- 14 *Where both traffic control signals and flashing – light signals (with or without automatic gates) are in operation at the same highway-LRT grade crossing, the operation of the devices should be coordinated to avoid any display of conflicting signal indications.*

Figure 8C-1. Composite Drawing of Active Traffic Control Devices for Grade Crossings Showing Clearances



*For locating this reference line on an approach that does not have a curb, see Section 8C.01.

Notes:

1. Where gates are located in the median, additional median width may be required to provide the minimum clearance for the counterweight supports.
2. The top of the signal foundation should be no more than 4 inches above the surface of the ground and should be at the same elevation as the crown of the roadway. Where site conditions would not allow this to be achieved, the shoulder side slope should be re-graded or the height of the signal post should be adjusted to meet the 17-foot vertical clearance requirement.

- 15 LRT typically operates through grade crossings in semi-exclusive and mixed-use alignments at speeds between 10 and 65 mph.
- 16 When LRT speed is cited in this Part, it refers to the maximum speed at which LRT equipment is permitted to traverse a particular grade crossing.

Section 8C.02 Flashing-Light Signals

Support:

- 01 Section 8C.03 contains additional information regarding flashing-light signals at highway-LRT grade crossings in semi-exclusive and mixed-use alignments.

Standard:

- 02 **If used, the flashing-light signal assembly (shown in Figure 8C-1) on the side of the highway shall include a standard Crossbuck (R15-1) sign, and where there is more than one track, a supplemental Number of Tracks (R15-2P) plaque, all of which indicate to motorists, bicyclists, and pedestrians the location of a grade crossing.**

Option:

- 03 At highway-rail grade crossings, bells or other audible warning devices may be included in the assembly and may be operated in conjunction with the flashing lights to provide additional warning for pedestrians, bicyclists, and/or other non-motorized road users.

Standard:

- 04 **When indicating the approach or presence of rail traffic, the flashing-light signal shall display toward approaching highway traffic two red lights mounted in a horizontal line flashing alternately.**
- 05 **If used, flashing-light signals shall be placed to the right of approaching highway traffic on all highway approaches to a grade crossing. They shall be located laterally with respect to the highway in compliance with Figure 8C-1 except where such location would adversely affect signal visibility.**
- 06 **If used at a grade crossing with highway traffic in both directions, back-to-back pairs of lights shall be placed on each side of the tracks. On multi-lane one-way streets and divided highways, flashing light signals shall be placed on the approach side of the grade crossing on both sides of the roadway or shall be placed above the highway.**
- 07 **Each red signal unit in the flashing-light signal shall flash alternately. The number of flashes per minute for each lamp shall be 35 minimum and 65 maximum. Each lamp shall be illuminated approximately the same length of time. Total time of illumination of each pair of lamps shall be the entire operating time. Flashing-light units shall use either 8-inch or 12-inch nominal diameter lenses.**

Guidance:

- 08 *In choosing between the 8-inch or 12-inch nominal diameter lenses for use in grade crossing flashing-light signals, consideration should be given to the principles stated in Section 4D.07.*

Standard:

- 09 **Grade crossing flashing-light signals shall operate at a low voltage using storage batteries either as a primary or stand-by source of electrical energy. Provision shall be made to provide a source of energy for charging batteries.**

Option:

- 10 Additional pairs of flashing-light units may be mounted on the same supporting post and directed toward vehicular traffic approaching the grade crossing from other than the principal highway route, such as where there are approaching routes on highways closely adjacent to and parallel to the track(s).

Standard:

- 11 **References to lenses in this Section shall not be used to limit flashing-light signal optical units to incandescent lamps within optical assemblies that include lenses.**

Support:

- 12 Research has resulted in flashing-light signal optical units that are not lenses, such as, but not limited to, light emitting diode (LED) flashing-light signal modules.

13 Flashing-light signals may be installed on overhead structures or cantilevered supports as shown in Figure 8C-1 where needed for additional emphasis, or for better visibility to approaching traffic, particularly on multi-lane approaches or highways with profile restrictions.

14 If it is determined by an engineering study that one set of flashing lights on the cantilever arm is not sufficiently visible to road users, one or more additional sets of flashing lights may be mounted on the supporting post and/or on the cantilever arm.

Standard:

15 **Breakaway or frangible bases shall not be used for overhead structures or cantilevered supports.**

16 **Except as otherwise provided in Paragraphs 13 through 15, flashing-light signals mounted overhead shall comply with the applicable provisions of this Section.**

Section 8C.03 Flashing-Light Signals at Highway-LRT Grade Crossings

Support:

01 Section 8C.02 contains additional provisions regarding the design and operation of flashing-light signals, including those installed at highway-LRT grade crossings.

Standard:

02 **Highway-LRT grade crossings in semi-exclusive alignments shall be equipped with flashing-light signals where LRT speeds exceed 35 mph. Flashing-light signals shall be clearly visible to motorists, pedestrians, and bicyclists.**

03 **If flashing-light signals are in operation at a highway-LRT crossing that is used by pedestrians, bicyclists, and/or other non-motorized road users, an audible device such as a bell shall also be provided and shall be operated in conjunction with the flashing-light signals.**

Guidance:

04 *Where the crossing is at a location other than an intersection and LRT speeds exceed 25 mph, flashing-light signals should be installed.*

Option:

05 Traffic control signals may be used instead of flashing-light signals at highway-LRT grade crossings within highway-highway intersections where LRT speeds do not exceed 35 mph. Traffic control signals or flashing-light signals may be used where the crossing is at a location other than an intersection, where LRT speeds do not exceed 25 mph, and when the roadway is a low-volume street where prevailing speeds do not exceed 25 mph.

Section 8C.04 Automatic Gates

Support:

01 An automatic gate is a traffic control device used in conjunction with flashing-light signals.

Standard:

02 **The automatic gate (see Figure 8C-1) shall consist of a drive mechanism and a fully retroreflectorized red- and white-striped gate arm with lights. When in the down position, the gate arm shall extend across the approaching lanes of highway traffic.**

03 **In the normal sequence of operation, unless constant warning time detection or other advanced system requires otherwise, the flashing-light signals and the lights on the gate arm (in its normal upright position) shall be activated immediately upon detection of approaching rail traffic. The gate arm shall start its downward motion not less than 3 seconds after the flashing-light signals start to operate, shall reach its horizontal position at least 5 seconds before the arrival of the rail traffic, and shall remain in the down position as long as the train occupies the grade crossing.**

04 **When the rail traffic clears the grade crossing, and if no other rail traffic is detected, the gate arm shall ascend to its upright position, following which the flashing-light signals and the lights on the gate arm shall cease operation.**

05 **Gate arms shall be fully retroreflectorized on both sides, and shall have vertical stripes alternately red and white at 16-inch intervals measured horizontally.**

- 06 It is acceptable to replace a damaged gate with a gate having vertical stripes even if the other existing gates at the same grade crossing have diagonal stripes; however, it is also acceptable to replace a damaged gate with a gate having diagonal stripes if the other existing gates at the same grade crossing have diagonal stripes in order to maintain consistency per the provisions of Paragraph 24 of the Introduction.

Standard:

- 07 **Gate arms shall have at least three red lights as provided in Figure 8C-1.**
08 **When activated, the gate arm light nearest the tip shall be illuminated continuously and the other lights shall flash alternately in unison with the flashing-light signals.**
09 **The entrance lane gate arm mechanism shall be designed to fail safe in the down position.**

Guidance:

- 10 *The gate arm should ascend to its upright position in 12 seconds or less.*
11 *In its normal upright position, when no rail traffic is approaching or occupying the grade crossing, the gate arm should be either vertical or nearly so (see Figure 8C-1).*
12 *In the design of individual installations, consideration should be given to timing the operation of the gate arm to accommodate large and/or slow-moving highway vehicles.*
13 *The gates should cover the approaching highway to block all highway vehicles from being driven around the gate without crossing the centerline.*

Option:

- 14 The effectiveness of gates may be enhanced by the use of channelizing devices or raised median islands to discourage driving around lowered automatic gates.
15 Where gates are located in the median, additional median width may be required to provide the minimum clearance for the counterweight supports.
16 Automatic gates may be supplemented by cantilevered flashing-light signals (see Figure 8C-1) where there is a need for additional emphasis or better visibility.

Section 8C.05 Use of Automatic Gates at LRT Grade Crossings

Guidance:

- 01 *Highway-LRT grade crossings in semi-exclusive alignments should be equipped with automatic gates and flashing-light signals (see Section 8C.02 and 8C.03) where LRT speeds exceed 35 mph.*

Option:

- 02 Where a highway-LRT grade crossing is at a location other than an intersection, where LRT speeds exceed 25 mph, automatic gates and flashing-light signals may be installed.
03 Traffic control signals may be used instead of automatic gates at highway-LRT grade crossings within highway-highway intersections where LRT speeds do not exceed 35 mph. Traffic control signals or flashing-light signals without automatic gates may be used where the crossing is at a location other than an intersection and where LRT speeds do not exceed 25 mph and the roadway is a low-volume street where prevailing speeds do not exceed 25 mph.

Section 8C.06 Four-Quadrant Gate Systems

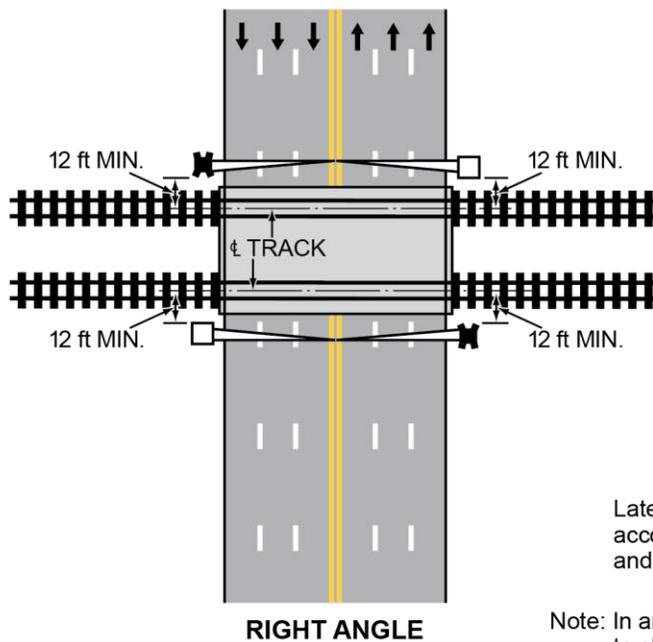
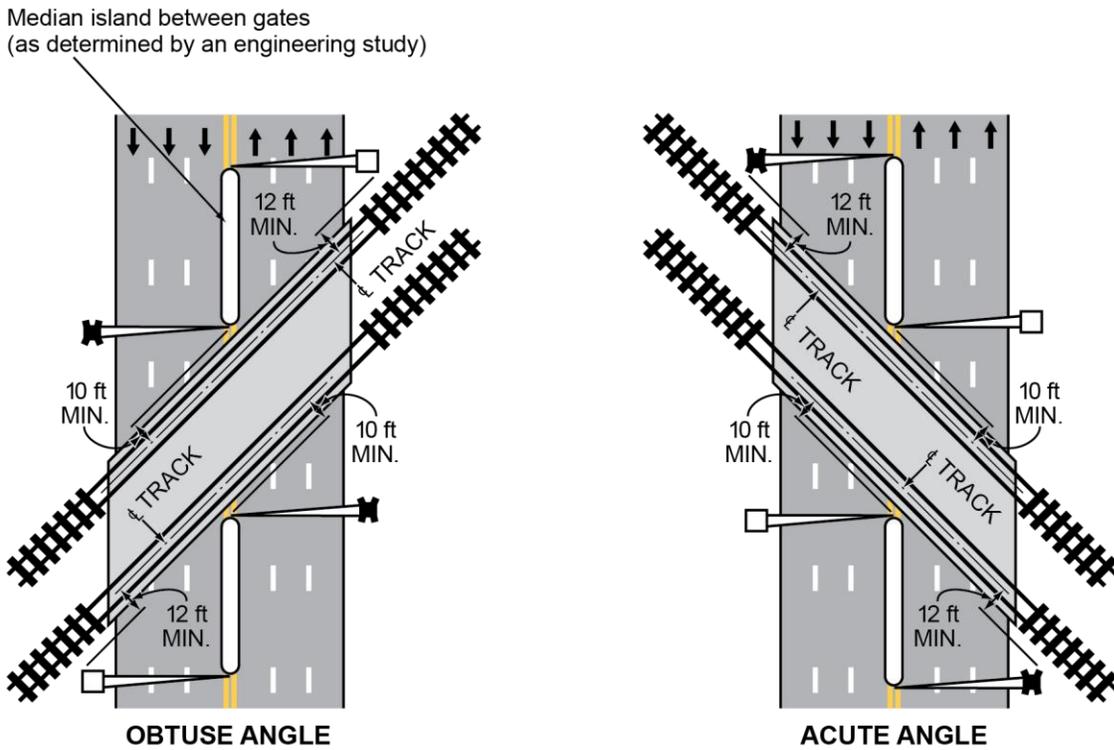
Option:

- 01 Four-Quadrant Gate systems may be installed to improve safety at grade crossings based on an engineering study when less restrictive measures, such as automatic gates and median islands, are not effective.

Standard:

- 02 **A Four-Quadrant Gate system shall consist of entrance and exit gates that control and block road users on all lanes entering and exiting the grade crossing.**
03 **The Four-Quadrant Gate system shall use a series of drive mechanisms and fully retroreflectorized red- and white-striped gate arms with lights, and when in the down position the gate arms extend**

Figure 8C-2. Example of Location Plan for Flashing-Light Signals and Four-Quadrant Gates



- Legend**
- Direction of travel
 - ⊠ Entrance gate
 - Exit gate

Lateral clearances shall be in accordance with Figure 8C-1 and Chapter 8C.

Note: In an effort to simplify the figure to show typical location plans for flashing-light signals and four-quadrant gates, not all traffic control devices are shown on this figure.

individually across the entrance and exit lanes of the roadway as shown in Figure 8C-2. Standards contained in Sections 8C.01 through 8C.03 for flashing-light signals shall be followed for signal specifications, location, and clearance distances.

04 **In the normal sequence of operation, unless constant warning time detection or other advanced system requires otherwise, the flashing-light signals and the lights on the gate arms (in their normal upright positions) shall be activated immediately upon the detection of approaching rail traffic. The gate arms for the entrance lanes of traffic shall start their downward motion not less than 3 seconds after the flashing-light signals start to operate and shall reach their horizontal position at least 5 seconds before the arrival of the rail traffic. Exit gate arm activation and downward motion shall be based on detection or timing requirements established by an engineering study of the individual site. The gate arms shall remain in the down position as long as the rail traffic occupies the grade crossing.**

05 **When the rail traffic clears the grade crossing, and if no other rail traffic is detected, the gate arms shall ascend to their upright positions, following which the flashing light signals and the lights on the gate arms shall cease operation.**

06 **Gate arm design, colors, and lighting requirements shall be in accordance with the Standards contained in Section 8C.04.**

07 **Except as provided in Paragraph 19, the exit gate arm mechanism shall be designed to fail-safe in the up position.**

08 **At locations where gate arms are offset a sufficient distance for highway vehicles to drive between the entrance and exit gate arms, median islands (see Figure 8C-2) shall be installed in accordance with the needs established by an engineering study.**

Guidance:

09 *The gate arm should ascend to its upright position in 12 seconds or less.*

10 *Four-Quadrant Gate systems should only be used in locations with constant-warning-time detection.*

11 *The operating mode of the exit gates should be determined based upon an engineering study, with input from the affected railroad company or LRT agency.*

12 *If the Timed Exit Gate Operating Mode is used, the engineering study, with input from the affected railroad company or LRT agency, should also determine the Exit Gate Clearance Time (see definition in Section 1A.13).*

13 *If the Dynamic Exit Gate Operating Mode is used, highway vehicle intrusion detection devices that are part of a system that incorporates processing logic to detect the presence of highway vehicles within the minimum track clearance distance should be installed to control exit gate operation.*

14 *Regardless of which exit gate operating mode is used, the Exit Gate Clearance Time should be considered when determining additional time requirements for the Minimum Warning Time.*

15 *If a Four-Quadrant Gate system is used at a location that is adjacent to an intersection that could cause highway vehicles to queue within the minimum track clearance distance, the Dynamic Exit Gate Operating Mode should be used unless an engineering study indicates otherwise.*

16 *If a Four-Quadrant Gate system is interconnected with a highway traffic signal, backup or standby power should be considered for the highway traffic signal. Also, circuitry should be installed to prevent the highway traffic signal from leaving the track clearance green interval until all of the gates are lowered.*

17 *At locations where sufficient space is available, exit gates should be positioned downstream from the track a distance that provides a safety zone long enough to accommodate at least one design vehicle between the exit gate and the nearest rail.*

18 *Four-Quadrant Gate systems should include remote health (status) monitoring capable of automatically notifying railroad or LRT signal maintenance personnel when anomalies have occurred within the system.*

Option:

19 *Exit gate arms may fail in the down position if the grade crossing is equipped with remote health (status) monitoring.*

20 *Four-Quadrant Gate installations may include median islands between opposing lanes on an approach to a grade crossing.*

Guidance:

21 *Where sufficient space is available, median islands should be at least 60 feet in length.*

Section 8C.07 Wayside Horn Systems**Option:**

01 A wayside horn system (see definition in Section 1A.13) may be installed in compliance with 49 CFR
Part 222 to provide audible warning directed toward the road users at a highway-rail or highway-LRT grade
crossing or at a pathway grade crossing.

Standard:

02 **Wayside horn systems used at grade crossings where the locomotive horn is not sounded shall be
equipped and shall operate in compliance with the requirements of Appendix E to 49 CFR Part 222.**

Guidance:

03 *The same lateral clearance and roadside safety features should apply to wayside horn systems as
described in the Standards contained in Section 8C.01. Wayside horn systems, when mounted on a separate
pole assembly, should be installed no closer than 15 feet from the center of the nearest track and should be
positioned to not obstruct the motorists' line of sight of the flashing-light signals.*

Section 8C.08 Rail Traffic Detection**Standard:**

01 **The devices employed in active traffic control systems shall be actuated by some form of rail traffic
detection.**

02 **Rail traffic detection circuits, insofar as practical, shall be designed on the fail-safe principle.**

03 **Flashing-light signals shall operate for at least 20 seconds before the arrival of any rail traffic,
except as noted in Paragraph 4.**

Option:

04 On tracks where all rail traffic operates at less than 20 mph and where road users are directed by
an authorized person on the ground to not enter the crossing at all times that approaching rail traffic is about
to occupy the crossing, a shorter signal operating time for the flashing-light signals may be used.

05 Additional warning time may be provided when determined by an engineering study.

Guidance:

06 *Where the speeds of different rail traffic on a given track vary considerably under normal operation,
special devices or circuits should be installed to provide reasonably uniform notice in advance of all rail
traffic movements over the grade crossing. Special control features should be used to eliminate the effects of
station stops and switching operations within approach control circuits to prevent excessive activation of the
traffic control devices while rail traffic is stopped on or switching upon the approach track control circuits.*

Section 8C.09 Traffic Control Signals at or Near Highway-Rail Grade Crossings**Option:**

01 Traffic control signals may be used instead of flashing-light signals to control road users at industrial
highway-rail grade crossings and other places where train movements are very slow, such as in switching
operations.

Standard:

02 **The appropriate provisions of Part 4 relating to traffic control signal design, installation, and
operation shall be applicable where traffic control signals are used to control road users instead of
flashing-light signals at highway-rail grade crossings.**

03 **Traffic control signals shall not be used instead of flashing-light signals to control road users at a
mainline highway-rail grade crossing.**

Guidance:

04 *If a highway-rail grade crossing is equipped with a flashing-light signal system and is located within 200
feet of an intersection or midblock location controlled by a traffic control signal, the traffic control signal
should be provided with preemption in accordance with Section 4D.27.*

05 *Coordination with the flashing-light signal system, queue detection, or other alternatives should be considered for traffic control signals located farther than 200 feet from the highway-rail grade crossing. Factors to be considered should include traffic volumes, highway vehicle mix, highway vehicle and train approach speeds, frequency of trains, and queue lengths.*

06 *The highway agency or authority with jurisdiction and the regulatory agency with statutory authority, if applicable should jointly determine the preemption operation and the timing of traffic control signals interconnected with highway-rail grade crossings adjacent to signalized highway intersections.*

Support:

07 Section 4D.27 includes a recommendation that traffic control signals that are adjacent to highway-rail grade crossings and that are coordinated with the flashing-light signals or that include railroad preemption features be provided with a back-up power supply.

Standard:

08 **Information regarding the type of preemption and any related timing parameters shall be provided to the railroad company so that they can design the appropriate train detection circuitry.**

09 **If preemption is provided, the normal sequence of traffic control signal indications shall be preempted upon the approach of trains to avoid entrapment of vehicles on the highway-rail grade crossing.**

10 **This preemption feature shall have an electrical circuit of the closed-circuit principle, or a supervised communication circuit between the control circuits of the highway-rail grade crossing warning system and the traffic control signal controller. The traffic control signal controller preemptor shall be activated via the supervised communication circuit or the electrical circuit that is normally energized by the control circuits of the highway-rail grade crossing warning system. The approach of a train to a highway-rail grade crossing shall de-energize the electrical circuit or activate the supervised communication circuit, which in turn shall activate the traffic control signal controller preemptor. This shall establish and maintain the preemption condition during the time the highway-rail grade crossing warning system is activated, except that when crossing gates exist, the preemption condition shall be maintained until the crossing gates are energized to start their upward movement. When multiple or successive preemptions occur, train activation shall receive first priority.**

Guidance:

11 *If a highway-rail grade crossing is located within 50 feet (or within 75 feet for a highway that is regularly used by multi-unit highway vehicles) of an intersection controlled by a traffic control signal, the use of pre-signals to control traffic approaching the grade crossing should be considered.*

Standard:

12 **If used, the pre-signals shall display a steady red signal indication during the track clearance portion of a signal preemption sequence to prohibit additional highway vehicles from crossing the railroad track.**

Guidance:

13 *Consideration should be given to using visibility-limited signal faces (see definition in Section 1A.13) at the intersection for the downstream signal faces that control the approach that is equipped with pre-signals.*

Option:

14 The pre-signal phase sequencing may be timed with an offset from the downstream signalized intersection such that the railroad track area and the area between the railroad track and the downstream signalized intersection is generally kept clear of stopped highway vehicles.

Standard:

15 **If a pre-signal is installed at an interconnected highway-rail grade crossing near a signalized intersection, a STOP HERE ON RED (R10-6) sign shall be installed near the pre-signal or at the stop line if used. If there is a nearby signalized intersection with insufficient clear storage distance for a design vehicle, or the highway-rail grade crossing does not have gates, a NO TURN ON RED (R10-11, R10-11a, or R10-11b) sign (see Section 2B.53) shall be installed for the approach that crosses the railroad track, if applicable.**

Option:

16 At locations where a highway-rail grade crossing is located more than 50 feet (or more than 75 feet for a highway regularly used by multi-unit highway vehicles) from an intersection controlled by a traffic control signal, a pre-signal may be used if an engineering study determines a need.

17 If highway traffic signals must be located within close proximity to the flashing-light signal system, the highway traffic signals may be mounted on the same overhead structure as the flashing-light signals.

Support:

18 Section 4C.10 describes the Intersection Near a Grade Crossing signal warrant that is intended for use at a location where the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal.

19 Section 4D.27 describes additional considerations regarding preemption of traffic control signals at or near highway-rail grade crossings.

Section 8C.10 Traffic Control Signals at or Near Highway-LRT Grade Crossings

Support:

01 There are two types of traffic control signals for controlling vehicular and LRT movements at interfaces of the two modes. The first is the standard traffic control signal described in Part 4, which is the focus of this section. The other type of signal is referred to as an LRT signal and is discussed in Section 8C.11.

Standard:

02 **The provisions of Part 4 and Section 8C.09 relating to traffic control signal design, installation, and operation, including interconnection with nearby automatic gates or flashing-light signals, shall be applicable as appropriate where traffic control signals are used at highway-LRT grade crossings.**

03 **If traffic control signals are in operation at a crossing that is used by pedestrians, bicyclists, and/or other non-motorized road users, an audible device such as a bell shall also be provided and shall be operated in conjunction with the traffic control signals.**

Guidance:

04 *When a highway-LRT grade crossing equipped with a flashing-light signal system is located within 200 feet of an intersection or midblock location controlled by a traffic control signal, the traffic control signal should be provided with preemption in accordance with Section 4D.27.*

05 *Coordination with the flashing-light signal system should be considered for traffic control signals located more than 200 feet from the crossing. Factors to be considered should include traffic volumes, highway vehicle mix, highway vehicle and LRT approach speeds, frequency of LRT traffic, and queue lengths.*

06 *If the highway traffic signal has emergency vehicle preemption capability, it should be coordinated with LRT operation.*

07 *Where LRT operates in a wide median, highway vehicles crossing the tracks and being controlled by both near and far side traffic signal faces should receive a protected left-turn green phase from the far side signal face to clear highway vehicles from the crossing when LRT equipment is approaching the crossing.*

Option:

08 Green indications may be provided during LRT phases for highway vehicle, pedestrian, and bicycle movements that do not conflict with LRT movements.

09 Traffic control signals may be installed in addition to four-quadrant gate systems and automatic gates at a highway-LRT crossing if the crossing occurs within a highway-highway intersection and if the traffic control signals meet the warrants described in Chapter 4C.

10 At a location other than an intersection, when LRT speeds are less than 25 mph, traffic control signals alone may be used to control road users at highway-LRT grade crossings only when justified by an engineering study.

11 Typical circumstances may include:

- A. Geometric conditions preclude the installation of highway-LRT grade crossing warning devices.

- B. LRT vehicles share the same roadway with road users.
- C. Traffic control signals already exist.

Support:

- 12 Section 4D.27 contains information regarding traffic control signals at or near highway-LRT grade crossings that are not equipped with highway-LRT grade crossing warning devices.
- 13 Section 4C.10 describes the Intersection Near a Grade Crossing signal warrant that is intended for use at a location where the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal.

Guidance:

- 14 *When a highway-LRT grade crossing exists within a signalized intersection, consideration should be given to providing separate turn signal faces (see definition in Section 1A.13) for the movements crossing the tracks.*

Standard:

- 15 **Separate turn signal faces that are provided for turn movements toward the crossing shall display a steady red indication during the approach and/or passage of LRT traffic.**

Guidance:

- 16 *When a signalized intersection that is located within 200 feet of a highway-LRT grade crossing is preempted, all existing turning movements toward the highway-LRT grade crossing should be prohibited.*

Support:

- 17 Section 8B.08 contains information regarding the prohibition of turning movements toward the crossing during preemption.
- 18 Part 4 contains information regarding signal phasing and timing requirements.

Section 8C.11 Use of Traffic Control Signals for Control of LRT Vehicles at Grade Crossings

Guidance:

- 01 *LRT movements in semi-exclusive alignments at non-gated grade crossings that are equipped with traffic control signals should be controlled by special LRT signal indications.*
- 02 *LRT traffic control signals that are used to control LRT movements only should display the signal indications illustrated in Figure 8C-3.*

Support:

- 03 Section 4D.27 contains information about the use of the signal indications shown in Figure 8C-3 for the control of exclusive bus movements at “queue jumper lanes” and for the control of exclusive bus rapid transit movements on semi-exclusive or mixed-use alignments.

Option:

- 04 Standard traffic control signals may be used instead of LRT traffic control signals to control the movement of LRT vehicles (see Section 8C.10).

Standard:

- 05 **If a separate set of standard traffic control signal indications (red, yellow, and green circular and arrow indications) is used to control LRT movements, the indications shall be positioned so they are not visible to motorists, pedestrians, and bicyclists (see Section 4D.12).**
- 06 **If the LRT crossing control is separate from the intersection control, the two shall be interconnected. The LRT signal phase shall not be terminated until after the LRT vehicle has cleared the crossing.**

Option:

- 07 LRT signals may be used at grade crossings and at intersections in mixed-use alignments in conjunction with standard traffic control signals where special LRT signal phases are used to accommodate turning LRT vehicles or where additional LRT clearance time is desirable.

Figure 8C-3. Light Rail Transit Signals

	Three-Lens Signal	Two-Lens Signal
<p>SINGLE LRT ROUTE</p> 	<p>STOP </p> <p>PREPARE TO STOP  Flashing</p> <p>GO </p>	<p>STOP </p> <p>GO ⁽²⁾</p>
<p>TWO LRT ROUTE DIVERSION</p> 	  Flashing   ⁽¹⁾	   ^{(1),(2)}
	  Flashing   ⁽¹⁾	   ^{(1),(2)}
<p>THREE LRT ROUTE DIVERSION</p> 	  Flashing    ⁽¹⁾	    ^{(1),(2)}

Notes:

All aspects (or signal indications) are white.

(1) Could be in single housing.

(2) "Go" lens may be used in flashing mode to indicate "prepare to stop".

- 08 *LRT signal faces should be separated vertically or horizontally from the nearest highway traffic signal face for the same approach by at least 3 feet.*

Section 8C.12 Grade Crossings Within or In Close Proximity to Circular Intersections

Support:

- 01 At circular intersections, such as roundabouts and traffic circles, that include or are within close proximity to a grade crossing, a queue of vehicular traffic could cause highway vehicles to stop on the grade crossing.

Standard:

- 02 **Where circular intersections include or are within 200 feet of a grade crossing, an engineering study shall be made to determine if queuing could impact the grade crossing. If traffic queues impact the grade crossing, provisions shall be made to clear highway traffic from the grade crossing prior to the arrival of rail traffic.**

Support:

- 03 Among the actions that can be taken to keep the grade crossing clear of traffic or to clear traffic from the grade crossing prior to the arrival of rail traffic are the following:
- A. Elimination of the circular intersection,
 - B. Geometric design revisions,
 - C. Grade crossing regulatory and warning devices,
 - D. Highway traffic signals,
 - E. Traffic metering devices,
 - F. Activated signs, or
 - G. A combination of these or other actions.

Section 8C.13 Pedestrian and Bicycle Signals and Crossings at LRT Grade Crossings

Guidance:

- 01 *Where LRT tracks are immediately adjacent to other tracks or a road, pedestrian signalization should be designed to avoid having pedestrians wait between sets of tracks or between the tracks and the road. If adequate space exists for a pedestrian refuge and is justified based on engineering judgment, additional pedestrian signal heads, signing, and detectors should be installed (see Section 4E.08).*

Standard:

- 02 **When used at LRT crossings, pedestrian signal heads shall comply with the provisions of Section 4E.04.**

Guidance:

- 03 *Flashing-light signals (see Figure 8C-4) with a Crossbuck (R15-1) sign and an audible device should be installed at pedestrian and bicycle crossings where an engineering study has determined that the sight distance is not sufficient for pedestrians and bicyclists to complete their crossing prior to the arrival of the LRT traffic at the crossing, or where LRT speeds exceed 35 mph.*
- 04 *If an engineering study shows that flashing-light signals with a Crossbuck sign and an audible device would not provide sufficient notice of an approaching LRT traffic, the LOOK (R15-8) sign (see Figure 8C-4) and/or pedestrian gates should be considered (see Figures 8C-5 through 8C-7).*

Support:

- 05 A pedestrian gate is similar to an automatic gate except the gate arm is shorter.
- 06 The swing gate alerts pedestrians to the LRT tracks that are to be crossed. Swing gates are designed to open away from the tracks, requiring users to pull the gate open to cross, but permitting a quick exit from the trackway, and to automatically close.

Option:

- 07 Swing gates may be installed across pedestrian and bicycle walkways (see Figure 8C-8).
- 08 Pedestrian barriers at offset crossings may be used at pedestrian and bicycle crossings as passive devices that force users to face approaching LRT before entering the trackway (see Figures 8C-9 and 8C-10).

Figure 8C-4. Example of Flashing-Light Signal Assembly for Pedestrian Crossings

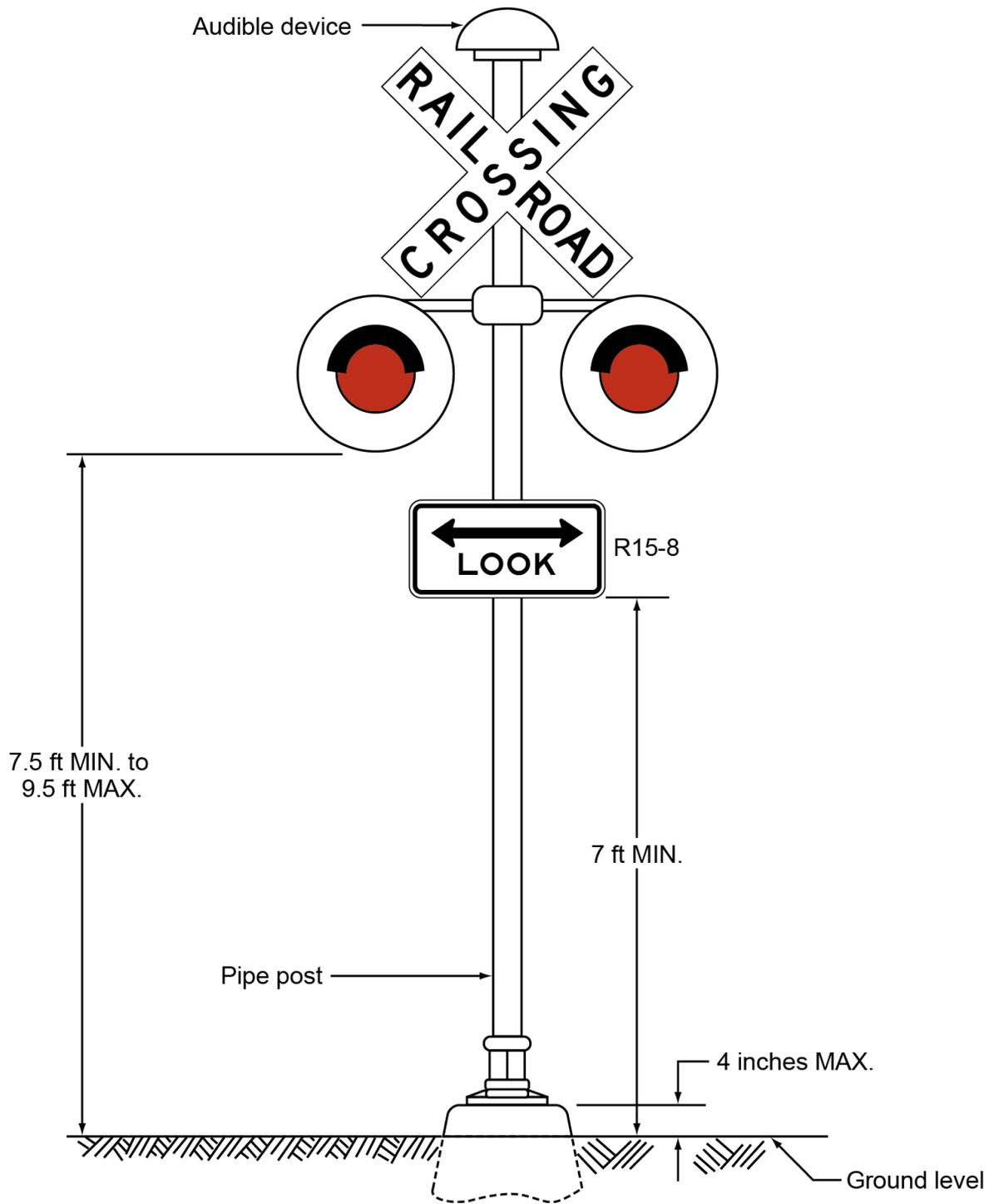


Figure 8C-5. Example of a Shared Pedestrian/Roadway Gate

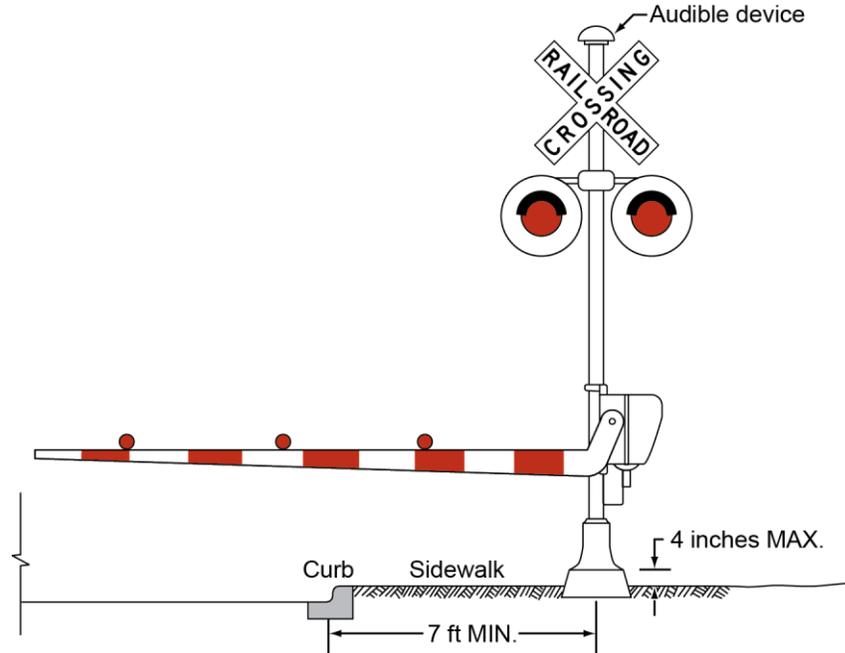
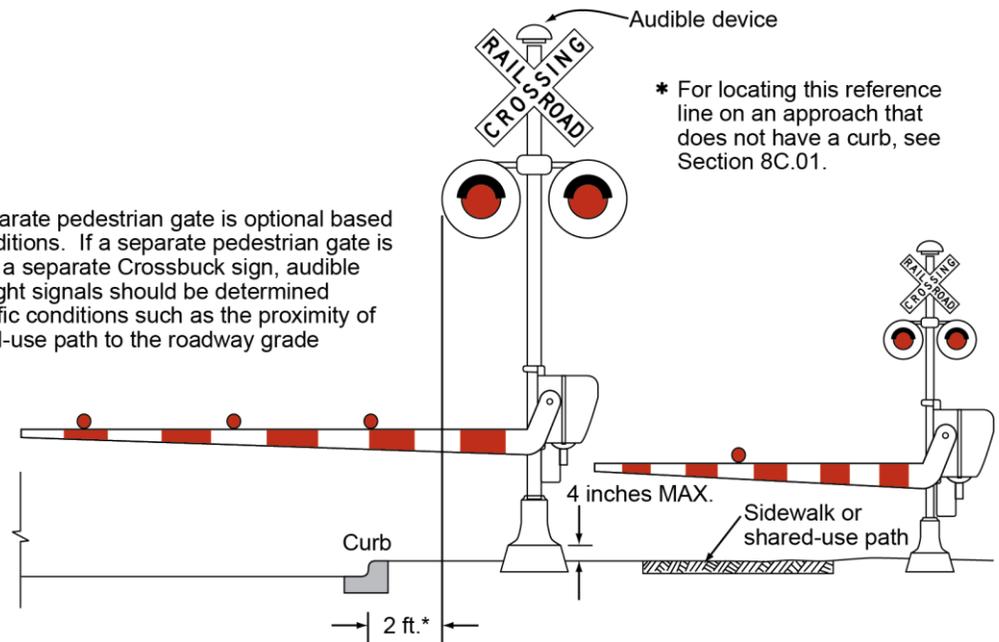


Figure 8C-6. Example of a Separate Pedestrian Gate

Note: The provision of a separate pedestrian gate is optional based upon site-specific conditions. If a separate pedestrian gate is provided, the need for a separate Crossbuck sign, audible device, and flashing-light signals should be determined based upon site-specific conditions such as the proximity of the sidewalk or shared-use path to the roadway grade crossing devices.



* For locating this reference line on an approach that does not have a curb, see Section 8C.01.

Figure 8C-7. Examples of Placement of Pedestrian Gates

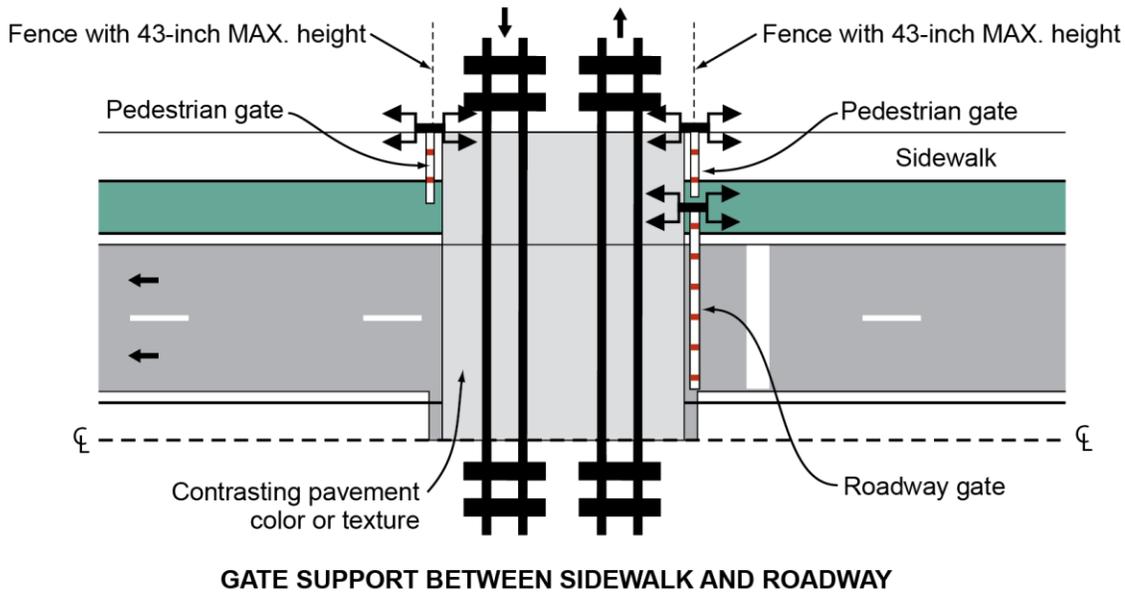
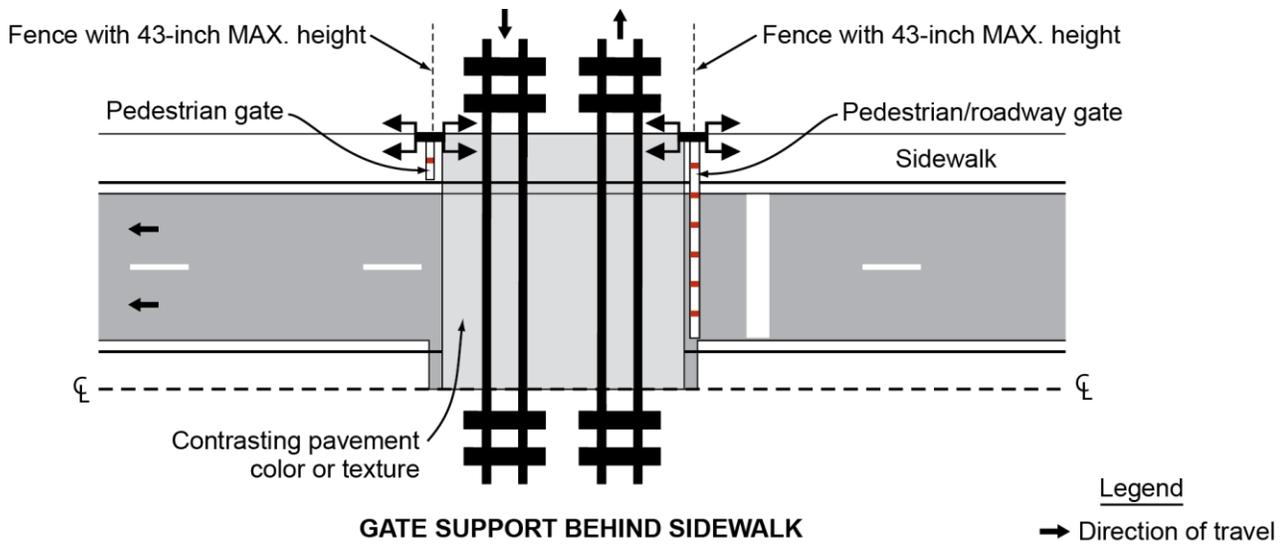


Figure 8C-8. Example of Swing Gates

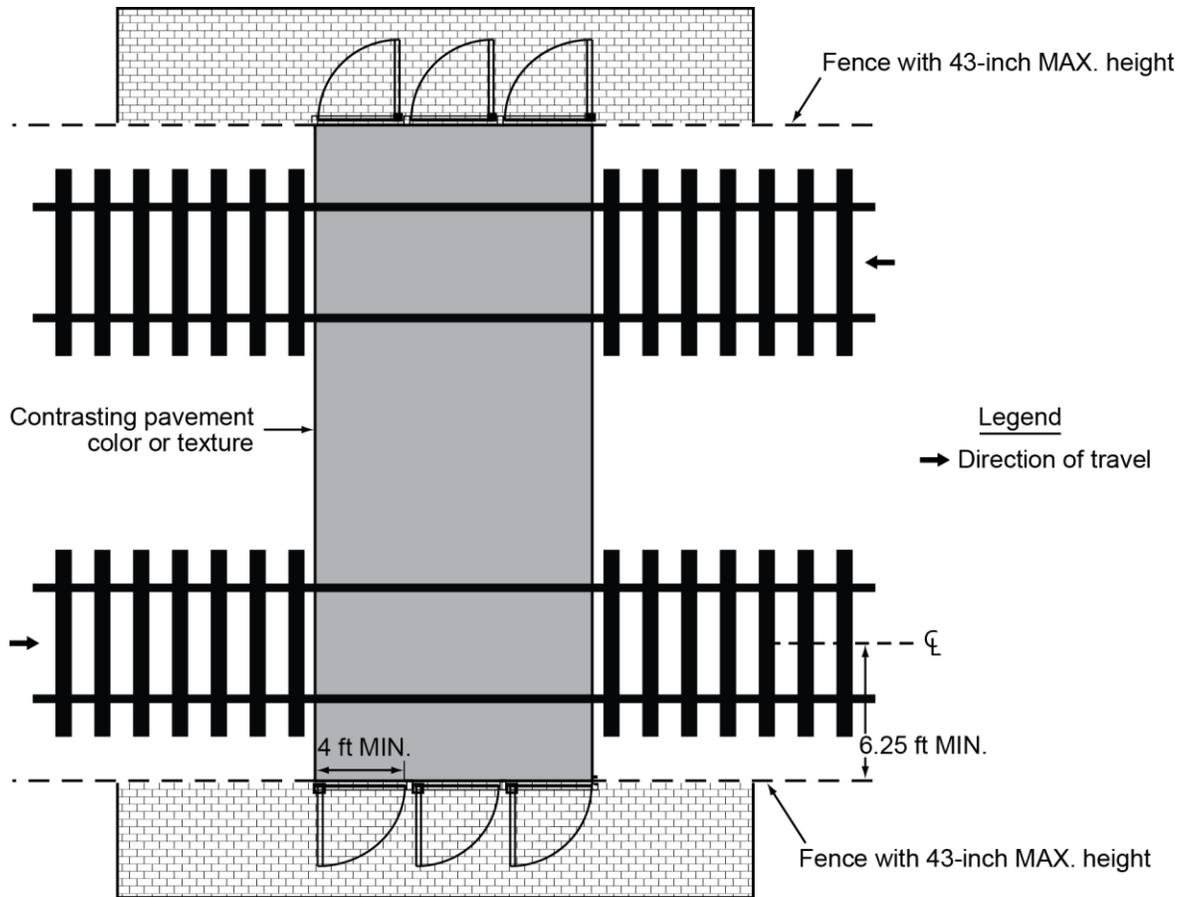


Figure 8C-9. Example of Pedestrian Barriers at an Offset Grade Crossing

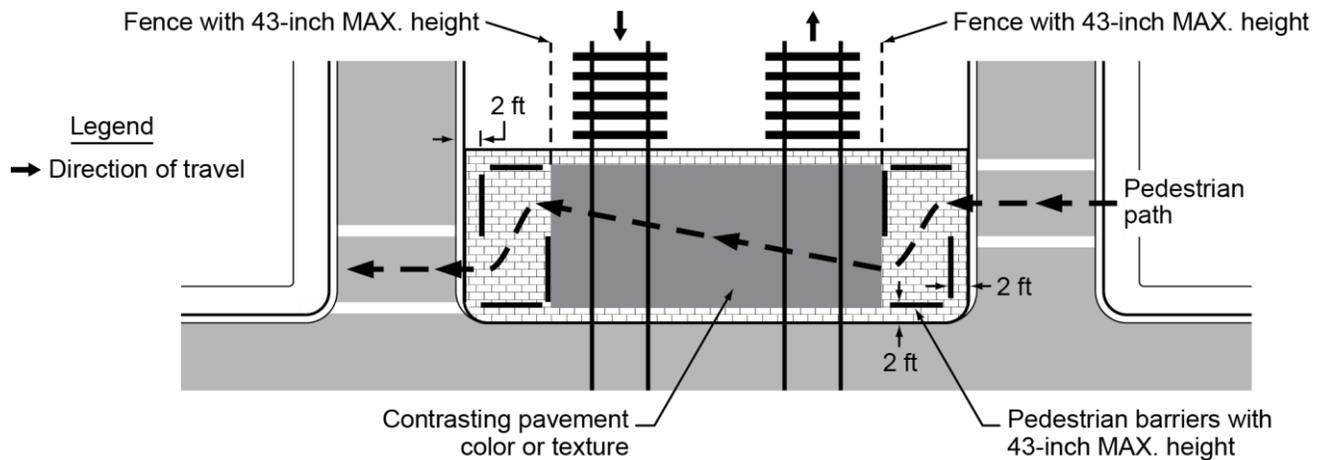
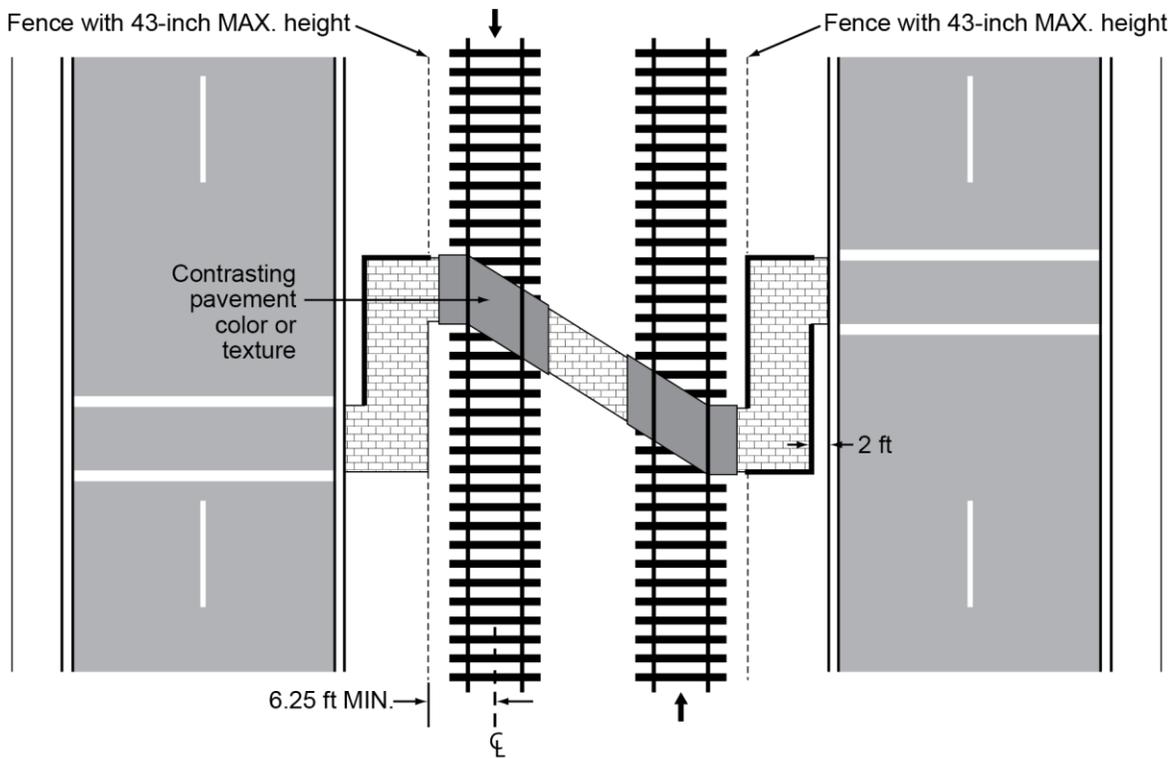
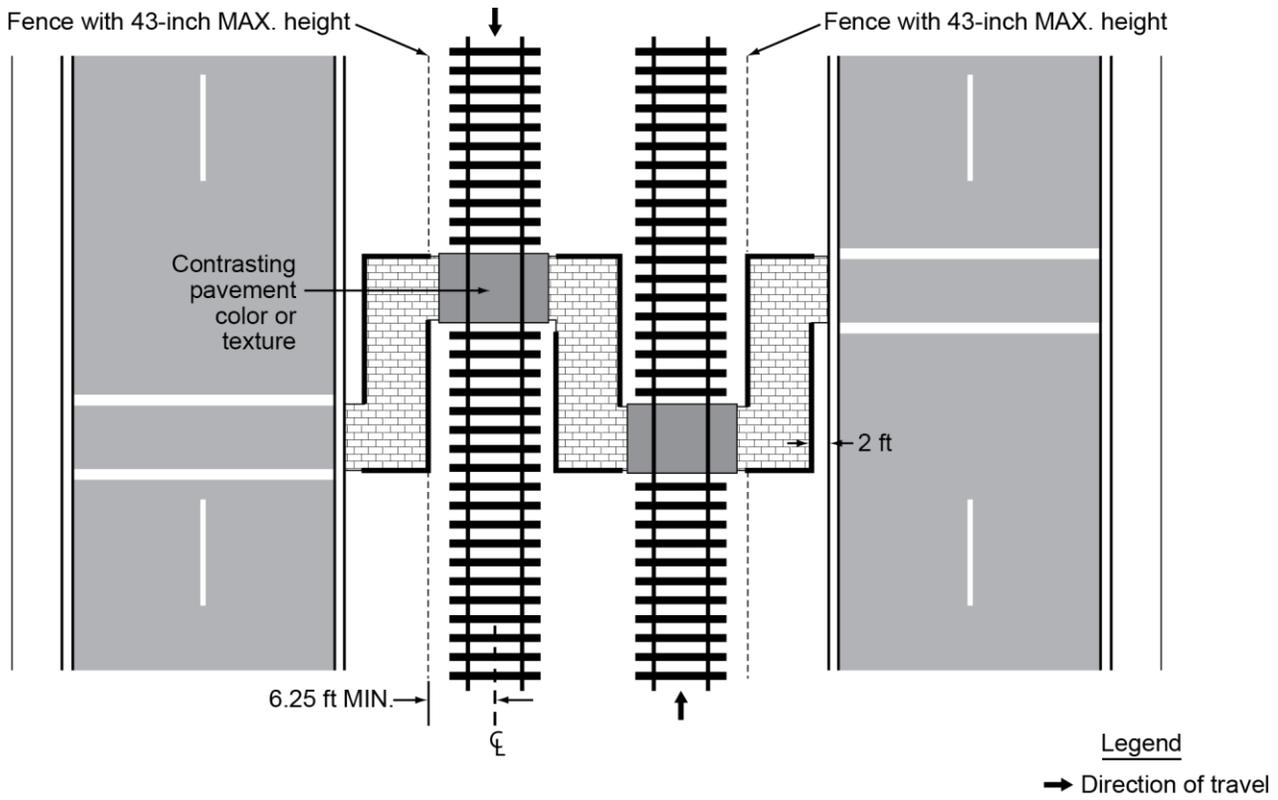


Figure 8C-10. Examples of Pedestrian Barrier Installation at an Offset Non-Intersection Grade Crossing



CHAPTER 8D. PATHWAY GRADE CROSSINGS

Section 8D.01 Purpose

Support:

- 01 Traffic control for pathway grade crossings includes all signs, signals, markings, other warning devices, and their supports at pathway grade crossings and along pathway approaches to grade crossings. The function of this traffic control is to promote safety and provide effective operation of both rail and pathway traffic at pathway grade crossings.
- 02 Except as specifically provided in this Chapter, sidewalks are considered to be part of a highway-rail or highway-LRT grade crossing rather than a pathway grade crossing, and are covered by the provisions of Chapters 8B and 8C rather than by the provisions of this Chapter. However, many of the treatments outlined in this Chapter are applicable to sidewalks adjacent to highway-rail or highway-LRT grade crossings, including detectable warnings, swing gates, and automatic gates.
- 03 Crosswalks at intersections where pedestrians cross LRT tracks in mixed-use alignments are covered by the provisions of Section 3B.18 rather than by the provisions of this Chapter.

Section 8D.02 Use of Standard Devices, Systems, and Practices

Guidance:

- 01 *The public agency with jurisdiction over the pathway and the regulatory agency with statutory authority, if applicable, should jointly determine the need and selection of devices at a pathway grade crossing, including the appropriate traffic control system to be used.*

Section 8D.03 Pathway Grade Crossing Signs and Markings

Guidance:

- 01 *If pathway users include those who travel faster than pedestrians, such as bicyclists or skaters, the use of warning signs and pavement markings in advance of the pathway grade crossing (see Figure 8D-1) should be considered.*

Standard:

- 02 **Pathway grade crossing signs shall be standard in shape, legend, and color.**
- 03 **Traffic control devices mounted adjacent to pathways at a height of less than 8 feet measured vertically from the bottom edge of the device to the elevation of the near edge of the pathway surface shall have a minimum lateral offset of 2 feet from the near edge of the device to the near edge of the pathway (see Figure 9B-1).**
- 04 **The minimum mounting height for post-mounted signs on pathways shall be 4 feet, measured vertically from the bottom edge of the sign to the elevation of the near edge of the pathway surface (see Figure 9B-1).**
- 05 **Pathway grade crossing traffic control devices shall be located a minimum of 12 feet from the center of the nearest track.**
- 06 **The minimum sizes of pathway grade crossing signs shall be as shown in the shared-use path column in Table 9B-1.**
- 07 **When overhead traffic control devices are used on pathways, the clearance from the bottom edge of the device to the pathway surface directly under the sign or device shall be at least 8 feet.**

Section 8D.04 Stop Lines, Edge Lines, and Detectable Warnings

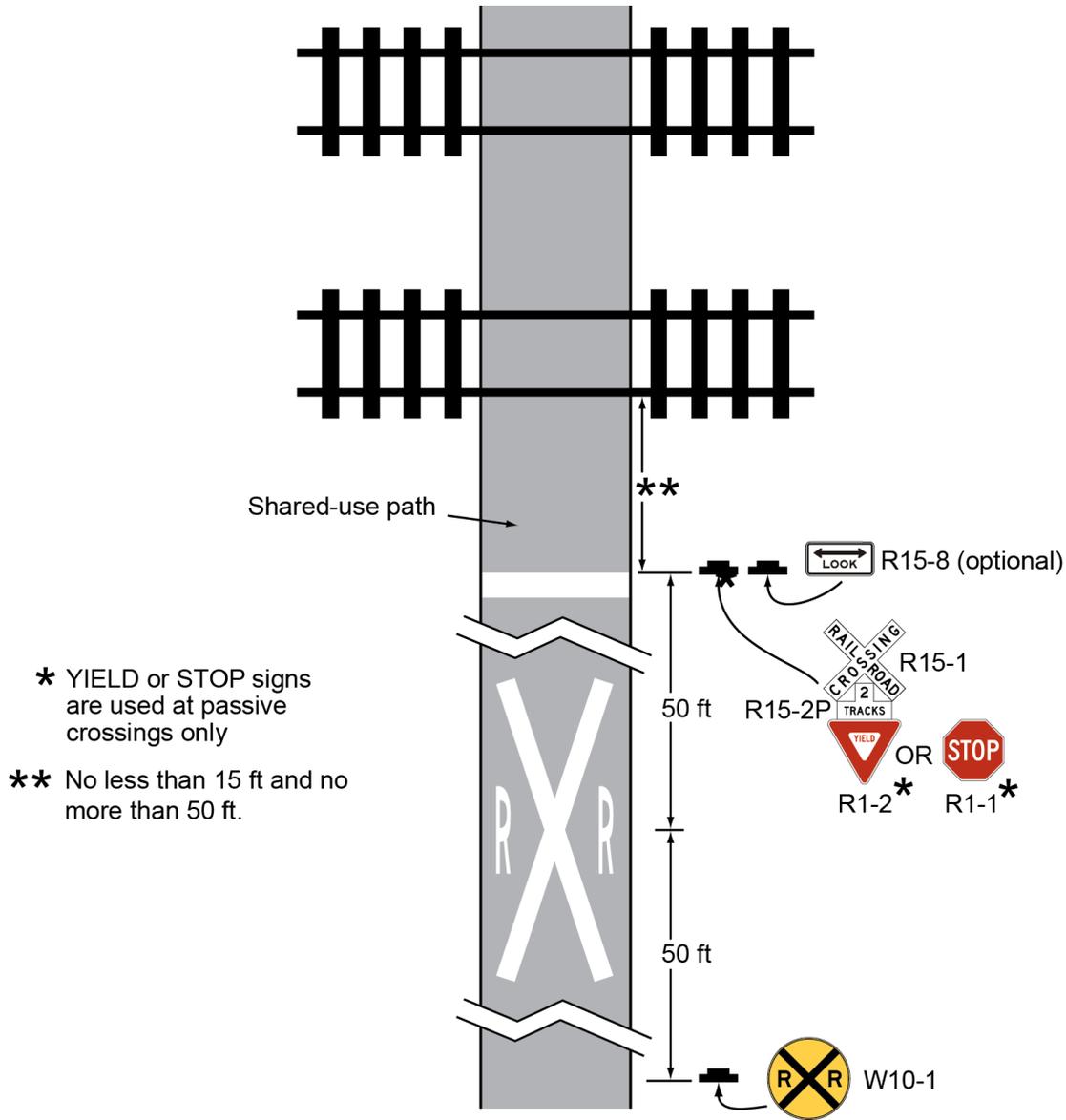
Guidance:

- 01 *If used at pathway grade crossings, the pathway stop line should be a transverse line at the point where a pathway user is to stop. The pathway stop line should be placed at least 2 feet further from the nearest rail than the gate, counterweight, or flashing-light signals (if any of these are present) is placed, but no less than 15 feet nor more than 50 feet in advance of the nearest rail (see Figure 8D-1).*

Option:

- 02 Edge lines (see Section 3B.06) may be used on approach to and across the tracks at a pathway grade crossing, a sidewalk at a highway-rail or highway-LRT grade crossing, or a station crossing to delineate the designated pathway user route.

Figure 8D-1. Example of Signing and Markings for a Pathway Grade Crossing



Support:

03 Edge line delineation can be beneficial where the distance across the tracks is long, commonly because of a skewed grade crossing or because of multiple tracks, or where the pathway surface is immediately adjacent to a traveled way.

04 Detectable warning surfaces (see Section 3B.18) that contrast visually with adjacent walking surfaces, either light-on-dark or dark-on-light, can be used to warn pedestrians about the locations of the tracks at a grade crossing. The “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)” (see Section 1A.11) contains specifications for design and placement of detectable warning surfaces.

Section 8D.05 Passive Devices for Pathway Grade Crossings

Standard:

01 Except as provided in Paragraph 2, where active traffic control devices are not used, a Crossbuck Assembly shall be installed on each approach to a pathway grade crossing.

Option:

- 02 The Crossbuck Assembly may be omitted at station crossings and on the approaches to a pathway grade crossing that is located within 25 feet of the traveled way at a highway-rail or highway-LRT grade crossing.

Guidance:

- 03 *The pathway user's ability to detect the presence of approaching rail traffic should be considered in determining the type and placement of traffic control devices or design features (such as fencing or swing gates).*

- 04 *Nighttime visibility should be considered if design features (such as fencing or swing gates) are used to channelize pathway users.*

- 05 *If automatic gates and swing gates are used, the pathway should be channelized to direct users to the entrance to and exit from the pathway grade crossing.*

Standard:

- 06 **If used, swing gates shall be designed to open away from the track(s) so that pathway users can quickly push the gate open when moving away from the track(s). If used, swing gates shall be designed to automatically return to the closed position after each use.**

Option:

- 07 When used in conjunction with automatic gates at pathway grade crossings, swing gates may be equipped with a latching device that permits the gate to be opened only from the track side of the gate.

Support:

- 08 The "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" (see Section 1A.11) contains information regarding spring hinges and door and gate opening forces for swing gates.

Section 8D.06 Active Traffic Control Systems for Pathway Grade Crossings**Standard:**

- 01 **If used at a pathway grade crossing, an active traffic control system shall include flashing-light signals for each direction of the pathway. A bell or other audible warning device shall also be provided.**

Option:

- 02 Separate active traffic control devices may be omitted at a pathway grade crossing that is located within 25 feet of the traveled way of a highway-rail or highway-LRT grade crossing that is equipped with an active traffic control system.

Standard:

- 03 **If used at pathway grade crossings, alternately flashing red lights shall be aligned horizontally and the light units shall have a diameter of at least 4 inches. The minimum mounting height of the flashing red lights shall be 4 feet, measured vertically from the bottom edge of the lights to the elevation of the near edge of the pathway surface.**

Option:

- 04 Traffic control devices may be installed between the tracks at multiple track crossings at stations.

Standard:

- 05 **The mounting height for flashing lights that are installed between the tracks at multiple track crossings at stations shall be a minimum of 1 foot, measured vertically from the bottom edge of the lights to the elevation of the near edge of the pathway surface.**

Option:

- 06 Automatic gates may be used at pathway grade crossings.

Guidance:

- 07 *If used at a pathway grade crossing, the height of the automatic gate arm when in the down position should be a minimum of 2.5 feet and a maximum of 4 feet above the sidewalk.*

- 08 *If used, the gate configuration, which might include a combination of automatic gates and swing gates, should provide for full width coverage of the pathway on both approaches to the track.*

Standard:

- 09 **Where a sidewalk is located between the edge of a roadway and the support for a gate arm that extends across the sidewalk and into the roadway, the location, placement, and height prescribed for vehicular gates shall be used (see Section 8C.04).**

Guidance:

- 10 *If a separate automatic gate is used for a sidewalk, the height of the gate arm when in the down position should be a minimum of 2.5 feet and a maximum of 4 feet above the sidewalk.*
- 11 *If a separate automatic gate is used for a sidewalk at a highway-rail or highway-LRT grade crossing, instead of a supplemental or auxiliary gate arm installed as a part of the same mechanism as the vehicular gate, a separate mechanism should be provided for the sidewalk gate to prevent a pedestrian from raising the vehicular gate.*

PART 9. TRAFFIC CONTROLS FOR BICYCLE FACILITIES

CHAPTER 9A. GENERAL

Section 9A.01 Requirements for Bicyclist Traffic Control Devices

Support:

- 01 General information and definitions concerning traffic control devices are found in Part 1.

Section 9A.02 Scope

Support:

- 01 Part 9 covers signs, pavement markings, and highway traffic signals specifically related to bicycle operation on both roadways and shared-use paths.

Guidance:

- 02 *Parts 1, 2, 3, and 4 should be reviewed for general provisions, signs, pavement markings, and signals.*

Standard:

- 03 **The absence of a marked bicycle lane or any of the other traffic control devices discussed in this Chapter on a particular roadway shall not be construed to mean that bicyclists are not permitted to travel on that roadway.**

Section 9A.03 Definitions Relating to Bicycles

Support:

- 01 Definitions and acronyms pertaining to Part 9 are provided in Sections 1A.13 and 1A.14.

Section 9A.04 Maintenance

Guidance:

- 01 *All signs, signals, and markings, including those on bicycle facilities, should be properly maintained to command respect from both the motorist and the bicyclist. When installing signs and markings on bicycle facilities, an agency should be designated to maintain these devices.*

Section 9A.05 Relation to Other Documents

Support:

- 01 “The Uniform Vehicle Code and Model Traffic Ordinance” published by the National Committee on Uniform Traffic Laws and Ordinances and the Ohio Revised Code (see Section 1A.11) have provisions for bicycles and are the basis for the traffic control devices included in this Manual.

- 02 Informational documents used during the development of the signing and marking recommendations in Part 9 include the following:

- A. “Guide for Development of Bicycle Facilities,” which is available from the American Association of State Highway and Transportation Officials (see the Preface for the address); and
- B. State and local government design guides.

- 03 Other publications that relate to the application of traffic control devices in general are listed in Section 1A.11.

Section 9A.06 Placement Authority

Support:

- 01 Section 1A.08 contains information regarding placement authority for traffic control devices.

Section 9A.07 Meaning of Standard, Guidance, Option, and Support

Support:

- 01 Paragraph 1 of Section 1A.13 contains information regarding the meaning of the headings Standard, Guidance, Option, and Support, and the use of the words “shall,” “should,” and “may.”

Section 9A.08 Colors

Support:

- 01 Section 1A.12 contains information regarding the color codes.

CHAPTER 9B. SIGNS

Section 9B.01 Application and Placement of Signs

Standard:

- 01 **Bicycle signs shall be standard in shape, legend, and color.**
- 02 **All signs shall be retro reflectorized for use on bikeways, including shared-use paths and bicycle lane facilities.**
- 03 **Where signs serve both bicyclists and other road users, vertical mounting height and lateral placement shall be as provided in Part 2.**
- 04 **Where used on a shared-use path, no portion of a sign or its support shall be placed less than 2 feet laterally from, or less than 8 feet vertically over the entire width of the shared-use path (see Figure 9B-1).**
- 05 **Mounting height for post-mounted signs on shared-use paths shall be a minimum of 4 feet, measured vertically from the bottom of the sign to the elevation of the near edge of the path surface (see Figure 9B-1).**

Guidance:

- 06 *Signs for the exclusive use of bicyclists should be located so that other road users are not confused by them.*
- 07 *The clearance for overhead signs on shared-use paths should be adjusted when appropriate to accommodate path users requiring more clearance, such as equestrians, or typical maintenance or emergency vehicles.*

Section 9B.02 Design of Bicycle Signs

Standard:

- 01 **If the sign or plaque applies to motorists and bicyclists, then the size shall be as shown for conventional roads in Tables 2B-1, 2C-2, 2D-1, 2H-1 or 8B-1.**
- 02 **The minimum sign and plaque sizes for shared-use paths shall be those shown in Table 9B-1, and shall be used only for signs and plaques installed specifically for bicycle traffic applications. The minimum sign and plaque sizes for bicycle facilities shall not be used for signs or plaques that are placed in a location that would have any application to other vehicles.**

Option:

- 03 *Larger size signs and plaques may be used on bicycle facilities when appropriate (see Section 2A.11).*

Guidance:

- 04 *Except for size, the design of signs and plaques for bicycle facilities should be identical to that provided in this Manual for signs and plaques for streets and highways.*

Support:

- 05 *Uniformity in design of bicycle signs and plaques includes shape, color, symbols, arrows, wording, lettering, and illumination or retroreflectorization.*

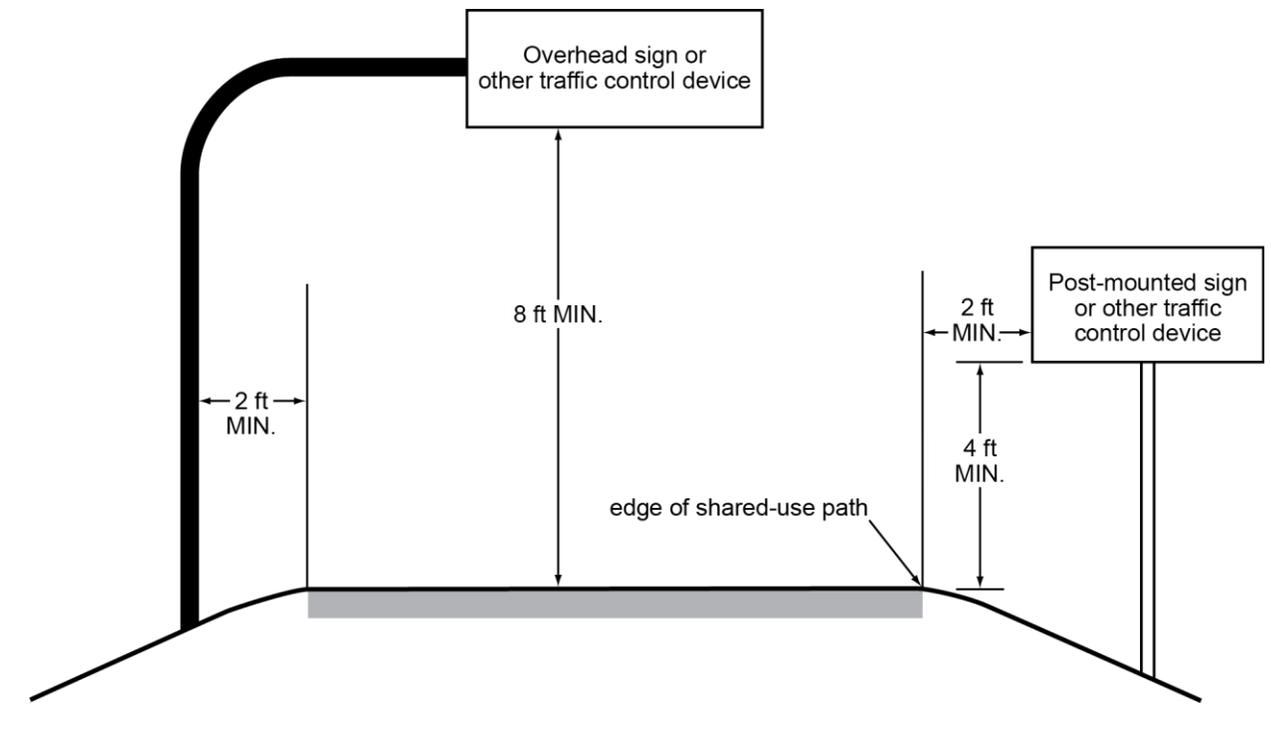
Section 9B.03 STOP and YIELD Signs (R1-1, R1-2)

Standard:

- 01 **STOP (R1-1) signs (see Figure 9B-2) shall be installed on shared-use paths at points where bicyclists are required to stop.**
- 02 **YIELD (R1-2) signs (see Figure 9B-2) shall be installed on shared-use paths at points where bicyclists have an adequate view of conflicting traffic as they approach the sign, and where bicyclists are required to yield the right-of-way to that conflicting traffic.**

Option:

- 03 *A 30 x 30 inch STOP sign or a 36 x 36 x 36 inch YIELD sign may be used on shared-use paths for added emphasis.*

Figure 9B-1. Sign Placement on Shared-Use Paths**Guidance:**

- 04 Where conditions require path users, but not roadway users, to stop or yield, the *STOP* sign or *YIELD* sign should be placed or shielded so that it is not readily visible to road users.
- 05 When placement of *STOP* or *YIELD* signs is considered, priority at a shared-use path/roadway intersection should be assigned with consideration of the following:
- A. Relative speeds of shared-use path and roadway users;
 - B. Relative volumes of shared-use path and roadway traffic; and
 - C. Relative importance of shared-use path and roadway.
- 06 Speed should not be the sole factor used to determine priority, as it is sometimes appropriate to give priority to a high-volume shared-use path crossing a low-volume street, or to a regional shared-use path crossing a minor collector street.
- 07 When priority is assigned, the least restrictive control that is appropriate should be placed on the lower priority approaches. *STOP* signs should not be used where *YIELD* signs would be acceptable.

Section 9B.04 Bike Lane Signs and Plaques (R3-17, R3-17a, R3-17bP)**Standard:**

- 01 The **BIKE LANE (R3-17)** sign and the **R3-17aP** and **R3-17bP** plaques (see Figure 9B-2) shall be used only in conjunction with marked bicycle lanes as described in Section 9C.04.

Guidance:

- 02 If used, Bike Lane signs and plaques should be used in advance of the upstream end of the bicycle lane, at the downstream end of the bicycle lane, and at periodic intervals along the bicycle lane as determined by engineering judgment based on prevailing speed of bicycle and other traffic, block length, distances from adjacent intersections, and other considerations.

Table 9B-1. Bicycle Facility Sign and Plaque Minimum Sizes^{1,2} (Sheet 1 of 2)

Sign or Plaque	Sign Designation	Section	Shared-Use Path	Roadway
STOP	R1-1	2B.05, 9B.03	18 x 18	—
YIELD	R1-2	2B.08, 9B.03	18 x 18 x 18	—
BIKE LANE	R3-17	9B.04	—	24 x 18
Bike Lane (plaques)	R3-17aP, 17bP	9B.04	—	24 x 8
Movement Restriction	R4-1, 2, 3, 7	2B.28, 29, 30, 32; 9B.14	12 x 18	—
BEGIN RIGHT TURN LANE YIELD TO BIKES	R4-4	9B.05	—	36 x 30
Bicycles MAY USE FULL LANE	R4-11	9B.06	—	30 x 30
Bicycle WRONG WAY	R5-1b	9B.07	12 x 18	
NO MOTOR VEHICLES	R5-3	9B.08	24 x 24	—
No Bicycles	R5-6	9B.09	24 x 24	—
No Parking BIKE LANE	R7-9, 9a	9B.10	—	12 x 18
No Pedestrians	R9-3	9B.09	18 x 18	—
RIDE WITH TRAFFIC (plaque)	R9-3cP	9B.07	12 x 12	
Bicycle Regulatory	R9-5, 6	9B.11	12 x 18	
Shared-Use Path Restriction	R9-7	9B.12	12 x 18	—
No Skaters	R9-13	9B.09	18 x 18	—
No Equestrians	R9-14	9B.09	18 x 18	—
Push Button For Green Light	R10-4	9B.11	9 x 12	—
Bicycle Signal Actuation	R10-22	9B.13	12 x 18	
Bike Push Button For Green Light	R10-24	9B.11	9 x 15	
Push Button To Turn On Warning Lights	R10-25	9B.11	9 x 12	—
Bike Push Button For Green Light (arrow)	R10-26	9B.11	9 x 15	
Grade Crossing (Crossbuck)	R15-1	8B.03, 9B.14	24 x 4.5	—
Number of Tracks (plaque)	R15-2P	8B.03, 9B.14	13.5 x 9	—
LOOK	R15-8	8B.17, 9B.14	18 x 9	—
Turn and Curve Warning	W1-1, 2, 3, 4, 5	2C.07, 9B.15	18 x 18	—
Arrow Warning	W1-6, 7	2C.12, 2C.47, 9B.15	24 x 12	—
Intersection Warning	W2-1, 2, 3, 4, 5	2C.46, 9B.16	18 x 18	—
Stop, Yield, Signal Ahead	W3-1, 2, 3	2C.36, 9B.19	18 x 18	—
NARROW BRIDGE	W5-2	9C.20, 9B.19	18 x 18	—
PATH NARROWS	W5-4a	9B.19	18 x 18	—
Hill (Bicycle)	W7-5	9B.19	18 x 18	30 x 30
BUMP or DIP	W8-1, 2	2C.28, 9B.17	18 x 18	—
PAVEMENT ENDS	W8-3	2C.30, 9B.17	18 x 18	—
Bicycle Surface Condition	W8-10	9B.17	18 x 18	30 x 30
SLIPPERY WHEN WET (plaque)	W8-10P	9B.17	12 x 9	
Grade Crossing Advance Warning	W10-1	8B.06, 9B.19	24 Dia.	—
NO TRAIN HORN (plaque)	W10-9P	8B.21, 9B.19	18 x 12	—
Skewed Crossing	W10-12	8B.25, 9B.19	18 x 18	—

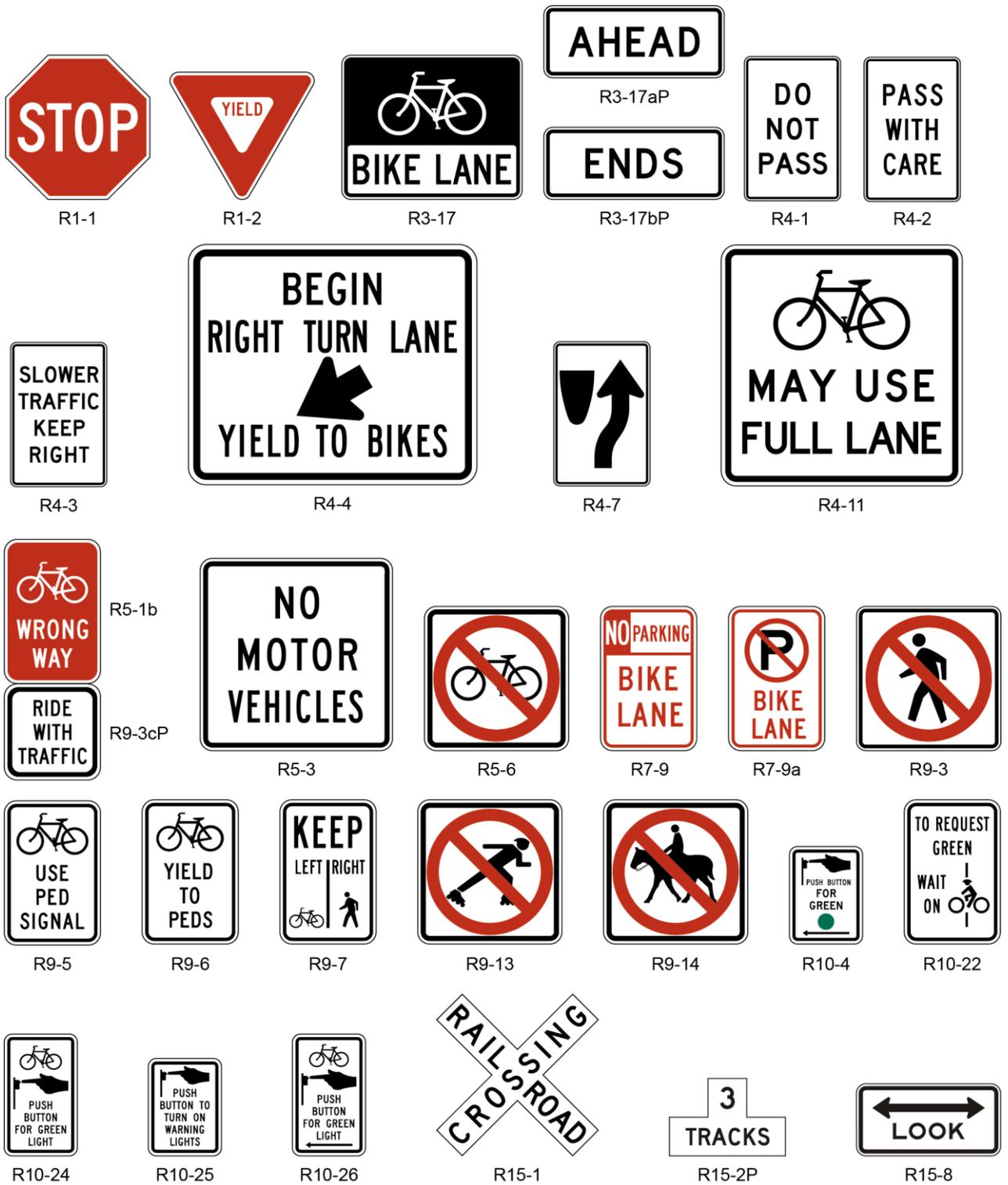
Table 9B-1. Bicycle Facility Sign and Plaque Minimum Sizes^{1,2} (Sheet 2 of 2)

Sign or Plaque	Sign Destination	Section	Shared-Use Path	Roadway
Bicycle Warning	W11-1	9B.18	18 x 18	—
Pedestrian Crossing	W11-2	2C.50, 9B.19	18 x 18	—
Combination Bike and Ped Crossing	W11-15	9B.18	18 x 18	—
TRAIL X-ING (plaque)	W11-15P	9B.18	18 x 12	—
Low Clearance	W12-2	2C.27, 9B.19	18 x 18	—
Playground	W15-1	2C.51, 9B.19	18 x 18	—
SHARE THE ROAD (plaque)	W16-1P	2C.60, 9B.19	—	—
XX FEET (plaque)	W16-2P	2C.55, 9B.18	18 x 12	—
XX FT (plaque)	W16-2aP	2C.55, 9B.18	18 x 9	—
Diagonal Arrow (plaque)	W16-7P	9B.18	—	—
AHEAD (plaque)	W16-9P	9B.18	—	—
Destination (1 line)	D1-H1, H1a	2D.37, 9B.20	varies x 6	—
Bicycle Destination (1 line)	D1-1b, 1c	9B.20	varies x 6	
Bicycle Destination (2 lines)	D1-2b, 2c	9B.20	varies x 12	
Bicycle Destination (3 lines)	D1-3b, 3c	9B.20	varies x 18	
Street Name	D3-1	2D.43, 9B.20	varies x 6	—
Bicycle Parking Area	D4-3	9B.23	12 x 18	
Reference Location (1-digit)	D10-1	2H.02, 9B.24	6 x 12	—
Intermediate Reference Location (1-digit)	D10-1a	2H.02, 9B.24	6 x 18	—
Reference Location (2-digit)	D10-2	2H.02, 9B.24	6 x 18	—
Intermediate Reference Location (2-digit)	D10-2a	2H.02, 9B.24	6 x 24	—
Reference Location (3-digit)	D10-3	2H.02, 9B.24	6 x 24	—
Intermediate Reference Location (3-digit)	D10-3a	2H.02, 9B.24	6 x 30	—
Bike Route	D11-1, 1c	9B.20	24 x 18	24 x 18
Bicycles Permitted	D11-1a	9B.25	18 x 18	—
BIKE ROUTE (plaque)	D11-1bP	9B.25	18 x 6	—
Pedestrians Permitted	D11-2	9B.25	18 x 18	—
Skaters Permitted	D11-3	9B.25	18 x 18	—
Equestrians Permitted	D11-4	9B.25	18 x 18	—
Bicycle Route	M1-8, 8a	9B.21	12 x 18	18 x 24
U.S. Bicycle Route	M1-9	9B.21	12 x 18	18 x 24
Bicycle Route Auxiliary Signs	M2-1; M3-1,2,3,4; M4-1,1a,2,3,5,6,7,7a,8,14	9B.22	12 x 6	
Bicycle Route Arrow Signs	M5-1,2; M6-1,2,3,4,5,6,7	9B.22	12 x 9	
Type 3 Object Markers	OM-3L, C, R	2C.63, 9B.26	6 x 18	—

Notes:

- Larger signs may be used when appropriate;
 - Dimensions are shown in inches as width x height.
- If the sign or plaque applies to motorists and bicyclists, then the size shall be as shown for conventional roads in Tables 2B-1, 2C-2, 2D-1, 2H-1 or 8B-1.

Figure 9B-2. Regulatory Signs and Plaques for Bicycle Facilities



Section 9B.05 BEGIN RIGHT TURN LANE YIELD TO BIKES Sign (R4-4)

Option:

01 Where motor vehicles entering an exclusive right-turn lane must weave across bicycle traffic in bicycle lanes, the BEGIN RIGHT TURN LANE YIELD TO BIKES (R4-4) sign (see Figure 9B-2) may be used to inform both the motorist and the bicyclist of this weaving maneuver (see Figures 9C-1, 9C-4, and 9C-5).

Guidance:

02 *The R4-4 sign should not be used when bicyclists need to move left because of a right-turn lane drop situation.*

Section 9B.06 Bicycles MAY USE FULL LANE Sign (R4-11)

Support:

01 ORC Section 4511.55 addresses operating bicycles and motorcycles on a roadway (see Appendix B). Generally, a bicyclist is required to ride as near to the right side of the roadway as possible, unless it is unsafe or impractical to do so.

Guidance:

02 *Use of the Bicycles MAY USE FULL LANE (R4-11) sign should be based on engineering judgment.*

Option:

03 The Bicycles MAY USE FULL LANE sign (see Figure 9B-2) may be used on roadways where no bicycle lanes or adjacent shoulders usable by bicyclists are present and where travel lanes are too narrow for bicyclists and motor vehicles to operate side by side.

04 The Bicycles MAY USE FULL LANE sign may be used in locations where it is important to inform road users that bicyclists might occupy the travel lane.

05 Section 9C.07 describes a Shared Lane Marking that may be used in addition to or instead of the Bicycles MAY USE FULL LANE sign to inform road users that bicyclists might occupy the travel lane.

Guidance:

06 *When the Bicycles MAY USE FULL LANE sign is used, the start and end of the section determined to warrant the signing should be marked with BEGIN (R3-9cP) and END (R3-9dP) plaques.*

Section 9B.07 Bicycle WRONG WAY Sign and RIDE WITH TRAFFIC Plaque (R5-1b, R9-3cP)

Option:

01 The Bicycle WRONG WAY (R5-1b) sign and RIDE WITH TRAFFIC (R9-3c) plaque (see Figure 9B-2) may be placed facing wrong-way bicycle traffic, such as on the left side of a roadway.

02 This sign and plaque may be mounted back-to-back with other signs to minimize visibility to other traffic.

Guidance:

03 *The RIDE WITH TRAFFIC plaque should be used only in conjunction with the Bicycle WRONG WAY sign, and should be mounted directly below the Bicycle WRONG WAY sign.*

Section 9B.08 NO MOTOR VEHICLES Sign (R5-3)

Option:

01 The NO MOTOR VEHICLES (R5-3) sign (see Figure 9B-2) may be installed at the entrance to a shared-use path.

Section 9B.09 Selective Exclusion Signs

Option:

01 Selective Exclusion signs (see Figure 9B-2) may be installed at the entrance to a roadway or facility to notify road or facility users that designated types of traffic are excluded from using the roadway or facility.

Standard:

02 **If used, Selective Exclusion signs shall clearly indicate the type of traffic that is excluded.**

- 03 Typical exclusion messages include:
- A. No Bicycles (R5-6),
 - B. No Pedestrians (R9-3),
 - C. No Skaters (R9-13), and
 - D. No Equestrians (R9-14)

Option:

- 04 When used on a sidewalk, the No Bicycles (R5-6) sign may be 18 x 18 inches.
- 05 Where bicyclists, pedestrians, and motor-driven cycles are all prohibited, it may be more desirable to use the R5-10a word message sign that is described in Section 2B.39.

Section 9B.10 No Parking BIKE LANE Signs (R7-9, R7-9a)

Standard:

- 01 **If the installation of signs is necessary to restrict parking, standing, or stopping in a bicycle lane, appropriate signs as described in Sections 2B.46 through 2B.48, or the No Parking BIKE LANE (R7-9 or R7-9a) signs (see Figure 9B-2) shall be installed.**

Section 9B.11 Bicycle Regulatory Signs (R9-5, R9-6, R10-4, R10-24, R10-25, R10-26)

Option:

- 01 The R9-5 sign (see Figure 9B-2) may be used where the crossing of a street by bicyclists is controlled by pedestrian signal indications.
- 02 Where it is not intended for bicyclists to be controlled by pedestrian signal indications, the R10-4, R10-24, or R10-26 sign (see Figure 9B-2 and Section 2B.52) may be used.

Guidance:

- 03 *If used, the R9-5, R10-4, R10-24, or R10-26 signs should be installed near the edge of the sidewalk, in the vicinity of where bicyclists will be crossing the street.*

Option:

- 04 If bicyclists are crossing a roadway where In-Roadway Warning Lights (see Section 4N.02) or other warning lights or beacons have been provided, the R10-25 sign (see Figure 9B-2) may be used.
- 05 The R9-6 sign (see Figure 9B-2) may be used where a bicyclist is required to cross or share a facility used by pedestrians and is required to yield to the pedestrians.

Section 9B.12 Shared-Use Path Restriction Sign (R9-7)

Option:

- 01 The Shared-Use Path Restriction (R9-7) sign (see Figure 9B-2) may be installed to supplement a solid white pavement marking line (see Section 9C.03) on facilities that are to be shared by pedestrians and bicyclists in order to provide a separate designated pavement area for each mode of travel. The symbols may be switched as appropriate.

Guidance:

- 02 *If two-way operation is permitted on the facility for pedestrians and/or bicyclists, the designated pavement area that is provided for each two-way mode of travel should be wide enough to accommodate both directions of travel for that mode.*

Section 9B.13 Bicycle Signal Actuation Sign (R10-22)

Option:

- 01 The Bicycle Signal Actuation (R10-22) sign (see Figure 9B-2) may be installed at signalized intersections where markings are used to indicate the location where a bicyclist is to be positioned to actuate the signal (see Section 9C.05).

Guidance:

- 02 *If the Bicycle Signal Actuation sign is installed, it should be placed at the roadside adjacent to the marking to emphasize the connection between the marking and the sign.*

Section 9B.14 Other Regulatory Signs

Option:

01 Other regulatory signs described in Chapter 2B may be installed on bicycle facilities as appropriate.

Section 9B.15 Turn or Curve Warning Signs (W1 Series)

Guidance:

01 *To warn bicyclists of unexpected changes in shared-use path direction, appropriate turn or curve (W1-1 through W1-7) signs (see Figure 9B-3) should be used.*

02 *The W1-1 through W1-5 signs should be installed at least 50 feet in advance of the beginning of the change of alignment.*

Section 9B.16 Intersection Warning Signs (W2 Series)

Option:

01 Intersection Warning (W2-1 through W2-5) signs (see Figure 9B-3) may be used on a roadway, street, or shared-use path in advance of an intersection to indicate the presence of an intersection and the possibility of turning or entering traffic.

Guidance:

02 *When engineering judgment determines that the visibility of the intersection is limited on the shared-use path approach, Intersection Warning signs should be used.*

03 *Intersection Warning signs should not be used where the shared-use path approach to the intersection is controlled by a STOP sign, YIELD sign, or a traffic control signal.*

Section 9B.17 Bicycle Surface Condition Warning Sign (W8-10)

Option:

01 The Bicycle Surface Condition Warning (W8-10) sign (see Figure 9B-3) may be installed where roadway or shared-use path conditions could cause a bicyclist to lose control of the bicycle.

02 Signs warning of other conditions that might be of concern to bicyclists, including BUMP (W8-1), DIP (W8-2), PAVEMENT ENDS (W8-3), and any other word message that describes conditions that are of concern to bicyclists, may also be used.

03 A supplemental plaque may be used to clarify the specific type of surface condition.

Section 9B.18 Bicycle Warning and Combined Bicycle/Pedestrian Signs (W11-1, W11-15)

Support:

01 The Bicycle Warning (W11-1) sign (see Figure 9B-3) alerts the road user to unexpected entries into the roadway by bicyclists, and other crossing activities that might cause conflicts. These conflicts might be relatively confined, or might occur randomly over a segment of roadway.

Option:

02 The combined Bicycle/Pedestrian (W11-15) sign (see Figure 9B-3) may be used where both bicyclists and pedestrians might be crossing the roadway, such as at an intersection with a shared-use path. A TRAIL X-ING (W11-15P) supplemental plaque (see Figure 9B-3) may be mounted below the W11-15 sign.

03 A supplemental plaque with the legend AHEAD or XX FEET may be used with the Bicycle Warning or combined Bicycle/Pedestrian sign.

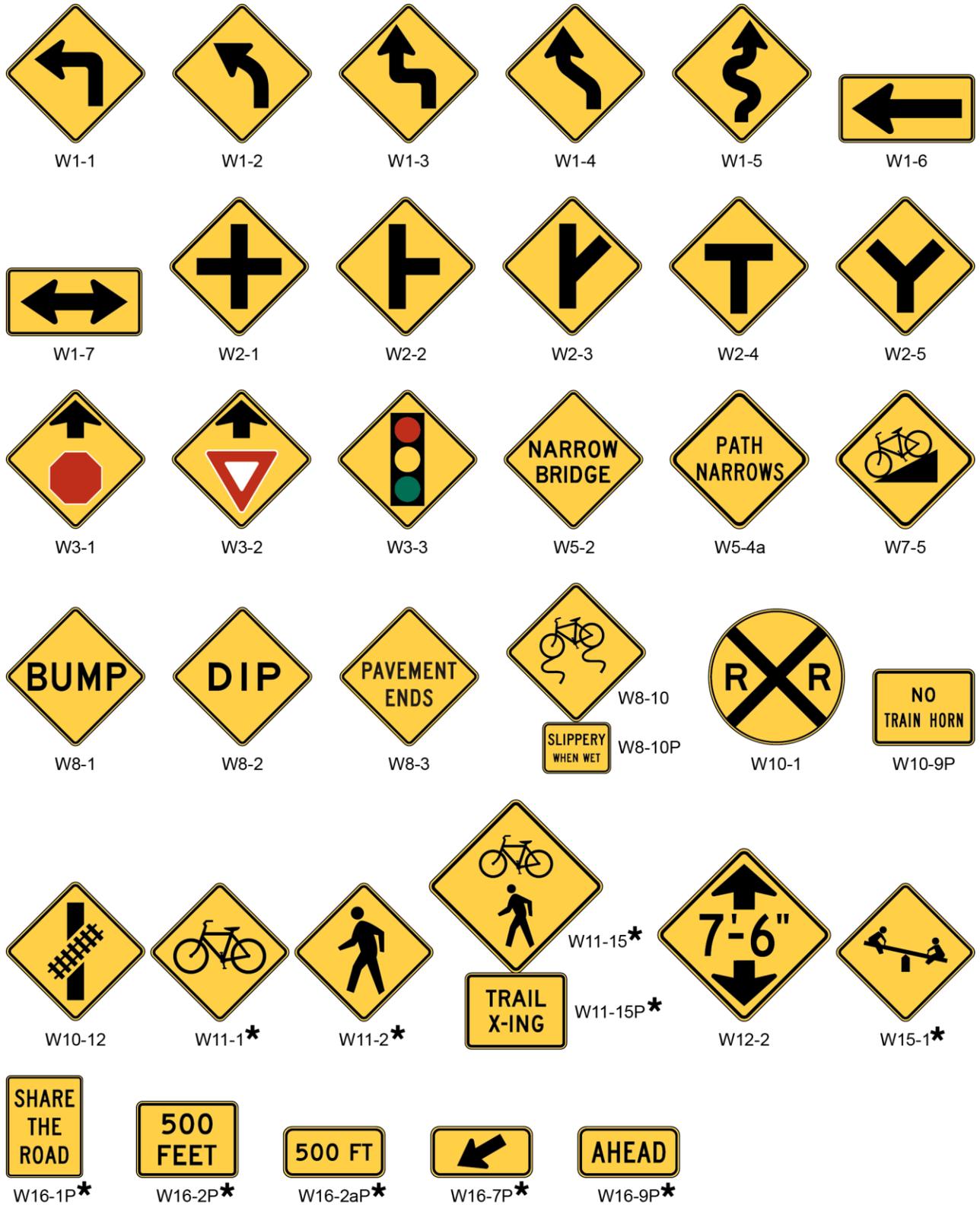
Guidance:

04 *If used in advance of a specific crossing point, the Bicycle Warning or combined Bicycle/Pedestrian sign should be placed at a distance in advance of the crossing location that conforms with the guidance given in Table 2C-4.*

Standard:

05 **Bicycle Warning and combined Bicycle/Pedestrian signs, when used at the location of the crossing, shall be supplemented with a diagonal downward pointing arrow (W16-7p) plaque (see Figure 9B-3) to show the location of the crossing.**

Figure 9B-3. Warning Signs and Plaques for Bicycle Facilities



* A fluorescent yellow-green background color may be used for this sign or plaque. The background color of the plaque should match the color of the warning sign that it supplements.

06 A fluorescent yellow-green background color with a black legend and border may be used for Bicycle Warning and combined Bicycle/Pedestrian signs and supplemental plaques.

Guidance:

07 *When the fluorescent yellow-green background color is used, a systematic approach featuring one background color within a zone or area should be used. The mixing of standard yellow and fluorescent yellow-green backgrounds within a zone or area should be avoided.*

Section 9B.19 Other Bicycle Warning Signs

Option:

01 Other bicycle warning signs (see Figure 9B-3) such as PATH NARROWS (W5-4a) and Hill (W7-5) may be installed on shared-use paths to warn bicyclists of conditions not readily apparent.

02 In situations where there is a need to warn motorists to watch for bicyclists traveling along the highway, the SHARE THE ROAD (W16-1) plaque (see Figure 9B-3) may be used in conjunction with the W11-1 sign.

Guidance:

03 *If used, other advance bicycle warning signs should be installed at least 50 feet in advance of the beginning of the condition.*

04 *Where temporary traffic control zones are present on bikeways, appropriate signs from Part 6 should be used.*

Option:

05 Other warning signs described in Chapter 2C may be installed on bicycle facilities as appropriate.

Section 9B.20 Bicycle Guide Signs (D1-1b, D1-1c, D1-2b, D1-2c, D1-3b, D1-3c, D11-1, D11-1c)

Option:

01 Bike Route Guide (D11-1) signs (see Figure 9B-4) may be provided along designated bicycle routes, to inform bicyclists of bicycle route direction changes and to confirm route direction, distance, and destination.

02 If used, Bike Route Guide signs may be repeated at regular intervals so that bicyclists entering from side streets will have an opportunity to know that they are on a bicycle route. Similar guide signing may be used for shared roadways with intermediate signs placed for bicyclist guidance.

03 Alternative Bike Route Guide (D11-1c) signs may be used to provide information on route direction, destination, and/or route name in place of the “BIKE ROUTE” wording on the D11-1 sign (see Figures 9B-4 and 9B-6).

04 Destination (D1-H1, D1-H1a) signs, Street Name (D3-1) signs, or Bicycle Destination (D1-1b, D1-1c, D1-2b, D1-2c, D1-3b, D1-3c) signs (see Figure 9B-4) may be installed to provide direction, destination, and distance information as needed for bicycle travel. If several destinations are to be shown at a single location, they may be placed on a single sign with an arrow (and the distance, if desired) for each name. If more than one destination lies in the same direction, a single arrow may be used for the destinations.

Guidance:

05 *Adequate separation should be made between any destination or group of destinations in one direction and those in other directions by suitable design of the arrow, spacing of lines of legend, heavy lines entirely across the sign, or separate signs.*

Standard:

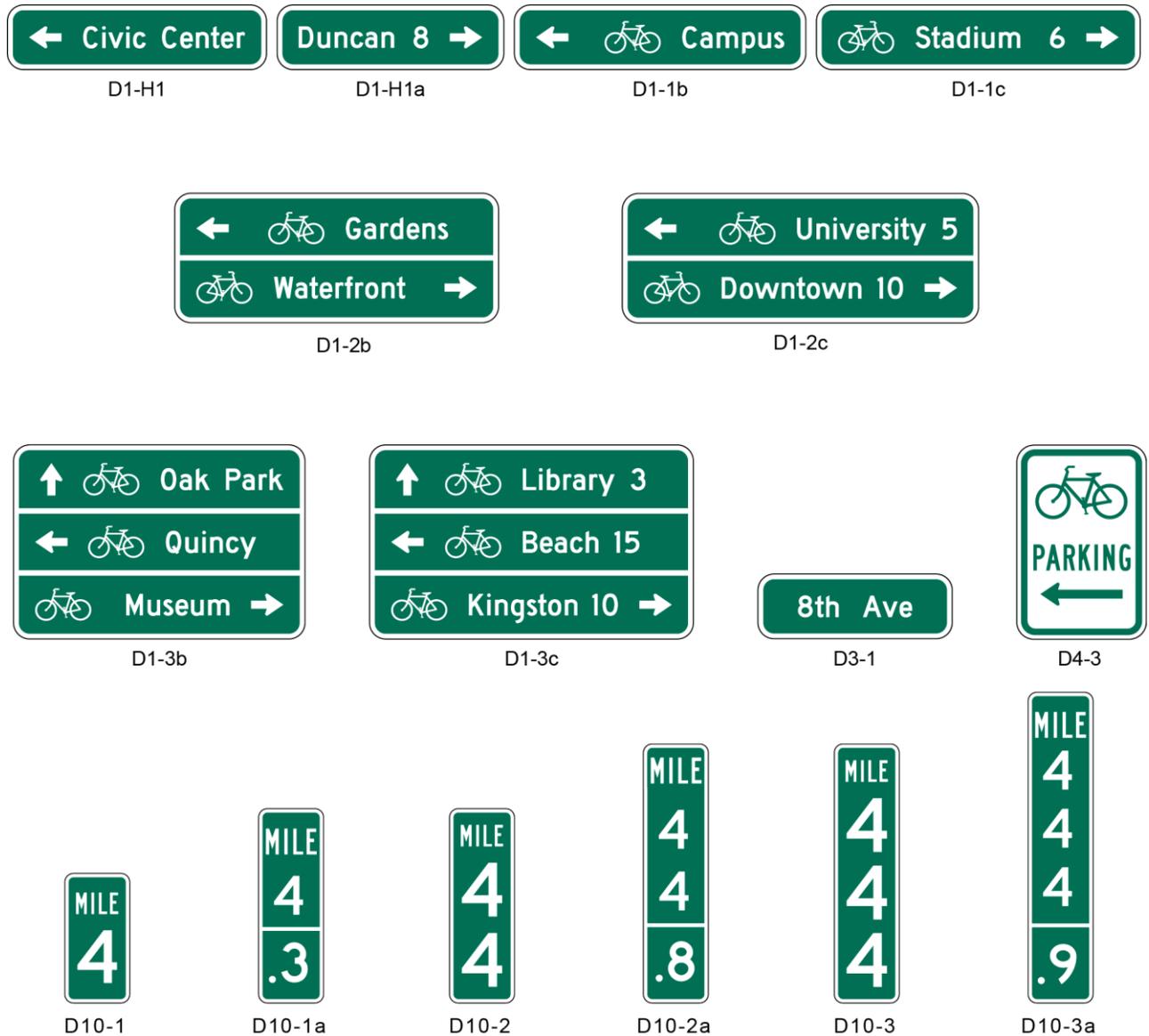
06 **An arrow pointing to the right, if used, shall be at the extreme right-hand side of the sign. An arrow pointing left or up, if used, shall be at the extreme left-hand side of the sign. The distance numerals, if used, shall be placed to the right of the destination names.**

07 **On Bicycle Destination signs, a bicycle symbol shall be placed next to each destination or group of destinations. If an arrow is at the extreme left, the bicycle symbol shall be placed to the right of the respective arrow.**

Guidance:

08 *Unless a sloping arrow will convey a clearer indication of the direction to be followed, the directional arrows should be horizontal or vertical.*

Figure 9B-4. Guide Signs and Plaques for Bicycle Facilities (Sheet 1 of 2)



- 09 *The bicycle symbol should be to the left of the destination legend.*
- 10 *If several individual name signs are assembled into a group, all signs in the assembly should have the same horizontal width.*
- 11 *Because of their smaller size, Bicycle Destination signs should not be used as a substitute for vehicular destination signs when the message is also intended to be seen by motorists.*

Support:

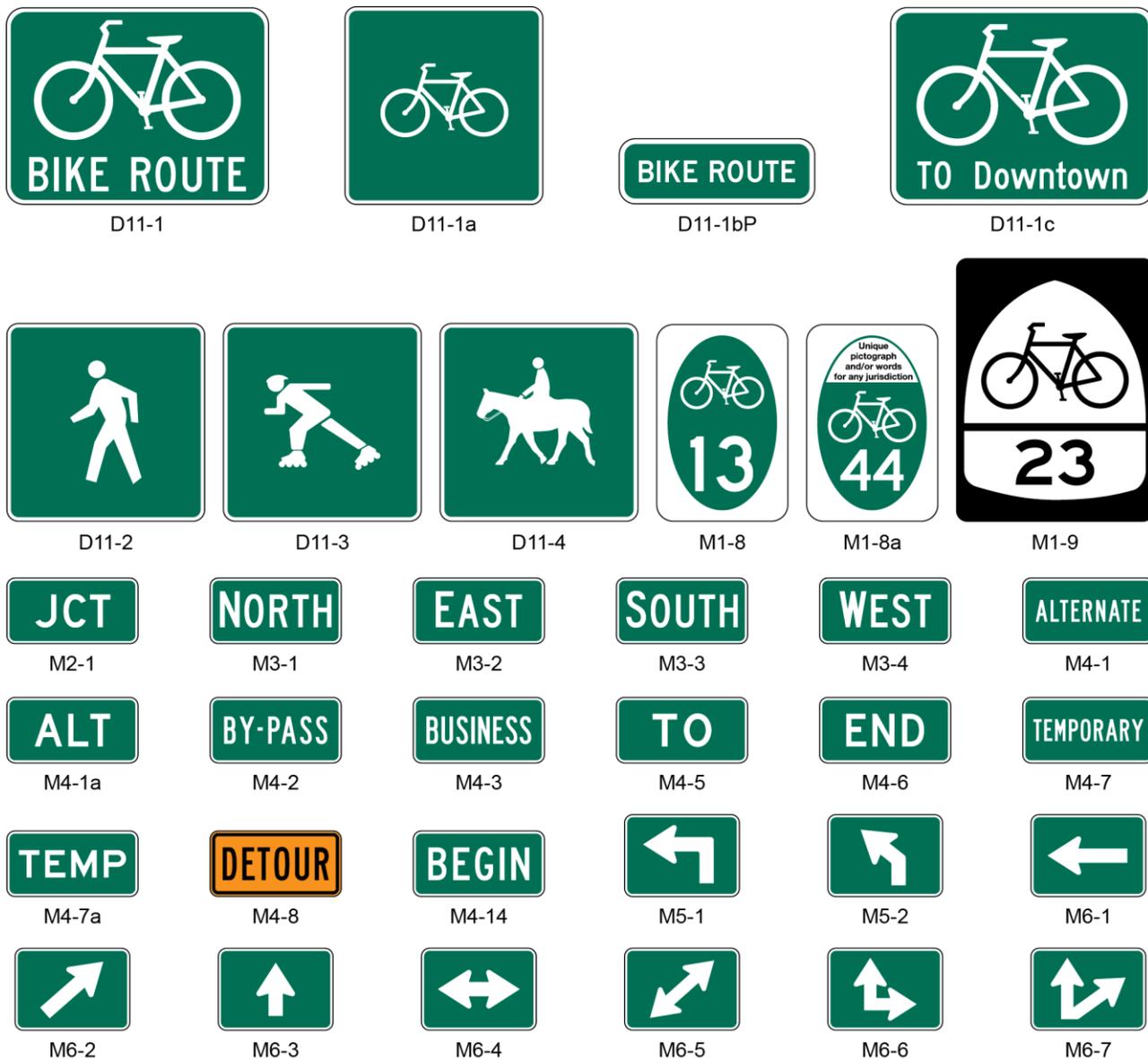
- 12 Figure 9B-5 shows an example of the signing for the beginning and end of a designated bicycle route on a shared-use path. Figure 9B-6 shows an example of signing for an on-roadway bicycle route. Figure 9B-7 shows examples of signing and markings for a shared-use path crossing.

Section 9B.21 Bicycle Route Signs (M1-8, M1-8a, M1-9)

Option:

- 01 To establish a unique identification (route designation) for a State or local bicycle route, the Bicycle Route (M1-8, M1-8a) sign (see Figure 9B-4) may be used.

Figure 9B-4. Guide Signs and Plaques for Bicycle Facilities (Sheet 2 of 2)

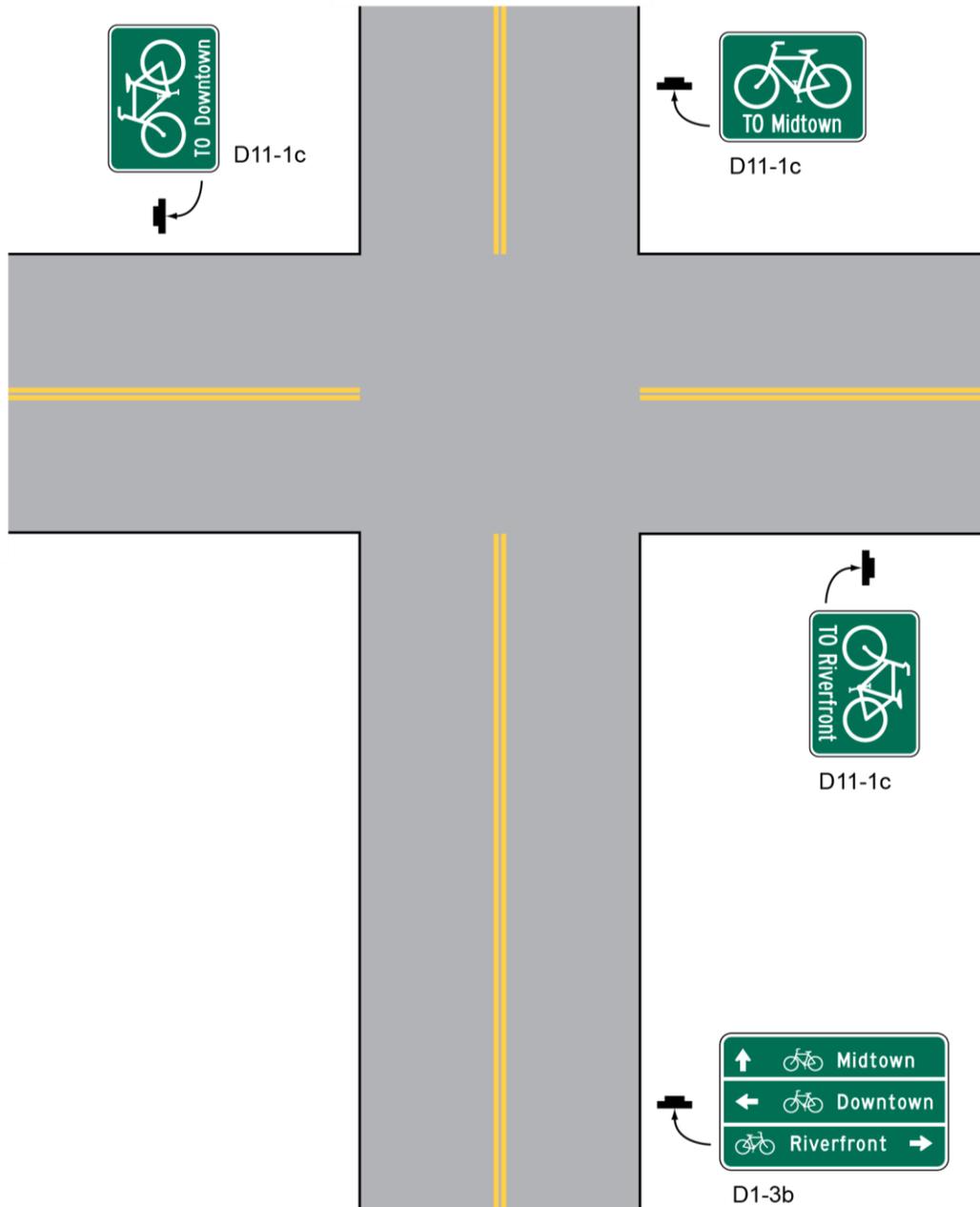


Standard:

- 02 **The Bicycle Route (M1-8) sign shall contain a route designation and shall have a green background with a retroreflectored white legend and border. The Bicycle Route (M1-8a) sign shall contain the same information as the M1-8 sign and in addition shall include a pictograph or words that are associated with the route or with the agency that has jurisdiction over the route.**

Guidance:

- 03 *Bicycle routes, which might be a combination of various types of bikeways, should establish a continuous routing.*
- 04 *Where a designated bicycle route extends through two or more States, a coordinated submittal by the affected States for an assignment of a U.S. Bicycle Route number designation should be sent to the American Association of State Highway and Transportation Officials (see the Preface for the address).*

Figure 9B-6. Example of Bicycle Guide Signing**Section 9B.22 Bicycle Route Sign Auxiliary Plaques**

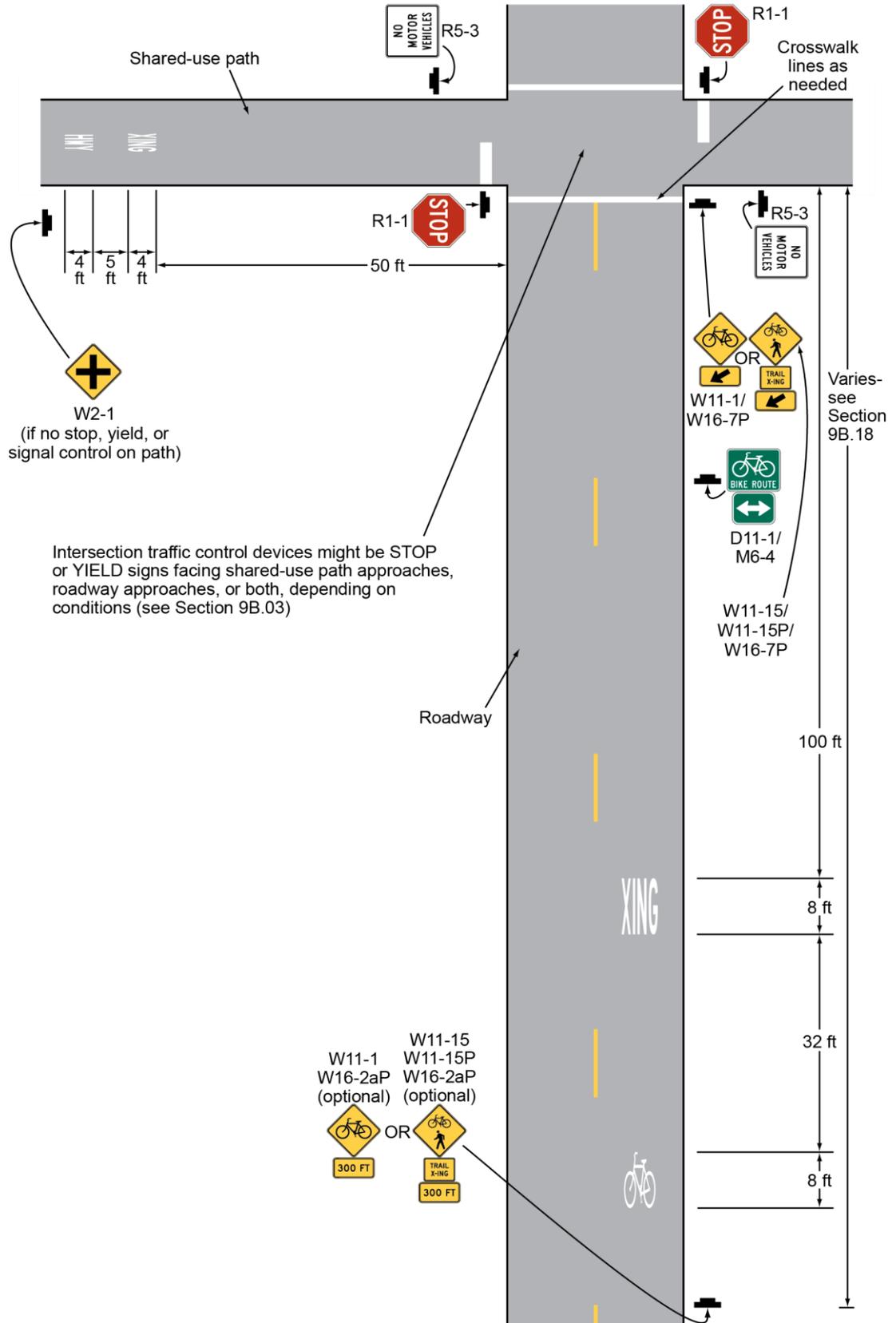
Option:

- 01 Auxiliary plaques may be used in conjunction with Bike Route Guide signs, Bicycle Route signs, or U.S. Bicycle Route signs as needed.

Guidance:

- 02 *If used, Junction (M2-1), Cardinal Direction (M3 series), and Alternative Route (M4 series) auxiliary plaques (see Figure 9B-4) should be mounted above the appropriate Bike Route Guide signs, Bicycle Route signs, or U.S. Bicycle Route signs.*
- 03 *If used, Advance Turn Arrow (M5 series) and Directional Arrow (M6 series) auxiliary plaques (see Figure 9B-4) should be mounted below the appropriate Bike Route Guide sign, Bicycle Route sign, or U.S. Bicycle Route sign.*

Figure 9B-7. Examples of Signing and Markings for a Shared-Use Path Crossing



04 *Except for the M4-8 plaque, all route sign auxiliary plaques should match the color combination of the route sign that they supplement.*

05 *Route Sign auxiliary plaques carrying word legends that are used on bicycle routes should have a minimum size of 12 x 6 inches. Route sign auxiliary plaques carrying arrow symbols that are used on bicycle routes should have a minimum size of 12 x 9 inches.*

Option:

06 With route signs of larger sizes, auxiliary plaques may be suitably enlarged, but not such that they exceed the width of the route sign.

07 A route sign and any auxiliary plaques used with it may be combined on a single sign.

08 Destination (D1-1b and D1-1c) signs (see Figure 9B-4) may be mounted below Bike Route Guide signs, Bicycle Route signs, or U.S. Bicycle Route signs to furnish additional information, such as directional changes in the route, or intermittent distance and destination information.

Section 9B.23 Bicycle Parking Area Sign (D4-3)

Option:

01 The Bicycle Parking Area (D4-3) sign (see Figure 9B-4) may be installed where it is desirable to show the direction to a designated bicycle parking area. The arrow may be reversed as appropriate.

Standard:

02 **The legend and border of the Bicycle Parking Area sign shall be green on a retroreflectorized white background.**

Section 9B.24 Reference Location Signs (D10-1 through D10-3) and Intermediate Reference Location Signs (D10-1a through D10-3a)

Support:

01 There are two types of reference location signs:

- A. Reference Location (D10-1, 2, and 3) signs show an integer distance point along a shared-use path; and
- B. Intermediate Reference Location (D10-1a, 2a, and 3a) signs also show a decimal between integer distance points along a shared-use path.

Option:

02 Reference Location (D10-1 to D10-3) signs (see Figure 9B-4) may be installed along any section of a shared-use path to assist users in estimating their progress, to provide a means for identifying the location of emergency incidents and crashes, and to aid in maintenance and servicing.

03 To augment the reference location sign system, Intermediate Reference Location (D10-1a to D10-3a) signs (see Figure 9B-4), which show the tenth of a mile with a decimal point, may be installed at one tenth of a mile intervals, or at some other regular spacing.

Standard:

04 **If Intermediate Reference Location (D10-1a to D10-3a) signs are used to augment the reference location sign system, the reference location sign at the integer mile point shall display a decimal point and a zero numeral.**

05 **If placed on shared-use paths, reference location signs shall contain 4.5-inch white numerals on a green background that is at least 6 inches wide with a white border. The signs shall contain the word MILE in 2.25-inch white letters.**

06 **Reference location signs shall have a minimum mounting height of 2 feet, measured vertically from the bottom of the sign to the elevation of the near edge of the shared-use path, and shall not be governed by the mounting height requirements prescribed in Section 9B.01.**

Option:

07 Reference location signs may be installed on one side of the shared-use path only and may be installed back-to-back.

08 If a reference location sign cannot be installed in the correct location, it may be moved in either direction as much as 50 feet.

- 09 If a reference location sign cannot be placed within 50 feet of the correct location, it should be omitted.
- 10 Zero distance should begin at the south and west terminus points of shared-use paths.

Support:

- 11 Section 2H.05 contains additional information regarding reference location signs.

Section 9B.25 Mode-Specific Guide Signs for Shared-Use Paths (D11-1a, D11-2, D11-3, D11-4)

Option:

- 01 Where separate pathways are provided for different types of users, Mode-Specific Guide (D11-1a, D11-2, D11-3, D11-4) signs (see Figure 9B-4) may be used to guide different types of users to the traveled way that is intended for their respective modes.

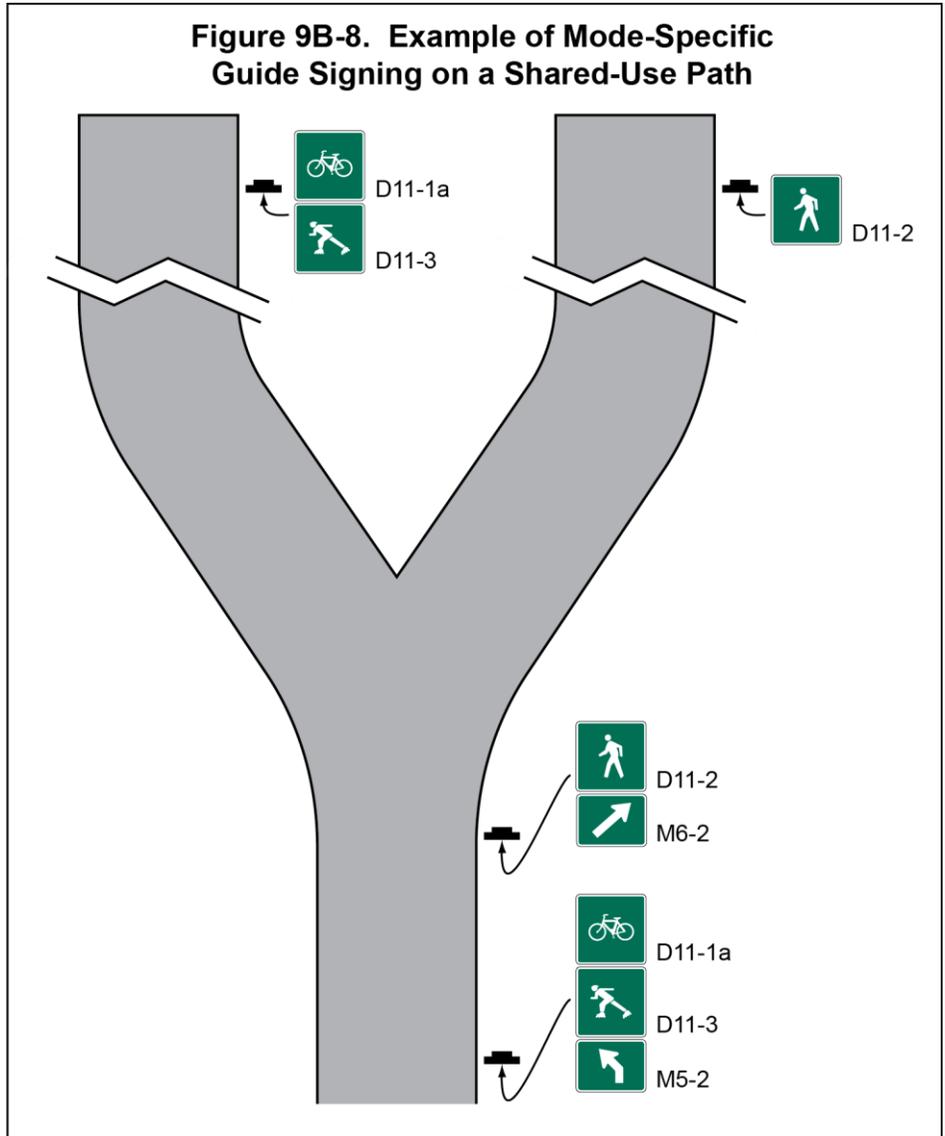
02 Mode-Specific Guide signs may be installed at the entrance to shared-use paths where the signed mode(s) are permitted or encouraged, and periodically along these facilities as needed.

03 The Bicycles Permitted (D11-1a) sign, when combined with the BIKE ROUTE supplemental plaque (D11-1bP), may be substituted for the D11-1 Bicycle Route Guide sign on paths and shared roadways.

04 When some, but not all, non-motorized user types are encouraged or permitted on a shared-use path, Mode-Specific Guide signs may be placed in combination with each other, and in combination with signs (see Section 9B.09) that prohibit travel by particular modes.

Support:

- 05 Figure 9B-8 shows an example of signing where separate pathways are provided for different non-motorized user types.



Section 9B.26 Object Markers

Option:

- 01 Fixed objects adjacent to shared-use paths may be marked with Type 1, Type 2, or Type 3 object markers such as those described in Section 2C.63 and shown in Figure 2C-13. If the object marker is not intended to also be seen by motorists, a smaller version of the Type 3 object marker may be used (see Table 9B-1).

Standard:

- 02 **Obstructions in the traveled way of a shared-use path shall be marked with retroreflectorized material or appropriate object markers.**
- 03 **All object markers shall be retroreflective.**
- 04 **On Type 3 object markers, the alternating black and retroreflective yellow stripes shall be sloped down at an angle of 45 degrees toward the side on which traffic is to pass the obstruction.**

CHAPTER 9C. MARKINGS

Section 9C.01 Functions of Markings

Support:

- 01 Markings indicate the separation of the lanes for road users, assist the bicyclist by indicating assigned travel paths, indicate correct position for traffic control signal actuation, and provide advance information for turning and crossing maneuvers.

Section 9C.02 General Principles

Guidance:

- 01 *Bikeway design guides (see Section 9A.05) should be used when designing markings for bicycle facilities.*

Standard:

- 02 **Markings used on bikeways shall be retroreflectorized.**

Guidance:

- 03 *Pavement marking word messages, symbols, and/or arrows should be used in bikeways where appropriate. Consideration should be given to selecting pavement marking materials that will minimize loss of traction for bicycles under wet conditions.*

Standard:

- 04 **The colors, width of lines, patterns of lines, symbols, and arrows used for marking bicycle facilities shall be as defined in Sections 3A.05, 3A.06, and 3B.20.**

Support:

- 05 Figures 9B-7 and 9C-1 through 9C-9 show examples of the application of lines, word messages, symbols, and arrows on designated bikeways.

Option:

- 06 A dotted line may be used to define a specific path for a bicyclist crossing an intersection (see Figure 9C-1) as described in Sections 3A.06 and 3B.08.

Section 9C.03 Marking Patterns and Colors on Shared-Use Paths

Option:

- 01 Where shared-use paths are of sufficient width to designate two minimum width lanes, a solid yellow line may be used to separate the two directions of travel where passing is not permitted, and a broken yellow line may be used where passing is permitted (see Figure 9C-2).

Guidance:

- 02 *Broken lines used on shared-use paths should have the usual 1-to-3 segment-to-gap ratio. A nominal 3 foot segment with a 9 foot gap should be used.*

- 03 *If conditions make it desirable to separate two directions of travel on shared-use paths at particular locations, a solid yellow line should be used to indicate no passing and no traveling to the left of the line.*

- 04 *Markings as shown in Figure 9C-8 should be used at the location of obstructions in the center of the path, including vertical elements intended to physically prevent unauthorized motor vehicles from entering the path.*

Option:

- 05 A solid white line may be used on shared-use paths to separate different types of users. The R9-7 sign (see Section 9B.12) may be used to supplement the solid white line.

- 06 Smaller size letters and symbols may be used on shared-use paths. Where arrows are needed on shared-use paths, half-size layouts of the arrows may be used (see Section 3B.20).

Section 9C.04 Markings For Bicycle Lanes

Support:

- 01 Pavement markings designate that portion of the roadway for preferential use by bicyclists. Markings inform all road users of the restricted nature of the bicycle lane.

Figure 9C-1. Example of Intersection Pavement Markings—Designated Bicycle Lane with Left-Turn Area, Heavy Turn Volumes, Parking, One-Way Traffic, or Divided Highway

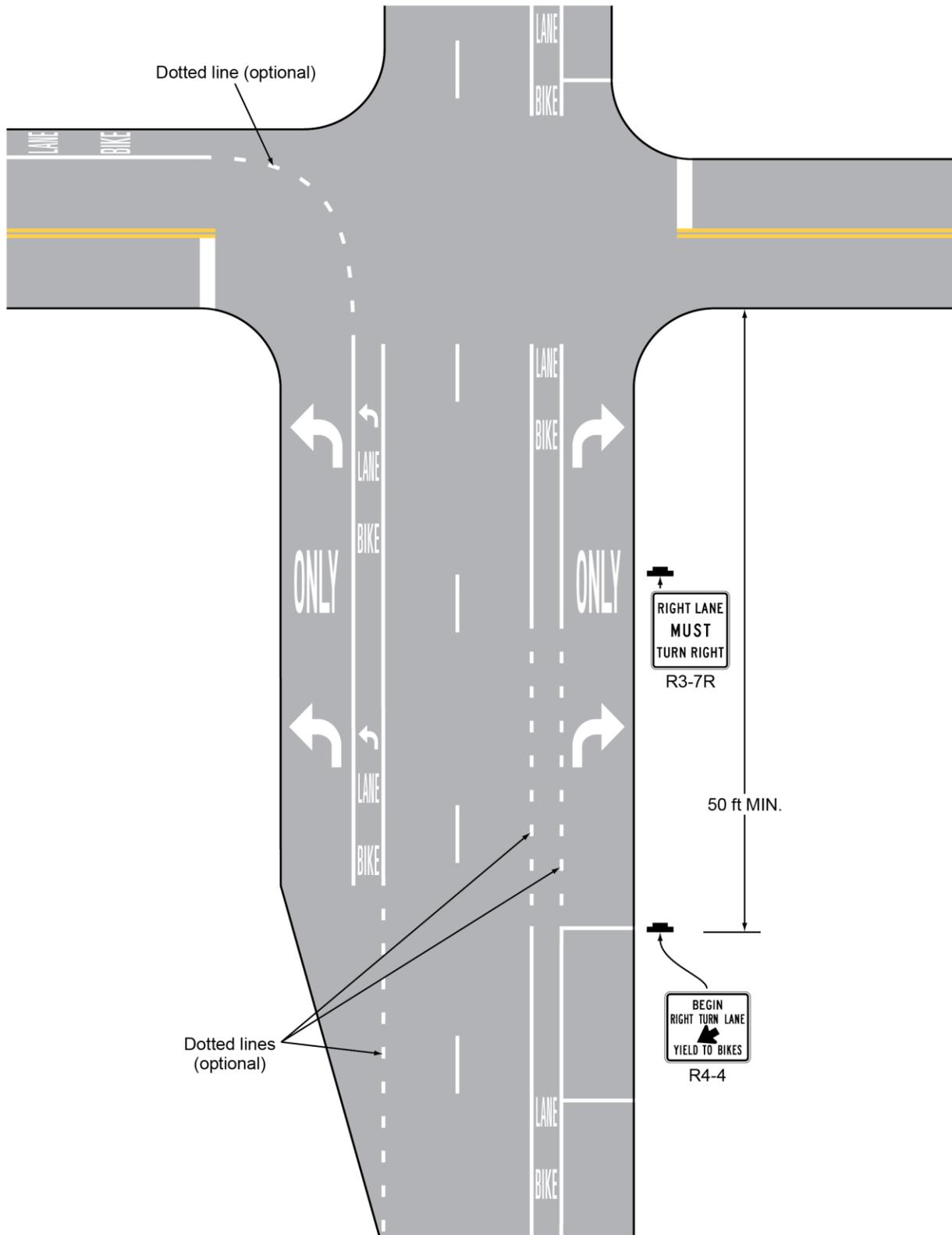
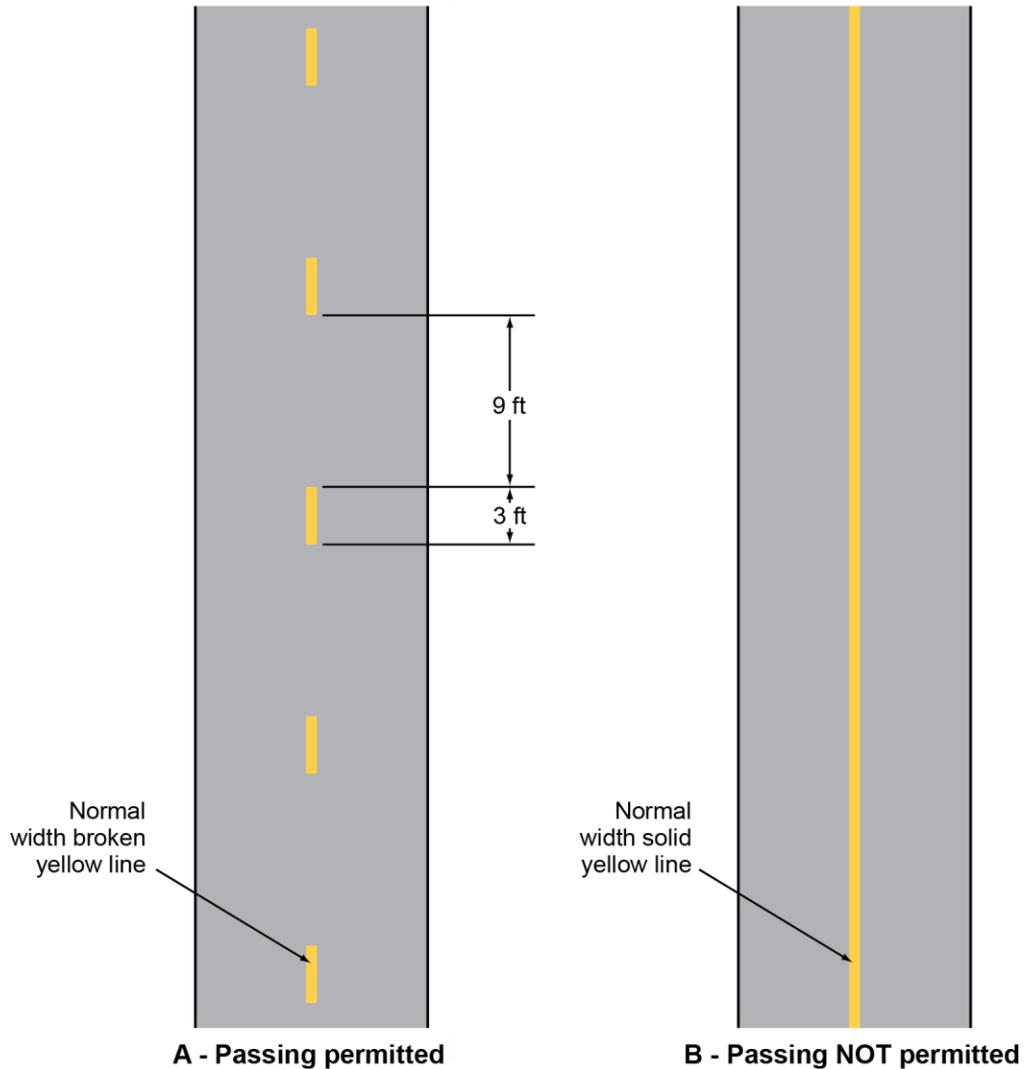


Figure 9C-2. Examples of Center Line Markings for Shared-Use Paths



Standard:

02 **Longitudinal pavement markings shall be used to define bicycle lanes.**

Guidance:

03 *If used, bicycle lane word, symbol, and/or arrow markings (see Figure 9C-3) should be placed at the beginning of a bicycle lane and at periodic intervals along the bicycle lane based on engineering judgment.*

Standard:

04 **If the bicycle lane symbol marking is used in conjunction with other word or symbol messages, it shall precede them.**

Option:

05 If the word, symbol, and/or arrow pavement markings shown in Figure 9C-3 are used, Bike Lane signs (see Section 9B.04) may also be used, but to avoid overuse of the signs not necessarily adjacent to every set of pavement markings.

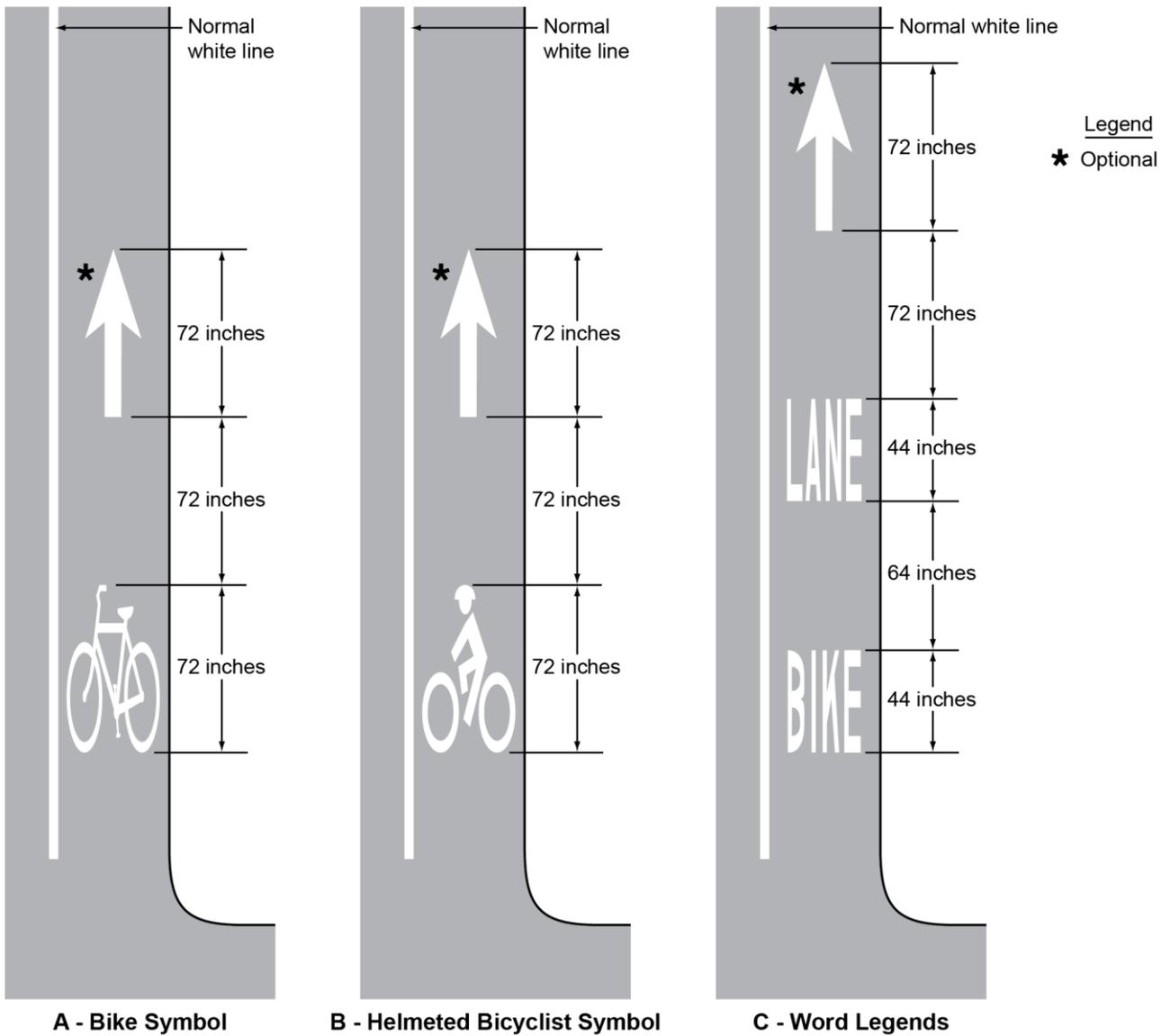
Standard:

06 **A through bicycle lane shall not be positioned to the right of a right turn only lane or to the left of a left turn only lane.**

Support:

07 A bicyclist continuing straight through an intersection from the right of a right turn lane or from the left

Figure 9C-3. Word, Symbol, and Arrow Pavement Markings for Bicycle Lanes



of a left-turn lane would be inconsistent with normal traffic behavior and would violate the expectations of right-or left-turning motorists.

Guidance:

- 08 *When the right through lane is dropped to become a right turn only lane, the bicycle lane markings should stop at least 100 feet before the beginning of the right-turn lane. Through bicycle lane markings should resume to the left of the right turn only lane.*
- 09 *An optional through-right turn lane next to a right turn only lane should not be used where there is a through bicycle lane. If a capacity analysis indicates the need for an optional through-right turn lane, the bicycle lane should be discontinued at the intersection approach.*
- 10 *Posts or raised pavement markers should not be used to separate bicycle lanes from adjacent travel lanes.*

Support:

- 11 Using raised devices creates a collision potential for bicyclists by placing fixed objects immediately adjacent to the travel path of the bicyclist. In addition, raised devices can prevent vehicles turning right from merging with the bicycle lane, which is the preferred method for making the right turn. Raised devices used to define a bicycle lane can also cause problems in cleaning and maintaining the bicycle lane.

Standard:

- 12 **Bicycle lanes shall not be provided on the circular roadway of a roundabout.**

Guidance:

- 13 *Bicycle lane markings should stop at least 100 feet before the crosswalk, or if no crosswalk is provided, at least 100 feet before the yield line, or if no yield line is provided, then at least 100 feet before the edge of the circulatory roadway.*

Support:

- 14 Examples of bicycle lane markings at right-turn lanes are shown in Figures 9C-1, 9C-4, and 9C-5. Examples of pavement markings for bicycle lanes on a two-way street are shown in Figure 9C-6. Pavement word message, symbol, and arrow markings for bicycle lanes are shown in Figure 9C-3.

Section 9C.05 Bicycle Detector Symbol*Option:*

- 01 A symbol (see Figure 9C-7) may be placed on the pavement indicating the optimum position for a bicyclist to actuate the signal.
- 02 An R10-22 sign (see Section 9B.13 and Figure 9B-2) may be installed to supplement the pavement marking.

Section 9C.06 Pavement Markings for Obstructions*Guidance:*

- 01 *In roadway situations where it is not practical to eliminate a drain grate or other roadway obstruction that is inappropriate for bicycle travel, white markings applied as shown in Figure 9C-8 should be used to guide bicyclists around the condition.*

Section 9C.07 Shared Lane Marking*Option:*

- 01 The Shared Lane Marking shown in Figure 9C-9 may be used to:
- A. Assist bicyclists with lateral positioning in a shared lane with on-street parallel parking in order to reduce the chance of a bicyclist's impacting the open door of a parked vehicle,
 - B. Assist bicyclists with lateral positioning in lanes that are too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane,
 - C. Alert road users of the lateral location bicyclists are likely to occupy within the traveled way,
 - D. Encourage safe passing of bicyclists by motorists, and
 - E. Reduce the incidence of wrong-way bicycling.

Guidance:

- 02 *The Shared Lane Marking should not be placed on roadways that have a speed limit above 35 mph.*

Standard:

- 03 **Shared Lane Markings shall not be used on shoulders or in designated bicycle lanes.**

Guidance:

- 04 *If used in a shared lane with on-street parallel parking, Shared Lane Markings should be placed so that the centers of the markings are at least 11 feet from the face of the curb, or from the edge of the pavement where there is no curb.*
- 05 *If used on a street without on-street parking that has an outside travel lane that is less than 14 feet wide, the centers of the Shared Lane Markings should be at least 4 feet from the face of the curb, or from the edge of the pavement where there is no curb.*
- 06 *If used, the Shared Lane Marking should be placed immediately after an intersection and spaced at intervals not greater than 250 feet thereafter.*

Option:

- 07 Section 9B.06 describes a Bicycles MAY USE FULL LANE sign that may be used in addition to or instead of the Shared Lane Marking to inform road users that bicyclists might occupy the travel lane.

Figure 9C-4. Example of Bicycle Lane Treatment at a Right Turn Only Lane

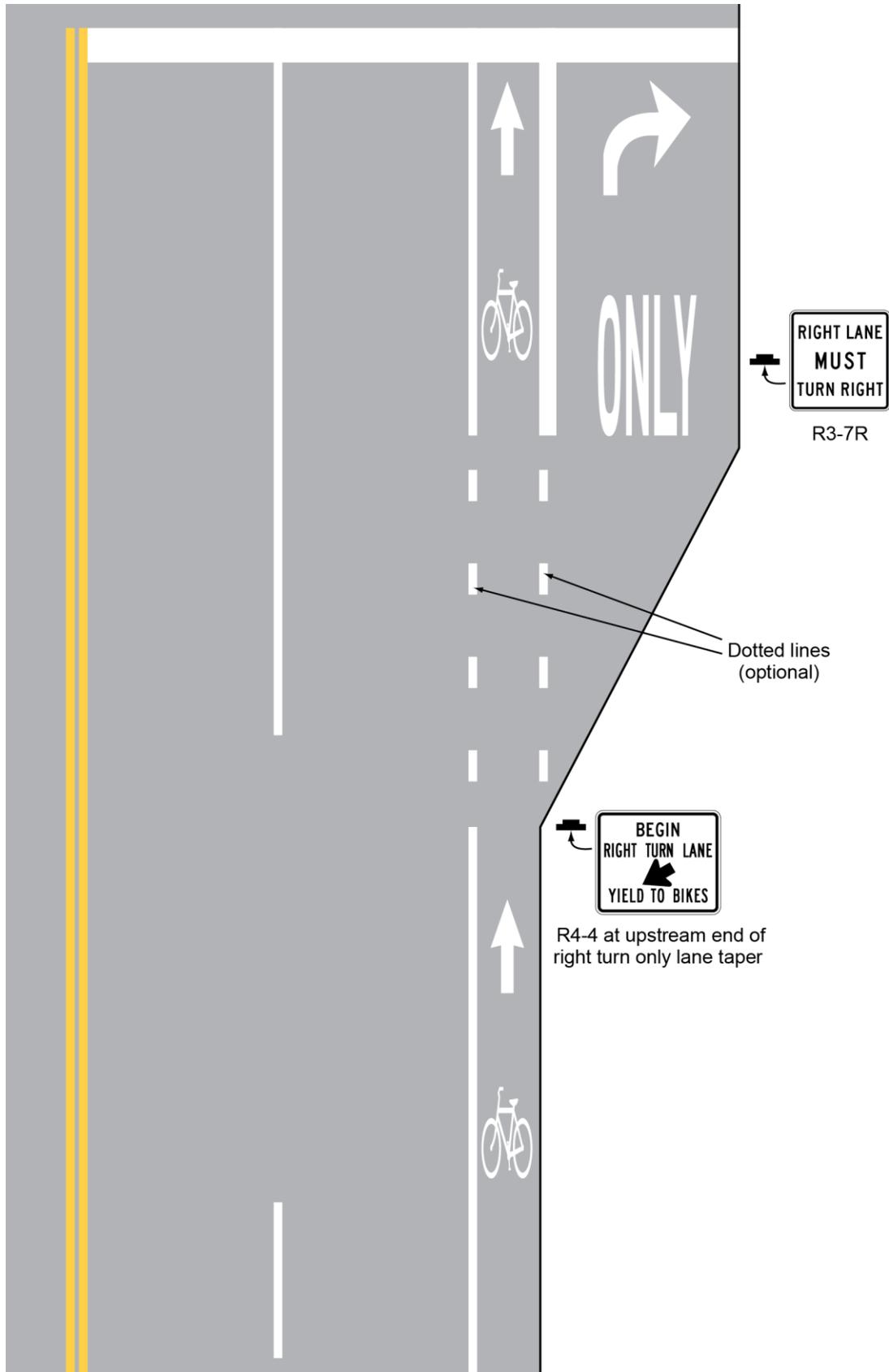


Figure 9C-5. Example of Bicycle Lane Treatment at Parking Lane into a Right Turn Only Lane

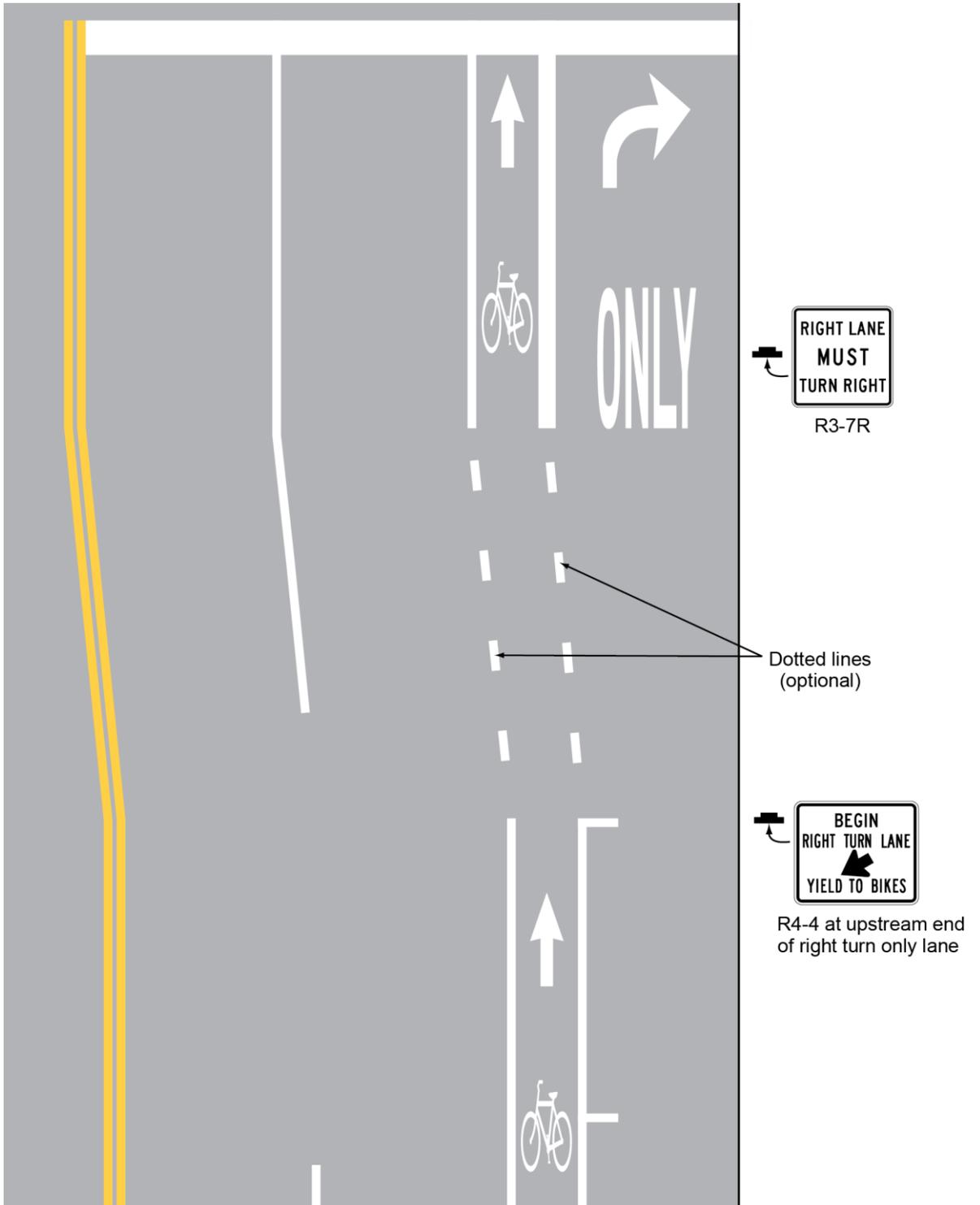


Figure 9C-6. Example of Pavement Markings for Bicycle Lanes on a Two-Way Street

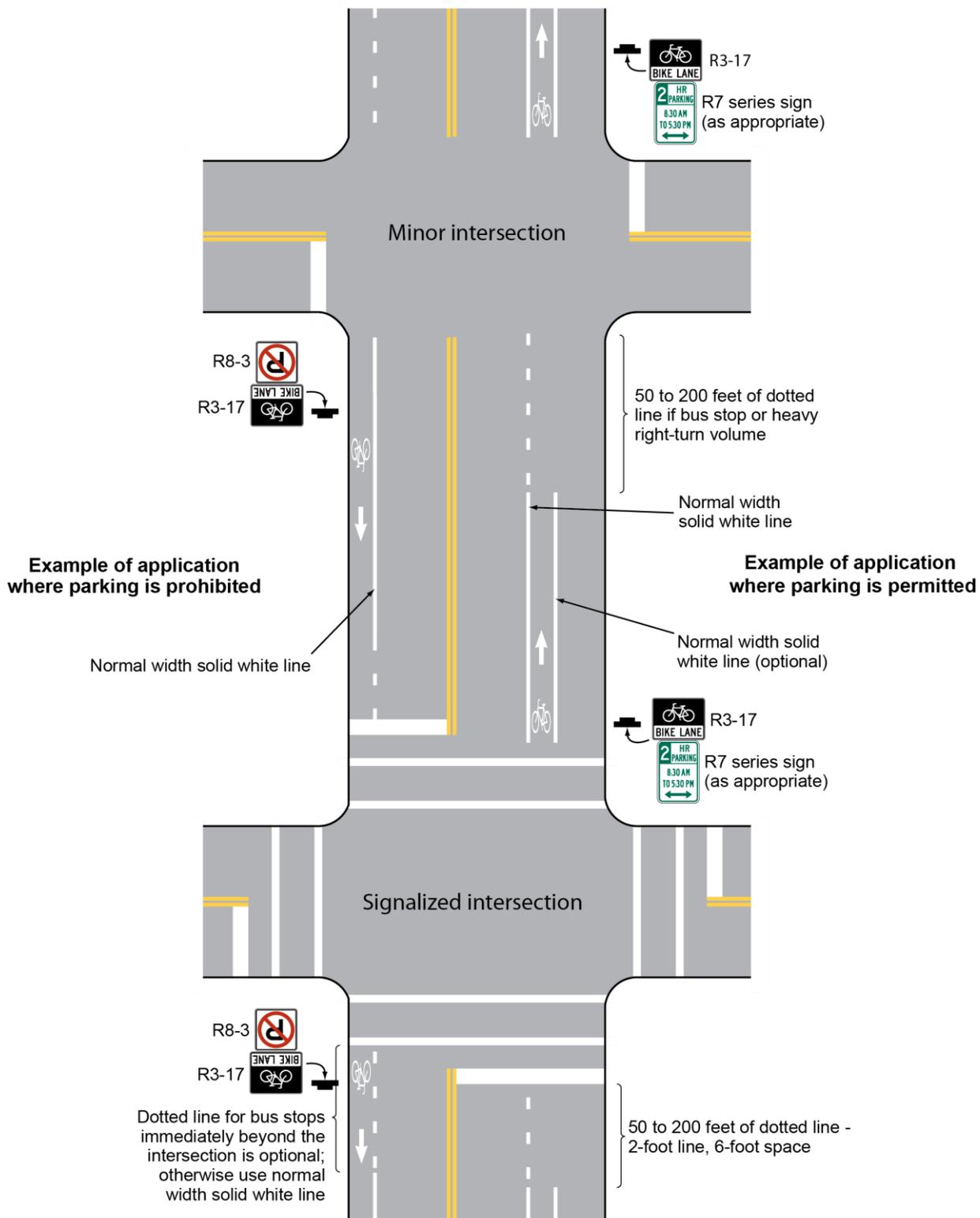


Figure 9C-7. Bicycle Detector Pavement Marking

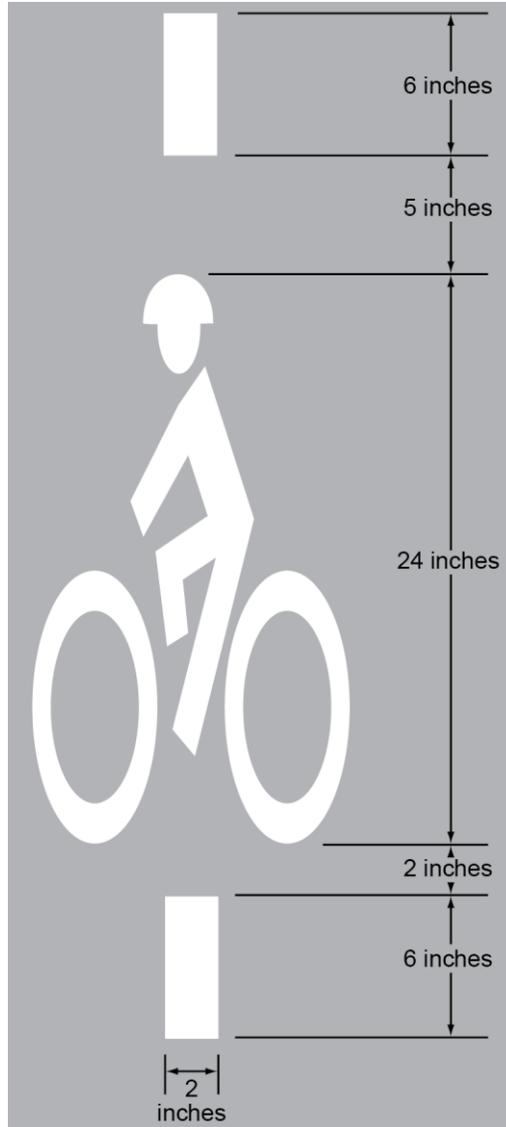
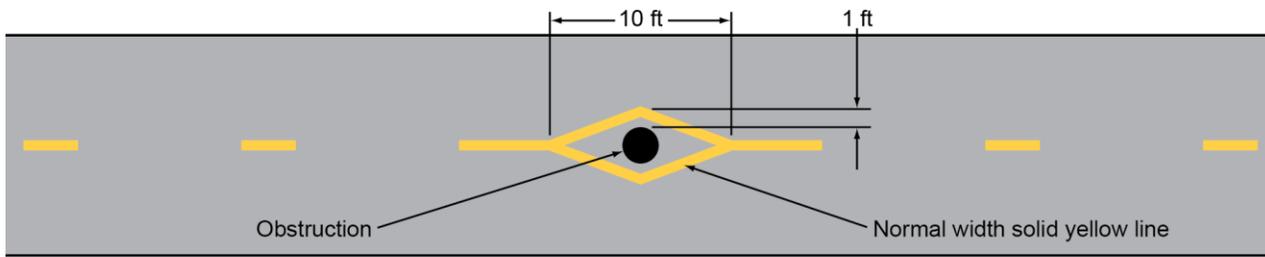
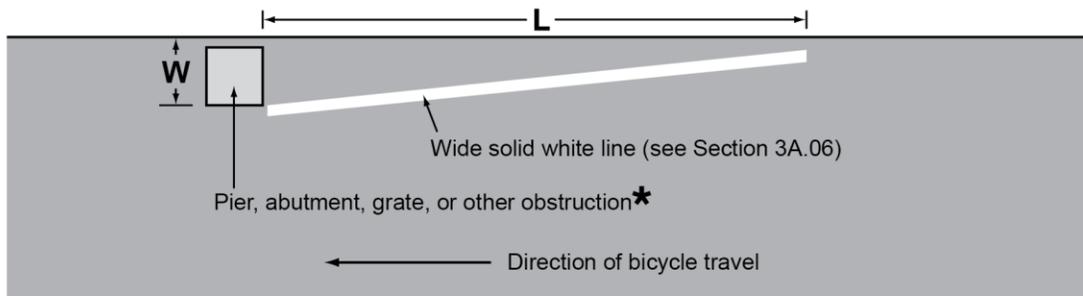


Figure 9C-8. Examples of Obstruction Pavement Markings



A - Obstruction within the path

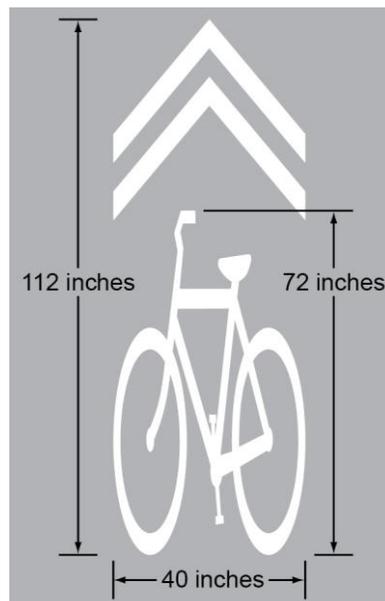


B - Obstruction at edge of path or roadway

$L = WS$, where W is the offset in feet and S is bicycle approach speed in mph

★ Provide an additional foot of offset for a raised obstruction and use the formula $L = (W+1) S$ for the taper length

Figure 9C-9. Shared Lane Marking



CHAPTER 9D. SIGNALS**Section 9D.01 Application**

Support:

- 01 Part 4 contains information regarding signal warrants and other requirements relating to signal installations.

Option:

- 02 For purposes of signal warrant evaluation, bicyclists may be counted as either vehicles or pedestrians.

Section 9D.02 Signal Operations for Bicycles

Standard:

- 01 **At installations where visibility-limited signal faces are used, signal faces shall be adjusted so bicyclists for whom the indications are intended can see the signal indications. If the visibility-limited signal faces cannot be aimed to serve the bicyclist, then separate signal faces shall be provided for the bicyclist.**
- 02 **On bikeways, signal timing and actuation shall be reviewed and adjusted to consider the needs of bicyclists.**

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APPENDIX A1. CONGRESSIONAL LEGISLATION REGARDING THE NATIONAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

For background information, references to Congressional legislation involving the national Manual on Uniform Traffic Control Devices (MUTCD) have been included in this Appendix. Information about Ohio Revised Code references related to information in this Manual is provided in Appendix B

PUBLIC LAW 102-240-DEC. 18, 1991 (INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT OF 1991)

Section 1077. REVISION OF MANUAL — Not later than 90 days after the date of the enactment of this Act, the Secretary shall revise the Manual of Uniform Traffic Control Devices and such other regulations and agreements of the Federal Highway Administration as may be necessary to authorize States and local governments, at their discretion, to install stop or yield signs at any rail-highway grade crossing without automatic traffic control devices with 2 or more trains operating across the rail-highway grade crossing per day.

PUBLIC LAW 102-388-OCT. 6, 1992 (DEPARTMENT OF TRANSPORTATION AND RELATED AGENCIES APPROPRIATIONS ACT, 1993)

Section 406 — The Secretary of Transportation shall revise the Manual of Uniform Traffic Control Devices to include —

- (a) a standard for a minimum level of retroreflectivity that must be maintained for pavement markings and signs, which shall apply to all roads open to public travel; and
- (b) a standard to define the roads that must have a centerline or edge lines or both, provided that in setting such standard the Secretary shall consider the functional classification of roads, traffic volumes, and the number and width of lanes.

PUBLIC LAW 104-59-NOV. 28, 1995 (NATIONAL HIGHWAY SYSTEM DESIGNATION ACT OF 1995)

Section 205. RELIEF FROM MANDATES —

(c) METRIC REQUIREMENTS —

(1) PLACEMENT AND MODIFICATION OF SIGNS — The Secretary shall not require the States to expend any Federal or State funds to construct, erect, or otherwise place or to modify any sign relating to a speed limit, distance, or other measurement on a highway for the purpose of having such sign establish such speed limit, distance, or other measurement using the metric system.

(2) OTHER ACTIONS — Before September 30, 2000, the Secretary shall not require that any State use or plan to use the metric system with respect to designing or advertising, or preparing plans, specifications, estimates, or other documents, for a Federal-aid highway project eligible for assistance under title 23, United States Code.

(3) DEFINITIONS — In this subsection, the following definitions apply:

(A) HIGHWAY — The term ‘highway’ has the meaning such term has under section 101 of title 23, United State Code.

(B) METRIC SYSTEM — the term ‘metric system’ has the meaning the term ‘metric system of measurement’ has under section 4 of the Metric Conversion Act of 1975 (15 U.S.C. 205c).

Section 306. MOTORIST CALL BOXES — Section 111 of title 23, United States Code, is amended by adding at the end the following:

(c) MOTORIST CALL BOXES—

(1) IN GENERAL— Notwithstanding subsection (a), a State may permit the placement of motorist call boxes on rights-of-way of the National Highway System. Such motorist call boxes may include the identification and sponsorship logos of such call boxes.

(2) SPONSORSHIP LOGOS—

(A) APPROVAL BY STATE AND LOCAL AGENCIES—All call box installations displaying sponsorship logos under this subsection shall be approved by the highway agencies having jurisdiction of the highway on which they are located.

(B) SIZE ON BOX—A sponsorship logo may be placed on the call box in a dimension not to exceed the size of the call box or a total dimension in excess of 12 inches by 18 inches.

(C) SIZE ON IDENTIFICATION SIGN—Sponsorship logos in a dimension not to exceed 12 inches by 30 inches may be displayed on a call box identification sign affixed to the call box post.

(D) SPACING OF SIGNS—Sponsorship logos affixed to an identification sign on a call box post may be located on the rights-of-way at intervals not more frequently than 1 per every 5 miles.

(E) DISTRIBUTION THROUGHOUT STATE—Within a State, at least 20 percent of the call boxes displaying sponsorship logos shall be located on highways outside of urbanized areas with a population greater than 50,000.

(3) NONSAFETY HAZARDS—The call boxes and their location, posts, foundations, and mountings shall be consistent with requirements of the Manual on Uniform Traffic Control Devices or any requirements deemed necessary by the Secretary to assure that the call boxes shall not be a safety hazard to motorists.

Section 353(a) SIGNS — Traffic control signs referred to in the experimental project conducted in the State of Oregon in December 1991 shall be deemed to comply with the requirements of Section 2B-4 of the Manual on Uniform Traffic Control Devices of the Department of Transportation.

Section 353(b) STRIPES — Notwithstanding any other provision of law, a red, white, and blue center line in the Main Street of Bristol, Rhode Island, shall be deemed to comply with the requirements of Section 3B-1 of the Manual on Uniform Traffic Control Devices of the Department of Transportation.

APPENDIX A2. METRIC CONVERSIONS

Through this Manual all dimensions and distances are provided in English units. Table A2-1 through A2-4 show the equivalent Metric (International System of Units) value for each of the English unit numerical values that are used in this Manual.

Table A2-1. Conversion of Inches to Millimeters

Inches	Millimeters
0.25	6
0.4	10
0.5	13
0.75	19
1	25
1.25	31
2	50
2.25	56
2.5	62
3	75

Inches	Millimeters
3.5	87
4	100
4.5	113
5	125
6	150
8	200
9	225
10	250
10.4	260
10.6	265

Inches	Millimeters
12	300
15	375
16	400
18	450
21	525
24	600
27	675
28	700
30	750
32	800

Inches	Millimeters
36	900
42	1050
48	1200
54	1350
60	1500
72	1800
84	2100
120	3000

Note: 1 inch = 25.4 millimeters; 1 millimeter = 0.039 inches

Table A2-2. Conversion of Feet to Meters

Feet	Meters
1	0.3
2	0.6
2.5	0.75
3	0.9
3.25	1
3.5	1.1
4	1.2
4.5	1.4
4.75	1.45
5	1.5
5.67	1.7
6	1.8
7	2.1
8	2.4
9	2.7
9.25	2.8
9.5	2.9
10	3

Feet	Meters
11	3.4
12	3.7
12.75	3.9
14	4.3
15	4.6
16	4.9
17	5.2
18	5.5
19	5.8
20	6.1
22	6.7
23.5	7.2
25	7.6
25.6	7.8
30	9
32	9.8
33	10
36	11

Feet	Meters
40	12
50	15
53	16
60	18
70	21
72	22
75	23
80	24
90	27
95	29
100	30
110	34
120	37
125	38
130	675
140	700
150	750
180	800

Feet	Meters
200	60
250	75
300	90
330	100
400	120
500	150
530	160
600	180
650	200
700	210
750	230
800	245
1,000	300
1,500	450
2,000	600
2,300	700
3,000	900

Note: 1 foot = 0.3048 meters; 1 meter = 3.28 feet

Table A2-3. Conversion of Miles to Kilometers

Miles	Kilometers
0.25	0.4
0.5	0.8
0.6	1

Miles	Kilometers
1	1.6
2	3.2
3	4.8

Miles	Kilometers
5	8
10	16
15	25

Miles	Kilometers
70	110

Note: 1 mile = 1.609 kilometers; 1 kilometer = 0.621 miles

Table A2-4. Conversion of Miles per Hour to Kilometers/Hour

mph	km/h
3	5
10	16
15	20
20	30

mph	km/h
25	40
30	50
35	60
40	60

mph	km/h
45	70
50	80
55	90
60	100

mph	km/h
65	105
65	110
80	130

Note: 1 mile per hour = 1.609 kilometers/hour; 1 kilometer/hour = 0.621 miles per hour

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APPENDIX B1. CROSS-REFERENCE GUIDE TO THE OHIO REVISED CODE

The Ohio Revised Code (ORC) contains many laws which apply to the control of traffic on the streets and highways of the State. It is important that officials responsible for the erection and maintenance of traffic control devices be well informed regarding these laws and their application to the operation of vehicles and the movement of pedestrians. A list of references follows, including important laws relative to traffic control and vehicle operation. These references are grouped by subject.

Code sections referenced in this Manual, as well as some others, have been reprinted in Appendix B2 for your convenience. An asterisk (*) next to the code number in the following cross-reference list indicates that a copy of that section is available in Appendix B2. The ORC is available through local libraries, and a searchable version is also available on the web at <http://codes.ohio.gov/>. The Ohio Administrative Code can also be reviewed on-line at the same website, and legislation can be viewed on-line at <http://www.legislature.state.oh.us/laws.cfm>.

PART 1. GENERAL

ORC Section Title / Description

§ 4511.01	Definitions.
§ 4511.07*	Local traffic regulations.
§ 4511.09*	Manual and specifications for uniform system of traffic control devices.
§ 4511.10*	Placement and maintenance of traffic control devices.
§ 4511.11*	Local conformity to manual and specifications for uniform system of traffic control devices.
§ 4511.12*	Obedience to traffic control devices.
§ 4511.16*	Unauthorized sign or signal resembling a traffic control device.
§ 4511.17*	Tampering with traffic control device, freshly applied pavement material, manhole covers.

PART 2. SIGNS

ORC Section Title / Description

§ 3767.32	Littering.
§ 4511.03	Emergency vehicles at red signal or stop sign.
§ 4511.051*	Freeways - prohibited acts.
§ 4511.07*	Local traffic regulations.
§ 4511.09*	Manual and specifications for uniform system of traffic control devices.
§ 4511.091	Arrest or citation based on radar, timing device or radio message from another officer.
§ 4511.10*	Placement and maintenance of traffic control devices.
§ 4511.101*	Placement of business logos on directional signs along interstates.
§ 4511.102*	Tourist-oriented directional sign program definitions.
§ 4511.103*	Administrative rules for placement of tourist-oriented directional signs and trailblazer markers.
§ 4511.104*	Participation in tourist-oriented directional sign program.
§ 4511.105*	Tourist-oriented directional signs to conform to federal manual of uniform traffic control devices.
§ 4511.106*	Local tourist-oriented directional sign programs.
§ 4511.11*	Local conformity to manual and specifications for uniform system of traffic control devices.
§ 4511.12*	Obedience to traffic control devices.
§ 4511.13*	Traffic control signal lights.
§ 4511.16*	Unauthorized sign or signal resembling a traffic control device.
§ 4511.17*	Tampering with traffic control device, freshly applied pavement material, manhole covers.
§ 4511.21*	Speed limits - assured clear distance.
§ 4511.211*	Establishing speed limit on private road or driveway.
§ 4511.212*	Complaint of noncompliance by local authority with school zone sign laws.
§ 4511.213*	Approaching stationary public safety vehicle displaying emergency light.
§ 4511.22*	Slow speed.
§ 4511.23*	Speed limits on bridges.

ORC Section Title / Description

§ 4511.25*	Lanes of travel upon roadways of sufficient width.
§ 4511.28*	Overtaking and passing upon the right of another vehicle.
§ 4511.31*	Establishing hazardous zones.
§ 4511.33*	Driving in marked lanes.
§ 4511.35*	Divided roadways.
§ 4511.36*	Rules for turns at intersections.
§ 4511.37*	Turning in roadway prohibited - exceptions.
§ 4511.43*	Right-of-way rule at through highways, stop signs, yield signs.
§ 4511.432*	Stop signs on private residential road or driveway.
§ 4511.47	Right-of-way of blind person.
§ 4511.50	Pedestrian walking in roadway.
§ 4511.61*	Stop Signs at dangerous highway crossings over railroad tracks.
§ 4511.65*	Designation of through highways.
§ 4511.66*	Prohibition against parking on highways.
§ 4511.68*	Parking – prohibited acts.
§ 4511.69*	Parking requirements..
§ 4511.71	Prohibition against driving upon closed highway.
§ 4511.712*	Obstructing intersection.
§ 4511.75*	Stopping for stopped school bus.
§ 4513.33	Unlawful vehicle weight.
§ 4513.40*	Warning sign before safety device at street crossing.
§ 4519.40*	Prohibited acts.
§ 4519.41	Operation of vehicle on or near highway, street or road.
§ 4955.33*	Crossbuck signs.
§ 5511.01	State highway system established.
§ 5511.02	Limited access highways and freeways.
§ 5511.05	Construction and maintenance of access roads.
§ 5515.04	Attaching guideposts or signs to utility poles.
§ 5516	Advertising on Interstate Highways.
§ 5517.03	Closing highways or bridges.
§ 5529.03	Acquiring land for rest and recreation areas and sanitary and other facilities.
§ 5533	Memorial Highways.
§ 5543.18	Erection of signposts.
§ 5571.01	Road improvements.
§ 5577.05	Prohibition against violation.
§ 5577.07	Reduction of weight and speed during times of thaws and moisture.
§ 5577.09	Rules - signs.
§ 5589.32	Erection of advertising signs resembling those required of railroad companies.
§ 5589.33	Advertising within the right-of-way of public highway.
§ 5591.42*	Carrying capacity of bridges - warning notice.

PART 3. MARKINGS**ORC Section Title / Description**

§ 4511.09*	Manual and specifications for uniform system of traffic control devices.
§ 4511.10*	Placement and maintenance of traffic control devices
§ 4511.11*	Local conformity to manual and specifications for uniform system of traffic control devices.
§ 4511.12*	Obedience to traffic control devices.
§ 4511.17*	Tampering with traffic control device, freshly applied pavement material, manhole covers.
§ 4511.27*	Overtaking and passing of vehicles proceeding in the same direction.
§ 4511.28*	Overtaking and passing upon the right of another vehicle.
§ 4511.29*	Driving to left of center of roadway in overtaking and passing traffic proceeding in same direction.
§ 4511.30*	Driving upon left side of roadway.
§ 4511.31*	Establishing hazardous zones.
§ 4511.33*	Driving in marked lanes.
§ 4511.35*	Divided roadways.
§ 4511.36*	Rules for turns at intersections.
§ 4511.46*	Right-of-way of pedestrian within crosswalk.

ORC Section Title / Description

§ 4511.48*	Right-of-way yielded by pedestrian.
§ 4511.49	Pedestrians on right half of crosswalk.
§ 4511.60	Driving through safety zone.
§ 4511.68*	Parking – prohibited acts.
§ 5521.01	Establishment and improvement of state highways within municipal corporation.

Part 4. HIGHWAY TRAFFIC SIGNALS**ORC Section Title / Description**

§ 4511.03	Emergency vehicles at red signal or stop sign.
§ 4511.09*	Manual and specifications for uniform system of traffic control devices.
§ 4511.11*	Local conformity to manual and specifications for uniform system of traffic control devices.
§ 4511.12*	Obedience to traffic control devices.
§ 4511.13*	Traffic control signal lights.
§ 4511.131*	Lane-use control signals.
§ 4511.132*	Operation at intersections with malfunctioning traffic control signal lights.
§ 4511.14*	Special pedestrian control signals
§ 4511.16*	Unauthorized sign or signal resembling a traffic control device.
§ 4511.17*	Tampering with traffic control device, freshly applied pavement marking material, manhole covers.
§ 4511.68*	Parking- prohibited acts.
§ 5555.02	General powers of board of county commissioners relating to public roads.
§ 5571.01	Road improvements.

PART 6. TEMPORARY TRAFFIC CONTROL**ORC Section Title / Description**

§ 3767.201	Destroying or removing barriers along limited access highways.
§ 4511.04*	Exception to traffic rules.
§ 4511.07*	Local traffic regulations.
§ 4511.09*	Manual and specifications for uniform system of traffic control devices.
§ 4511.10*	Placment and maintainance of traffic control devices.
§ 4511.11*	Local conformity to manual and specifications for uniform system of traffic contol devices.
§ 4511.12*	Obedience to traffic control devices.
§ 4511.17*	Tampering with traffic control device, freshly applied pavement material, manhole covers.
§ 4511.25*	Lanes of travel upon roadways of sufficient width.
§ 4511.68*	Parking - prohibited acts.
§ 4511.69*	Parking requirements.
§ 4511.71	Prohibition against driving upon closed highway.
§ 4511.74	Placing injurious material on highway.
§ 4511.98*	Signs as to increased penalties in construction zones.
§ 5501.27*	Increased penalties for traffic violations in construction zone.
§ 5515.01	Permits granted to use or occupy portions of road or highway.
§ 5515.02	Removal of structures constituting obstructions or interferences.
§ 5515.03	Occupants of land to remove all obstructions.
§ 5515.04	Attaching guideposts or signs to utility poles.
§ 5517.03	Closing highways or bridges.
§ 5517.04	Director to repair damage to county or township roads.
§ 5589.10	Digging, excavating, piling earth, or building fence on highway.
§ 5589.31	Construction of walk or ditch across highway.

PART 7. SCHOOL AREAS**ORC Section Title / Description**

§ 4511.21*	Speed limits – assured clear distance.
§ 4511.212*	Complaint of noncompliance by local authority with school zone sign laws.
§ 4511.75*	Stopping for stopped school bus.
§ 4511.76*	Administrative rules for school bus construction, design, equipment, operation and licensing.

PART 8. RAILROAD AND LIGHT RAIL TRANSIT GRADE CROSSINGS**ORC Section Title / Description**

§ 715.33	Streetcars.
§ 4511.01	Traffic laws – operation of motor vehicles definitions.
§ 4511.07*	Local traffic regulations.
§ 4511.12*	Obedience to traffic control devices.
§ 4511.13*	Traffic control signal lights.
§ 4511.132*	Operation at intersections with malfunctioning traffic control signal lights.
§ 4511.14*	Special pedestrian control signals.
§ 4511.20*	Operation in willful or wanton disregard of the safety of persons or property.
§ 4511.201*	Operation off street or highway in willful or wanton disregard of the safety of persons or property.
§ 4511.202*	Operation without being in reasonable control of vehicle, trolley, or streetcar.
§ 4511.21*	Speed limits – assured clear distance.
§ 4511.23*	Speed limits on bridges.
§ 4511.34*	Space between moving vehicles.
§ 4511.36*	Rules for turns at intersections.
§ 4511.38	Rules for starting and backing vehicles.
§ 4511.41*	Right-of-way rule at intersections.
§ 4511.42*	Right of way rule when turning left.
§ 4511.44*	Right of way at highway from any place other than another roadway.
§ 4511.45	Right-of-way of public safety or coroner's vehicle.
§ 4511.46*	Right-of-way of pedestrian within crosswalk.
§ 4511.48*	Right-of-way yielded by pedestrian.
§ 4511.50	Pedestrian walking in roadway.
§ 4511.57	Passing on left side of streetcar.
§ 4511.58	Vehicle shall not pass streetcar discharging passengers - exception.
§ 4511.59	Driving and turning in front of streetcars.
§ 4511.61*	Stop signs at dangerous highway crossings over railroad tracks.
§ 4511.62	Stopping at railroad grade crossing.
§ 4511.63*	Stopping at grade crossings.
§ 4511.64*	Slow-moving vehicles or equipment crossing railroad tracks.
§ 4511.68*	Parking – prohibited acts.
§ 4511.712*	Obstructing intersection.
§ 4513.40*	Warning sign before safety device at street crossing.
§ 4905.04	Power to regulate public utilities and railroads.
§ 4907.47*	Installing crossing signals.
§ 4907.471*	Surveys determining probability of accident at crossing.
§ 4907.474	Closing crossings to vehicular traffic.
§ 4907.475	Closing rural crossings.
§ 4907.48*	Regulation of crossing signals.
§ 4907.49*	Dangerous crossings.
§ 4907.52*	Safety devices at grade crossings.
§ 4951.02*	Grant of right to construct.
§ 4951.12	Use of public highways.
§ 4951.14*	Crossings.
§ 4951.45	Electric railways or interurban railroads operating cars along third rail required to maintain fences
§ 4955.201*	Abandonment of railroad track.
§ 4955.33*	Crossbuck signs.
§ 5589.32	Erection of advertising signs resembling those required of railroad companies.

PART 9. BICYCLE FACILITIES**ORC Section Title / Description**

§ 4501.01	Motor vehicles definitions.
§ 4511.01	Traffic laws – operation of motor vehicles definitions.
§ 4511.051*	Freeways – prohibited acts.
§ 4511.07*	Local traffic regulations.
§ 4511.512	Operation of electric personal assistive mobility devices.

ORC Section Title / Description

§ 4511.52	Bicycles – issuance of ticket – points not assessed..
§ 4511.521	Operation of motorized bicycles.
§ 4511.53	Operation of bicycles, motorcycles and snowmobiles.
§ 4511.55	Operating bicycles and motorcycles on roadway.
§ 4511.68*	Parking – prohibited acts.
§ 4511.711	Driving on sidewalk.
§ 4511.713	Use of bicycle paths.

HAZARDOUS MATERIALS**ORC Section Title / Description**

§ 4905.80	Uniform registration and uniform permitting of persons engaged in the highway transportation of hazardous materials rules.
§ 4905.81	Highway routing of hazardous materials rules.

MEMORIAL HIGHWAYS**ORC Section Title / Description**

§ 5511.01	State highway system established.
§ 5533	Memorial Highways.
§ 5541.04	Changing name of road.
§ 5543.04	Naming and numbering of roads and bridges - maps.
§ 5511.09	Procedure for naming of highway.
§ 5529.08	Memorial markers listing POWS/MIAS at any improved roadside rest area.
§ 5913.30	Placement of memorial markers listing POWS/MIAS at highway rest areas.

MOTORCYCLES**ORC Section Title / Description**

§ 505.17	Regulations for engine noise and vehicle parking.
§ 4511.01	Traffic laws – operation of motor vehicles definitions.
§ 4511.53	Operation of bicycles, motorcycles and snowmobiles.
§ 4511.55	Operating bicycles and motorcycles on roadway.
§ 4513.221	Local regulation of passenger car and motorcycle noise.
§ 4519.41	Operation of vehicle on or near highway, street or road.

PEDESTRIANS**ORC Section Title / Description**

§ 729.12	New curbs to have ramped curbing for handicapped.
§ 737.022	Authority of director of public safety to promulgate certain traffic regulations.
§ 4511.01	Traffic laws – operation of motor vehicles definitions.
§ 4511.051*	Freeways – prohibited acts.
§ 4511.12*	Obedience to traffic control devices.
§ 4511.13*	Traffic control signal lights.
§ 4511.14*	Special pedestrian control signals.
§ 4511.441	Right-of-way of pedestrian on sidewalk.
§ 4511.452	Right-of-way yielded by pedestrian to public safety vehicle.
§ 4511.46*	Right-of-way of pedestrian within crosswalk.
§ 4511.47	Right-of-way of blind person.
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§ 4511.481*	Intoxicated or drugged pedestrian on highway.
§ 4511.49	Pedestrians on right half of crosswalk.
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§ 4511.511	Pedestrian on bridge or railroad grade crossing.
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§ 4907.474	Closing crossings to vehicular traffic.
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SPEEDS**ORC Section Title / Description**

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- § 4511.091 Arrest or citation based on radar, timing device or radio message from another officer.
- § 4511.21* Speed limits – assured clear distance.
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- § 4511.23* Speed limits on bridges.
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TRAFFIC REGULATIONS**ORC Section Title / Description**

- § 3767.201 Destroying or removing barriers along limited access highways.
- § 4511.07* Local traffic regulations.
- § 4511.12* Obedience to traffic control devices.
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- § 4511.202* Operation without being in reasonable control of vehicle, trolley, or streetcar.
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- § 4511.26* Vehicles traveling in opposite directions.
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- § 951.02 Animals running at large on public roads - grazing on another's land.
- § 4511.06* Applicability and uniformity of traffic laws.
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- § 4511.20* Operation in willful or wanton disregard of the safety of persons or property.

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APPENDIX B2. OHIO REVISED CODE SECTIONS

For your convenience, the Ohio Revised Code (ORC) Sections listed below have been reprinted in this Appendix. Although we have checked for any recent changes in the sections quoted, we cannot guarantee the accuracy of the following copies of ORC text at any particular time. The ORC is available through local libraries, and a searchable version is also available on the web at <http://codes.ohio.gov/>.

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§ 4511.04. Exception to traffic rules.

- (A) Sections 4511.01 to 4511.18, 4511.20 to 4511.78, 4511.99, and 4513.01 to 4513.37 of the Revised Code do not apply to persons, teams, motor vehicles, and other equipment while actually engaged in work upon the surface of a highway within an area designated by traffic control devices, but apply to such persons and vehicles when traveling to or from such work.
- (B) The driver of a highway maintenance vehicle owned by this state or any political subdivision of this state, while the driver is engaged in the performance of official duties upon a street or highway, provided the highway maintenance vehicle is equipped with flashing lights and such other markings as are required by law, and such lights are in operation when the driver and vehicle are so engaged, shall be exempt from criminal prosecution for violations of sections 4511.22, 4511.25, 4511.26, 4511.27, 4511.28, 4511.30, 4511.31, 4511.33, 4511.35, 4511.66, 4513.02, and 5577.01 to 5577.09 of the Revised Code.
- (C) (1) This section does not exempt a driver of a highway maintenance vehicle from civil liability arising from the violation of sections 4511.22, 4511.25, 4511.26, 4511.27, 4511.28, 4511.30, 4511.31, 4511.33, 4511.35, 4511.66, or 4513.02 or sections 5577.01 to 5577.09 of the Revised Code.
- (2) This section does not exempt the driver of a vehicle that is engaged in the transport of highway maintenance equipment from criminal liability for a violation of sections 5577.01 to 5577.09 of the Revised Code.
- (D) As used in this section, "highway maintenance vehicle" means a vehicle used in snow and ice removal or road surface maintenance, including a snow plow, traffic line striper, road sweeper, mowing machine, asphalt distributing vehicle, or other such vehicle designed for use in specific highway maintenance activities.

HISTORY: GC § 6307-4; 119 v 766, § 4; Bureau of Code Revision, 10-1-53; 133 v S 77. Eff 11-17-69; 150 v H 87, § 1, eff.6-30-03.

§ 4511.051. Freeways – prohibited acts.

- (A) No person, unless otherwise directed by a police officer, shall:
- (1) As a pedestrian, occupy any space within the limits of the right-of-way of a freeway, except: in a rest area; on a facility that is separated from the roadway and shoulders of the freeway and is designed and appropriately marked for pedestrian use; in the performance of public works or official duties; as a result of an emergency caused by an accident or breakdown of a motor vehicle; or to obtain assistance;
- (2) Occupy any space within the limits of the right-of-way of a freeway, with: an animal-drawn vehicle; a ridden or led animal; herded animals; a pushcart; a bicycle, except on a facility that is separated from the roadway and shoulders of the freeway and is designed and appropriately marked for bicycle use; a bicycle with motor attached; a motor driven cycle with a motor which produces not to exceed five brake horsepower; an agricultural tractor; farm machinery; except in the performance of public works or official duties.
- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: 131 v 1099 (Eff 9-1-65); 132 v H 1 (Eff 2-21-67); 143 v H 258. Eff 11-2-89; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.06. Applicability and uniformity of traffic laws.

Sections 4511.01 to 4511.78, 4511.99, and 4513.01 to 4513.37 of the Revised Code shall be applicable and uniform throughout this state and in all political subdivisions and municipal corporations of this state. No local authority shall enact or enforce any rule in conflict with such sections, except that this section does not prevent local authorities from exercising the rights granted them by Chapter 4521. of the Revised Code and does not limit the effect or application of the provisions of that chapter.

HISTORY: GC § 6307-6; 119 v 766, § 6; Bureau of Code Revision, 10-1-53; 139 v H 707. Eff 1-1-83.

§ 4511.07. Local traffic regulations.

- (A) Sections 4511.01 to 4511.78, 4511.99, and 4513.01 to 4513.37 of the Revised Code do not prevent local authorities from carrying out the following activities with respect to streets and highways under their jurisdiction and within the reasonable exercise of the police power:

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- (1) Regulating the stopping, standing, or parking of vehicles, trackless trolleys, and streetcars;
- (2) Regulating traffic by means of police officers or traffic control devices;
- (3) Regulating or prohibiting processions or assemblages on the highways;
- (4) Designating particular highways as one-way highways and requiring that all vehicles, trackless trolleys, and streetcars on the one-way highways be moved in one specific direction;
- (5) Regulating the speed of vehicles, streetcars, and trackless trolleys in public parks;
- (6) Designating any highway as a through highway and requiring that all vehicles, trackless trolleys, and streetcars stop before entering or crossing a through highway, or designating any intersection as a stop intersection and requiring all vehicles, trackless trolleys, and streetcars to stop at one or more entrances to the intersection;
- (7) Regulating or prohibiting vehicles and trackless trolleys from passing to the left of safety zones;
- (8) Regulating the operation of bicycles; provided that no such regulation shall be fundamentally inconsistent with the uniform rules of the road prescribed by this chapter and that no such regulation shall prohibit the use of bicycles on any public street or highway except as provided in section 4511.051 of the Revised Code;
- (9) Requiring the registration and licensing of bicycles, including the requirement of a registration fee for residents of the local authority;
- (10) Regulating the use of certain streets by vehicles, streetcars, or trackless trolleys.

(B) No ordinance or regulation enacted under division (D), (E), (F), (G), or (I) of this section shall be effective until signs giving notice of the local traffic regulations are posted upon or at the entrance to the highway or part of the highway affected, as may be most appropriate.

Every ordinance, resolution, or regulation enacted under division (A) of this section shall be enforced in compliance with section 4511.071 of the Revised Code, unless the local authority that enacted it also enacted an ordinance, resolution, or regulation pursuant to division (A) of section 4521.02 of the Revised Code that specifies that a violation of it shall not be considered a criminal offense, in which case the ordinance, resolution, or regulation shall be enforced in compliance with Chapter 4521. of the Revised Code.

HISTORY: GC § 6307-7; 119 v 766; Bureau of Code Revision, 10-1-53; 129 v 1037 (Eff 8-11-61); 133 v S 452 (Eff 7-17-70); 135 v H 995 (Eff 1-1-75); 138 v S 257 (Eff 6-25-80); 139 v H 707. Eff 1-1-83; 9-21-06.

§ 4511.09. Manual and specifications for uniform system of traffic control devices.

The department of transportation shall adopt a manual for a uniform system of traffic control devices, including signs denoting names of streets and highways, for use upon any street, highway, bikeway, or private road open to public travel within this state. Such uniform system shall correlate with, and so far as possible conform to, the system approved by the federal highway administration.

HISTORY: GC § 6307-9; 119 v 766, § 9; Bureau of Code Revision, 10-1-53; 135 v H 200 (Eff 9-28-73); 129 v H 349. Eff 4-12-12.

The manual referred to is the "Ohio Manual of Uniform Traffic Control Devices for Streets and Highways" prepared by the Ohio Department of Transportation, Office of Traffic Engineering, and for sale by the Office of Contracts, 1980 W. Broad St., P.O. Box 899, Columbus, Ohio 43216-0899.

§ 4511.10. Placing and maintenance of traffic control devices.

The department of transportation may place and maintain traffic control devices, conforming to its manual and specifications, upon all state highways as are necessary to indicate and to carry out sections 4511.01 to 4511.78 and 4511.99 of the Revised Code, or to regulate, warn, or guide traffic.

No local authority shall place or maintain any traffic control device upon any highway under the jurisdiction of the department except by permission of the director of transportation.

HISTORY: GC § 6307-10; 119 v 766, § 10; Bureau of Code Revision, 10-1-53; 135 H 200. Eff 9-28-73.

The manual referred to is the "Ohio Manual of Uniform Traffic Control Devices for Streets and Highways" prepared by the Ohio Department of Transportation, Office of Traffic Engineering, and for sale by the Office of Contracts, 1980 W. Broad St., P.O. Box 899, Columbus, Ohio 43216-0899.

§ 4511.101. Placement of business logos on directional signs along interstates.

- (A) The director of transportation, in accordance with 23 U.S.C.A. 109(d), 131(f), and 315, as amended, shall establish a program for the placement of business logos for identification purposes on state directional signs within the rights-of-way of divided, multi-lane, limited access highways in both rural and urban areas.
- (B) (1) The director shall establish, and may revise at any time, a fee for participation in the business logo sign program. All direct and indirect costs of the business logo sign program established pursuant to this section shall be fully paid by the businesses applying for participation in the program. All direct and indirect costs of the business logo sign program established pursuant to this section shall be fully paid by the businesses applying for participation in the program. The direct and indirect costs of the program shall include, but not be limited to, the cost of capital, directional signs, blanks, posts, logos, installation, repair, engineering, design, insurance, removal, replacement, and administration.
- (2) Money generated from participating businesses in excess of the direct and indirect costs and any reasonable profit earned by a person awarded a contract under division (C) of this section shall be remitted to the department.
- (3) Nothing in this chapter shall be construed to prohibit the director from establishing such a program. If the department operates such a program and does not contract with a private person to operate it, all money collected from participating businesses shall be deposited and credited as prescribed in division (B)(2) of this section.
- (C) The director, in accordance with rules adopted pursuant to Chapter 119. of the Revised Code, may contract with any private person to operate, maintain, and market the business logo sign program. The contract may allow for a reasonable profit to be earned by the successful applicant. In awarding the contract, the director shall consider the skill, expertise, prior experience, and other qualifications of each applicant.
- (D) As used in this section, "urban area" means an area having a population of fifty thousand or more according to the most recent federal census and designated as such on urban maps prepared by the department.
- (E) In implementing this section, neither the department nor the director shall do either of the following:
- (1) Limit the right of any person to erect, maintain, repair, remove, or utilize any off-premises or on-premises advertising device;
 - (2) Make participation in the business logo sign program conditional upon a business agreeing to limit, discontinue, withdraw, modify, alter, or change any advertising or sign.
- (F) The program shall permit the business logo signs of a seller of motor vehicle fuel to include on the seller's signs a marking or symbol indicating that the seller sells one or more types of alternative fuel so long as the seller in fact sells that fuel.

As used in this division, "alternative fuel" has the same meaning as in section 125.831 of the Revised Code.

HISTORY: 143 v H 356 (Eff 11-2-89); 143 v H 737 (Eff 4-11-91); 145 v H 154 (Eff 6-30-93); 146 v H 107 (Eff 6-30-95); 146 v H 353 (Eff 9-17-96); 146 v H 670 (Eff 12-2-96); 147 v H 210 (Eff 6-30-97); 147 v H 462. Eff 3-18-99. 07-06-2006; 2008 HB562 (vetoed provisions) 09-22-2008

§ 4511.102. Tourist-oriented directional sign program definitions.

As used in sections 4511.102 to 4511.106 of the Revised Code:

- (A) "Tourist-oriented activity" includes any lawful cultural, historical, recreational, educational, or commercial activity a major portion of whose income or visitors are derived during the normal business season from motorists not residing in the immediate area of the activity and attendance at which is no less than two thousand visitors in any consecutive twelve-month period.
- (B) "Eligible attraction" means any tourist-oriented activity that meets all of the following criteria:
- (1) Is not eligible for inclusion in the business logo sign program established under section 4511.101 of the Revised Code at that intersection;
 - (2) If currently advertised by signs adjacent to a highway on the interstate system or state system, those signs are consistent with Chapter 5516. of the Revised Code and the "National Highway Beautification Act of 1965," 79 Stat. 1028, 23 U.S.C. 131, and the national standards, criteria, and rules adopted pursuant to that act;
 - (3) Is within ten miles of the highway for which signing is sought under sections 4511.102 to 4511.105 of the Revised Code;
 - (4) Meets any additional criteria developed by the director of transportation and adopted by the director as rules in accordance with Chapter 119. of the Revised Code.

- (C) "Interstate system" has the same meaning as in section 5516.01 of the Revised Code.
- (D) "Commercial activity" means a farm market, winery, bed and breakfast, lodging that is not a franchise or part of a national chain, antiques shop, craft store, or gift store.

HISTORY: 145 v H 687 (Eff 10-12-94); 146 v H 217 (Eff 11-1-95); 147 v H 210 (Eff 6-30-97); 147 v H 215 (Eff 6-30-97); 129 v H 349. Eff 4-12-12.

§ 4511.103. Administrative rules for placement of tourist-oriented directional signs and trailblazer markers.

- (A) The director of transportation, in accordance with 23 U.S.C. 109(d) and 315, with the provisions of the manual of uniform traffic control devices relating to tourist-oriented directional signs and trailblazer markers, and with Chapter 119. of the Revised Code, shall adopt rules to carry out a program for the placement of tourist-oriented directional signs and trailblazer markers within the rights-of-way of those portions of rural state highways that are not on the interstate system. The rules shall prohibit the placement of tourist-oriented directional signs and trailblazer markers at interchanges on state system expressways and freeways. The rules shall include, but need not be limited to, all of the following:
- (1) The form of the application to participate in the program. The form shall include such necessary information as the director requires to ensure that a tourist-oriented activity for which signing is sought is an eligible attraction.
 - (2) Provisions for covering or otherwise obscuring signs during off-seasons for eligible attractions that operate on a seasonal basis;
 - (3) A determination as to the circumstances that justify including on a sign the hours of operation of an eligible attraction;
 - (4) Criteria for use of the signs at at-grade intersections on expressways.
- (B) The program established pursuant to division (A) of this section may be operated, maintained, and marketed either by the department of transportation or by any private person with whom the director, in accordance with rules adopted by the director pursuant to Chapter 119. of the Revised Code, contracts for the operation, maintenance, and marketing. The rules shall describe the terms of the contract and shall allow for a reasonable profit to be made by the successful applicant. In awarding the contract, the director shall consider the skill, expertise, prior experience, and other qualifications of each applicant.
- (C) All direct and indirect costs of the program shall be fully paid by the eligible attractions that participate in the program. The director shall develop a fee schedule for participation in the program, and shall charge each program participant the appropriate fee. Direct and indirect costs include, but are not limited to, the cost of all of the following:
- (1) Capital;
 - (2) Insurance;
 - (3) Directional signs, sign blanks, and posts, and the design, engineering, installation, repair, replacement, and removal of directional signs and posts;
 - (4) Program administration.
- (D) Money generated from participating businesses in excess of the direct and indirect costs and any reasonable profit earned by a person awarded a contract under division (B) of this section shall be remitted to the department, which shall deposit all such money into the state treasury to the credit of the highway operating fund created by section 5735.291 of the Revised Code
- (E) Nothing in this chapter shall be construed to prohibit the director from establishing such a program. If the department operates such a program and does not contract with a private entity to operate the program, all money collected from participating businesses shall be deposited into the state treasury to the credit of the highway operating fund.

HISTORY: 145 v H 687 (Eff 10-12-94); 146 v H 217 (Eff 11-1-95); 129 v H 349. Eff 4-12-12.

§ 4511.104. Participation in tourist-oriented directional sign program

- (A) The operator of any tourist-oriented activity who wishes to participate in the tourist-oriented directional sign program established under sections 4511.102 to 4511.105 of the Revised Code shall forward a completed application, as provided in section 4511.103 of the Revised Code, to the director of transportation or person holding a contract under division (B) of section 4511.103 of the Revised Code. If the director or person finds the application to be complete and determines that the activity constitutes an eligible attraction, the director or person shall so notify the applicant in writing. Upon receipt of the notice, the applicant shall forward to the director or person, in a manner determined by the director, the amount of the fee due and thereupon shall execute an advertising agreement in a form prescribed by the director.

- (B) The operator of any eligible attraction for which an advertising agreement is in effect under this section immediately shall forward the advertising agreement to the director or person holding a contract under division (B) of section 4511.103 of the Revised Code for cancellation if the eligible attraction ceases to be such an attraction.
- (C) The director, when having reasonable cause to believe that an eligible attraction for which an advertising agreement is in effect has ceased to be such an attraction, immediately and without conducting an adjudication shall issue an order canceling the advertising agreement and forward notice of the cancellation in writing to the operator of the attraction together with information that the cancellation may be appealed in accordance with section 119.12 of the Revised Code. If no appeal is entered within the period specified in that section or if an appeal is entered but cancellation of the advertising agreement subsequently is affirmed, the director shall order the removal of the signs relating to the former eligible attraction.
- (D) Any person holding a contract under division (B) of section 4511.103 of the Revised Code, when having reasonable cause to believe that an eligible attraction for which an advertising agreement is in effect has ceased to be such an attraction, immediately shall notify the director in writing of that fact. Upon receipt of the notice, the director shall proceed in accordance with division (C) of this section.

HISTORY: 145 v H 687 (Eff 10-12-94); 146 v H 217. Eff 11-1-95.

§ 4511.105. Tourist-oriented directional signs to conform to federal manual of uniform traffic control devices.

Tourist-oriented directional signs shall conform to the specifications contained in the manual of uniform traffic control devices.

If more than one eligible attraction requires a sign at the same location, multiple signs may be combined on the same panel in accordance with the manual of uniform traffic control devices.

Advance signing may be installed in those situations where sight distance, intersection vehicle maneuvers, or other vehicle operating characteristics require advance notice of an eligible attraction in order to reduce vehicle conflicts and improve highway safety.

The design, arrangement, size, and location of tourist-oriented directional signs, including advance signs and trailblazer markers, authorized under sections 4511.102 to 4511.105 of the Revised Code shall conform to the applicable specifications contained in the manual of uniform traffic control devices.

HISTORY: 145 v H 687 (Eff 10-12-94); 146 v H 217. Eff 11-1-95.

§ 4511.106. Local tourist-oriented directional sign programs.

The legislative authority of a local authority may adopt a resolution establishing a program for the placement of tourist-oriented directional signs and trailblazer markers within the rights-of-way of streets and highways under its jurisdiction. Any program established under this section shall conform to the rules and specifications contained in the program established by the director of transportation pursuant to sections 4511.102 to 4511.105 of the Revised Code and the applicable provisions of the manual of uniform traffic control devices. If a local authority establishes a program under this section, the local authority may request guidance from the department of transportation in structuring, implementing, and administering its program, but the local authority is solely responsible for the structure and actual implementation and administration of its program, including, but not limited to, the evaluation and review of applications to participate in the local program and the execution of advertising agreements with eligible attractions.

HISTORY: 145 v H 687 (Eff 10-12-94); 146 v H 217 (Eff 11-1-95); 129 v H 349. Eff 4-12-12.

§ 4511.11. Local conformity to manual and specifications for uniform system of traffic control devices..

- (A) Local authorities in their respective jurisdictions shall place and maintain traffic control devices in accordance with the department of transportation manual for a uniform system of traffic control devices, adopted under section 4511.09 of the Revised Code, upon highways under their jurisdiction as are necessary to indicate and to carry out sections 4511.01 to 4511.76 and 4511.99 of the Revised Code, local traffic ordinances, or to regulate, warn, or guide traffic.
- (B) The director of transportation may require to be removed any traffic control device that does not conform to the manual for a uniform system of traffic control devices on the extensions of the state highway system within municipal corporations.
- (C) No village shall place or maintain any traffic control signal upon an extension of the state highway system within the village without first obtaining the permission of the director. The director may revoke the permission and may require to be removed any traffic control signal that has been erected without

the director's permission on an extension of a state highway within a village, or that, if erected under a permit granted by the director, does not conform to the state manual, or that is not operated in accordance with the terms of the permit.

- (D) All traffic control devices erected on any street, highway, alley, bikeway, or private road open to public travel shall conform to the state manual and specifications.
- (E) No person, firm, or corporation shall sell or offer for sale to local authorities any traffic control device that does not conform to the state manual, except by permission of the director.
- (F) No local authority shall purchase or manufacture any traffic control device that does not conform to the state manual, except by permission of the director.
- (G) Whoever violates division (E) of this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-11; 119 v 766, § 11; 121 v 684; Bureau of Code Revision, 10-1-53; 130 v 1081 (Eff 10-14-63); 130 v PtlI, H 5 (Eff 12-16-64); 131 v 1100 (Eff 11-1-65); 135 v H 200 (Eff 9-28-73); 143 v H 258 (Eff 11-2-89); 143 v H 162 (Eff 6-28-90); 149 v S 123, § 1, (Eff 1-1-04); 129 v H 349. Eff 4-12-12.

§ 4511.12. Obedience to traffic control devices.

- (A) No pedestrian, driver of a vehicle, or operator of a streetcar or trackless trolley shall disobey the instructions of any traffic control device placed in accordance with this chapter, unless at the time otherwise directed by a police officer.

No provisions of this chapter for which signs are required shall be enforced against an alleged violator if at the time and place of the alleged violation an official sign is not in proper position and sufficiently legible to be seen by an ordinarily observant person. Whenever a particular section of this chapter does not state that signs are required, that section shall be effective even though no signs are erected or in place.

- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-12; 119 v 766, § 12; 124 v 514; Bureau of Code Revision, 10-1-53; 143 v H 258. Eff 11-2-89; 149 v S123, § 1, eff. 1-1-04.

§ 4511.13. Traffic control signal lights.

Highway traffic signal indications for vehicles and pedestrians shall have the following meanings:

- (A) Steady green signal indication:

- (1) (a) Vehicular traffic, streetcars, and trackless trolleys facing a circular green signal indication are permitted to proceed straight through or turn right or left or make a u-turn movement except as such movement is modified by a lane-use sign, turn prohibition sign, lane marking, roadway design, separate turn signal indication, or other traffic control device. Such vehicular traffic, including vehicles turning right or left or making a u-turn movement, shall yield the right-of-way to both of the following:

- (i) Pedestrians lawfully within an associated crosswalk;
- (ii) Other vehicles lawfully within the intersection.

- (b) In addition, vehicular traffic turning left or making a u-turn movement to the left shall yield the right-of-way to other vehicles approaching from the opposite direction so closely as to constitute an immediate hazard during the time when such turning vehicle is moving across or within intersection.

- (2) Vehicular traffic, streetcars, and trackless trolleys facing a green arrow signal indication, displayed alone or in combination with another signal indication, are permitted to cautiously enter the intersection only to make the movement indicated by such arrow, or such other movement as is permitted by other indications displayed at the same time. Such vehicular traffic, streetcars, and trackless trolleys, including vehicles turning right or left or making a u-turn movement, shall yield the right-of-way to both of the following:

- (a) Pedestrians lawfully within an associated crosswalk;
- (b) Other traffic lawfully using the intersection.

- (3) (a) Unless otherwise directed by a signal indication, as provided in section 4511.14 of the Revised Code, pedestrians facing a circular green signal indication are permitted to proceed across the roadway within any marked or unmarked associated crosswalk. The pedestrian shall yield the

right-of-way to vehicles lawfully within the intersection or so close as to create an immediate hazard at the time that the green signal indication is first displayed.

(b) Pedestrians facing a green arrow signal indication, unless otherwise directed by a pedestrian signal indication or other traffic control device, shall not cross the roadway.

(B) Steady yellow signal indication:

- (1) Vehicular traffic, streetcars, and trackless trolleys facing a steady circular yellow signal indication are thereby warned that the related green movement or the related flashing arrow movement is being terminated or that a steady red signal indication will be exhibited immediately thereafter when vehicular traffic, streetcars, and trackless trolleys shall not enter the intersection. The provisions governing vehicular operation under the movement being terminated shall continue to apply while the steady circular yellow signal indication is displayed.
- (2) Vehicular traffic facing a steady yellow arrow signal indication is thereby warned that the related green arrow movement or the related flashing arrow movement is being terminated. The provisions governing vehicular operation under the movement being terminated shall continue to apply while the steady yellow arrow signal indication is displayed.
- (3) Pedestrians facing a steady circular yellow or yellow arrow signal indication, unless otherwise directed by a pedestrian signal indication as provided in section 4511.14 of the Revised Code or other traffic control device, shall not start to cross the roadway.

(C) Steady red signal indication:

- (1) (a) Vehicular traffic, streetcars, and trackless trolleys facing a steady circular red signal indication, unless entering the intersection to make another movement permitted by another signal indication, shall stop at a clearly marked stop line; but if there is no stop line, traffic shall stop before entering the crosswalk on the near side of the intersection; or if there is no crosswalk, then before entering the intersection; and shall remain stopped until a signal indication to proceed is displayed except as provided in divisions (C)(1), (2), and (3) of this section.
 - (b) Except when a traffic control device is in place prohibiting a turn on red or a steady red arrow signal indication is displayed, vehicular traffic facing a steady circular red signal indication is permitted to enter the intersection to turn right, or to turn left from a one-way street, after stopping. The right to proceed with the turn shall be subject to the provisions that are applicable after making a stop at a stop sign.
- (2) (a) Vehicular traffic, streetcars, and trackless trolleys facing a steady red arrow signal indication shall not enter the intersection to make the movement indicated by the arrow and, unless entering the intersection to make another movement permitted by another signal indication, shall stop at a clearly marked stop line; but if there is no stop line, before entering the crosswalk on the near side of the intersection; or if there is no crosswalk, then before entering the intersection; and shall remain stopped until a signal indication or other traffic control device permitting the movement indicated by such red arrow is displayed.
 - (b) When a traffic control device is in place permitting a turn on a steady red arrow signal indication, vehicular traffic facing a steady red arrow indication is permitted to enter the intersection to make the movement indicated by the arrow signal indication, after stopping. The right to proceed with the turn shall be limited to the direction indicated by the arrow and shall be subject to the provisions that are applicable after making a stop at a stop sign.
- (3) Unless otherwise directed by a pedestrian signal indication as provided in section 4511.14 of the Revised Code or other traffic control device, pedestrians facing a steady circular red or steady red arrow signal indication shall not enter the roadway.
- (4) Local authorities by ordinance, or the director of transportation on state highways, may prohibit a right or a left turn against a steady red signal at any intersection, which shall be effective when signs giving notice thereof are posted at the intersection. (D) In the event an official traffic-control signal is erected and maintained at a place other than an intersection, the provisions of this section shall be applicable except as to those provisions which by their nature can have no application. Any stop required shall be made at a sign or marking on the pavement indicating where the stop shall be made, but in the absence of any such sign or marking the stop shall be made at the signal.

(D) A flashing green signal indication has no meaning and shall not be used.

(E) Flashing yellow signal indication:

- (1) (a) Vehicular traffic, on an approach to an intersection, facing a flashing circular yellow signal indication, is permitted to cautiously enter the intersection to proceed straight through or turn right or left or make a u-turn movement except as such movement is modified by lane-use signs, turn prohibition signs, lane markings, roadway design, separate turn signal indications, or other

traffic control devices. Such vehicular traffic, including vehicles turning right or left or making a u-turn movement, shall yield the right-of-way to both of the following:

- (i) Pedestrians lawfully within an associated crosswalk;
 - (ii) Other vehicles lawfully within the intersection.
 - (b) In addition, vehicular traffic turning left or making a u-turn to the left shall yield the right-of-way to other vehicles approaching from the opposite direction so closely as to constitute an immediate hazard during the time when such turning vehicle is moving across or within the intersection.
- (2) (a) Vehicular traffic, on an approach to an intersection, facing a flashing yellow arrow signal indication, displayed alone or in combination with another signal indication, is permitted to cautiously enter the intersection only to make the movement indicated by such arrow, or other such movement as is permitted by other signal indications displayed at the same time. Such vehicular traffic, including vehicles turning right or left or making a u-turn, shall yield the right-of-way to both of the following:
- (i) Pedestrians lawfully within an associated crosswalk;
 - (ii) Other vehicles lawfully within the intersection.
- (b) In addition, vehicular traffic turning left or making a u-turn to the left shall yield the right-of-way to other vehicles approaching from the opposite direction so closely as to constitute an immediate hazard during the time when such turning vehicle is moving across or within the intersection.
- (3) Pedestrians facing any flashing yellow signal indication at an intersection, unless otherwise directed by a pedestrian signal indication or other traffic control device, are permitted to proceed across the roadway within any marked or unmarked associated crosswalk. Pedestrians shall yield the right-of-way to vehicles lawfully within the intersection at the time that the flashing yellow signal indication is first displayed.
- (4) When a flashing circular yellow signal indication is displayed as a beacon to supplement another traffic control device, road users are notified that there is a need to pay additional attention to the message contained thereon or that the regulatory or warning requirements of the other traffic control device, which might not be applicable at all times, are currently applicable.
- (F) Flashing red signal indication:
- (1) Vehicular traffic, on an approach to an intersection, facing a flashing circular red signal indication, shall stop at a clearly marked stop line; but if there is no stop line, before entering the crosswalk on the near side of the intersection; or if there is no crosswalk, at the point nearest the intersecting roadway where the driver has a view of approaching traffic on the intersecting roadway before entering the intersection. The right to proceed shall be subject to the provisions that are applicable after making a stop at a stop sign.
 - (2) Pedestrians facing any flashing red signal indication at an intersection, unless otherwise directed by a pedestrian signal indication or other traffic control device, are permitted to proceed across the roadway within any marked or unmarked associated crosswalk. Pedestrians shall yield the right-of-way to vehicles lawfully within the intersection at the time that the flashing red signal indication is first displayed.
 - (3) When a flashing circular red signal indication is displayed as a beacon to supplement another traffic control device, road users are notified that there is a need to pay additional attention to the message contained thereon or that the regulatory requirements of the other traffic control device, which might not be applicable at all times, are currently applicable. Use of this signal indication shall be limited to supplementing stop, do not enter, or wrong way signs, and to applications where compliance with the supplemented traffic control device requires a stop at a designated point.
- (G) In the event an official traffic-control signal is erected and maintained at a place other than an intersection, the provisions of this section shall be applicable except as to those provisions which by their nature can have no application. Any stop required shall be made at a sign or marking on the pavement indicating where the stop shall be made, but in the absence of any such sign or marking the stop shall be made at the signal.
- (H) This section does not apply at railroad grade crossings. Conduct of drivers of vehicles, trackless trolleys, and streetcars approaching railroad grade crossings shall be governed by sections 4511.61 and 4511.62 of the Revised Code.

HISTORY: GC § 6307-13; 119 v 766, § 13; 124 v 514; Bureau of Code Revision, 10-1-53; 130 v 1081 (Eff 8-

9-63); 135 v S 263 (Eff 7-3-74); 135 v H 99 (Eff 7-1-75); 137 v H 171 (Eff 8-26-77); 140 v H 703 (Eff 3-28-85); 129 v H 349. Eff 4-12-12.

§ 4511.131. Lane-use control signals.

The meanings of lane-use control signal indications are as follows:

(A) A steady downward green arrow:

A road user is permitted to drive in the lane over which the arrow signal indication is located.

(B) A steady yellow "X":

A road user is to prepare to vacate the lane over which the signal indication is located because a lane control change is being made to a steady red "X" signal indication.

(C) A steady white two-way left-turn arrow:

A road user is permitted to use a lane over which the signal indication is located for a left turn, but not for through travel, with the understanding that common use of the lane by oncoming road users for left turns also is permitted.

(D) A steady white one-way left-turn arrow:

A road user is permitted to use a lane over which the signal indication is located for a left turn, without opposing turns in the same lane, but not for through travel.

(E) A steady red "X":

A road user is not permitted to use the lane over which the signal indication is located and that this signal indication shall modify accordingly the meaning of other traffic controls present.

HISTORY: 130 v 1083 (Eff 8-9-63); 135 v S 263 (Eff 7-3-74); 129 v H 349. Eff 4-12-12.

§ 4511.132. Operation at intersections with malfunctioning traffic control signal lights.

(A) The driver of a vehicle, streetcar, or trackless trolley who approaches an intersection where traffic is controlled by traffic control signals shall do all of the following, if the signal facing the driver either exhibits no colored lights or colored lighted arrows or exhibits a combination of such lights or arrows that fails to clearly indicate the assignment of right-of-way:

(1) Stop at a clearly marked stop line, but if none, stop before entering the crosswalk on the near side of the intersection, or, if none, stop before entering the intersection;

(2) Yield the right-of-way to all vehicles, streetcars, or trackless trolleys in the intersection or approaching on an intersecting road, if the vehicles, streetcars, or trackless trolleys will constitute an immediate hazard during the time the driver is moving across or within the intersection or junction of roadways;

(3) Exercise ordinary care while proceeding through the intersection.

() Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: 143 v S 44. Eff 7-25-89; 149 v S123, § 1, eff. 1-1-04.

§ 4511.14. Special pedestrian control signals.

Whenever special pedestrian control signals exhibiting the words "walk" or "don't walk," or the symbol of a walking person or an upraised palm are in place, such signals shall indicate the following instructions:

(A) A steady walking person signal indication, which symbolizes "walk," means that a pedestrian facing the signal indication is permitted to start to cross the roadway in the direction of the signal indication, possibly in conflict with turning vehicles. The pedestrian shall yield the right-of-way to vehicles lawfully within the intersection at the time that the walking person signal indication is first shown.

(B) A flashing upraised hand signal indication, which symbolizes "don't walk," means that a pedestrian shall not start to cross the roadway in the direction of the signal indication, but that any pedestrian who has already started to cross on a steady walking person signal indication shall proceed to the far side of the traveled way of the street or highway, unless otherwise directed by a traffic control device to proceed only to the median of a divided highway or only to some other island or pedestrian refuge area.

(C) A steady upraised hand signal indication means that a pedestrian shall not enter the roadway in the direction of the signal indication.

(D) Nothing in this section shall be construed to invalidate the continued use of pedestrian control signals utilizing the word "wait" if those signals were installed prior to March 28, 1985.

(E) A flashing walking person signal indication has no meaning and shall not be used.

HISTORY: GC § 6307-14; 119 v 766, § 14; 124 v 514; Bureau of Code Revision, 10-1-53; 140 v H 703 (Eff 3-28-85); 129 v H 349. Eff 4-12-12.

§ 4511.16. Unauthorized sign or signal resembling a traffic control device.

(A) No person shall place, maintain, or display upon or in view of any highway any unauthorized sign, signal, marking, or device which purports to be, is an imitation of, or resembles a traffic control device or railroad sign or signal, or which attempts to direct the movement of traffic or hides from view or interferes with the effectiveness of any traffic control device or any railroad sign or signal, and no person shall place or maintain, nor shall any public authority permit, upon any highway any traffic sign or signal bearing thereon any commercial advertising. This section does not prohibit either the erection upon private property adjacent to highways of signs giving useful directional information and of a type that cannot be mistaken for traffic control devices or the erection upon private property of traffic control devices by the owner of real property in accordance with sections 4511.211 and 4511.432 of the Revised Code.

Every such prohibited sign, signal, marking, or device is a public nuisance, and the authority having jurisdiction over the highway may remove it or cause it to be removed.

(B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-16; 119 v 766, § 16; Bureau of Code Revision, 10-1-53; 143 v H 171. Eff 5-31-90; 149 v S123, § 1, eff. 1-1-04.

§ 4511.17. Tampering with traffic control device, freshly applied pavement material, manhole covers.

(A) No person, without lawful authority, shall do any of the following:

- (1) Knowingly move, deface, damage, destroy, or otherwise improperly tamper with any traffic control device, any railroad sign or signal, or any inscription, shield, or insignia on the device, sign, or signal, or any part of the device, sign, or signal;
- (2) Knowingly drive upon or over any freshly applied pavement marking material on the surface of a roadway while the marking material is in an undried condition and is marked by flags, markers, signs, or other devices intended to protect it;
- (3) Knowingly move, damage, destroy, or otherwise improperly tamper with a manhole cover.

(B) (1) Except as otherwise provided in this division, whoever violates division (A)(1) or (3) of this section is guilty of a misdemeanor of the third degree. If a violation of division (A)(1) or (3) of this section creates a risk of physical harm to any person, the offender is guilty of a misdemeanor of the first degree. If a violation of division (A)(1) or (3) of this section causes serious physical harm to property that is owned, leased, or controlled by a state or local authority, the offender is guilty of a felony of the fifth degree.

(2) Except as otherwise provided in this division, whoever violates division (A)(2) of this section is guilty of a minor misdemeanor. If within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates division (A)(2) of this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates division (A)(2) of this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-17; 119 v 766, § 17; 121 v 684; Bureau of Code Revision, 10-1-53; 143 v H 162. Eff 6-28-90; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.18. Purchase, possession or sale of traffic control device.

(A) As used in this section, "traffic control device" means any sign, traffic control signal, or other device conforming to and placed or erected in accordance with the manual adopted under section 4511.09 of the Revised Code by authority of a public body or official having jurisdiction, for the purpose of regulating, warning, or guiding traffic, including signs denoting the names of streets and highways, but does not mean any pavement marking.

- (B) No individual shall buy or otherwise possess, or sell, a traffic control device, except when one of the following applies:
- (1) In the course of the individual's employment by the state or a local authority for the express or implied purpose of manufacturing, providing, erecting, moving, or removing such a traffic control device;
 - (2) In the course of the individual's employment by any manufacturer of traffic control devices other than a state or local authority;
 - (3) For the purpose of demonstrating the design and function of a traffic control device to state or local officials;
 - (4) When the traffic control device has been purchased from the state or a local authority at a sale of property that is no longer needed or is unfit for use;
 - (5) The traffic control device has been properly purchased from a manufacturer for use on private property and the person possessing the device has a sales receipt for the device or other acknowledgment of sale issued by the manufacturer.
- (C) This section does not preclude, and shall not be construed as precluding, prosecution for theft in violation of section 2913.02 of the Revised Code or a municipal ordinance relating to theft, or for receiving stolen property in violation of section 2913.51 of the Revised Code or a municipal ordinance relating to receiving stolen property.
- (D) Whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: 143 v H 162. Eff 6-28-90; 149 v S 123, § 1, eff.1-1-04.

§ 4511.20. Operation in willful or wanton disregard of the safety of persons or property.

- (A) No person shall operate a vehicle, trackless trolley, or streetcar on any street or highway in willful or wanton disregard of the safety of persons or property.
- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-20; 119 v 766, § 20; Bureau of Code Revision, 10-1-53; 132 v S 179 (Eff 12-13-67); 139 v S 432. Eff 3-16-83; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.201. Operation off street or highway in willful or wanton disregard of the safety of persons or property.

- (A) No person shall operate a vehicle, trackless trolley, or streetcar on any public or private property other than streets or highways, in willful or wanton disregard of the safety of persons or property.
- This section does not apply to the competitive operation of vehicles on public or private property when the owner of such property knowingly permits such operation thereon.
- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: 129 v 1637 (Eff 10-2-61); 132 v S 179 (Eff 12-13-67); 139 v S 432. Eff 3-16-83; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.202. Operation without being in reasonable control of vehicle, trolley, or streetcar.

- (A) No person shall operate a motor vehicle, trackless trolley, streetcar, agricultural tractor, or agricultural tractor that is towing, pulling, or otherwise drawing a unit of farm machinery on any street, highway, or property open to the public for vehicular traffic without being in reasonable control of the vehicle, trolley, streetcar, agricultural tractor, or unit of farm machinery.
- (B) Whoever violates this section is guilty of operating a motor vehicle or agricultural tractor without being in control of it, a minor misdemeanor.

HISTORY: 139 v S 432. Eff 3-16-83; 149 v S 123, § 1, eff. 1-1-04. 2007 HB9 10-18-2007

§ 4511.21. Speed Limits-assured clear distance.

(A) No person shall operate a motor vehicle, trackless trolley, or streetcar at a speed greater or less than is reasonable or proper, having due regard to the traffic, surface, and width of the street or highway and any other conditions, and no person shall drive any motor vehicle, trackless trolley, or streetcar in and upon any street or highway at a greater speed than will permit the person to bring it to a stop within the assured clear distance ahead.

(B) It is prima-facie lawful, in the absence of a lower limit declared pursuant to this section by the director of transportation or local authorities, for the operator of a motor vehicle, trackless trolley, or streetcar to operate the same at a speed not exceeding the following:

(1) (a) Twenty miles per hour in school zones during school recess and while children are going to or leaving school during the opening or closing hours, and when twenty miles per hour school speed limit signs are erected; except, that, on controlled-access highways and expressways, if the right-of-way line fence has been erected without pedestrian opening, the speed shall be governed by division (B)(4) of this section and on freeways, if the right-of-way line fence has been erected without pedestrian opening, the speed shall be governed by divisions (B)(9) and (10) of this section. The end of every school zone may be marked by a sign indicating the end of the zone. Nothing in this section or in the manual and specifications for a uniform system of traffic control devices shall be construed to require school zones to be indicated by signs equipped with flashing or other lights, or giving other special notice of the hours in which the school zone speed limit is in effect.

(b) As used in this section and in section 4511.212 of the Revised Code, "school" means any school chartered under section 3301.16 of the Revised Code and any nonchartered school that during the preceding year filed with the department of education in compliance with rule 3301-35-08 of the Ohio Administrative Code, a copy of the school's report for the parents of the school's pupils certifying that the school meets Ohio minimum standards for non chartered, non tax-supported schools and presents evidence of this filing to the jurisdiction from which it is requesting the establishment of a school zone.

(c) As used in this section, "school zone" means that portion of a street or highway passing a school fronting upon the street or highway that is encompassed by projecting the school property lines to the fronting street or highway, and also includes that portion of a state highway. Upon request from local authorities for streets and highways under their jurisdiction and that portion of a state highway under the jurisdiction of the director of transportation, the director may extend the traditional school zone boundaries. The distances in divisions (B)(1)(c)(i) (ii), and (iii) of this section shall not exceed three hundred feet per approach per direction and are bounded by whichever of the following distances or combinations thereof the director approves as most appropriate:

- (i) The distance encompassed by projecting the school building lines normal to the fronting highway and extending a distance of three hundred feet on each approach direction;
- (ii) The distance encompassed by projecting the school property lines intersecting the fronting highway and extending a distance of three hundred feet on each approach direction;
- (iii) The distance encompassed by the special marking of the pavement for a principal school pupil crosswalk plus a distance of three hundred feet on each approach direction of the highway.

Nothing in this section shall be construed to invalidate the director's initial action on August 9, 1976, establishing all school zones at the traditional school zone boundaries defined by projecting school property lines, except when those boundaries are extended as provided in divisions (B)(1)(a) and (c) of this section.

(d) As used in this division, "crosswalk" has the meaning given that, term in division (LL)(2) of section 4511.01 of the Revised Code.

The director may, upon request by resolution of the legislative authority of a municipal corporation, the board of trustees of a township, or a county board of mental retardation and developmental disabilities created pursuant to Chapter 5126. of the Revised Code, and upon submission by the municipal corporation, township, or county board of such engineering, traffic, and other information as the director considers necessary, designate a school zone on any portion of a state route lying within the municipal corporation, lying within the unincorporated territory of the township, or lying adjacent to the property of a school that is operated by such county board, that includes a crosswalk customarily used by children going to or leaving a school during recess and opening and closing hours, whenever the distance, as measured in a straight line, from the school property line nearest

the crosswalk to the nearest point of the crosswalk is no more than one thousand three hundred twenty feet. Such a school zone shall include the distance encompassed by the crosswalk and extending three hundred feet on each approach direction of the state route.

- (e) As used in this section, "special elementary school" means a school that meets all of the following criteria:
- (i) It is not chartered and does not receive tax revenue from any source.
 - (ii) It does not educate children beyond the eighth grade.
 - (iii) It is located outside the limits of a municipal corporation.
 - (iv) A majority of the total number of students enrolled at the school are not related by blood.
 - (v) The principal or other person in charge of the special elementary school annually sends a report to the superintendent of the school district in which the special elementary school is located indicating the total number of students enrolled at the school, but otherwise the principal or other person in charge does not report any other information or data to the superintendent.
- (2) Twenty-five miles per hour in all other portions of a municipal corporation, except on state routes outside business districts, through highways outside business districts, and alleys;
 - (3) Thirty-five miles per hour on all state routes or through highways within municipal corporations outside business districts, except as provided in divisions (B)(4) and (6) of this section;
 - (4) Fifty miles per hour on controlled-access highways and expressways within municipal corporations;
 - (5) Fifty-five miles per hour on highways outside municipal corporations, other than highways within island jurisdictions as provided in division (B)(8) of this section and freeways as provided in divisions (B)(13) and (14) of this section;
 - (6) Fifty miles per hour on state routes within municipal corporations outside urban districts unless a lower prima-facie speed is established as further provided in this section;
 - (7) Fifteen miles per hour on all alleys within the municipal corporation;
 - (8) Thirty-five miles per hour on highways outside municipal corporations that are within an island jurisdiction;
 - (9) Fifty-five miles per hour at all times on freeways with paved shoulders inside municipal corporations, other than freeways as provided in divisions (B)(13) and (14) of this section;
 - (10) Fifty-five miles per hour at all times on freeways outside municipal corporations, other than freeways as provided in division (B)(13) and (14) of this section;
 - (11) Fifty-five miles per hour at all times on all portions of freeways that are part of the interstate system and on all portions of freeways not part of the interstate system, but are built to the standards and specifications that are applicable to freeways that are part of the interstate system for operators of any motor vehicle weighing in excess of eight thousand pounds empty weight and any noncommercial bus, except as provided in division (B)(14) of this section;
 - (12) Fifty-five miles per hour for operators of any motor vehicle weighing eight thousand pounds or less empty weight and any commercial bus at all times on all portions of freeways that are part of the interstate system and that had such a speed limit established prior to October 1, 1995, and freeways that are not part of the interstate system, but are built to the standards and specifications that are applicable to freeways that are part of the interstate system and that had such a speed limit established prior to October 1, 1995, unless a higher speed limit is established under division (L) of this section;
 - (13) Sixty-five miles per hour for operators of any motor vehicle weighing eight thousand pounds or less empty weight and any commercial bus at all times on all portions of the following:
 - (a) Freeways that are part of the interstate system and that had such a speed limit established prior to October 1, 1995, and freeways that are not part of the interstate system, but are built to the standards and specifications that are applicable to freeways that are part of the interstate system and that had such a speed limit established prior to October 1, 1995;
 - (b) Freeways that are part of the interstate system and freeways that are not part of the interstate system but are built to the standards and specifications that are applicable to freeways that are part of the interstate system, and that had such a speed limit established under division (L) of this section;
 - (c) Rural, divided, multi-lane highways that are designated as part of the national highway system under the "National Highway System Designation Act of 1995," 109 Stat. 568, 23 U.S.C.A. 103, and that had such a speed limit established under division (M) of this section.
- (C) It is prima-facie unlawful for any person to exceed any of the speed limitations in divisions (B)(1)(a), (2), (3), (4), (6), (7) and (8) of this section, or any declared or established pursuant to this section by the director or local authorities and it is unlawful for any person to exceed any of the speed limitations in division (D) of this section. No person shall be convicted of more than one violation of this section for the

same conduct, although violations of more than one provision of this section may be charged in the alternative in a single affidavit.

- (D) No person shall operate a motor vehicle, trackless trolley, or streetcar upon a street or highway as follows:
- (1) At a speed exceeding fifty-five miles per hour, except upon a freeway as provided in divisions (B)(13) and (14) of this section;
 - (2) At a speed exceeding sixty-five miles per hour upon a freeway as provided in divisions (B)(13) and (14) of this section;
 - (3) If a motor vehicle weighing in excess of eight thousand pounds empty weight or a noncommercial bus as prescribed in division (B)(11) of this section, at a speed exceeding fifty-five miles per hour upon a freeway as provided in that division;
 - (4) At a speed exceeding the posted speed limit upon a freeway for which the director has determined and declared a speed limit of not more than sixty-five miles per hour pursuant to division (L)(2) or (M) of this section;
 - (5) At a speed exceeding sixty-five miles per hour upon a freeway for which such a speed limit has been established through the operation of division (L)(3) of this section;
 - (6) At a speed exceeding the posted speed limit upon a freeway for which the director has determined and declared a speed limit pursuant to division (I)(2) of this section.
- (E) In every charge of violation of this section the affidavit and warrant shall specify the time, place, and speed at which the defendant is alleged to have driven, and in charges made in reliance upon division (C) of this section also the speed which division (B)(1)(a), (2), (3), (4), (6), (7) or (8) of, or a limit declared pursuant to, this section declares is prima-facie lawful at the time and place of such alleged violation, except that in affidavits where a person is alleged to have driven at a greater speed than will permit the person to bring the vehicle to a stop within the assured clear distance ahead the affidavit and warrant need not specify the speed at which the defendant is alleged to have driven.
- (F) When a speed in excess of both a prima-facie limitation and a limitation in division (D)(1), (2), (3), (4), (5), or (6) of this section is alleged, the defendant shall be charged in a single affidavit, alleging a single act, with a violation indicated of both division (B)(1)(a), (2), (3), (4), (6), (7), or (8) of this section, or of a limit declared pursuant to this section by the director or local authorities, and of the limitation in division (D)(1), (2), (3), (4), (5), or (6) of this section. If the court finds a violation of division (B)(1)(a), (2), (3), (4), (6), (7) or (8) of, or a limit declared or established pursuant to, this section has occurred, it shall enter a judgment of conviction under such division and dismiss the charge under division (D)(1), (2), (3), (4), (5), or (6) of this section. If it finds no violation of division (B)(1)(a), (2), (3), (4), (6), (7), or (8) of, or a limit declared pursuant to, this section, it shall then consider whether the evidence supports a conviction under division (D)(1), (2), (3), (4), (5), or (6) of this section.
- (G) Points shall be assessed for violation of a limitation under division (D) of this section in accordance with section 4510.036 of the Revised Code.
- (H) Whenever the director determines upon the basis of a geometric and traffic characteristic study that any speed limit set forth in divisions (B)(1)(a) to (D) of this section is greater or less than is reasonable or safe under the conditions found to exist at any portion of a street or highway under the jurisdiction of the director, the director shall determine and declare a reasonable and safe prima-facie speed limit, which shall be effective when appropriate signs giving notice of it are erected at the location.
- (I) (1) Except as provided in divisions (I)(2) and (K) of this section, whenever local authorities determine upon the basis of an engineering and traffic investigation that the speed permitted by divisions (B)(1)(a) to (D) of this section, on any part of a highway under their jurisdiction, is greater than is reasonable and safe under the conditions found to exist at such location, the local authorities may by resolution request the director to determine and declare a reasonable and safe prima-facie speed limit. Upon receipt of such request the director may determine and declare a reasonable and safe prima-facie speed limit at such location, and if the director does so, then such declared speed limit shall become effective only when appropriate signs giving notice thereof are erected at such location by the local authorities. The director may withdraw the declaration of a prima-facie speed limit whenever in the director's opinion the altered prima-facie speed becomes unreasonable. Upon such withdrawal, the declared prima-facie speed shall become ineffective and the signs relating thereto shall be immediately removed by the local authorities.
- (2) A local authority may determine on the basis of a geometric and traffic characteristic study that the speed limit of sixty-five miles per hour on a portion of a freeway under its jurisdiction that was established through the operation of division (L)(3) of this section is greater than is reasonable or safe under the conditions found to exist at that portion of the freeway. If the local authority makes such a determination, the local authority by resolution may request the director to determine and

declare a reasonable and safe speed limit of not less than fifty-five miles per hour for that portion of the freeway. If the director takes such action, the declared speed limit becomes effective only when appropriate signs giving notice of it are erected at such location by the local authority.

- (J) Local authorities in their respective jurisdictions may authorize by ordinance higher prima-facie speeds than those stated in this section upon through highways, or upon highways or portions thereof where there are no intersections, or between widely spaced intersections, provided signs are erected giving notice of the authorized speed, but local authorities shall not modify or alter the basic rule set forth in division (A) of this section or in any event authorize by ordinance a speed in excess of fifty miles per hour.

Alteration of prima-facie limits on state routes by local authorities shall not be effective until the alteration has been approved by the director. The director may withdraw approval of any altered prima-facie speed limits whenever in the director's opinion any altered prima-facie speed becomes unreasonable, and upon such withdrawal, the altered prima-facie speed shall become ineffective and the signs relating thereto shall be immediately removed by the local authorities.

- (K) (1) As used in divisions (K)(1), (2), (3), and (4) of this section, "unimproved highway" means a highway consisting of any of the following:
- (a) Unimproved earth;
 - (b) Unimproved graded and drained earth;
 - (c) Gravel.
- (2) Except as otherwise provided in divisions (K)(4) and (5) of this section, whenever a board of township trustees determines upon the basis of an engineering and traffic investigation that the speed permitted by division (B)(5) of this section on any part of an unimproved highway under its jurisdiction and in the unincorporated territory of the township is greater than is reasonable or safe under the conditions found to exist at the location, the board may by resolution declare a reasonable and safe prima-facie speed limit of fifty-five but not less than twenty-five miles per hour. An altered speed limit adopted by a board of township trustees under this division becomes effective when appropriate traffic control devices, as prescribed in section 4511.11 of the Revised Code, giving notice thereof are erected at the location, which shall be no sooner than sixty days after adoption of the resolution.
- (3) (a) Whenever, in the opinion of a board of township trustees, any altered prima-facie speed limit established by the board under this division becomes unreasonable, the board may adopt a resolution withdrawing the altered prima-facie speed limit. Upon the adoption of such a resolution, the altered prima-facie speed limit becomes ineffective and the traffic control devices relating thereto shall be immediately removed.
- (b) Whenever a highway ceases to be an unimproved highway and the board has adopted an altered prima-facie speed limit pursuant to division (K)(2) of this section, the board shall, by resolution, withdraw the altered prima-facie speed limit as soon as the highway ceases to be unimproved. Upon the adoption of such a resolution, the altered prima-facie speed limit becomes ineffective and the traffic control devices relating hereto shall be immediately removed.
- (4) (a) If the boundary of two townships rests on the centerline of an unimproved highway in unincorporated territory and both townships have jurisdiction over the highway, neither of the boards of township trustees of such townships may declare an altered prima-facie speed limit pursuant to division (K)(2) of this section on the part of the highway under their joint jurisdiction unless the boards of township trustees of both of the townships determine, upon the basis of an engineering and traffic investigation, that the speed permitted by division (B)(5) of this section is greater than is reasonable or safe under the conditions found to exist at the location and both boards agree upon a reasonable and safe prima-facie speed limit of less than fifty-five but not less than twenty-five miles per hour for that location. If both boards so agree, each shall follow the procedure specified in division (K)(2) of this section for altering the prima-facie speed limit on the highway. Except as otherwise provided in division (K)(4)(b) of this section, no speed limit altered pursuant to division (K)(4)(a) of this section may be withdrawn unless the boards of township trustees of both townships determine that the altered prima-facie speed limit previously adopted becomes unreasonable and each board adopts a resolution withdrawing the altered prima-facie speed limit pursuant to the procedure specified in division (K)(3)(a) of this section.
- (b) Whenever a highway described in division (K)(4)(a) of this section ceases to be an unimproved highway and two boards of township trustees have adopted an altered prima-facie speed limit pursuant to division (K)(4)(a) of this section, both boards shall, by resolution, withdraw the altered prima-facie speed limit as soon as the highway ceases to be unimproved. Upon the adoption of the resolution, the altered prima-facie speed limit becomes ineffective and the traffic control devices relating thereto shall be immediately removed.

(5) As used in division (K)(5) of this section:

- (a) "Commercial subdivision" means any platted territory outside the limits of a municipal corporation and fronting a highway where, for a distance of three hundred feet or more, the frontage is improved with buildings in use for commercial purposes, or where the entire length of the highway is less than three hundred feet long and the frontage is improved with buildings in use for commercial purposes.
- (b) "Residential subdivision" means any platted territory outside the limits of a municipal corporation and fronting a highway, where, for a distance of three hundred feet or more, the frontage is improved with residences or residences and buildings in use for business, or where the entire length of the highway is less than three hundred feet long and the frontage is improved with residences or residences and buildings in use for business.

Whenever a board of township trustees finds upon the basis of an engineering and traffic investigation that the prima-facie speed permitted by division (B)(5) of this section on any part of a highway under its jurisdiction that is located in a commercial or residential subdivision, except on highways or portions thereof at the entrances to which vehicular traffic from the majority of intersecting highways is required to yield the right-of-way to vehicles on such highways in obedience to stop or yield signs or traffic control signals, is greater than is reasonable and safe under the conditions found to exist at the location, the board may by resolution declare a reasonable and safe prima-facie speed limit of less than fifty-five but not less than twenty-five miles per hour at the location. An altered speed limit adopted by a board of township trustees under this division shall become effective when appropriate signs giving notice thereof are erected at the location by the township. Whenever, in the opinion of a board of township trustees, any altered prima-facie speed limit established by it under this division becomes unreasonable, it may adopt a resolution withdrawing the altered prima-facie speed, and upon such withdrawal, the altered prima-facie speed shall become ineffective, and the signs relating thereto shall be immediately removed by the township.

- (L) (1) Within one hundred twenty days of February 29, 1996, the director of transportation, based upon a geometric and traffic characteristic study of a freeway that is part of the interstate system or that is not part of the interstate system, but is built to the standards and specifications that are applicable to freeways that are part of the interstate system, in consultation with the director of public safety and, if applicable, the local authority having jurisdiction over a portion of such freeway, may determine and declare that the speed limit of less than sixty-five miles per hour established on such freeway or portion of freeway either is reasonable and safe or is less than that which is reasonable and safe.
- (2) If the established speed limit for such a freeway or portion of freeway is determined to be less than that which is reasonable and safe, the director of transportation, in consultation with the director of public safety and, if applicable, the local authority having jurisdiction over the portion of freeway, shall determine and declare a reasonable and safe speed limit of not more than sixty-five miles per hour for that freeway or portion of freeway.
The director of transportation or local authority having jurisdiction over the freeway or portion of freeway shall erect appropriate signs giving notice of the speed limit at such location within one hundred fifty days of February 29, 1996. Such speed limit becomes effective only when such signs are erected at the location.
- (3) If, within one hundred twenty days of February 29, 1996, the director of transportation does not make a determination and declaration of a reasonable and safe speed limit for a freeway or portion of freeway that is part of the interstate system or that is not part of the interstate system, but is built to the standards and specifications that are applicable to freeways that are part of the interstate system and that has a speed limit of less than sixty-five miles per hour, the speed limit on that freeway or portion of a freeway shall be sixty-five miles per hour. The director of transportation or local authority having jurisdiction over the freeway or portion of the freeway shall erect appropriate signs giving notice of the speed limit of sixty-five miles per hour at such location within one hundred fifty days of February 29, 1996. Such speed limit becomes effective only when such signs are erected at the location. A speed limit established through the operation of division (L)(3) of this section is subject to reduction under division (I)(2) of this section.
- (M) Within three hundred sixty days after February 29, 1996, the director of transportation, based upon a geometric and traffic characteristic study of a rural, divided, multi-lane highway that has been designated as part of the national highway system under the "National Highway System Designation Act of 1995," 109 Stat. 568, 23 U.S.C.A. 103, in consultation with the director of public safety and, if applicable, the local authority having jurisdiction over a portion of the highway, may determine and declare that the speed limit of less than sixty-five miles per hour established on the highway or portion of highway either is reasonable and safe or is less than that which is reasonable and safe. If the established speed limit for the highway or portion of highway is determined to be less than that which is reasonable and safe, the

director of transportation, in consultation with the director of public safety and, if applicable, the local authority having jurisdiction over the portion of highway, shall determine and declare a reasonable and safe speed limit of not more than sixty-five miles per hour for that highway or portion of highway. The director of transportation or local authority having jurisdiction over the highway or portion of highway shall erect appropriate signs giving notice of the speed limit at such location within three hundred ninety days after February 29, 1996. The speed limit becomes effective only when such signs are erected at the location.

- (N) (1) (a) If the boundary of two local authorities rests on the centerline of a highway and both authorities have jurisdiction over the highway, the speed limit for the part of the highway within their joint jurisdiction shall be either one of the following as agreed to by both authorities:
- (i) Either prima-facie speed limit permitted by division (B) of this section;
 - (ii) An altered speed limit determined and posted in accordance with this section.
- (b) If the local authorities are unable to reach an agreement, the speed limit shall remain as established and posted under this section.
- (2) Neither local authority may declare an altered prima-facie speed limit pursuant to this section on the part of the highway under their joint jurisdiction unless both of the local authorities determine, upon the basis of an engineering and traffic investigation, that the speed permitted by this section is greater than is reasonable or safe under the conditions found to exist at the location and both authorities agree upon a uniform reasonable and safe prima-facie speed limit of less than fifty-five but not less than twenty-five miles per hour for that location. If both authorities so agree, each shall follow the procedure specified in this section for altering the prima-facie speed limit on the highway, and the speed limit for the part of the highway within their joint jurisdiction shall be uniformly altered. No altered speed limit may be withdrawn unless both local authorities determine that the altered prima-facie speed limit previously adopted becomes unreasonable and each adopts a resolution withdrawing the altered prima-facie speed limit pursuant to the procedure specified in this section.
- (O) As used in this section:
- (1) "Interstate system" has the same meaning as in 23 U.S.C.A. 101.
 - (2) "Commercial bus" means a motor vehicle designed for carrying more than nine passengers and used for the transportation of persons for compensation.
 - (3) "Noncommercial bus" includes but is not limited to a school bus or a motor vehicle operated solely for the transportation of persons associated with a charitable or nonprofit organization.
- (P) (1) A violation of any provision of this section is one of the following:
- (a) Except as otherwise provided in divisions (P)(1)(b), (1)(c), (2), and (3) of this section, a minor misdemeanor;
 - (b) If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to two violations of any provision of this section or of any provision of a municipal ordinance that is substantially similar to any provision of this section, a misdemeanor of the fourth degree;
 - (c) If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to three or more violations of any provision of this section or of any provision of a municipal ordinance that is substantially similar to any provision of this section, a misdemeanor of the third degree.
- (2) If the offender has not previously been convicted of or pleaded guilty to a violation of any provision of this section or of any provision of a municipal ordinance that is substantially similar to this section and operated a motor vehicle faster than thirty-five miles an hour in a business district of a municipal corporation, faster than fifty miles an hour in other portions of a municipal corporation, or faster than thirty-five miles an hour in a school zone during recess or while children are going to or leaving school during the school's opening or closing hours, a misdemeanor of the fourth degree.
- (3) Notwithstanding division (P)(1) of this section, if the offender operated a motor vehicle in a construction zone where a sign was then posted in accordance with section 4511.98 of the Revised Code, the court, in addition to all other penalties provided by law, shall impose upon the offender a fine of two times the usual amount imposed for the violation. No court shall impose a fine of two times the usual amount imposed for the violation upon an offender if the offender alleges, in an affidavit filed with the court prior to the offender's sentencing, that the offender is indigent and is unable to pay the fine imposed pursuant to this division and if the court determines that the offender is an indigent person and unable to pay the fine.

HISTORY: GC § 6307-21; 119 v 766, § 21; 124 v 514; Bureau of Code Revision, 10-1-53; 126 v 115 (Eff 10-1-56); 127 v 931 (Eff 9-14-57); 128 v 1270 (Eff 11-4-59); 130 v 1083 (Eff 9-30-63); 130 v Ptil, H 5 (Eff 12-16-64); 131 v 1101 (Eff 11-4-65); 132 v H 1 (Eff 2-21-67); 135 v H 200 (Eff 9-28-73); 136 v H 632 (Eff 6-27-75); 136 v H 1166 (Eff 8-9-76); 137 v H 587 (Eff 11-3-77); 138 v H 20 (Eff 8-29-79); 138 v H 32 (Eff 8-29-79); 138

v S 14 (Eff 10-25-79); 140 v S 37 (Eff 9-7-83); 141 v H 795 (Eff 8-29-86); 141 v S 356 (Eff 9-24-86); 141 v H 428 (Eff 12-23-86); 141 v H 666 (Eff 3-25-87); 142 v H 43 (Eff 7-31-87); 142 v H 493 (Eff 7-15-87); 143 v H 381 (Eff 7-1-89); 144 v H 96 (Eff 6-18-91); 144 v S 201 (Eff 8-19-92); 144 v S 301 (Eff 3-15-93); 146 v H 565. Eff 2-29-96; 149 v S 123, § 1, eff. 1-1-04; 151 v H 68, § 101.01, eff. 6-29-05. 06-15-2006; 2007 HB67 07-03-2007; 2009 HB2 07-01-2009

§ 4511.211. Establishing speed limit on private residential road or driveway.

- (A) The owner of a private road or driveway located in a private residential area containing twenty or more dwelling units may establish a speed limit on the road or driveway by complying with all of the following requirements:
- (1) The speed limit is not less than twenty-five miles per hour and is indicated by a sign that is in a proper position, is sufficiently legible to be seen by an ordinarily observant person, and meets the specifications for the basic speed limit sign included in the manual adopted by the department of transportation pursuant to section 4511.09 of the Revised Code;
 - (2) The owner has posted a sign at the entrance of the private road or driveway that is in plain view and clearly informs persons entering the road or driveway that they are entering private property, a speed limit has been established for the road or driveway, and the speed limit is enforceable by law enforcement officers under state law.
- (B) No person shall operate a vehicle upon a private road or driveway as provided in division (A) of this section at a speed exceeding any speed limit established and posted pursuant to that division.
- (C) When a speed limit is established and posted in accordance with division (A) of this section, any law enforcement officer may apprehend a person violating the speed limit of the residential area by utilizing any of the means described in section 4511.091 of the Revised Code or by any other accepted method of determining the speed of a motor vehicle and may stop and charge the person with exceeding the speed limit.
- (D) Points shall be assessed for violation of a speed limit established and posted in accordance with division (A) of this section in accordance with section 4510.036 of the Revised Code..
- (E) As used in this section:
- (1) "Owner" includes but is not limited to a person who holds title to the real property in fee simple, a condominium owners' association, a property owners' association, the board of directors or trustees of a private community, and a nonprofit corporation governing a private community.
 - (2) "Private residential area containing twenty or more dwelling units" does not include a Chautauqua assembly as defined in section 4511.90 of the Revised Code.
- (F) A violation of division (B) of this section is one of the following:
- (1) Except as otherwise provided in divisions (F)(2) and (3) of this section, a minor misdemeanor;
 - (2) If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to two violations of division (B) of this section or of any municipal ordinance that is substantially similar to division (B) of this section, a misdemeanor of the fourth degree;
 - (3) If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to three or more violations of division (B) of this section or of any municipal ordinance that is substantially similar to division (B) of this section, a misdemeanor of the third degree.

HISTORY: 143 v H 171. Eff 5-31-90; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.212. Complaint of noncompliance by local authority with school zone sign laws.

- (A) As used in this section, "local authority" means the legislative authority of a municipal corporation, the board of trustees of a township, or the board of county commissioners of a county.
- (B) The board of education or the chief administrative officer operating or in charge of any school may submit a written complaint to the director of transportation alleging that a local authority is not complying with section 4511.11 or divisions (B)(1)(a) to (d) of section 4511.21 of the Revised Code with regard to school zones. Upon receipt of such a complaint, the director shall review or investigate the facts of the complaint and discuss the complaint with the local authority and the board of education or chief administrative officer submitting the complaint. If the director finds that the local authority is not complying with section 4511.11 or divisions (B)(1)(a) to (d) of section 4511.21 of the Revised Code with regard to school zones, the director shall issue a written order requiring the local authority to comply by a specified date and the local authority shall comply with the order. If the local authority fails to comply with the order, the director shall implement the order and charge the local authority for the cost of the implementation. Any local authority being so charged shall pay to the state the amount charged. Any amounts received under this section shall be deposited into the state treasury to the credit of the highway operating fund created by section 5735.291 of the Revised Code.

§ 4511.213. Approaching stationary public safety vehicle displaying emergency light.

- (A) The driver of a motor vehicle, upon approaching a stationary public safety vehicle, or a road service vehicle that is displaying the appropriate visual signals by means of flashing, oscillating, or rotating lights, as prescribed in section 4513.17 of the Revised Code, shall do either of the following:
 - (1) If the driver of the motor vehicle is traveling on a highway that consists of at least two lanes that carry traffic in the same direction of travel as that of the driver's motor vehicle, the driver shall proceed with due caution and, if possible and with due regard to the road, weather, and traffic conditions, shall change lanes into a lane that is not adjacent to that of the stationary public safety vehicle.
 - (2) If the driver is not traveling on a highway of a type described in division (A)(1) of this section, or if the driver is traveling on a highway of that type but it is not possible to change lanes or if to do so would be unsafe, the driver shall proceed with due caution, reduce the speed of the motor vehicle, and maintain a safe speed for the road, weather, and traffic conditions.
- (B) This section does not relieve the driver of a public safety vehicle from the duty to drive with due regard for the safety of all persons and property upon the highway.
- (C) No person shall fail to drive a motor vehicle in compliance with division (A)(1) or (2) of this section when so required by division (A) of this section.
- (D) (1) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.
 - (2) Notwithstanding section 2929.28 of the Revised Code, upon a finding that a person operated a motor vehicle in violation of division (C) of this section, the court, in addition to all other penalties provided by law, shall impose a fine of two times the usual amount imposed for the violation.
- (E) As used in this section, "public safety vehicle" has the same meaning as in section 4511.01 of the Revised Code.

HISTORY: 148 v H 86. Eff 9-28-99; 149 v S 123, § 1, eff. 1-1-04; 149 v H 490, § 1, eff. 1-1-04. 2009 HB2 07-01-2009.

§ 4511.22. Slow speed

- (A) No person shall stop or operate a vehicle, trackless trolley, or streetcar at such slow speed as to impede or block the normal and reasonable movement of traffic, except when stopping or reduced speed is necessary for safe operation or to comply with law.
- (B) Whenever the director of transportation or local authorities determine on the basis of an engineering and traffic investigation that slow speeds on any part of a controlled-access highway, expressway, or freeway consistently impede the normal and reasonable movement of traffic, the director or such local authority may declare a minimum speed limit below which no person shall operate a motor vehicle, trackless trolley, or street car except when necessary for safe operation or in compliance with law. No minimum speed limit established hereunder shall be less than thirty miles per hour, greater than fifty miles per hour, nor effective until the provisions of section 4511.21 of the Revised Code, relating to appropriate signs, have been fulfilled and local authorities have obtained the approval of the director.
- (C) In a case involving a violation of this section, the trier of fact, in determining whether the vehicle was being operated at an unreasonably slow speed, shall consider the capabilities of the vehicle and its operator.
- (D) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-22; 119 v 766, § 22; Bureau of Code Revision, 10-1-53; 127 v 51 (Eff 8-23-57); 135 v H 200 (Eff 9-28-73); 136 v H 632 (Eff 6-27-75); 144 v H 96. Eff 6-18-91; 149 v S 123, § 1, eff. 1-1-04. 09-21-2006

§ 4511.23. Speed limits on bridges.

- (A) No person shall operate a vehicle, trackless trolley, or streetcar over any bridge or other elevated structure constituting a part of a highway at a speed which is greater than the maximum speed that can

be maintained with safety to such bridge or structure, when such structure is posted with signs as provided in this section.

The department of transportation upon request from any local authority shall, or upon its own initiative may, conduct an investigation of any bridge or other elevated structure constituting a part of a highway, and if it finds that such structure cannot with safety withstand traffic traveling at the speed otherwise permissible under sections 4511.01 to 4511.85 and 4511.98 of the Revised Code, the department shall determine and declare the maximum speed of traffic which such structure can withstand, and shall cause or permit suitable signs stating such maximum speed to be erected and maintained at a distance of at least one hundred feet before each end of such structure.

Upon the trial of any person charged with a violation of this section, proof of said determination of the maximum speed by the department and the existence of said signs shall constitute prima-facie evidence of the maximum speed which can be maintained with safety to such bridge or structure.

- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-23; 119 v 766, § 23; Bureau of Code Revision, 10-1-53; 135 v H 200. Eff 9-28-73; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.24. Speed limits not applicable to emergency or public safety vehicles.

The prima-facie speed limitations set forth in section 4511.21 of the Revised Code do not apply to emergency vehicles or public safety vehicles when they are responding to emergency calls and are equipped with and displaying at least one flashing, rotating, or oscillating light visible under normal atmospheric conditions from a distance of five hundred feet to the front of the vehicle and when the drivers thereof sound audible signals by bell, siren, or exhaust whistle. This section does not relieve the driver of an emergency vehicle or public safety vehicle from the duty to drive with due regard for the safety of all persons using the street or highway.

HISTORY: GC § 6307-24; 119 v 766, § 24; Bureau of Code Revision, 10-1-53; 132 v H 378 (Eff 12-14-67); 135 v H 995. Eff 1-1-75.

§ 4511.25. Lanes of travel upon roadways of sufficient width.

- (A) Upon all roadways of sufficient width, a vehicle or trackless trolley shall be driven upon the right half of the roadway, except as follows:
- (1) When overtaking and passing another vehicle proceeding in the same direction, or when making a left turn under the rules governing such movements;
 - (2) When an obstruction exists making it necessary to drive to the left of the center of the highway; provided, any person so doing shall yield the right of way to all vehicles traveling in the proper direction upon the unobstructed portion of the highway within such distance as to constitute an immediate hazard;
 - (3) When driving upon a roadway divided into three or more marked lanes for traffic under the rules applicable thereon;
 - (4) When driving upon a roadway designated and posted with signs for one-way traffic;
 - (5) When otherwise directed by a police officer or traffic control device
- (B) (1) Upon all roadways any vehicle or trackless trolley proceeding at less than the prevailing and lawful speed of traffic at the time and place and under the conditions then existing shall be driven in the righthand lane then available for traffic, and far enough to the right to allow passing by faster vehicles if such passing is safe and reasonable, except under any of the following circumstances:
- (a) When overtaking and passing another vehicle or trackless trolley proceeding in the same direction;
 - (b) When preparing for a left turn;
 - (c) When the driver must necessarily drive in a lane other than the right-hand lane to continue on the driver's intended route.
- (2) Nothing in division (B)(1) of this section requires a driver of a slower vehicle to compromise the driver's safety to allow overtaking by a faster vehicle.
- (C) Upon any roadway having four or more lanes for moving traffic and providing for two-way movement of traffic, no vehicle or trackless trolley shall be driven to the left of the center line of the roadway, except when authorized by official traffic control devices designating certain lanes to the left of the center of the

roadway for use by traffic not otherwise permitted to use the lanes, or except as permitted under division (A)(2) of this section.

This division shall not be construed as prohibiting the crossing of the center line in making a left turn into or from an alley, private road, or driveway.

- (D) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-25; 119 v 766, § 25; Bureau of Code Revision, 10-1-53; 129 v 1032 (Eff 9-9-61); 130 v 1086 (Eff 6-10-63); 135 v H 995. Eff 1-1-75. The effective date is set by section 3 of HB 995; 149 v S 123, § 1, eff. 1-1-04. 09-21-2006

§ 4511.26. Vehicles traveling in opposite directions.

- (A) Operators of vehicles and trackless trolleys proceeding in opposite directions shall pass each other to the right, and upon roadways having width for not more than one line of traffic in each direction, each operator shall give to the other one-half of the main traveled portion of the roadway or as nearly one-half as is reasonably possible.
- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-26; 119 v 766(778), § 26; Bureau of Code Revision. Eff 10-1-53; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.27. Overtaking and passing of vehicles proceeding in the same direction.

- (A) The following rules govern the overtaking and passing of vehicles or trackless trolleys proceeding in the same direction:
- (1) The operator of a vehicle or trackless trolley overtaking another vehicle or trackless trolley proceeding in the same direction shall, except as provided in division (A)(3) of this section, signal to the vehicle or trackless trolley to be overtaken, shall pass to the left thereof at a safe distance, and shall not again drive to the right side of the roadway until safely clear of the overtaken vehicle or trackless trolley.
 - (2) Except when overtaking and passing on the right is permitted, the operator of an overtaken vehicle shall give way to the right in favor of the overtaking vehicle at the latter's audible signal, and the operator shall not increase the speed of the operator's vehicle until completely passed by the overtaking vehicle.
 - (3) The operator of a vehicle or trackless trolley overtaking and passing another vehicle or trackless trolley proceeding in the same direction on a divided highway as defined in section 4511.35 of the Revised Code, a limited access highway as defined in section 5511.02 of the Revised Code, or a highway with four or more traffic lanes, is not required to signal audibly to the vehicle or trackless trolley being overtaken and passed.
- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-27; 119 v 766(778), § 27; Bureau of Code Revision, 10-1-53; 133 v S 289. Eff 11-6-69; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.28. Overtaking and passing upon the right of another vehicle.

- (A) The driver of a vehicle or trackless trolley may overtake and pass upon the right of another vehicle or trackless trolley only under the following conditions:
- (1) When the vehicle or trackless trolley overtaken is making or about to make a left turn;

- (2) Upon a roadway with unobstructed pavement of sufficient width for two or more lines of vehicles moving lawfully in the direction being traveled by the overtaking vehicle.
- (B) The driver of a vehicle or trackless trolley may overtake and pass another vehicle or trackless trolley only under conditions permitting such movement in safety. The movement shall not be made by driving off the roadway.
- (C) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-28; 119 v 766(778), § 28; Bureau of Code Revision, 10-1-53; 135 v H 995. Eff 1-1-75; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.29. Driving to left of center of roadway in overtaking and passing traffic proceeding in same direction.

- (A) No vehicle or trackless trolley shall be driven to the left of the center of the roadway in overtaking and passing traffic proceeding in the same direction, unless such left side is clearly visible and is free of oncoming traffic for a sufficient distance ahead to permit such overtaking and passing to be completely made, without interfering with the safe operation of any traffic approaching from the opposite direction or any traffic overtaken. In every event the overtaking vehicle or trackless trolley must return to an authorized lane of travel as soon as practicable and in the event the passing movement involves the use of a lane authorized for traffic approaching from the opposite direction, before coming within two hundred feet of any approaching vehicle.
- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-29; 119 v 766(778), § 29; Bureau of Code Revision, 10-1-53; 135 v H 995. Eff 1-1-75; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.30. Driving upon left side of roadway.

- (A) No vehicle or trackless trolley shall be driven upon the left side of the roadway under the following conditions:
- (1) When approaching the crest of a grade or upon a curve in the highway, where the operator's view is obstructed within such a distance as to create a hazard in the event traffic might approach from the opposite direction;
 - (2) When the view is obstructed upon approaching within one hundred feet of any bridge, viaduct, or tunnel;
 - (3) When approaching within one hundred feet of or traversing any intersection or railroad grade crossing.
- (B) This section does not apply to vehicles or trackless trolleys upon a one-way roadway, upon a roadway where traffic is lawfully directed to be driven to the left side, or under the conditions described in division (A)(2) of section 4511.25 of the Revised Code.
- (C) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-30; 119 v 766(779), § 30; 120 v 221; Bureau of Code Revision, 10-1-53; 135 v H 995. Eff 1-1-75; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.31. Establishing hazardous zones.

- (A) The department of transportation may determine those portions of any state highway where overtaking and passing other traffic or driving to the left of the center or center line of the roadway would be especially hazardous, and may, by appropriate signs or markings on the highway, indicate the beginning

and end of such zones. When such signs or markings are in place and clearly visible, every operator of a vehicle or trackless trolley shall obey the directions of the signs or markings, notwithstanding the distances set out in section 4511.30 of the Revised Code.

(B) Division (A) of this section does not apply when all of the following apply:

- (1) The slower vehicle is proceeding at less than half the speed of the speed limit applicable to that location.
- (2) The faster vehicle is capable of overtaking and passing the slower vehicle without exceeding the speed limit.
- (3) This is sufficient clear sight distance to the left of the center of center line of the roadway to meet the overtaking and passing provisions of section 4511.29 of the revised code, considering the speed of the slower vehicle.

(C) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-31; 119 v 766(779), § 31; 124 v 514; Bureau of Code Revision, 10-1-53; 135 v H 200. Eff 9-28-73; 149 v S 123, § 1, eff. 1-1-04. 09-21-2006

§ 4511.32. One-way traffic - rotary islands.

(A) The department of transportation may designate any highway or any separate roadway under its jurisdiction for one-way traffic and shall erect appropriate signs giving notice thereof.

Upon a roadway designated and posted with signs for one-way traffic a vehicle shall be driven only in the direction designated.

A vehicle passing around a rotary traffic island shall be driven only to the right of the rotary traffic island.

(B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-32; 119 v 766(779), § 32; Bureau of Code Revision, 10-1-53; 135 v H 200. Eff 9-28-73; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.33. Driving in marked lanes.

(A) Whenever any roadway has been divided into two or more clearly marked lanes for traffic, or wherever within municipal corporations traffic is lawfully moving in two or more substantially continuous lines in the same direction, the following rules apply:

- (1) A vehicle or trackless trolley shall be driven, as nearly as is practicable, entirely within a single lane or line of traffic and shall not be moved from such lane or line until the driver has first ascertained that such movement can be made with safety.
- (2) Upon a roadway which is divided into three lanes and provides for two-way movement of traffic, a vehicle or trackless trolley shall not be driven in the center lane except when overtaking and passing another vehicle or trackless trolley where the roadway is clearly visible and such center lane is clear of traffic within a safe distance, or when preparing for a left turn, or where such center lane is at the time allocated exclusively to traffic moving in the direction the vehicle or trackless trolley is proceeding and is posted with signs to give notice of such allocation.
- (3) Official signs may be erected directing specified traffic to use a designated lane or designating those lanes to be used by traffic moving in a particular direction regardless of the center of the roadway, or restricting the use of a particular lane to only buses during certain hours or during all hours, and drivers of vehicles and trackless trolleys shall obey the directions of such signs.
- (4) Official traffic control devices may be installed prohibiting the changing of lanes on sections of roadway and drivers of vehicles shall obey the directions of every such device.

(B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been

convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-33; 119 v 766(779), § 33; Bureau of Code Revision, 10-1-53; 135 v H 995. Eff 1-1-75; 149 v S 123, § 1, eff. 1-1-04; 150 v H 95, § 1, eff. 9-26-03; 150 v H 95, § 3.13, eff. 1-1-04.

§ 4511.34. Space between moving vehicles.

(A) The operator of a motor vehicle, streetcar, or trackless trolley shall not follow another vehicle, streetcar, or trackless trolley more closely than is reasonable and prudent, having due regard for the speed of such vehicle, streetcar, or trackless trolley, and the traffic upon and the condition of the highway.

The driver of any truck, or motor vehicle drawing another vehicle, when traveling upon a roadway outside a business or residence district shall maintain a sufficient space, whenever conditions permit, between such vehicle and another vehicle ahead so an overtaking motor vehicle may enter and occupy such space without danger. This paragraph does not prevent overtaking and passing nor does it apply to any lane specially designated for use by trucks.

Outside a municipal corporation, the driver of any truck, or motor vehicle when drawing another vehicle, while ascending to the crest of a grade beyond which the driver's view of the roadway is obstructed, shall not follow within three hundred feet of another truck, or motor vehicle drawing another vehicle. This paragraph shall not apply to any lane specially designated for use by trucks.

Motor vehicles being driven upon any roadway outside of a business or residence district in a caravan or motorcade, shall maintain a sufficient space between such vehicles so an overtaking vehicle may enter and occupy such space without danger. This paragraph shall not apply to funeral processions.

(B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-34; 119 v 766(789), § 34; Bureau of Code Revision, 10-1-53; 126 v 113. Eff 9-30-55; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.35. Divided roadways.

(A) Whenever any highway has been divided into two roadways by an intervening space, or by a physical barrier, or clearly indicated dividing section so constructed as to impede vehicular traffic, every vehicle shall be driven only upon the right-hand roadway, and no vehicle shall be driven over, across, or within any such dividing space, barrier, or section, except through an opening, crossover, or intersection established by public authority. This section does not prohibit the occupancy of such dividing space, barrier, or section for the purpose of an emergency stop or in compliance with an order of a police officer.

(B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-34a; 124 v 514; Bureau of Code Revision. Eff 10-1-53; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.36. Rules for turns at intersections.

(A) The driver of a vehicle intending to turn at an intersection shall be governed by the following rules:

- (1) Approach for a right turn and a right turn shall be made as close as practicable to the right-hand curb or edge of the roadway.
- (2) At any intersection where traffic is permitted to move in both directions on each roadway entering the intersection, an approach for a left turn shall be made in that portion of the right half of the roadway nearest the center line thereof and by passing to the right of such center line where it enters the intersection and after entering the intersection the left turn shall be made so as to leave the intersection to the right of the center line of the roadway being entered. Whenever practicable the left turn shall be made in that portion of the intersection to the left of the center of the intersection.
- (3) At any intersection where traffic is restricted to one direction on one or more of the roadways, the driver of a vehicle intending to turn left at any such intersection shall approach the intersection in the extreme left-hand lane lawfully available to traffic moving in the direction of travel of such vehicle, and after entering the intersection the left turn shall be made so as to leave the intersection, as

nearly as practicable, in the left-hand lane of the roadway being entered lawfully available to traffic moving in that lane.

- (B) The operator of a trackless trolley shall comply with divisions (A)(1), (2), and (3) of this section wherever practicable.
- (C) The department of transportation and local authorities in their respective jurisdictions may cause markers, buttons, or signs to be placed within or adjacent to intersections and thereby require and direct that a different course from that specified in this section be traveled by vehicles, streetcars, or trackless trolleys, turning at an intersection, and when markers, buttons, or signs are so placed, no operator of a vehicle, streetcar, or trackless trolley shall turn such vehicle, streetcar, or trackless trolley at an intersection other than as directed and required by such markers, buttons, or signs.
- (D) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-35; 119 v 766(780), § 35; 124 v 514; Bureau of Code Revision, 10-1-53; 135 v H 200. Eff 9-28-73; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.37. Turning in roadway prohibited - exceptions.

- (A) Except as provided in section 4511.13 and division (B) of this section, no vehicle shall be turned so as to proceed in the opposite direction upon any curve, or upon the approach to or near the crest of a grade, if the vehicle cannot be seen within five hundred feet by the driver of any other vehicle approaching from either direction.
- (B) The driver of an emergency vehicle or public safety vehicle, when responding to an emergency call, may turn the vehicle so as to proceed in the opposite direction. This division applies only when the emergency vehicle or public safety vehicle is responding to an emergency call, is equipped with and displaying at least one flashing, rotating, or oscillating light visible under normal atmospheric conditions from a distance of five hundred feet to the front of the vehicle, and when the driver of the vehicle is giving an audible signal by siren, exhaust whistle, or bell. This division does not relieve the driver of an emergency vehicle or public safety vehicle from the duty to drive with due regard for the safety of all persons and property upon the highway.
- (C) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-36; 119 v 766(781), § 36; Bureau of Code Revision, 10-1-53; 145 v H 149. Eff 5-20-93; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.41. Right-of-way rule at intersections.

- (A) When two vehicles, including any trackless trolley or streetcar, approach or enter an intersection from different streets or highways at approximately the same time, the driver of the vehicle on the left shall yield the right-of-way to the vehicle on the right.
- (B) The right-of-way rule declared in division (A) of this section is modified at through highways and otherwise as stated in Chapter 4511 of the Revised Code.
- (C) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: 135 v H 995 (Eff 1-1-75); 136 v H 1. Eff 6-13-75; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.42. Right of way rule when turning left.

- (A) The operator of a vehicle, streetcar, or trackless trolley intending to turn to the left within an intersection or into an alley, private road, or driveway shall yield the right of way to any vehicle, streetcar, or trackless trolley approaching from the opposite direction, whenever the approaching vehicle, streetcar, or trackless

trolley is within the intersection or so close to the intersection, alley, private road, or driveway as to constitute an immediate hazard.

- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-41; 119 v 766(782), § 41; Bureau of Code Revision, 10-1-53; 130 v 1087 (Eff 6-27-63); 135 v H 995 (Eff 1-1-75); 137 v S 62. Eff 7-8-77; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.43. Right-of-way rule at through highways, stop signs, yield signs.

- (A) Except when directed to proceed by a law enforcement officer, every driver of a vehicle or trackless trolley approaching a stop sign shall stop at a clearly marked stop line, but if none, before entering the crosswalk on the near side of the intersection, or, if none, then at the point nearest the intersecting roadway where the driver has a view of approaching traffic on the intersecting roadway before entering it. After having stopped, the driver shall yield the right-of-way to any vehicle in the intersection or approaching on another roadway so closely as to constitute an immediate hazard during the time the driver is moving across or within the intersection or junction of roadways.
- (B) The driver of a vehicle or trackless trolley approaching a yield sign shall slow down to a speed reasonable for the existing conditions and, if required for safety to stop, shall stop at a clearly marked stop line, but if none, before entering the crosswalk on the near side of the intersection, or, if none, then at the point nearest the intersecting roadway where the driver has a view of approaching traffic on the intersecting roadway before entering it. After slowing or stopping, the driver shall yield the right-of-way to any vehicle or trackless trolley in the intersection or approaching on another roadway so closely as to constitute an immediate hazard during the time the driver is moving across or within the intersection or junction of roadways. Whenever a driver is involved in a collision with a vehicle or trackless trolley in the intersection or junction of roadways, after driving past a yield sign without stopping, the collision shall be prima-facie evidence of the driver's failure to yield the right-of-way.
- (C) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: 135 v H 995 Eff 1-1-75; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.431. Stop prior to driving on sidewalk sidewalk area.

- (A) The driver of a vehicle or trackless trolley emerging from an alley, building, private road, or driveway within a business or residence district shall stop the vehicle or trackless trolley immediately prior to driving onto a sidewalk or onto the sidewalk area extending across the alley, building entrance, road, or driveway, or in the event there is no sidewalk area, shall stop at the point nearest the street to be entered where the driver has a view of approaching traffic thereon.
- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: 135 v H 995. Eff 1-1-75; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.432. Stop signs on private residential road or driveway.

- (A) The owner of a private road or driveway located in a private residential area containing twenty or more dwelling units may erect stop signs at places where the road or driveway intersects with another private road or driveway in the residential area, in compliance with all of the following requirements:
- (1) The stop sign is sufficiently legible to be seen by an ordinarily observant person and meets the specifications of and is placed in accordance with the manual adopted by the department of transportation pursuant to section 4511.09 of the Revised Code;

- (2) The owner has posted a sign at the entrance of the private road or driveway that is in plain view and clearly informs persons entering the road or driveway that they are entering private property, stop signs have been posted and must be obeyed, and the signs are enforceable by law enforcement officers under state law. The sign required by division (A)(2) of this section, where appropriate, may be incorporated with the sign required by division (A)(2) of section 4511.211 of the Revised Code.
- (B) Division (A) of section 4511.43 and section 4511.46 of the Revised Code shall be deemed to apply to the driver of a vehicle on a private road or driveway where a stop sign is placed in accordance with division (A) of this section and to a pedestrian crossing such a road or driveway at an intersection where a stop sign is in place.
- (C) When a stop sign is placed in accordance with division (A) of this section, any law enforcement officer may apprehend a person found violating the stop sign and may stop and charge the person with violating the stop sign.
- (D) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.
- (E) As used in this section, and for the purpose of applying division (A) of section 4511.43 and section 4511.46 of the Revised Code to conduct under this section:
- (1) "Intersection" means:
 - (a) The area embraced within the prolongation or connection of the lateral curb lines, or, if none, then the lateral boundary lines of the roadways of two private roads or driveways which join one another at, or approximately at, right angles, or the area within which vehicles traveling upon different private roads or driveways joining at any other angle may come in conflict.
 - (b) Where a private road or driveway includes two roadways thirty feet or more apart, then every crossing of two roadways of such private roads or driveways shall be regarded as a separate intersection.
 - (2) "Roadway" means that portion of a private road or driveway improved, designed, or ordinarily used for vehicular travel, except the berm or shoulder. If a private road or driveway includes two or more separate roadways, the term "roadway" means any such roadway separately but not all such roadways collectively.
 - (3) "Owner" and "private residential area containing twenty or more dwelling units" have the same meanings as in section 4511.211 of the Revised Code.

HISTORY: 143 v H 171. Eff 5-31-90; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.44. Right-of-way at highway from any place other than another roadway.

- (A) The operator of a vehicle, streetcar, or trackless trolley about to enter or cross a highway from any place other than another roadway shall yield the right of way to all traffic approaching on the roadway to be entered or crossed.
- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-43; 119 v 766(782), § 43; Bureau of Code Revision, 10-1-53; 135 v H 995. Eff 1-1-75; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.46. Right-of-way of pedestrian within crosswalk.

- (A) When traffic control signals are not in place, not in operation, or are not clearly assigning the right-of-way, the driver of a vehicle, trackless trolley, or streetcar shall yield the right-of-way, slowing down or stopping if need be to so yield or if required by section 4511.132 of the Revised Code, to a pedestrian crossing the roadway within a crosswalk when the pedestrian is upon the half of the roadway upon which the vehicle is traveling, or when the pedestrian is approaching so closely from the opposite half of the roadway as to be in danger.

- (B) No pedestrian shall suddenly leave a curb or other place of safety and walk or run into the path of a vehicle, trackless trolley, or streetcar which is so close as to constitute an immediate hazard.
- (C) Division (A) of this section does not apply under the conditions stated in division (B) of section 4511.48 of the Revised Code.
- (D) Whenever any vehicle, trackless trolley, or streetcar is stopped at a marked crosswalk or at any unmarked crosswalk at an intersection to permit a pedestrian to cross the roadway, the driver of any other vehicle, trackless trolley, or streetcar approaching from the rear shall not overtake and pass the stopped vehicle.
- (E) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: 135 v H 995 (Eff 1-1-75); 143 v S 44. Eff 7-25-89; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.48. Right of way yielded by pedestrian.

- (A) Every pedestrian crossing a roadway at any point other than within a marked crosswalk or within an unmarked crosswalk at an intersection shall yield the right of way to all vehicles, trackless trolleys, or streetcars upon the roadway.
- (B) Any pedestrian crossing a roadway at a point where a pedestrian tunnel or overhead pedestrian crossing has been provided shall yield the right of way to all traffic upon the roadway.
- (C) Between adjacent intersections at which traffic control signals are in operation, pedestrians shall not cross at any place except in a marked crosswalk.
- (D) No pedestrian shall cross a roadway intersection diagonally unless authorized by official traffic control devices; and, when authorized to cross diagonally, pedestrians shall cross only in accordance with the official traffic control devices pertaining to such crossing movements.
- (E) This section does not relieve the operator of a vehicle, streetcar, or trackless trolley from exercising due care to avoid colliding with any pedestrian upon any roadway.
- (F) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-46; 119 v 766(783), § 46; Bureau of Code Revision, 10-1-53; 135 v H 995. Eff 1-1-75; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.481. Intoxicated or drugged pedestrian on highway.

- (A) A pedestrian who is under the influence of alcohol, any drug of abuse, or any combination of them to a degree that renders the pedestrian a hazard shall not walk or be upon a highway.
- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: 135 v H 995. Eff 1-1-75; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.61. Stop signs at dangerous highway crossings over railroad tracks.

- (A) The department of transportation and local authorities in their respective jurisdictions, with the approval of the department, may designate dangerous highway crossings over railroad tracks whether on state, county, or township highways or on streets or ways within municipal corporations, and erect stop signs thereat. When such stop signs are erected, the operator of any vehicle, streetcar, or trackless trolley shall stop within fifty, but not less than fifteen, feet from the nearest rail of the railroad tracks and shall exercise due care before proceeding across such grade crossing.

(B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-59; 119 v 766(786), § 59; Bureau of Code Revision, 10-1-53; 127 v 887 (Eff 9-16-57); 135 v H 200 (Eff 9-28-73); 135 v S 171. Eff 10-31-73; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.62. Stopping at railroad grade crossings.

- (A) (1) Whenever any person driving a vehicle or trackless trolley approaches a railroad grade crossing, the person shall stop within fifty feet, but not less than fifteen feet from the nearest rail of the railroad if any of the following circumstances exist at the crossing:
- (a) A clearly visible electric or mechanical signal device gives warning of the immediate approach of a train.
 - (b) A crossing gate is lowered.
 - (c) A flagperson gives or continues to give a signal of the approach or passage of a train.
 - (d) There is insufficient space on the other side of the railroad grade crossing to accommodate the vehicle or trackless trolley the person is operating without obstructing the passage of other vehicles, trackless trolleys, pedestrians, or railroad trains, notwithstanding any traffic control signal indication to proceed.
 - (e) An approaching train is emitting an audible signal or is plainly visible and is in hazardous proximity to the crossing.
 - (f) There is insufficient undercarriage clearance to safely negotiate the crossing.
- (2) A person who is driving a vehicle or trackless trolley and who approaches a railroad grade crossing shall not proceed as long as any of the circumstances described in divisions (A)(1)(a) to (f) of this section exist at the crossing.
- (B) No person shall drive any vehicle through, around, or under any crossing gate or barrier at a railroad crossing while the gate or barrier is closed or is being opened or closed unless the person is signaled by a law enforcement officer or flagperson that it is permissible to do so.
- (C) Whoever violates this section is guilty of a misdemeanor of the fourth degree.

HISTORY: GC § 6307-60; 119 v 766(786), § 60; Bureau of Code Revision, 10-1-53; 135 v H 995 (Eff 1-1-75); 147 v S 60. Eff 10-21-97; 149 v S 123, § 1, eff. 1-1-04; 150 v H 95, § 1, eff. 9-26-03; 150 v H 95, § 3.13, eff. 1-1-04.

§ 4511.63. Stopping at grade crossings.

- (A) Except as provided in division (B) of this section, the operator of any bus, any school vehicle, or any vehicle transporting a material or materials required to be placarded under 49 C.F.R. Parts 100-185, before crossing at grade any track of a railroad, shall stop the vehicle and, while so stopped, shall listen through an open door or open window and look in both directions along the track for any approaching train, and for signals indicating the approach of a train, and shall proceed only upon exercising due care after stopping, looking, and listening as required by this section. Upon proceeding, the operator of such a vehicle shall cross only in a gear that will ensure there will be no necessity for changing gears while traversing the crossing and shall not shift gears while crossing the tracks.
- (B) This section does not apply at grade crossings when the public utilities commission has authorized and approved an exempt crossing as provided in this division.
- (1) Any local authority may file an application with the commission requesting the approval of an exempt crossing. Upon receipt of such a request, the commission shall authorize a limited period for the filing of comments by any party regarding the application and then shall conduct a public hearing in the community seeking the exempt crossing designation. The commission shall provide appropriate prior public notice of the comment period and the public hearing. By registered mail, the commission shall notify each railroad operating over the crossing of the comment period.
- (2) After considering any comments or other information received, the commission may approve or reject the application. By order, the commission may establish conditions for the exempt crossing designation, including compliance with division (b) of 49 C.F.R. Part 392.10, when applicable. An exempt crossing designation becomes effective only when appropriate signs giving notice of the exempt designation are erected at the crossing as ordered by the commission and any other conditions ordered by the commission are satisfied.

(3) By order, the commission may rescind any exempt crossing designation made under this section if the commission finds that a condition at the exempt crossing has changed to such an extent that the continuation of the exempt crossing designation compromises public safety. The commission may conduct a public hearing to investigate and determine whether to rescind the exempt crossing designation. If the commission rescinds the designation, it shall order the removal of any exempt crossing signs and may make any other necessary order.

(C) As used in this section:

- (1) "School vehicle" means any vehicle used for the transportation of pupils to and from a school or school-related function if the vehicle is owned or operated by, or operated under contract with, a public or nonpublic school.
- (2) "Bus" means any vehicle originally designed by its manufacturer to transport sixteen or more passengers, including the driver, or carries sixteen or more passengers, including the driver.
- (3) "Exempt crossing" means a highway rail grade crossing authorized and approved by the public utilities commission under division (B) of this section at which vehicles may cross without making the stop otherwise required by this section.

(D) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If the offender previously has been convicted of or pleaded guilty to one or more violations of this section or section 4511.76, 4511.761 [4511.76.1], 4511.762 [4511.76.2], 4511.764 [4511.76.4], 4511.77, or 4511.79 of the Revised Code or a municipal ordinance that is substantially similar to any of those sections, whoever violates this section is guilty of a misdemeanor of the fourth degree.

HISTORY: GC § 6307-61; 119 v 766(786), § 61; 124 v 514; Bureau of Code Revision, 10-1-53; 125 v 903(1025) (Eff 10-1-53); 145 v H 154. Eff 6-30-93; 149 v S 123, § 1, eff. 1-1-04; 150 v H 95, § 1, eff. 9-26-03; 150 v H 95, § 3.13, eff. 1-1-04; 150 v S 156, § 1, eff. 5-18-05.

§ 4511.64. Slow-moving vehicles or equipment crossing railroad tracks.

(A) No person shall operate or move any crawler-type tractor, steam shovel, derrick, roller, or any equipment or structure having a normal operating speed of six or less miles per hour or a vertical body or load clearance of less than nine inches above the level surface of a roadway, upon or across any tracks at a railroad grade crossing without first complying with divisions (A)(1) and (2) of this section.

- (1) Before making any such crossing, the person operating or moving any such vehicle or equipment shall first stop the same, and while stopped the person shall listen and look in both directions along such track for any approaching train and for signals indicating the approach of a train, and shall proceed only upon exercising due care.
- (2) No such crossing shall be made when warning is given by automatic signal or crossing gates or a flagperson or otherwise of the immediate approach of a railroad train or car.

(B) If the normal sustained speed of such vehicle, equipment, or structure is not more than three miles per hour, the person owning, operating, or moving the same shall also give notice of such intended crossing to a station agent or superintendent of the railroad, and a reasonable time shall be given to such railroad to provide proper protection for such crossing. Where such vehicles or equipment are being used in constructing or repairing a section of highway lying on both sides of a railroad grade crossing, and in such construction or repair it is necessary to repeatedly move such vehicles or equipment over such crossing, one daily notice specifying when such work will start and stating the hours during which it will be prosecuted is sufficient.

(C) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-62; 119 v 766(786), § 62; Bureau of Code Revision. Eff 10-1-53; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.65. Designation of through highways.

(A) All state routes are hereby designated as through highways, provided that stop signs, yield signs, or traffic control signals shall be erected at all intersections with such through highways by the department of transportation as to highways under its jurisdiction and by local authorities as to highways under their jurisdiction, except as otherwise provided in this section. Where two or more state routes that are through highways intersect and no traffic control signal is in operation, stop signs or yield signs shall be

erected at one or more entrances thereto by the department, except as otherwise provided in this section.

Whenever the director of transportation determines on the basis of an engineering and traffic investigation that stop signs are necessary to stop traffic on a through highway for safe and efficient operation, nothing in this section shall be construed to prevent such installations. When circumstances warrant, the director also may omit stop signs on roadways intersecting through highways under his jurisdiction. Before the director either installs or removes a stop sign under this division, he shall give notice, in writing, of that proposed action to the affected local authority at least thirty days before installing or removing the stop sign.

- (B) Other streets or highways, or portions thereof, are hereby designated through highways if they are within a municipal corporation, if they have a continuous length of more than one mile between the limits of said street or highway or portion thereof, and if they have "stop" or "yield" signs or traffic control signals at the entrances of the majority of intersecting streets or highways. For purposes of this section, the limits of said street or highway or portion thereof shall be a municipal corporation line, the physical terminus of the street or highway, or any point on said street or highway at which vehicular traffic thereon is required by regulatory signs to stop or yield to traffic on the intersecting street, provided that in residence districts a municipal corporation may by ordinance designate said street or highway, or portion thereof, not to be a through highway and thereafter the affected residence district shall be indicated by official traffic control devices. Where two or more through highways designated under this division intersect and no traffic control signal is in operation, stop signs or yield signs shall be erected at one or more entrances thereto by the department or by local authorities having jurisdiction, except as otherwise provided in this section.
- (C) The department or local authorities having jurisdiction need not erect stop signs at intersections they find to be so constructed as to permit traffic to safely enter a through highway without coming to a stop. Signs shall be erected at such intersections indicating that the operator of a vehicle shall yield the right-of-way to or merge with all traffic proceeding on the through highway.
- (D) Local authorities with reference to highways under their jurisdiction may designate additional through highways and shall erect stop signs, yield signs, or traffic control signals at all streets and highways intersecting such through highways, or may designate any intersection as a stop or yield intersection and shall erect like signs at one or more entrances to such intersection.

HISTORY: GC § 6307-63; 119 v 766(787), § 63; Bureau of Code Revision, 10-1-53; 128 v 1270 (Eff 11-4-59); 131 v 1103 (Eff 10-15-65); 135 v H 200 (Eff 9-28-73); 136 v H 21 (Eff 12-30-75); 138 v H 290 (Eff 1-10-80); 143 v H 258. Eff 11-2-89.

§ 4511.66. Prohibition against parking on highways.

- (A) Upon any highway outside a business or residence district, no person shall stop, park, or leave standing any vehicle, whether attended or unattended, upon the paved or main traveled part of the highway if it is practicable to stop, park, or so leave such vehicle off the paved or main traveled part of said highway. In every event a clear and unobstructed portion of the highway opposite such standing vehicle shall be left for the free passage of other vehicles, and a clear view of such stopped vehicle shall be available from a distance of two hundred feet in each direction upon such highway.

This section does not apply to the driver of any vehicle which is disabled while on the paved or improved or main traveled portion of a highway in such manner and to such extent that it is impossible to avoid stopping and temporarily leaving the disabled vehicle in such position.

- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-64; 119 v 766(788), § 64; Bureau of Code Revision. Eff 10-1-53; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.661. Unattended motor vehicles.

- (A) No person driving or in charge of a motor vehicle shall permit it to stand unattended without first stopping the engine, locking the ignition, removing the key from the ignition, effectively setting the parking brake, and, when the motor vehicle is standing upon any grade, turning the front wheels to the curb or side of the highway.

The requirements of this section relating to the stopping of the engine, locking of the ignition, and removing the key from the ignition of a motor vehicle shall not apply to an emergency vehicle or a public safety vehicle.

- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: 135 v H 995 (Eff 1-1-75); 136 v H 763. Eff 8-6-76; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.67. Police may remove illegally parked vehicle.

Whenever any police officer finds a vehicle standing upon a highway in violation of section 4511.66 of the Revised Code, such officer may move such vehicle, or require the driver or other person in charge of the vehicle to move the same, to a position off the paved or improved or main traveled part of such highway.

Whenever any police officer finds a vehicle unattended upon any highway, bridge, or causeway, or in any tunnel, where such vehicle constitutes an obstruction to traffic, such officer may provide for the removal of such vehicle to the nearest garage or other place of safety.

HISTORY: GC § 6307-65; 119 v 766(788), § 65; 121 v 684; Bureau of Code Revision. Eff 10-1-53.

§ 4511.68. Parking – prohibited acts.

- (A) No person shall stand or park a trackless trolley or vehicle, except when necessary to avoid conflict with other traffic or to comply with sections 4511.01 to 4511.78, 4511.99, and 4513.01 to 4513.37 of the Revised Code, or while obeying the directions of a police officer or a traffic control device, in any of the following places:

- (1) On a sidewalk, except a bicycle;
- (2) In front of a public or private driveway;
- (3) Within an intersection;
- (4) Within ten feet of a fire hydrant;
- (5) On a crosswalk;
- (6) Within twenty feet of a crosswalk at an intersection;
- (7) Within thirty feet of, and upon the approach to, any flashing beacon, stop sign, or traffic control device;
- (8) Between a safety zone and the adjacent curb or within thirty feet of points on the curb immediately opposite the ends of a safety zone, unless a different length is indicated by a traffic control device;
- (9) Within fifty feet of the nearest rail of a railroad crossing;
- (10) Within twenty feet of a driveway entrance to any fire station and, on the side of the street opposite the entrance to any fire station, within seventy-five feet of the entrance when it is properly posted with signs;
- (11) Alongside or opposite any street excavation or obstruction when such standing or parking would obstruct traffic;
- (12) Alongside any vehicle stopped or parked at the edge or curb of a street;
- (13) Upon any bridge or elevated structure upon a highway, or within a highway tunnel;
- (14) At any place where signs prohibit stopping;
- (15) Within one foot of another parked vehicle;
- (16) On the roadway portion of a freeway, expressway, or thruway.

- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-66; 119 v 766(788), § 66; 124 v 514; Bureau of Code Revision, 10-1-53; 130 v 1087. Eff 8-5-63; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.681. Parking on private property – prohibited acts.

- (A) If an owner of private property posts on the property, in a conspicuous manner, a prohibition against parking on the property or conditions and regulations under which parking is permitted, no person shall do either of the following:

- (1) Park a vehicle on the property without the owner's consent;
 - (2) Park a vehicle on the property in violation of any condition or regulation posted by the owner.
- (B) Whoever violates this section is guilty of a minor misdemeanor.

HISTORY: 139 v H 707 (Eff 1-1-83); 140 v H 112. Eff 10-4-84; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.69. Parking requirements.

- (A) Every vehicle stopped or parked upon a roadway where there is an adjacent curb shall be stopped or parked with the right-hand wheels of the vehicle parallel with and not more than twelve inches from the right-hand curb, unless it is impossible to approach so close to the curb; in such case the stop shall be made as close to the curb as possible and only for the time necessary to discharge and receive passengers or to load or unload merchandise. Local authorities by ordinance may permit angle parking on any roadway under their jurisdiction, except that angle parking shall not be permitted on a state route within a municipal corporation unless an unoccupied roadway width of not less than twenty-five feet is available for free-moving traffic.
- (B) Local authorities by ordinance may permit parking of vehicles with the left-hand wheels adjacent to and within twelve inches of the left-hand curb of a one-way roadway.
- (C)
 - (1) Except as provided in division (C)(2) of this section, no vehicle or trackless trolley shall be stopped or parked on a road or highway with the vehicle or trackless trolley facing in a direction other than the direction of travel on that side of the road or highway.
 - (2) The operator of a motorcycle may back the motorcycle into an angled parking space so that when the motorcycle is parked it is facing in a direction other than the direction of travel on the side of the road or highway.
- (D) Notwithstanding any statute or any rule, resolution, or ordinance adopted by any local authority, air compressors, tractors, trucks, and other equipment, while being used in the construction, reconstruction, installation, repair, or removal of facilities near, on, over, or under a street or highway, may stop, stand, or park where necessary in order to perform such work, provided a flagperson is on duty or warning signs or lights are displayed as may be prescribed by the director of transportation.
- (E) Special parking locations and privileges for persons with disabilities that limit or impair the ability to walk, also known as handicapped parking spaces or disability parking spaces, shall be provided and designated by all political subdivisions and by the state and all agencies and instrumentalities thereof at all offices and facilities, where parking is provided, whether owned, rented, or leased, and at all publicly owned parking garages. The locations shall be designated through the posting of an elevated sign, whether permanently affixed or movable, imprinted with the international symbol of access and shall be reasonably close to exits, entrances, elevators, and ramps. All elevated signs posted in accordance with this division and division (C) of section 3781.111 of the Revised Code shall be mounted on a fixed or movable post, and the distance from the ground to the bottom edge of the sign shall measure not less than five feet. If a new sign or a replacement sign designating a special parking location is posted on or after October 14, 1999, there also shall be affixed upon the surface of that sign or affixed next to the designating sign a notice that states the fine applicable for the offense of parking a motor vehicle in the special designated parking location if the motor vehicle is not legally entitled to be parked in that location.
- (F)
 - (1) No person shall stop, stand, or park any motor vehicle at special parking locations provided under division (E) of this section or at special clearly marked parking locations provided in or on privately owned parking lots, parking garages, or other parking areas and designated in accordance with that division, unless one of the following applies:
 - (a) The motor vehicle is being operated by or for the transport of a person with a disability that limits or impairs the ability to walk and is displaying a valid removable windshield placard or special license plates;
 - (b) The motor vehicle is being operated by or for the transport of a handicapped person and is displaying a parking card or special handicapped license plates.
 - (2) Any motor vehicle that is parked in a special marked parking location in violation of division (F)(1)(a) or (b) of this section may be towed or otherwise removed from the parking location by the law enforcement agency of the political subdivision in which the parking location is located. A motor vehicle that is so towed or removed shall not be released to its owner until the owner presents proof of ownership of the motor vehicle and pays all towing and storage fees normally imposed by that political subdivision for towing and storing motor vehicles. If the motor vehicle is a leased vehicle, it shall not be released to the lessee until the lessee presents proof that that person is the lessee of the motor vehicle and pays all towing and storage fees normally imposed by that political subdivision for towing and storing motor vehicles.

- (3) If a person is charged with a violation of division (F)(1)(a) or (b) of this section, it is an affirmative defense to the charge that the person suffered an injury not more than seventy-two hours prior to the time the person was issued the ticket or citation and that, because of the injury, the person meets at least one of the criteria contained in division (A)(1) of section 4503.44 of the Revised Code.

(G) When a motor vehicle is being operated by or for the transport of a person with a disability that limits or impairs the ability to walk and is displaying a removable windshield placard or a temporary removable windshield placard or special license plates, or when a motor vehicle is being operated by or for the transport of a handicapped person and is displaying a parking card or special handicapped license plates, the motor vehicle is permitted to park for a period of two hours in excess of the legal parking period permitted by local authorities, except where local ordinances or police rules provide otherwise or where the vehicle is parked in such a manner as to be clearly a traffic hazard

(H) No owner of an office, facility, or parking garage where special parking locations are required to be designated in accordance with division (E) of this section shall fail to properly mark the special parking locations in accordance with that division or fail to maintain the markings of the special locations, including the erection and maintenance of the fixed or movable signs

(I) Nothing in this section shall be construed to require a person or organization to apply for a removable windshield placard or special license plates if the parking card or special license plates issued to the person or organization under prior law have not expired or been surrendered or revoked

(J)

(1) Whoever violates division (A) or (C) of this section is guilty of a minor misdemeanor.

(2)(a) Whoever violates division (F)(1)(a) or (b) of this section is guilty of a misdemeanor and shall be punished as provided in division (J)(2)(a) and (b) of this section. Except as otherwise provided in division (J)(2)(a) of this section, an offender who violates division (F)(1)(a) or (b) of this section shall be fined not less than two hundred fifty nor more than five hundred dollars. An offender who violates division (F)(1)(a) or (b) of this section shall be fined not more than one hundred dollars if the offender, prior to sentencing, proves either of the following to the satisfaction of the court:

(i) At the time of the violation of division (F)(1)(a) of this section, the offender or the person for whose transport the motor vehicle was being operated had been issued a removable windshield placard that then was valid or special license plates that then were valid but the offender or the person neglected to display the placard or license plates as described in division (F)(1)(a) of this section.

(ii) At the time of the violation of division (F)(1)(b) of this section, the offender or the person for whose transport the motor vehicle was being operated had been issued a parking card that then was valid or special handicapped license plates that then were valid but the offender or the person neglected to display the card or license plates as described in division (F)(1)(b) of this section.

(b) In no case shall an offender who violates division (F)(1)(a) or (b) of this section be sentenced to any term of imprisonment.

An arrest or conviction for a violation of division (F)(1)(a) or (b) of this section does not constitute a criminal record and need not be reported by the person so arrested or convicted in response to any inquiries contained in any application for employment, license, or other right or privilege, or made in connection with the person's appearance as a witness.

The clerk of the court shall pay every fine collected under division (J)(2) of this section to the political subdivision in which the violation occurred. Except as provided in division (J)(2) of this section, the political subdivision shall use the fine moneys it receives under division (J)(2) of this section to pay the expenses it incurs in complying with the signage and notice requirements contained in division (E) of this section. The political subdivision may use up to fifty per cent of each fine it receives under division (J)(2) of this section to pay the costs of educational, advocacy, support, and assistive technology programs for persons with disabilities, and for public improvements within the political subdivision that benefit or assist persons with disabilities, if governmental agencies or nonprofit organizations offer the programs.

(3) Whoever violates division (H) of this section shall be punished as follows:

(a) Except as otherwise provided in division (J)(3) of this section, the offender shall be issued a warning.

(b) If the offender previously has been convicted of or pleaded guilty to a violation of division (H) of this section or of a municipal ordinance that is substantially similar to that division, the offender shall not be issued a warning but shall be fined not more than twenty-five

dollars for each parking location that is not properly marked or whose markings are not properly maintained.

(K) As used in this section:

- (1) "Handicapped person" means any person who has lost the use of one or both legs or one or both arms, who is blind, deaf, or so severely handicapped as to be unable to move without the aid of crutches or a wheelchair, or whose mobility is restricted by a permanent cardiovascular, pulmonary, or other handicapping condition.
- (2) "Person with a disability that limits or impairs the ability to walk" has the same meaning as in section 4503.44 of the Revised Code.
- (3) "Special license plates" and "removable windshield placard" mean any license plates or removable windshield placard or temporary removable windshield placard issued under section 4503.41 or 4503.44 of the Revised Code, and also mean any substantially similar license plates or removable windshield placard or temporary removable windshield placard issued by a state, district, country, or sovereignty.

HISTORY: GC §§ 6307-67; 119 v 766(789), §§ 67; 121 v 684; 124 v 514; Bureau of Code Revision, 10-1-53; 135 v H 200 (Eff 9-28-v H 48 (Eff 1-1-83); 139 v H 116 (Eff 7-5-82); 140 v H 174 (Eff 9-30-83); 142 v H 111 (Eff 4-27-88); 144 v H 73 (Eff 9-25-91); 144 v S 98 (Eff 11-12-92); 145 v H 687 (Eff 1-1-95); 148 v H 148. Eff 10-14-99; 149 v S 123, § 1, eff. 1-1-04; 149 v H 490, § 1, eff. 1-1-04. Amended by 128th General Assembly File No. 9, HB 1, (Vetoed Provisions) §101.01, eff. 10/16/2009. Amended by 129th General Assembly File No. 7, HB 114, § 101.01, Eff (6-29-2011); 129 v H 349. Eff 4-12-12.

§ 4511.712. Obstructing intersection.

- (A) No driver shall enter an intersection or marked crosswalk or drive onto any railroad grade crossing unless there is sufficient space on the other side of the intersection, crosswalk, or grade crossing to accommodate the vehicle, streetcar, or trackless trolley the driver is operating without obstructing the passage of other vehicles, streetcars, trackless trolleys, pedestrians, or railroad trains, notwithstanding any traffic control signal indication to proceed.
- (B) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If, within one year of the offense, the offender previously has been convicted of or pleaded guilty to one predicate motor vehicle or traffic offense, whoever violates this section is guilty of a misdemeanor of the fourth degree. If, within one year of the offense, the offender previously has been convicted of two or more predicate motor vehicle or traffic offenses, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: 135 v H 995. Eff 1-1-75; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.75. Stopping for stopped school bus.

- (A) The driver of a vehicle, streetcar, or trackless trolley upon meeting or overtaking from either direction any school bus stopped for the purpose of receiving or discharging any school child, person attending programs offered by community boards of mental health and county boards of mental retardation and developmental disabilities, or child attending a program offered by a head start agency, shall stop at least ten feet from the front or rear of the school bus and shall not proceed until such school bus resumes motion, or until signaled by the school bus driver to proceed.

It is no defense to a charge under this division that the school bus involved failed to display or be equipped with an automatically extended stop warning sign as required by division (B) of this section.

- (B) Every school bus shall be equipped with amber and red visual signals meeting the requirements of section 4511.771 of the Revised Code, and an automatically extended stop warning sign of a type approved by the state board of education, which shall be actuated by the driver of the bus whenever but only whenever the bus is stopped or stopping on the roadway for the purpose of receiving or discharging school children, persons attending programs offered by community boards of mental health and county boards of mental retardation and developmental disabilities, or children attending programs offered by head start agencies. A school bus driver shall not actuate the visual signals or the stop warning sign in designated school bus loading areas where the bus is entirely off the roadway or at school buildings when children or persons attending programs offered by community boards of mental health and county boards of mental retardation and developmental disabilities are loading or unloading at curbside or at buildings when children attending programs offered by head start agencies are loading or unloading at curbside. The visual signals and stop warning sign shall be synchronized or otherwise operated as required by rule of the board.

- (C) Where a highway has been divided into four or more traffic lanes, a driver of a vehicle, streetcar, or trackless trolley need not stop for a school bus approaching from the opposite direction which has stopped for the purpose of receiving or discharging any school child, persons attending programs offered by community boards of mental health and county boards of mental retardation and developmental disabilities, or children attending programs offered by head start agencies. The driver of any vehicle, streetcar, or trackless trolley overtaking the school bus shall comply with division (A) of this section.
- (D) School buses operating on divided highways or on highways with four or more traffic lanes shall receive and discharge all school children, persons attending programs offered by community boards of mental health and county boards of mental retardation and developmental disabilities, and children attending programs offered by head start agencies on their residence side of the highway.
- (E) No school bus driver shall start the driver's bus until after any child, person attending programs offered by community boards of mental health and county boards of mental retardation and developmental disabilities, or child attending a program offered by a head start agency who may have alighted therefrom has reached a place of safety on the child's or person's residence side of the road.
- (F) (1) Whoever violates division (A) of this section may be fined an amount not to exceed five hundred dollars. A person who is issued a citation for a violation of division (A) of this section is not permitted to enter a written plea of guilty and waive the person's right to contest the citation in a trial but instead must appear in person in the proper court to answer the charge.
- (2) In addition to and independent of any other penalty provided by law, the court or mayor may impose upon an offender who violates this section a class seven suspension of the offender's driver's license, commercial driver's license, temporary instruction permit, probationary license, or nonresident operating privilege from the range specified in division (A)(7) of section 4510.02 of the Revised Code. When a license is suspended under this section, the court or mayor shall cause the offender to deliver the license to the court, and the court or clerk of the court immediately shall forward the license to the registrar of motor vehicles, together with notice of the court's action
- (G) As used in this section:
- (1) "Head start agency" has the same meaning as in section 3301.31 of the Revised Code.
- (2) "School bus," as used in relation to children who attend a program offered by a head start agency, means a bus that is owned and operated by a head start agency, is equipped with an automatically extended stop warning sign of a type approved by the state board of education, is painted the color and displays the markings described in section 4511.77 of the Revised Code, and is equipped with amber and red visual signals meeting the requirements of section 4511.771 of the Revised Code, irrespective of whether or not the bus has fifteen or more children aboard at any time. "School bus" does not include a van owned and operated by a head start agency, irrespective of its color, lights, or markings.

HISTORY: GC § 6307-73; 119 v 766(790), § 73; 123 v 614; Bureau of Code Revision, 10-1-53; 125 v 167 (Eff 10-2-53); 135 v H 995 (Eff 1-1-75); 136 v H 369 (Eff 8-29-75); 137 v S 389 (Eff 3-15-79); 138 v S 160 (Eff 10-31-80); 140 v H 478 (Eff 3-28-85); 147 v H 618. Eff 3-22-99; 149 v S 123, § 1, eff. 1-1-04; 150 v H 95, § 3.13, eff. 7-1-04. 06-30-2005

§ 4511.76. Administrative rules for school bus construction, design, equipment, operation and licensing.

- (A) The department of public safety, by and with the advice of the superintendent of public instruction, shall adopt and enforce rules relating to the construction, design, and equipment, including lighting equipment required by section 4511.771 of the Revised Code, of all school buses both publicly and privately owned and operated in this state.
- (B) The department of education, by and with the advice of the director of public safety, shall adopt and enforce rules relating to the operation of all vehicles used for pupil transportation.
- (C) No person shall operate a vehicle used for pupil transportation within this state in violation of the rules of the department of education or the department of public safety. No person, being the owner thereof or having the supervisory responsibility therefor, shall permit the operation of a vehicle used for pupil transportation within this state in violation of the rules of the department of education or the department of public safety.
- (D) The department of public safety shall adopt and enforce rules relating to the issuance of a license under section 4511.763 of the Revised Code. The rules may relate to the moral character of the applicant; the condition of the equipment to be operated; the liability and property damage insurance carried by the applicant; the posting of satisfactory and sufficient bond; and such other rules as the director of public safety determines reasonably necessary for the safety of the pupils to be transported.

(E) As used in this section, "vehicle used for pupil transportation" means any vehicle that is identified as such by the department of education by rule and that is subject to Chapter 3301-83 of the Administrative Code.

(F) Except as otherwise provided in this division, whoever violates this section is guilty of a minor misdemeanor. If the offender previously has been convicted of or pleaded guilty to one or more violations of this section or section 4511.63, 4511.761, 4511.762, 4511.764, 4511.77, or 4511.79 of the Revised Code or a municipal ordinance that is substantially similar to any of those sections, whoever violates this section is guilty of a misdemeanor of the third degree.

HISTORY: GC § 6307-74; 119 v 766(790), § 74; 122 v 284; Bureau of Code Revision, 10-1-53; 126 v 392(412) (Eff 3-17-55); 129 v 1273 (Eff 10-26-61); 131 v 1105 (Eff 9-1-65); 132 v H 1 (Eff 2-21-67); 135 v H 995 (Eff 1-1-75); 144 v S 98 (Eff 11-12-92); 147 v S 60 (Eff 10-21-97); 149 v H 73. Eff 6-29-2001; 149 v S 123, § 1, eff. 1-1-04.

§ 4511.98. Signs as to increased penalties in construction zones.

The director of transportation, board of county commissioners, or board of township trustees shall cause signs to be erected advising motorists that increased penalties apply for certain traffic violations occurring on streets or highways in a construction zone. The increased penalties shall be effective only when signs are erected in accordance with the guidelines and design specifications established by the director under section 5501.27 of the Revised Code, and when a violation occurs during hours of actual work within the construction zone.

HISTORY: 145 v H 247. Eff 5-1-95; 150 v H 52, § 1, eff. 6-1-04.

§ 4513.40. Warning sign before safety device at street crossing.

When a safety device has been installed in the traveled portion of a street at a railroad grade crossing for the protection of the traveling public, the municipal corporation shall place a warning sign not less than two hundred feet from the crossing. The driver of any vehicle shall place his vehicle under control at the location of said warning signs so as to be able to bring said vehicle to a complete stop at said safety device. Colliding with such safety device at the crossing is prima-facie evidence that the driver is a reckless driver.

HISTORY: GC § 591-1; 117 v 655; Bureau of Code Revision, 10-1-53; 125 v 903(1026). Eff 10-1-53.

§ 4519.40. Prohibited acts.

(A) The applicable provisions of Chapters 4511. and 4549. of the Revised Code shall be applied to the operation of snowmobiles, off-highway motorcycles, and all purpose vehicles, except that no snowmobile, off-highway motorcycle, or all-purpose vehicle shall be operated as follows:

- (1) On any limited access highway or freeway or the right-of-way thereof, except for emergency travel only during such time and in such manner as the director of public safety shall designate;
- (2) On any private property, or in any nursery or planting area, without the permission of the owner or other person having the right to possession of the property;
- (3) On any land or waters controlled by the state, except at those locations where a sign has been posted permitting such operation;
- (4) On the tracks or right-of-way of any operating railroad;
- (5) While transporting any firearm, bow, or other implement for hunting, that is not unloaded and securely encased;
- (6) For the purpose of chasing, pursuing, capturing, or killing any animal or wildfowl;
- (7) During the time from sunset to sunrise, unless displaying lighted lights as required by section 4519.20 of the Revised Code.

(B) Whoever violates this section shall be fined not less than fifty nor more than five hundred dollars, imprisoned not less than three nor more than thirty days, or both.

HISTORY: 134 v H 214 (Eff 3-7-72); 138 v H 450 (Eff 5-29-80); 144 v S 98 (Eff 11-12-92); 147 v H 611 (Eff 7-1-99); 148 v H 484. Eff 10-5-2000; 149 v S 123, § 1, eff. 1-1-04.

§ 4907.47. Installing crossing signals.

(A) If, after public hearing as to the necessity for installing protective devices at a public railroad highway grade crossing, written notice of which is published once a week for three consecutive weeks in a newspaper of general circulation in the county in which the crossing is located and is given the railroad and public authority involved at least thirty days in advance of such hearing, it is the opinion of the public utilities commission that the public safety requires a gate, automatic alarm bell, or other mechanical device to be erected and maintained at any place where a public road or street is crossed at the same level by a railroad, and the crossing has been declared by the commission to be so dangerous and hazardous as to require additional protective devices, or the public safety requires that a flagman be

stationed and maintained at such crossing, the commission shall give the superintendent, manager, or other officer in charge of such railroad a written order of what is required, and shall assign the cost of installing any such device between the railroad and the public in any proportion it determines proper that is consistent with any applicable federal requirements, after giving due consideration to the factors listed in division (B) of this section.

- (B) In assigning the cost of any such device the commission shall consider factors of volume of vehicular traffic, volume of train traffic, train type and speed, limitations of view and the causes thereof, savings, if any, which will inure to the railroad as the result of the installation, benefits to the public resulting from the reduction of hazard at the crossing, the probable cost of the installation, the future cost to the railroad of maintaining any such device, and any other special factors and conditions that the commission considers relevant. The commission may accept a railroad's agreement to maintain the installation as being its share of the cost for the protection. If any part of the cost is assigned to the public, it shall be apportioned to the state agency or political subdivision having jurisdiction over such crossing, and may be paid from any funds levied and made available for highway or street purposes; provided, that funds from the grade crossing protection fund created by section 4907.472 of the Revised Code may be used to pay the public's share of the cost. After the commission has issued an appropriate order requiring that additional protective devices be installed by a specific date, which shall be a reasonable time from the date of the order, the railroad concerned shall erect or install the additional protective devices or station the flagman within the time prescribed by the order. If the additional protective devices are not erected or installed within that time, the commission may reduce or eliminate the amount of any funds in the grade crossing protection fund obligated to pay the public's share of the costs relating to the erection, installation, and maintenance of the additional protective devices and, consistent with any applicable federal requirements, may assign to the railroad concerned any amount, up to one hundred per cent, of the total amount of the costs of erecting, installing, and maintaining the additional protective devices.

Any person owning or operating a railroad and neglecting or refusing to erect or maintain such gate, automatic alarm bell, or other mechanical device, or to maintain such flagman, when required by the commission pursuant to this section or section 4907.471 of the Revised Code, and after the commission has issued an appropriate order finding that the public funds will be made available with respect to any protective device it has ordered installed, shall forfeit to the state, for every such neglect or refusal, one thousand dollars, and in addition, shall forfeit one thousand dollars for each day such neglect or refusal continues.

HISTORY: RS § 247a; 86 v 367; 91 v 353; GC §§ 588, 589; Bureau of Code Revision, 10-1-53; 129 v 313 (Eff 9-21-61); 135 v H 111 (Eff 7-26-73); 137 v S 221 (Eff 11-23-77); 141 v H 201 (Eff 7-1-85); 143 v H 111. Eff 10-29-89.

§ 4907.471. Surveys determining probability of accident at crossing.

- (A) The public utilities commission shall survey all public crossings of railroads at grade, whether on state, county, or township highways or on streets or ways within municipal corporations. The commission shall devise a formula according to sound highway engineering practice for determining the probability of accident at each such crossing and may include in the formula factors representing volume of vehicular traffic, volume of train traffic, history of previous accidents, train type and speed, limitations of view, intersection angle, number of tracks, highway alignment, and such other special factors and conditions as are in its opinion relevant. The commission shall submit the formula to the director of transportation, who shall review it to ensure that it is consistent with applicable federal requirements.

The commission shall classify all such public crossings according to that formula and shall prepare a priority list for the protection of such crossings, giving highest priority to the crossings at which the commission finds the highest probability of accident, and lowest priority to the ones at which it finds the least probability of accident, provided that for the purposes of this section the commission shall place first on the list any crossing that meets all of the following criteria:

- (1) The crossing is at a section of railroad track that is being reactivated on or after May 1, 1990, and that has not been used for at least three years prior to the reactivation as determined by the commission;
- (2) The territory abutting the railroad's right-of-way for a distance of three hundred feet or more has been improved with residences during the period of time the track was not being used;
- (3) The commission has designated the crossing as dangerous and hazardous under division (A) of this section.

The priority list shall be for the use of the commission in carrying out this section and sections 4907.47, 4907.474, and 4907.475 of the Revised Code and shall not be admissible in evidence in any action to recover damages for negligence arising out of the use of such grade crossings. The list

shall be made available to the department of transportation for use in carrying out sections 4511.61 and 4955.33 of the Revised Code.

The survey shall be continuous, and after the original list is prepared, the commission may change the respective priority ratings as it may from time to time determine. When new crossings at grade are opened, the commission shall survey them and place them on the priority list at such places as in its opinion the probability of accident at those crossings warrants.

The commission may, pursuant to the priority ratings established as provided in this section, designate as dangerous and hazardous any railroad highway grade crossing it determines to be in need of additional protective devices. With respect to a high priority crossing so designated, the commission may negotiate with the railroad concerned, and with the state agency or political subdivision having jurisdiction over the crossing, an agreement providing for the installation at the crossing of appropriate luminous reflecting warning signs, luminous flashing signals, crossing gates illuminated at night, or other protective devices. The number, type, and location of the signs, signals, gates, or other protective devices, which shall conform with generally recognized national standards, shall be determined by agreement among the commission, the railroad concerned, and the state agency or political subdivision. The assignment of any part or all of the cost of the installation and subsequent maintenance of such signs, signals, gates, or other protective devices to the railroad and to the state or the political subdivisions shall be by the commission in any proportion it determines proper that is consistent with any applicable federal requirements, after giving due consideration to the factors listed in division (C) of this section.

- (B) In cases where the railroad does not agree that the installation of additional protective devices is necessary, or where no agreement can be reached with the railroad as to the number, type, or location of such devices or the proportion of cost to be assigned to the railroad, the commission shall hold a public hearing as to the necessity for installing additional protective devices at the crossing at issue. Written notice of the hearing shall be given to the railroad at least thirty days in advance of the hearing, and notice of the hearing shall be published once a week for three consecutive weeks in a newspaper of general circulation in the county in which the crossing at issue is located. If, after the hearing, it is the opinion of the commission that the public safety requires additional protective devices to be erected and maintained at the crossing, the commission shall give the superintendent, manager, or other officer in charge of the railroad a written order of the protective devices required and the date by which any action shall be completed, and shall assign to the parties the cost of installing and maintaining the protective devices in any proportion it determines proper that is consistent with any applicable federal requirements, after giving due consideration to the factors listed in division (C) of this section.
- (C) In assigning the cost of additional protective devices, the commission shall consider factors of volume of vehicular traffic, volume of train traffic, train type and speed, limitations of view and the causes thereof, savings, if any, which will inure to the railroad as the result of the installation, benefits to the public resulting from the reduction of hazard at the crossing, the probable cost of the installation, the future cost to the railroad of maintaining the devices, and any other special factors and conditions that the commission considers relevant. The commission may accept a railroad's agreement to maintain the additional protective devices as being its share of the cost for the protection. If any part of the cost of installation is assigned by the commission to the state agency or political subdivision having jurisdiction over the crossing, that cost may be paid from any funds levied and made available for highway or street purposes, provided that funds from the grade crossing protection fund created by section 4907.472 of the Revised Code may be used to pay the public's share of the cost. After the commission has issued an appropriate order requiring that additional protective devices be installed by a specific date, which shall be a reasonable time from the date of the order, the railroad concerned shall erect or install the additional protective devices within the time prescribed by the order. If the additional protective devices are not erected or installed within that time, the commission may reduce or eliminate the amount of any funds in the grade crossing protection fund obligated to pay the public's share of the costs relating to the erection, installation, and maintenance of the additional protective devices and, consistent with any applicable federal requirements, may assign to the railroad concerned any amount, up to one hundred per cent, of the total amount of the costs of erecting, installing, and maintaining the additional protective devices.

HISTORY: RC § 5523.31, 129 v 582(945) (Eff 1-10-61); 135 v H 111 (Eff 7-26-73); 135 v H 200 (Eff 9-28-73); 137 v S 221 (Eff 11-23-77); 141 v H 201 (Eff 7-1-85); RC § 4907.47.1, 143 v H 111 (Eff 10-29-89); 144 v S 8 (Eff 5-21-91); 144 v H 248. Eff 11-28-91.

§ 4907.48. Regulation of crossing signals.

All gates, bells, or devices erected under the direction of the public utilities commission shall be built within the time, in the manner, and of materials approved by the commission. Such devices so authorized shall be

located in the highway or street on one or both sides of the railroad tracks, as the commission deems the public safety requires. Such gates shall be so constructed that when closed they obstruct or prevent passage across such railroad from the side on which a gate is located. Such bell must be so constructed that it will ring before the approach of every train of cars or locomotive within three hundred feet or more of such crossing, and continue to ring until such train or locomotive has reached the crossing. A person shall be in charge of such gate who shall close it at the approach of each train or locomotive and keep it open at all other times. If an automatic bell or other mechanical device is required at such crossing, the railroad shall keep such bell or device in good working order. For every neglect of duty imposed by this section such railroad shall forfeit twenty-five dollars.

HISTORY: RS § 247b; 86 v 367; 91 v 353; GC § 590; 113 v 83; Bureau of Code Revision. Eff 10-1-53.

§ 4907.49. Dangerous crossings.

When two or more railroads cross a public highway or street at a dangerous crossing, the expenses incurred in the erection and maintenance of gates, bells, or other devices, and of necessary gatekeepers or flagmen, and apportioned by the public utilities commission as railroad expense, shall be shared equally by the railroads.

Chapters 4901., 4903., 4905., 4907., 4909., 4921., and 4923. of the Revised Code do not prevent the use of automatic bells or other mechanical devices by a railroad at a public crossing not declared dangerous by the public utilities commission, nor do they prevent state, county, township, or municipal officials from entering into an agreement with a railroad to pay all or part of the expense of erecting a warning device. Any funds levied and made available for highways or street purposes may be used to pay the public share of the cost under such an agreement. If a gate is erected or a flagman is stationed and maintained by a railroad, either alone or pursuant to such an agreement, the gate or flagman shall not be abandoned nor an automatic bell or other mechanical device substituted for the gate or flagman, unless the commission consents to the abandonment or substitution.

HISTORY: 145 v S 75. Eff 10-20-94.

§ 4907.52. Safety devices at grade crossings.

When two railroads, a railroad and an interurban railroad or electric or street railway, two interurban railroads, or a railroad or electric railway and a street or highway cross at grade, if, in the opinion of the public utilities commission, public safety requires protection, the commission, upon its own motion or upon complaint, after notice to the railroads interested and full investigation, may make an order requiring the railroads so intersecting and crossing to install such devices as in the opinion of the commission will properly protect such crossing.

The commission may make any other orders regulating the speed and running of trains or of cars and the switching of cars over such crossing or street, and it shall apportion the expense of installation or maintenance of such devices between the railroad companies whose tracks are thus protected.

HISTORY: RS § 247e; 92 v 315; 99 v 390, § 2; GC §§ 594, 595; Bureau of Code Revision. Eff 10-1-53.

§ 4951.02. Grant of right to construct.

The right to construct or extend a street railway within or beyond the limits of a municipal corporation may be granted only by its legislative authority by ordinance. The right to construct such street railway without the limits of a municipal corporation may be granted only by the board of county commissioners by an order entered on its journal.

The legislative authority or the board may fix the conditions upon which such street railways may be constructed, operated, extended, and consolidated.

HISTORY: RS § 3443; RS Bates § 1536-183; 66 v 140; 67 v 10; 96 v 31, § 29; GC §§ 9101, 9113; Bureau of Code Revision. Eff 10-1-53.

§ 4951.14. Crossings.

Whenever it is deemed necessary by a majority of the board of directors of a street railway company to cross the streets, avenues, alleys, ways, or any part thereof, of any municipal corporation or any public highway outside of a municipal corporation, the legislative authority of such municipal corporation, or the public officers owning or having charge of such highways outside of municipal corporations, may agree with such company as to the manner and mode of such crossing and the compensation to be paid for it. If the parties fail to agree, such company may proceed in accordance with sections 163.01 to 163.22, inclusive, of the Revised Code. In its final order the court shall fix the manner and mode of such crossing. Upon compliance with such decree, the company may construct and maintain such crossing in accordance with the order in said cause.

HISTORY: GC § 9118-1; 101 v 375; Bureau of Code Revision, 10-1-53; 131 v 1201. Eff 1-1-66.

§ 4955.201. Abandonment of railroad track.

- (A) If the interstate commerce commission approves the abandonment of a railroad track that crosses a road or highway at grade, the railroad that owned the track immediately after the approval of the abandonment shall remove the track at the crossing and fill the space previously occupied by the rails with the same material that comprises the road or highway at the crossing. Upon completion of the work, the surface of the crossing where the rails previously were located shall be the same height as the surface of the road or highway abutting the crossing. The restored portion of the road or highway shall meet the construction standards applicable to the road or highway of which the restored portion is a part.
- (B) No railroad shall fail to remove from a crossing the rails that comprise a track whose abandonment has been approved or fail to fill the space previously occupied by the rails as required by division (A) of this section.

HISTORY: 145 v H154. Eff 6-30-93.

§ 4955.33. Crossbuck signs.

At all points where its railroad crosses a public road at a common grade, each company shall erect crossbuck signing at positions at each such crossing that are in accordance with the department of transportation manual for uniform traffic control devices, adopted under section [4511.09](#) of the Revised Code, to give notice of the proximity of the railroad and warn persons to be on the lookout for the locomotive. Any such signing that has been or is erected in accordance with this section may lawfully be continued in use until it is replaced. A company that neglects or refuses to comply with this section is liable in damages for all injuries that occur to persons or property from such neglect or refusal. HISTORY: RS § 3323; S&C 279; 50 v 274, §18; GC § 8852; 113 v 27; Bureau of Code Revision, 10-1-53; 127 v 887 (Eff 9-16-57); 135 v H 200 (Eff 9-28-73); 135 v S 567 (Eff 6-29-74); 143 v H 258 (Eff 11-2-89); 144 v H 648 (Eff 1-1-95); 129 v H 349. Eff 4-12-12.

§ 5501.27. Increased penalties for traffic violations in construction zone.

- (A) The director of transportation shall adopt rules that do the following:
- (1) Rules governing the posting of signs advising motorists that increased penalties apply for certain traffic violations occurring on streets or highways in a construction zone;
 - (2) Rules governing the posting of signs to be used pursuant to section 2903.081 [2903.08.1] of the Revised Code giving notice to motorists of the prohibitions set forth in sections 2903.06 and 2903.08 of the Revised Code regarding the death of or injury to any person in a construction zone as a proximate result of a reckless operation offense or speeding offense.
- (B) The rules required under divisions (A)(1) and (2) of this section shall include guidelines to determine which areas are appropriate to the posting of such signs. The guidelines may include consideration of the following: the duration of the work on the street or highway, the proximity of workers to moving traffic, the existence of any unusual or hazardous conditions, the volume of traffic on the street or highway, and any other appropriate factors. The director shall formulate design specifications for the signs described in division (A)(1) of this section advising motorists of the increased penalties and the signs described in division (A)(2) of this section notifying motorists of the prohibitions set forth in sections 2903.06 and 2903.08 of the Revised Code regarding the death of or injury to any person in a construction zone as a proximate result of a reckless operation offense or speeding offense as described in that division. For purposes of traffic violation penalties, nothing in this section is intended to conflict with any standard set forth in the federal manual of uniform traffic control devices for streets and highways.
- (C) As used in this section and in section 4511.98 of the Revised Code, "construction zone" means that lane or portion of street or highway open to vehicular traffic and adjacent to a lane, berm, or shoulder of a street or highway within which lane, berm, or shoulder construction, reconstruction, resurfacing, or any other work of a repair or maintenance nature, including public utility work, is being conducted, commencing with the point where the first worker or piece of equipment is located and ending where the last worker or piece of equipment is located.

HISTORY: 145 v H 247. Eff 11-1-94; 150 v H 52, § 1, eff. 6-1-04.

§ 5591.42. Carrying capacity of bridges - warning notice.

The board of county commissioners together with the county engineer or an engineer to be selected by the board, or the director of transportation, may ascertain the safe carrying capacity of the bridges on roads or highways under their jurisdiction. Where the safe carrying capacity of any such bridge is ascertained and found to be less than the load limit prescribed by sections 5577.01 to 5577.12 of the Revised Code, warning

notice shall be conspicuously posted near each end of the bridge. The notice shall caution all persons against driving on the bridge a loaded conveyance of greater weight than the bridge's carrying capacity.

HISTORY: RS § 4944; S&C 193; 66 v 90; GC § 7572; 101 v 220; 119 v 182; Bureau of Code Revision, 10-1-53; 135 v H 200 (Eff 9-28-73); 139 v S 114 (Eff 10-27-81); 143 v H 258. Eff 11-2-89.

APPENDIX C. SIGN INDEX Regulatory Signs



R1-1
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R1-2
Sec. 2B.08



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Sec. 2B.10



R1-3P
Sec. 2B.05



R1-5
Sec. 2B.11



R1-5a
Sec. 2B.11



R1-6
Sec. 2B.12



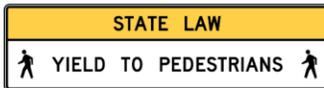
R1-6b
Sec. 7B.13



R1-7
Sec. 6E.05



R1-8
Sec. 6E.05



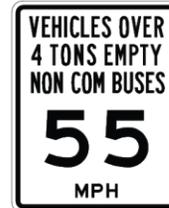
R1-9
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R2-1
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R2-2P
Sec. 2B.14



R2-H2a
Sec. 2B.14



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R2-3P
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R2-5P
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R2-5bP
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R2-12
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R3-1a
Sec. 8B.08



R3-2
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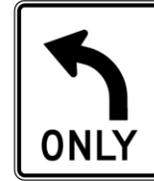
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R3-3
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R3-4
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R3-5
Sec. 2B.20



R3-5a
Sec. 2B.20



R3-5bP
Sec. 2B.20



R3-5cP
Sec. 2B.20



R3-5dP
Sec. 2B.20



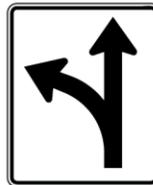
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R3-5fP
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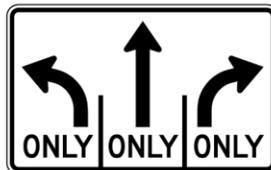
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R3-8a
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R3-8b
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R3-9b
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Regulatory Signs – continued



R3-9e
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R3-9f
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R3-9g
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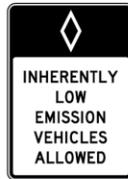
R3-9h
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R3-9i
Sec. 2B.26



R3-10
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R3-10a
Sec. 2G.04



R3-11
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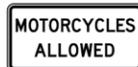
R3-11a
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R3-11b
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R3-11c
Sec. 2G.05



R3-11P
Sec. 2G.03



R3-12
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R3-12a
Sec. 2G.06



R3-12b
Sec. 2G.06



R3-12c
Sec. 2G.06



R3-12d
Sec. 2G.06



R3-12e
Sec. 2G.06



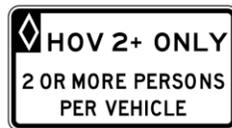
R3-12f
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R3-12g
Sec. 2G.06



R3-12h
Sec. 2G.06



R3-13
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R3-13a
Sec. 2G.04

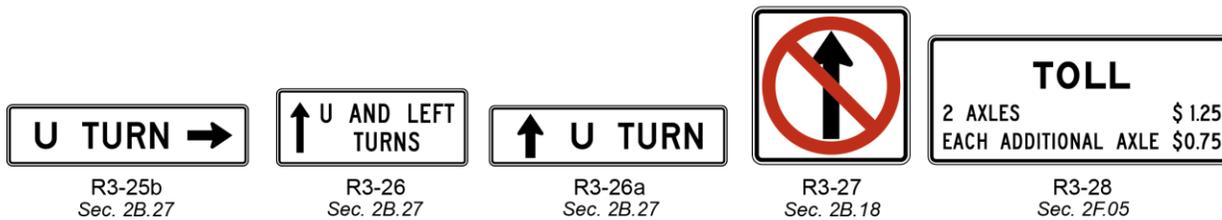
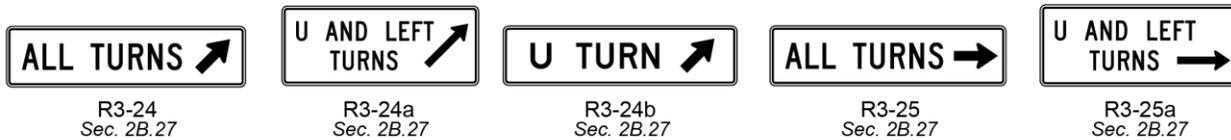
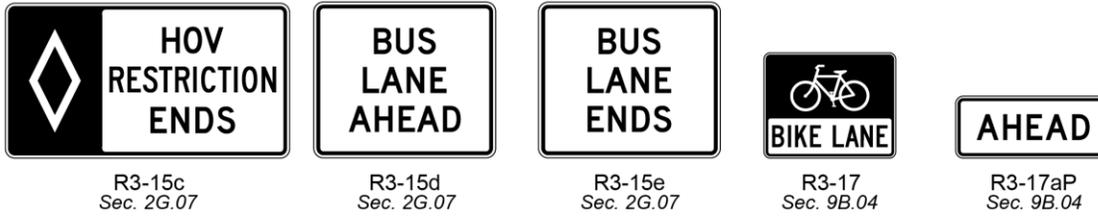
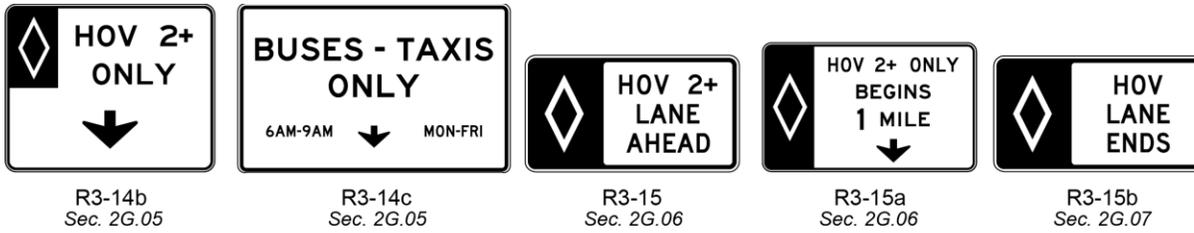


R3-14
Sec. 2G.05



R3-14a
Sec. 2G.05

Regulatory Signs – continued



Regulatory Signs – continued



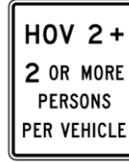
R3-29P
Sec. 2F.05



R3-30P
Sec. 2F.05



R3-33
Sec. 2B.23



R3-40
Sec. 2G.17



R3-42
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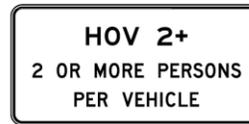
R3-42a
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R3-42b
Sec. 2G.17



R3-42c
Sec. 2G.17



R3-43
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R3-44
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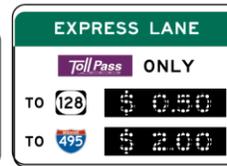
R3-44a
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R3-45
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R3-45a
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R3-48
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R4-3
Sec. 2B.30



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R4-4
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R4-5
Sec. 2B.31



R4-7
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R4-7a
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R4-7b
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R4-7c
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Regulatory Signs – continued



R4-8
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R4-8c
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R4-11
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R4-12
Sec. 2B.35



R4-13
Sec. 2B.35



R4-14
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R4-18
Sec. 2B.36



R5-1
Sec. 2B.37



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R5-1b
Sec. 9B.07



R5-2
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R5-H2b
Sec. 2B.39



R5-H2c
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R5-4
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R5-5
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R5-7
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R5-8
Sec. 2B.39

Regulatory Signs – continued



R5-10a
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R5-10b
Sec. 2B.39



R5-10c
Sec. 2B.39



R5-H10d
Sec. 2B.39



R5-H10e
Sec. 2B.39



R5-H10f
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R5-11
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R6-1
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R6-3a
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R6-4
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R6-4a
Sec. 2B.43



R6-4b
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R6-5P
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R6-6
Sec. 2B.40



R6-7
Sec. 2B.40



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Sec. 2B.46



R7-2
Sec. 2B.46



R7-2a
Sec. 2B.46



R7-3
Sec. 2B.46



R7-4
Sec. 2B.46



R7-5
Sec. 2B.46



R7-6
Sec. 2B.46

Regulatory Signs – continued



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R7-8P
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R7-H8bP
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R7-9a
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R7-21
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R7-21a
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R7-22
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R7-107a
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R7-108
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R7-200
Sec. 2B.46



R7-200a
Sec. 2B.46



OR



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Sec. 2B.46



R7-201aP
Sec. 2B.46



R7-202P
Sec. 2B.46



R7-203
Sec. 2B.46



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R8-3
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R8-3a
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Regulatory Signs – continued



R8-3bP
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R8-3cP
Sec. 2B.46



R8-3dP
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Sec. 2B.46



R8-3fP
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R8-3gP
Sec. 2B.46



R8-3hP
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R8-5
Sec. 2B.46



R8-6
Sec. 2B.46



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R8-9
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R8-10
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R8-10a
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R9-2
Sec. 2B.51



R9-3
Sec. 2B.51



R9-3a
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R9-3bP
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R9-3cP
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R9-4
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R9-4a
Sec. 2B.50



R9-5
Sec. 9B.11



R9-6
Sec. 9B.11

Regulatory Signs – continued



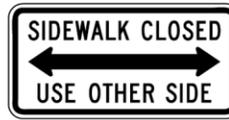
R9-7
Sec. 9B.12



R9-8
Sec. 6F.13



R9-9
Sec. 6F.14



R9-10
Sec. 6F.14



R9-11
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R9-13
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R9-14
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R10-2
Sec. 2B.52



R10-3
Sec. 2B.52



R10-3a
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R10-3b
Sec. 2B.52



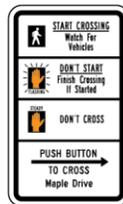
R10-3c
Sec. 2B.52



R10-3d
Sec. 2B.52



R10-3e
Sec. 2B.52



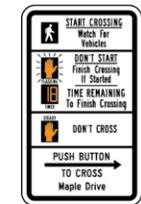
R10-3f
Sec. 2B.52



R10-3g
Sec. 2B.52



R10-3h
Sec. 2B.52



R10-3i
Sec. 2B.52



R10-4
Sec. 2B.52



R10-4a
Sec. 2B.52



R10-5
Sec. 2B.53



R10-6
Sec. 2B.53



R10-6a
Sec. 2B.53

Regulatory Signs – continued



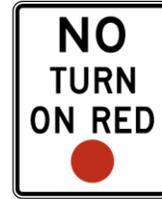
R10-7
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R10-8
Sec. 2B.53



R10-10
Sec. 2B.53



R10-11
Sec. 2B.54



R10-11a
Sec. 2B.54



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R10-11c
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R10-11d
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R10-13
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R10-14
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R10-17a
Sec. 2B.54



R10-18
Sec. 2B.55



R10-19P
Sec. 2B.55



R10-19aP
Sec. 2B.55



OR



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Sec. 2B.53



R10-22
Sec. 9B.13



R10-23
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R10-25
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R10-26
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R10-28
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R10-32P
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R11-3b
Sec. 2B.58, 6F.09



R11-4
Sec. 2B.58, 6F.09



R11-H5a
Sec. 6F.12



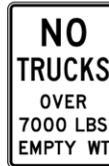
R11-H8
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R12-2
Sec. 2B.59



R12-3
Sec. 2B.59



R12-4
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R13-H2
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R15-4b
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R15-4c
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R15-6
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R15-6a
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R15-7
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R15-7a
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R15-8
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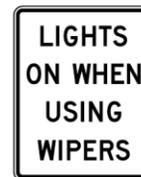
R16-H1
Sec. 2B.66



R16-H3
Sec. 7B.18



R16-4
Sec. 2B.65



R16-5
Sec. 2B.64



R16-6
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R16-8



R16-10



R16-7
Sec. 2B.64



R16-9
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R16-11
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Warning Signs



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Sec. 2C.07



W1-2a
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W1-3
Sec. 2C.07



W1-4
Sec. 2C.07



W1-4b
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W1-4c
Sec. 6F.48



W1-5
Sec. 2C.07



W1-6
Sec. 2C.12



W1-7
Sec. 2C.47



W1-8
Sec. 2C.09



W1-10
Sec. 2C.11



W1-10a
Sec. 2C.11



W1-10b
Sec. 2C.11



W1-10c
Sec. 2C.11



W1-10d
Sec. 2C.11



W1-10e
Sec. 2C.11



W1-11
Sec. 2C.07



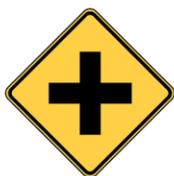
W1-13
Sec. 2C.13



W1-15
Sec. 2C.07



W1-H16
Sec. 6F.50.1



W2-1
Sec. 2C.46



W2-2
Sec. 2C.46



W2-3
Sec. 2C.46

Warning Signs – continued



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W2-5
Sec. 2C.46



W2-6
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W2-7L
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W2-8
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W3-1
Sec. 2C.36



W3-2
Sec. 2C.36



W3-3
Sec. 2C.36



W3-4
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W3-5
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W3-5a
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W3-6
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W3-7
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W4-1
Sec. 2C.40



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W4-2L (modified)
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W4-4P
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W4-4bP
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W4-5P
Sec. 2C.40



W4-6
Sec. 2C.41

Warning Signs – continued



W5-1
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W5-2
Sec. 2C.20



W5-3
Sec. 2C.21



W5-4
Sec. 6F.26



W5-4a
Sec. 9B.19



W6-1
Sec. 2C.22



W6-2
Sec. 2C.23



W6-3
Sec. 2C.44, 6F.32



W6-4
Sec. 6F.76



W7-1
Sec. 2C.16



W7-1a
Sec. 2C.16



W7-2P
Sec. 2C.57



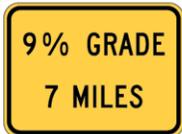
W7-2bP
Sec. 2C.57



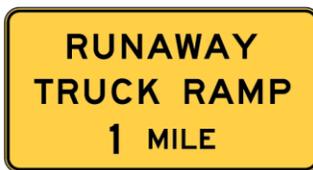
W7-3P
Sec. 2C.57



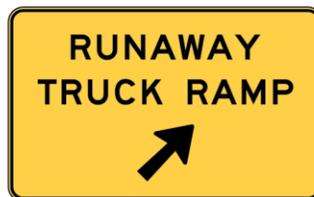
W7-3aP
Sec. 2C.55



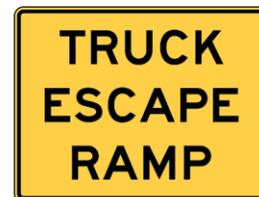
W7-3bP
Sec. 2C.57



W7-4
Sec. 2C.17



W7-4b
Sec. 2C.17



W7-4c
Sec. 2C.17



W7-4dP
Sec. 2C.17



W7-4eP
Sec. 2C.17



W7-4fP
Sec. 2C.17



W7-5
Sec. 9B.19



W7-6
Sec. 2C.18

Warning Signs – continued



W8-1
Sec. 2C.28



W8-2
Sec. 2C.28



W8-3
Sec. 2C.30



W8-4
Sec. 2C.31



W8-5
Sec. 2C.32



W8-5P
Sec. 2C.32



W8-5aP
Sec. 2C.32



W8-5bP
Sec. 2C.32



W8-5cP
Sec. 2C.32



W8-6
Sec. 2C.49



W8-7
Sec. 2C.32



W8-8
Sec. 2C.32



W8-9
Sec. 2C.31



W8-10
Sec. 9B.17



W8-10P
Sec. 9B.17



W8-11
Sec. 2C.32



W8-12
Sec. 2C.34



W8-H12a
Sec. 6F.47



W8-13
Sec. 2C.32



W8-14
Sec. 2C.32



W8-15
Sec. 2C.33



W8-15P
Sec. 2C.33



W8-16
Sec. 2C.33



W8-17
Sec. 2C.31



W8-17P
Sec. 2C.31

Warning Signs – continued



W8-18
Sec. 2C.35



W8-19
Sec. 2C.35



W8-21
Sec. 2C.35



W8-22
Sec. 2C.35



W8-23
Sec. 2C.31



W8-24
Sec. 6F.46



W8-25
Sec. 2C.31



W9-1
Sec. 2C.42



W9-2
Sec. 2C.42



W9-3
Sec. 6F.23



W9-6
Sec. 2F.06



W9-6P
Sec. 2F.07



W9-6a
Sec. 2F.08



W9-6aP
Sec. 2F.09



W9-7
Sec. 2C.43



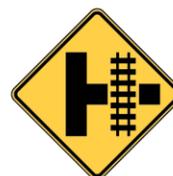
W10-1
Sec. 8B.06



W10-1aP
Sec. 8B.07



W10-2
Sec. 8B.06



W10-3
Sec. 8B.06



W10-4
Sec. 8B.06

Warning Signs – continued



W10-5
Sec. 8B.23



W10-5P
Sec. 8B.23



W10-7
Sec. 8B.19



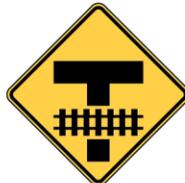
W10-8
Sec. 8B.20



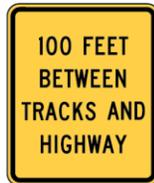
W10-9
Sec. 8B.21



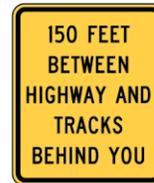
W10-9P
Sec. 8B.21



W10-11
Sec. 8B.24



W10-11a
Sec. 8B.24



W10-11b
Sec. 8B.24



W10-12
Sec. 8B.25



W10-13P
Sec. 8B.22



W10-14P
Sec. 8B.23



W10-14aP
Sec. 8B.23



W10-15P
Sec. 8B.23



W11-1
Sec. 2C.49, 9B.18



W11-2
Sec. 2C.50, 4F.02



W11-3
Sec. 2C.50



W11-4
Sec. 2C.50



W11-5
Sec. 2C.49



W11-5a
Sec. 2C.49



W11-6
Sec. 2C.50



W11-7
Sec. 2C.50



W11-8
Sec. 2C.49, 4G.02



W11-9
Sec. 2C.50



W11-10
Sec. 2C.49

Warning Signs – continued



W11-11
Sec. 2C.49



W11-12P
Sec. 2C.49, 4G.02



W11-14
Sec. 2C.49



W11-15
Sec. 2C.49, 9B.18



W11-15P
Sec. 2C.49



W11-15a
Sec. 2C.49



W11-16
Sec. 2C.50



W11-17
Sec. 2C.50



W12-1
Sec. 2C.25



W12-2
Sec. 2C.27



W12-2a
Sec. 2C.27



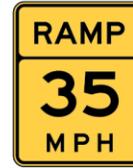
W13-1P
Sec. 2C.08



W13-2
Sec. 2C.14



W13-2 (mod.)
Sec. 2G.08



W13-3
Sec. 2C.14



W13-4P
Sec. 6F.25



W13-6
Sec. 2C.15



W13-7
Sec. 2C.15



W14-1
Sec. 2C.26



W14-1a
Sec. 2C.26



W14-2
Sec. 2C.26



W14-2a
Sec. 2C.26



W14-3
Sec. 2C.45



W15-1
Sec. 2C.51



W16-1P
Sec. 2C.60

Warning Signs – continued



W16-2P
Sec. 2C.55



W16-2aP
Sec. 2C.55



W16-3P
Sec. 2C.55



W16-3aP
Sec. 2C.55



W16-4P
Sec. 2C.55



W16-5P
Sec. 2C.56



W16-6P
Sec. 2C.56



W16-7P
Sec. 2C.50



W16-8P
Sec. 2C.58



W16-8aP
Sec. 2C.58



W16-9P
Sec. 2C.50



W16-10P
Sec. 2C.61



W16-10aP
Sec. 2C.61



W16-11P
Sec. 2G.09



W16-12P
Sec. 2C.46



W16-13P
Sec. 2C.50



W16-15P
Sec. 2C.62



W16-16P
Sec. 2F.10



W16-17P
Sec. 2C.46



W16-18P
Sec. 2A.15



W17-1
Sec. 2C.29



W18-1
Sec. 5C.12

Warning Signs – continued



W19-1
Sec. 2C.24



W19-2
Sec. 2C.24



W19-3
Sec. 2C.24



W19-4
Sec. 2C.24



W19-5
Sec. 2C.34



W20-1
Sec. 6F.18



W20-1
Sec. 6F.18



W20-2
Sec. 6F.19



W20-3
Sec. 6F.20



W20-4
Sec. 6F.21



W20-5
Sec. 6F.22



W20-5a
Sec. 6F.22



W20-7
Sec. 6F.31



W21-1
Sec. 6F.33



W21-2
Sec. 6F.34



W21-3
Sec. 6F.35



W21-4
Sec. 6G.06



W21-5
Sec. 6F.37



W21-5a
Sec. 6F.37



W21-5b
Sec. 6F.37



W21-6
Sec. 6F.38

Warning Signs – continued



W21-7
Sec. 6F.39



W21-8
Sec. 6G.06



W22-1
Sec. 6F.41



W22-2
Sec. 6F.42



W22-3
Sec. 6F.43



W23-1
Sec. 6F.27



W23-2
Sec. 2C.52



W24-1
Sec. 6F.49



W24-1a
Sec. 6F.49



W24-1b
Sec. 6F.49



W24-1cP
Sec. 6F.49



W25-1
Sec. 2C.48



W25-2
Sec. 2C.48

Guide Signs – Marker Series



M1-1
Sec. 2D.11, 2E.27



M1-2
Sec. 2D.11, 2E.27



M1-3
Sec. 2D.11, 2E.27



M1-4
Sec. 2D.11, 2E.27



M1-5
Sec. 2D.11



M1-6
Sec. 2D.11



M1-H6a
Sec. 2D.11



M1-H6b
Sec. 2D.11



M1-7
Sec. 2D.11



M1-8
Sec. 9B.21



M1-8a
Sec. 9B.21



M1-9
Sec. 9B.21



M1-10
Sec. 2E.28



Sec. 9B.22

M2-1
Sec. 2D.13



M2-2
Sec. 2D.14



Sec. 9B.22



Sec. 9B.22



Sec. 9B.22



Sec. 9B.22



Sec. 9B.22



M3-1
Sec. 2D.15



M3-2
Sec. 2D.15



M3-3
Sec. 2D.15



M3-4
Sec. 2D.15



M4-1
Sec. 2D.17



Sec. 9B.22



Sec. 9B.22



Sec. 9B.22



Sec. 9B.22



M4-1a
Sec. 2D.17



M4-2
Sec. 2D.18



M4-3
Sec. 2D.19



M4-4
Sec. 2D.20



M4-5
Sec. 2D.21

Guide Signs – Marker Series (continued)



Sec. 9B.22



Sec. 9B.22



Sec. 9B.22



M4-6
Sec. 2D.22



M4-7
Sec. 2D.24



M4-7a
Sec. 2D.24



M4-8
Sec. 6F.59, 9B.22



M4-8a
Sec. 6F.59



M4-8b
Sec. 6F.59



M4-9
Sec. 6F.59



M4-9a
Sec. 6F.59



M4-9b
Sec. 6F.59



M4-9c
Sec. 6F.59



M4-10
Sec. 6F.59



Sec. 9B.22



M4-14
Sec. 2D.23



M4-15
Sec. 2F.11



M4-16
Sec. 2F.12



M4-20
Sec. 2F.12



Sec. 9B.22



M5-1
Sec. 2D.26



Sec. 9B.22



M5-2
Sec. 2D.26



M5-3
Sec. 2D.26



M5-4
Sec. 2D.27



M5-5
Sec. 2D.27



Sec. 9B.22



M5-6
Sec. 2D.27



M6-1
Sec. 2D.28



Sec. 9B.22



M6-2
Sec. 2D.28



M6-2a
Sec. 2D.28



Sec. 9B.22



M6-3
Sec. 2D.28

Guide Signs – Marker Series (continued)



Sec. 9B.22



Sec. 9B.22



Sec. 9B.22



Sec. 9B.22



M8-H3
Sec. 2D.56



M8-H3P
Sec. 2D.56



M6-4
Sec. 2D.28



M6-5
Sec. 2D.28



M6-6
Sec. 2D.28



M6-7
Sec. 2D.28

Guide Signs – Directional Series



D1-1b
Sec. 9B.20



D1-1c
Sec. 9B.20



D1-1d
Sec. 2D.38



D1-1e
Sec. 2D.38



D1-H1
Sec. 2D.37, 9B.20



D1-H1a
Sec. 2D.37, 9B.20



D1-2b
Sec. 9B.20



D1-2c
Sec. 9B.20



D1-2d
Sec. 2D.38



D1-3b
Sec. 9B.20



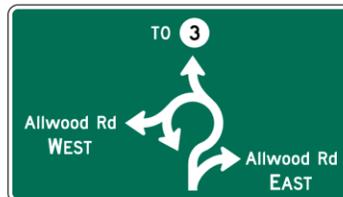
D1-3c
Sec. 9B.20



D1-3d
Sec. 2D.38



D1-5
Sec. 2D.38



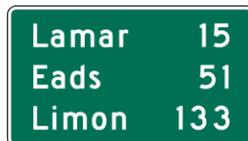
D1-5a
Sec. 2D.38



D2-H1
Sec. 2D.41



D2-H2
Sec. 2D.41



D2-H3
Sec. 2D.41



D3-1
Sec. 2D.43



D3-1a
Sec. 2D.43

Guide Signs – Directional Series (continued)



D3-2
Sec. 2D.44



D3-2
Sec. 2D.44



D3-2
Sec. 2D.44



D4-1
Sec. 2D.47



D4-2
Sec. 2D.48



D4-3
Sec. 9B.23



D5-H1
Sec. 2I.05



D5-H1a
Sec. 2I.05



D5-H2
Sec. 2I.05



D5-H2a
Sec. 2I.05



D5-5
Sec. 2I.05



D5-6
Sec. 2I.05



D5-H7
Sec. 2I.08



D5-H8
Sec. 2I.08



D5-H11
Sec. 2I.08



D5-12
Sec. 2I.04



D5-12P
Sec. 2I.04



D5-13
Sec. 2I.06



D5-14
Sec. 2I.06

Guide Signs – Directional Series (continued)



D5-15
Sec. 2I.07



D5-16
Sec. 2I.07



D6-4
Sec. 2D.55



D6-4a
Sec. 2D.55



D8-1
Sec. 2D.49, 2E.54



D8-H2
Sec. 2D.49, 2E.54



D8-3
Sec. 2D.49, 2E.54



D9-1
Sec. 2I.02



D9-2
Sec. 2I.02



D9-3
Sec. 2I.02



D9-3a
Sec. 2I.02



D9-4
Sec. 2I.02



D9-6
Sec. 2I.02



D9-6P
Sec. 2I.02



D9-7
Sec. 2I.02



D9-8
Sec. 2I.02



D9-9
Sec. 2I.02



D9-10
Sec. 2I.02



D9-11
Sec. 2I.02



D9-11a
Sec. 2I.02



D9-11b
Sec. 2I.02



D9-11bP
Sec. 2I.02

Guide Signs – Directional Series (continued)



D9-11c
Sec. 21.02



D9-12
Sec. 21.02



D9-13
Sec. 21.02



D9-13aP
Sec. 21.02



D9-13bP
Sec. 21.02



D9-13cP
Sec. 21.02



D9-13dP
Sec. 21.02



D9-14
Sec. 21.02



D9-15
Sec. 21.02



D9-16
Sec. 21.02



D9-17P
Sec. 21.02



D9-18
Sec. 21.03



D9-18a
Sec. 21.03



D9-18b
Sec. 21.03



D9-18c
Sec. 21.03



D9-21
Sec. 21.05



D9-22
Sec. 21.05



D11-1
Sec. 9B.20



D11-1a
Sec. 9B.25



D11-1bP
Sec. 9B.25



D11-1c
Sec. 9B.20



D11-2
Sec. 9B.25

Guide Signs – Directional Series (continued)



D11-3
Sec. 9B.25



D11-4
Sec. 9B.25



D12-1
Sec. 2I.09



D12-2
Sec. 2I.11



D12-3
Sec. 2I.09



D12-4
Sec. 2I.09



D12-5
Sec. 2I.10



D12-5a
Sec. 2I.10



D13-1
Sec. 2D.54



D13-2
Sec. 2D.54



D13-3
Sec. 2D.46



D13-3a
Sec. 2D.46



D15-1
Sec. 2D.33



D17-1
Sec. 2D.51



D17-2
Sec. 2D.51



D17-7
Sec. 2D.52

Guide Signs – Freeways, Expressways & Miscellaneous



Sec. 2E.36



Sec. 2E.36



Sec. 2E.36



Sec. 2E.36



Sec. 2E.36



Sec. 2E.12



Sec. 2E.12



E1-5aP
Sec. 2E.33



E1-H5P
Sec. 2E.31



E1-H5bP
Sec. 2E.31



E2-H1a
Sec. 2E.34



E2-H1P
Sec. 2E.34



E5-H1
Sec. 2E.37



E5-H1a
Sec. 2E.37



E5-H1bP
Sec. 2E.37



E5-H1c
Sec. 2E.37



E5-H1d
Sec. 2E.37



E5-2
Sec. 6F.28



E5-2a
Sec. 6F.28



E5-H2b
Sec. 6F.28



E5-H2c
Sec. 6F.28



E5-3
Sec. 6F.29

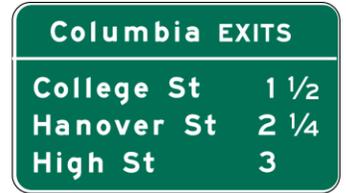
Guide Signs – Freeways, Expressways & Miscellaneous (cont.)



E7-H1
Sec. 2E.39



E7-H2
Sec. 2E.40



E7-H3
Sec. 2E.41



E7-H4
Sec. 2E.42



E8-1
Sec. 2G.10



E8-1a
Sec. 2G.10



E8-2
Sec. 2G.11



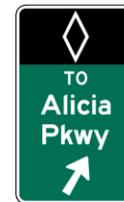
E8-2a
Sec. 2G.11



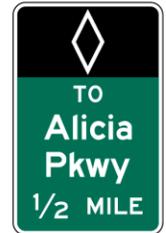
E8-3
Sec. 2G.11



E8-4
Sec. 2G.15



E8-5
Sec. 2G.13



E8-6
Sec. 2G.13



E11-1
Sec. 2E.24



E11-1a
Sec. 2E.24



E11-1b
Sec. 2E.24



E11-1c
Sec. 2E.24



E11-1d
Sec. 2E.24

Guide Signs – Freeways, Expressways & Miscellaneous (cont.)



E11-1e
Sec. 2E.24



E11-1f
Sec. 2E.24



E11-2
Sec. 2E.40



E13-1P
Sec. 2E.37



E13-2
Sec. 2E.36



D3-H3
Sec. 2E.29.1



D3-H3a
Sec. 2E.29.1



D3-H4
Sec. 2E.29.2



G20-1
Sec. 6F.56



G20-2
Sec. 6F.57



G20-4
Sec. 6F.58



G20-5aP
Sec. 6F.12

General Information Signs



I1-1
Sec. 2H.03



I-2
Sec. 2H.04



I-H2
Sec. 2H.02



I-H2a
Sec. 2H.02



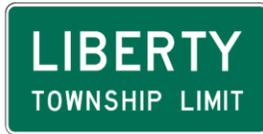
I-H2b
Sec. 2H.02



I-H2c
Sec. 2H.02



I-H2d
Sec. 2H.02



I-H2e
Sec. 2H.02



I-H2f
Sec. 2H.02



I-H2g
Sec. 2H.02



I-H2h
Sec. 2H.02



I-3
Sec. 2H.04



I-5
Sec. 2H.02



I-6
Sec. 2H.02



I-7
Sec. 2H.02



I-8
Sec. 2H.02



I-9
Sec. 2H.02



I-11
Sec. 2H.02



I-12
Sec. 2H.05



D10-1
Sec. 2H.05, 9B.24



D10-2
Sec. 2H.05, 9B.24



D10-3
Sec. 2H.05, 9B.24



D10-1a
Sec. 2H.05, 9B.24



D10-2a
Sec. 2H.05, 9B.24



D10-3a
Sec. 2H.05, 9B.24

General Information Signs (continued)



D10-4
Sec. 2H.06



D10-5
Sec. 2H.06



D10-H5a
Sec. 2H.06



D14-1
Sec. 2H.08



D14-2
Sec. 2H.08



D14-3
Sec. 2H.08



D14-H4
Sec. 2H.08

Recreational and Cultural Interest Series



RS-021
Sec. 2M.04



RS-022
Sec. 2M.04



RS-023
Sec. 2M.04



RS-034
Sec. 2M.04



RS-037
Sec. 2M.04

(This is representative of a few of the symbol signs in this series. The full series is shown in Figures 2M-5 through 2M-10 and is discussed in Section 2M.04.)

Emergency Management Series



EM-1
Sec. 2N.03



EM-2
Sec. 2N.04



EM-3
Sec. 2N.05



EM-4
Sec. 2N.06



EM-5
Sec. 2N.07



EM-6a
Sec. 2N.08



EM-6b
Sec. 2N.08



EM-6c
Sec. 2N.08



EM-6d
Sec. 2N.08



EM-7a
Sec. 2N.09



EM-7b
Sec. 2N.09



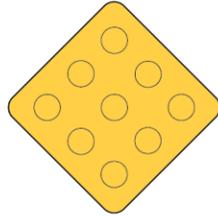
EM-7c
Sec. 2N.09



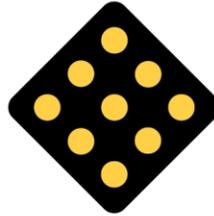
EM-7d
Sec. 2N.09

Object Markers and End of Roadway Markers

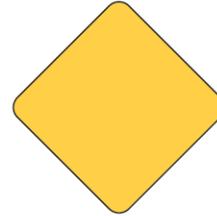
Type 1 Object Markers (obstructions within the roadway)



OM1-1
Sec. 2C.63, 9B.26

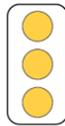


OM1-2
Sec. 2C.63, 9B.26



OM1-3
Sec. 2C.63, 9B.26

Type 2 Object Markers (obstructions adjacent to the roadway)



OM2-1V
Sec. 2C.63, 9B.26



OM2-2V
Sec. 2C.63, 9B.26



OM2-1H
Sec. 2C.63, 9B.26



OM2-2H
Sec. 2C.63, 9B.26

Type 3 Object Markers (obstructions adjacent to or within the roadway)



OM3-L
Sec. 2C.63, 9B.26

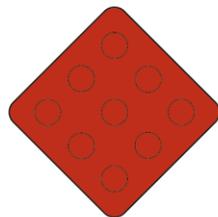


OM3-C
Sec. 2C.63, 9B.26

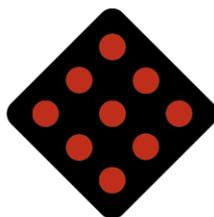


OM3-R
Sec. 2C.63, 9B.26

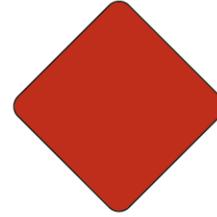
Type 4 Object Markers (end of roadway)



OM4-1
Sec. 2C.63



OM4-2
Sec. 2C.63



OM4-3
Sec. 2C.63

School Area Signs



S1-1
Sec. 7B.08



S3-1
Sec. 7B.14



S3-2
Sec. 7B.15



S4-1P
Sec. 7B.10



S4-3P
Sec. 7B.09, 7B.10



S4-5
Sec. 7B.16



S4-5a
Sec. 7B.16



S4-6P
Sec. 7B.10



S4-7P
Sec. 7B.10



S4-H8P
Sec. 7B.10



S5-H1
Sec. 7B.10



S5-3
Sec. 7B.10



R1-6b
Sec. 7B.13



R16-H3
Sec. 7B.18

INDEX

This section has been reserved for an Index similar to the one currently in the national Manual on Uniform Traffic Control Devices.

Notes

