Manual on Uniform Traffic Control Devices

for Streets and Highways

2003 EDITION

Including Revision 1 dated November 2004
and Revision 2 dated December 2007

U.S. Department of Transportation
Federal Highway Administration

Dotted line indicates edge of binder spine.

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MUTCD

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The Manual on Uniform Traffic Control Devices (MUTCD) is approved by the Federal Highway Administrator as the National Standard in accordance with Title 23 U.S. Code, Sections 109(d), 114(a), 217, 315, and 402(a), 23 CFR 655, and 49 CFR 1.48(b)(8), 1.48(b)(33), and 1.48(c)(2).

Addresses for Publications Referenced in the MUTCD

American Association of State Highway and Transportation Officials (AASHTO)
444 North Capitol Street, NW, Suite 249
Washington, DC 20001
www.transportation.org

American Railway Engineering and Maintenance-of-Way Association (AREMA)
8201 Corporate Drive, Suite 1125
Landover, MD 20785-2230
www.arema.org

Federal Highway Administration Report Center
Facsimile number: 301.577.1421
report.center@fhwa.dot.gov

Illuminating Engineering Society (IES)
120 Wall Street, Floor 17
New York, NY 10005
www.iesna.org

Institute of Makers of Explosives
1120 19th Street, NW, Suite 310
Washington, DC 20036-3605
www.ime.org

Institute of Transportation Engineers (ITE)
1099 14th Street, NW, Suite 300 West
Washington, DC 20005-3438
www.ite.org

International Organization for Standards
c/o Mr. Gerard Kuso
Austrian Standards Institute
Heinestrabe 38
Postfach 130
A-1021
Wien, Austria
www.iso.ch

ISEA - The Safety Equipment Association
1901 North Moore Street, Suite 808
Arlington, VA 22209
www.safetyequipment.org

National Committee on Uniform Traffic Laws and Ordinances (NCUTLO)
107 South West Street, Suite 110
Alexandria, VA 22314
www.ncutlo.org

Occupational Safety and Health Administration (OSHA)
U.S. Department of Labor
200 Constitution Avenue, NW
Washington, DC 20210
www.osha.gov

Transportation Research Board (TRB)
The National Academies
2101 Constitution Avenue, NW
Washington, DC 20418
www.nas.edu/trb

U.S. Architectural and Transportation Barriers Compliance Board (The U.S. Access Board)
1331 F Street, NW, Suite 1000
Washington, DC 20004-1111
www.access-board.gov

Acknowledgments

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MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
INTRODUCTION

Standard:

Traffic control devices shall be defined as all signs, signals, markings, and other devices used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, pedestrian facility, or bikeway by authority of a public agency having jurisdiction.

The Manual on Uniform Traffic Control Devices (MUTCD) is incorporated by reference in 23 Code of Federal Regulations (CFR), Part 655, Subpart F and shall be recognized as the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel in accordance with 23 U.S.C. 109(d) and 402(a). The policies and procedures of the Federal Highway Administration (FHWA) to obtain basic uniformity of traffic control devices shall be as described in 23 CFR 655, Subpart F.

Any traffic control device design or application provision contained in this Manual shall be considered to be in the public domain. Traffic control devices contained in this Manual shall not be protected by a patent, trademark, or copyright, except for the Interstate Shield and any other items owned by FHWA.

Support:

The need for uniform standards was recognized long ago. The American Association of State Highway Officials (AASHO), now known as the American Association of State Highway and Transportation Officials (AASHTO), published a manual for rural highways in 1927, and the National Conference on Street and Highway Safety (NCSHS) published a manual for urban streets in 1930. In the early years, the necessity for unification of the standards applicable to the different classes of road and street systems was obvious. To meet this need, a joint committee of AASHO and NCSHS developed and published the original edition of this Manual on Uniform Traffic Control Devices (MUTCD) in 1935. That committee, now called the National Committee on Uniform Traffic Control Devices (NCUTCD), though changed from time to time in name, organization, and personnel, has been in continuous existence and has contributed to periodic revisions of this Manual. The FHWA has administered the MUTCD since the 1971 edition. The FHWA and its predecessor organizations have participated in the development and publishing of the previous editions. There were eight previous editions of the MUTCD, and several of those editions were revised one or more times. Table I-1 traces the evolution of the MUTCD, including the two manuals developed by AASHO and NCSHS.

Standard:

The U.S. Secretary of Transportation, under authority granted by the Highway Safety Act of 1966, decreed that traffic control devices on all streets and highways open to public travel in accordance with 23 U.S.C. 109(d) and 402(a) in each State shall be in substantial conformance with the Standards issued or endorsed by the FHWA.

Support:

23 CFR 655.603 adopts the MUTCD as the national standard for any street, highway, or bicycle trail open to public travel in accordance with 23 U.S.C. 109(d) and 402(a). The "Uniform Vehicle Code (UVC)" is one of the publications referenced in the MUTCD. The UVC contains a model set of motor vehicle codes and traffic laws for use throughout the United States. The States are encouraged to adopt Section 15-116 of the UVC, which states that, "No person shall install or maintain in any area of private property used by the public any sign, signal, marking, or other device intended to regulate, warn, or guide traffic unless it conforms with the State manual and specifications adopted under Section 15-104."

The Standard, Guidance, Option, and Support material described in this edition of the MUTCD provide the transportation professional with the information needed to make appropriate decisions regarding the use of traffic control devices on streets and highways. The material in this edition is organized to better differentiate between Standards that must be satisfied for the particular circumstances of a situation, Guidances that should be followed for the particular circumstances of a situation, and Options that may be applicable for the particular circumstances of a situation.

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

Standard:

When used in this Manual, the text headings shall be defined as follows:

1. **Standard—a statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device. All standards are labeled, and the text appears in bold type. The verb shall is typically used. Standards are sometimes modified by Options.**

Table I-1. Evolution of the MUTCD

Year	Name	Month / Year Revised
1927	Manual and Specifications for the Manufacture, Display, and Erection of U.S. Standard Road Markers and Signs (for rural roads)	4/29, 12/31
1930	Manual on Street Traffic Signs, Signals, and Markings (for urban streets)	No revisions
1935	Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)	2/39
1942	Manual on Uniform Traffic Control Devices for Streets and Highways — War Emergency Edition	No revisions
1948	Manual on Uniform Traffic Control Devices for Streets and Highways	9/54
1961	Manual on Uniform Traffic Control Devices for Streets and Highways	No revisions
1971	Manual on Uniform Traffic Control Devices for Streets and Highways	11/71, 4/72, 3/73, 10/73, 6/74, 6/75, 9/76, 12/77
1978	Manual on Uniform Traffic Control Devices for Streets and Highways	12/79, 12/83, 9/84, 3/86
1988	Manual on Uniform Traffic Control Devices for Streets and Highways	1/90, 3/92, 9/93, 11/94, 12/96, 6/98, 1/00
2000	Manual on Uniform Traffic Control Devices for Streets and Highways — Millennium Edition	7/02
2003	Manual on Uniform Traffic Control Devices for Streets and Highways	

2. **Guidance—a statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or engineering study indicates the deviation to be appropriate. All Guidance statements are labeled, and the text appears in unbold type. The verb should is typically used. Guidance statements are sometimes modified by Options.**
3. **Option—a statement of practice that is a permissive condition and carries no requirement or recommendation. Options may contain allowable modifications to a Standard or Guidance. All Option statements are labeled, and the text appears in unbold type. The verb may is typically used.**
4. **Support—an informational statement that does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition. Support statements are labeled, and the text appears in unbold type. The verbs shall, should, and may are not used in Support statements.**

Support:

Throughout this Manual all dimensions and distances are provided in the International System of Units, a modernized version of the Metric system, and their English equivalent units are shown in parentheses.

Guidance:

Before laying out distances or determining sign sizes, the public agency should decide whether to use the International System of Units (Metric) or the English equivalent units. The chosen units should be specified on plan drawings. The chosen unit of measurement should be made known to those responsible for designing, installing, or maintaining traffic control devices.

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

Support:

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

There are ten Parts in this Manual and each Part is comprised of one or more Chapters. Each Chapter is comprised of one or more Sections. Parts are given a numerical identification, such as Part 2-Signs. Chapters are identified by the Part number and a letter, such as Chapter 2B-Regulatory Signs. Sections are identified by the Chapter number and letter followed by a decimal point and a number, such as Section 2B.03-Size of Regulatory Signs.

Each Section is comprised of one or more paragraphs. The paragraphs are indented but are not identified by a number or letter. Paragraphs are counted from the beginning of each Section without regard to the intervening text headings (Standard, Guidance, Option, or Support). Some paragraphs have lettered or numbered items. As an example of how to cite this Manual, the phrase "Not less than 12 m (40 ft) beyond the stop line" that appears on Page 4D-12 of this Manual would be referenced in writing as "Section 4D.15, P7, D1(a)," and would be verbally referenced as "Item D1(a) of Paragraph 7 of Section 4D.15."

Standard:

In accordance with 23 CFR 655.603(b)(1), States or other Federal agencies that have their own MUTCDs or Supplements shall revise these MUTCDs or Supplements to be in substantial conformance with changes to the National MUTCD within 2 years of issuance of the changes. Unless a particular device is no longer serviceable, non-compliant devices on existing highways and bikeways shall be brought into compliance with the current edition of the National MUTCD as part of the systematic upgrading of substandard traffic control devices (and installation of new required traffic control devices) required pursuant to the Highway Safety Program, 23 U.S.C. § 402(a). In cases involving Federal-aid projects for new highway or bikeway construction or reconstruction, the traffic control devices installed (temporary or permanent) shall be in conformance with the most recent edition of the National MUTCD before that highway is opened or re-opened to the public for unrestricted travel [23 CFR 655.603(d)(2)]. The FHWA has the authority to establish other target compliance dates for implementation of particular changes to the MUTCD [23 CFR 655.603(d)(4)]. These target compliance dates established by the FHWA shall be as follows:

Section 2A.09 Maintaining Minimum Retroreflectivity—new section—from the effective date of the Final Rule for Revision 2 of the 2003 MUTCD:

- **4 years for implementation and continued use of an assessment or management method that is designed to maintain traffic sign retroreflectivity at or above the established minimum levels;**
- **7 years for replacement of regulatory, warning, and ground-mounted guide (except street name) signs that are identified using the assessment or management method as failing to meet the established minimum levels; and** Rev. 2
- **10 years for replacement of street name signs and overhead guide signs that are identified using the assessment or management method as failing to meet the established minimum levels.**

Section 2A.19 Lateral Offset—crashworthiness of sign supports—January 17, 2013 for roads with posted speed limit of 80 km/h (50 mph) or higher.

Section 2B.03 Size of Regulatory Signs—increased sign sizes and other changes to Table 2B-1—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2B.04 STOP Sign (R1-1)—4-WAY plaque requirement—January 17, 2004.

Section 2B.06 STOP Sign Placement—signs mounted on back of STOP sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2B.09 YIELD Sign Applications—changes in YIELD sign application criteria from the 1988 MUTCD—January 17, 2011.

Section 2B.10 YIELD Sign Placement—signs mounted on back of YIELD sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2B.11 Yield Here to Pedestrians Signs (R1-5, R1-5a)—new section—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2B.13 Speed Limit Sign (R2-1)—color of changeable message legend of YOUR SPEED—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2B.25 Reversible Lane Control Signs (R3-9d, R3-9f through R3-9i)—removal of R3-9c and R3-9e signs—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2B.26 Preferential Only Lane Signs (R3-10 through R3-15)—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2B.27 Preferential Only Lanes for High-Occupancy Vehicles (HOVs)—new section in Millennium Edition—January 17, 2007.

Section 2B.28 Preferential Only Lane Sign Applications and Placement—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2B.37 ONE WAY Signs (R6-1, R6-2)—placement requirement at intersecting alleys—January 17, 2008.

Section 2B.46 Photo Enforced Signs (R10-18, R10-19)—new section—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2B.52 Hazardous Material Signs (R14-2, R14-3)—change in sign legend—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2C.04 Size of Warning Signs—increased sizes of W4-1, W5-2, W6-3, and W12-1 signs—January 17, 2008.

Section 2C.04 Size of Warning Signs—sizes of W1 Series Arrows signs, W7 Series truck runaway signs, W12-2p low clearance signs, and W10-1 advance grade crossing sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2C.11 Truck Rollover Warning Signs (W1-13, W1-13a)—new section—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2C.16 NARROW BRIDGE Sign (W5-2)—elimination of symbol sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2C.25 PAVEMENT ENDS Sign (W8-3)—removal of symbol sign—January 17, 2011.

Section 2C.26 Shoulder Signs (W8-4, W8-9, and W8-9a)—removal of symbol signs—January 17, 2011.

Section 2C.30 Speed Reduction Signs (W3-5, W3-5a)—removal of R2-5 Series Reduced Speed Ahead signs and use of W3-5 or W3-5a warning signs instead—15 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2C.31 Merge Signs (W4-1, W4-5)—Entering Roadway Merge sign (W4-1a)—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2C.32 Added Lane Signs (W4-3, W4-6)—Entering Roadway Added Lane sign (W4-3a)—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2C.33 Lane Ends Signs (W4-2, W9-1, W9-2)—new design of W4-2 sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2C.34 Two-Way Traffic Sign (W6-3)—transition from one-way street—5 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2C.37 Intersection Warning Signs (W2-1 through W2-6)—new design of Circular Intersection (W2-6) sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2C.40 Vehicular Traffic Signs (W8-6, W11-1, W11-5, W11-5a, W11-6, W11-8, W11-10, W11-11, W11-12, W11-14)—new symbol signs W11-1, W11-5, W11-5a, W11-6, W11-11, and W11-14—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2C.41 Nonvehicular Signs (W11-2, W11-3, W11-4, W11-7, W11-9)—elimination of crosswalk lines from crossing signs and use of diagonal downward pointing arrow supplemental plaque (W16-7) if at the crossing—January 17, 2011.

Section 2C.53 PHOTO ENFORCED Plaque (W16-10)—new section—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2D.38 Street Name Sign (D3-1)—symbol sizes, 150 mm (6 in) letter sizes for lettering on ground-mounted Street Name signs on roads that are not multi-lane streets with speed limits greater than 60 km/h (40 mph), other new provisions of Millennium Edition—January 9, 2012.

Section 2D.38 Street Name Sign (D3-1)—letter sizes on ground-mounted signs on multi-lane streets with speed limits greater than 60 km/h (40 mph) and letter sizes on overhead-mounted signs—15 years from the effective date of the Final Rule of the 2003 MUTCD.

Section 2D.39 Advance Street Name Signs (D3-2)—new section in 2000 MUTCD and revisions in 2003 MUTCD—15 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2D.45 General Service Signs (D9 Series)—Traveler Info Call 511 (D12-5) sign, Channel 9 Monitored (D12-3) sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2D.46 Reference Location Signs (D10-1 through D10-3) and Intermediate Reference Location Signs (D10-1a through D10-3a)—location and spacing of Reference Location signs and design of Intermediate Reference Location signs—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2E.28 Interchange Exit Numbering—size of exit number plaque—January 17, 2008.

Section 2E.28 Interchange Exit Numbering—LEFT on exit number plaques for left exits—5 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2E.30 Advance Guide Signs—advance placement distance—January 17, 2008.

Section 2E.54 Reference Location Signs and Enhanced Reference Location Signs (D10-4, D10-5)—design of Enhanced Reference Location signs and Intermediate Enhanced Reference Location signs—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2E.59 Preferential Only Lane Signs—new section in 2003 Edition—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 2F.05 Size of Lettering—minimum height of letters and numerals on specific service signs—January 17, 2011.

Section 2I.03 EVACUATION ROUTE Sign (EM-1)—new design and size of EM-1 sign—15 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 3B.01 Yellow Centerline Pavement Markings and Warrants—new section in Millennium Edition—January 3, 2003.

Section 3B.03 Other Yellow Longitudinal Pavement Markings—spacing requirements for pavement marking arrows in two-way left-turn lanes—5 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 3B.07 Warrants for Use of Edge Lines—new section in Millennium Edition—January 3, 2003.

Section 3B.17 Crosswalk Markings—gap between transverse lines of a crosswalk—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 3B.19 Pavement Word and Symbol Markings—typical spacing of lane-use arrows in two-way left-turn lanes shown in Figure 3B-7—5 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 3C.01 Object Marker Design and Placement Height—width of stripes on Type 3 striped marker—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 4D.01 General—location of signalized midblock crosswalks—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 4D.05 Application of Steady Signal Indications—Item B.4 in STANDARD—5 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 4D.12 Flashing Operation of Traffic Control Signals—duration of steady red clearance interval in change from red-red flashing mode to steady (stop-and-go) mode—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 4E.06 Accessible Pedestrian Signals—new section in Millennium Edition—January 17, 2005.

Section 4E.07 Countdown Pedestrian Signals—new section—10 years from the effective date of the Final Rule for the 2003 MUTCD for countdown pedestrian signal hardware; 3 years from the effective date of the Final Rule for the 2003 MUTCD for operational requirements of countdown pedestrian signals.

Section 4E.09 Accessible Pedestrian Signal Detectors—new section in Millennium Edition—January 17, 2005.

Section 4E.10 Pedestrian Intervals and Signal Phases—pedestrian clearance time sufficient to travel to far side of the traveled way—5 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 5C.05 NARROW BRIDGE Sign (W5-2)—elimination of symbol sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.

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Section 6D.02 Accessibility Considerations—5 years from the effective date of the Final Rule for the MUTCD.

Section 6D.03 Worker Safety Considerations—high-visibility apparel requirements—3 years from the effective date of the Final Rule for the 2003 MUTCD.

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Section 6F.03 Sign Placement—crashworthiness of sign supports—January 17, 2005.

Section 6F.58 Channelizing Devices—crashworthiness—January 17, 2005.

Section 6F.59 Cones—width of retroreflective stripes—5 years from the effective date of the Final Rule for the 2003 MUTCD.

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Section 6F.66 Longitudinal Channelizing Barricades—crashworthiness—January 17, 2005.

Section 6F.82 Crash Cushions—crashworthiness—January 17, 2005.

Section 7B.08 School Advance Warning Assembly (S1-1 with Supplemental Plaque)—use of AHEAD plaque (W16-9p) or distance plaque (W16-2 or W16-2a)—January 17, 2011.

Section 7B.09 School Crosswalk Warning Assembly (S1-1 with Diagonal Arrow)—elimination of crosswalk lines from crossing signs and use of diagonal downward pointing arrow supplemental plaque (W16-7) —January 17, 2011.

Section 7B.12 Reduced Speed School Zone Ahead Sign (S4-5, S4-5a)—15 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 7E.04 Uniform of Adult Crossing Guards and Student Patrols—requirement for high-visibility apparel for adult crossing guards—5 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 8B.03 Highway-Rail Grade Crossing (Crossbuck) Sign (R15-1) and Number of Tracks Sign (R15-2)—retroreflective strip on crossbuck support—January 17, 2011.

Section 8B.04 Highway-Rail Grade Crossing Advance Warning Signs (W10 Series)—removal of existing W10-6 series signs—January 17, 2006.

Section 8D.07 Traffic Control Signals at or Near Highway-Rail Grade Crossings—pre-signals—10 years from the effective date of the Final Rule for the 2003 MUTCD.

Section 9B.04 Bicycle Lane Signs (R3-17, R3-17a, R3-17b)—deletion of preferential lane symbol (diamond) for bicycle lane signs—January 17, 2006.

Section 9B.17 Bicycle Warning Sign (W11-1)—elimination of crosswalk lines from crossing signs and use of diagonal downward pointing arrow supplemental plaque (W16-7) if at the crossing—January 17, 2011.

Chapter 9C Markings—deletion of preferential lane symbol (diamond) for bicycle pavement markings—January 17, 2007.

Part 10 Traffic Controls for Highway-Light Rail Transit Grade Crossings—automatic gates, flashing-light signals, and blank-out signs—January 17, 2011.

Section 10C.15 Highway-Rail Grade Crossing Advance Warning Signs (W10 Series)—removal of existing W10-6 series signs—January 17, 2006.

Option:

In order for maintenance personnel to understand what to do when replacing a damaged non-compliant traffic control device, agencies may establish a policy regarding whether to replace the device in kind or to replace it with a compliant device.

Support:

Often it is desirable to upgrade to a compliant device at the time of this maintenance of a damaged device. However, it might be appropriate to replace the damaged non-compliant device in kind at the time of this maintenance activity if engineering judgment indicates that:

A. One compliant device in the midst of a series of adjacent non-compliant devices could potentially be confusing to road users; and/or
B. The anticipated schedule for replacement of the whole series of non-compliant devices will result in achieving timely compliance with the MUTCD.

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APPENDIX A1. CONGRESSIONAL LEGISLATION

Manual on Uniform Traffic Control Devices

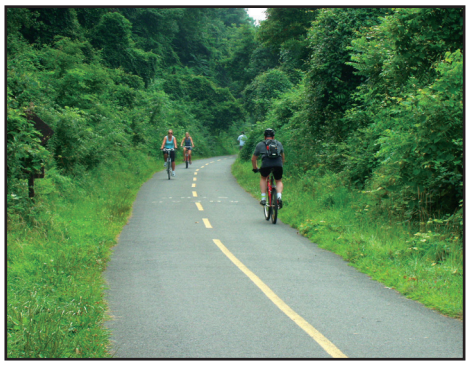
for Streets and Highways

2003 EDITION

Including Revision 2 dated December 2007

Part 1

General



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PART 1. GENERAL

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CHAPTER 1A. GENERAL

Section 1A.01 Purpose of Traffic Control Devices

Support:

The purpose of traffic control devices, as well as the principles for their use, is to promote highway safety and efficiency by providing for the orderly movement of all road users on streets and highways throughout the Nation.

Traffic control devices notify road users of regulations and provide warning and guidance needed for the reasonably safe, uniform, and efficient operation of all elements of the traffic stream.

Standard:

Traffic control devices or their supports shall not bear any advertising message or any other message that is not related to traffic control.

Support:

Tourist-oriented directional signs and Specific Service signs are not considered advertising; rather, they are classified as motorist service signs.

Section 1A.02 Principles of Traffic Control Devices

Support:

This Manual contains the basic principles that govern the design and use of traffic control devices for all streets and highways open to public travel regardless of type or class or the public agency having jurisdiction. This Manual's text specifies the restriction on the use of a device if it is intended for limited application or for a specific system. It is important that these principles be given primary consideration in the selection and application of each device.

Guidance:

To be effective, a traffic control device should meet five basic requirements:

A. Fulfill a need;
B. Command attention;
C. Convey a clear, simple meaning;
D. Command respect from road users; and
E. Give adequate time for proper response.

Design, placement, operation, maintenance, and uniformity are aspects that should be carefully considered in order to maximize the ability of a traffic control device to meet the five requirements listed in the previous paragraph. Vehicle speed should be carefully considered as an element that governs the design, operation, placement, and location of various traffic control devices.

Support:

The definition of the word "speed" varies depending on its use. The definitions of specific speed terms are contained in Section 1A.13.

Guidance:

The actions required of road users to obey regulatory devices should be specified by State statute, or in cases not covered by State statute, by local ordinance or resolution consistent with the "Uniform Vehicle Code."

The proper use of traffic control devices should provide the reasonable and prudent road user with the information necessary to reasonably safely and lawfully use the streets, highways, pedestrian facilities, and bikeways.

Support:

Uniformity of the meaning of traffic control devices is vital to their effectiveness. The meanings ascribed to devices in this Manual are in general accord with the publications mentioned in Section 1A.11.

Section 1A.03 Design of Traffic Control Devices

Guidance:

Devices should be designed so that features such as size, shape, color, composition, lighting or retroreflection, and contrast are combined to draw attention to the devices; that size, shape, color, and simplicity of message combine to produce a clear meaning; that legibility and size combine with placement to permit adequate time for response; and that uniformity, size, legibility, and reasonableness of the message combine to command respect.

Standard:

All symbols shall be unmistakably similar to or mirror images of the adopted symbol signs, all of which are shown in the "Standard Highway Signs" book (see Section 1A.11). Symbols and colors shall not be modified unless otherwise stated herein. All symbols and colors for signs not shown in the "Standard Highway Signs" book shall follow the procedures for experimentation and change described in Section 1A.10.

Guidance:

Aspects of a device's design should be modified only if there is a demonstrated need.

Support:

An example of modifying a device's design would be to modify the Side Road (W2-2) sign to show a second offset intersecting road.

Option:

Highway agencies may develop word message signs to notify road users of special regulations or to warn road users of a situation that might not be readily apparent. Unlike symbol signs and colors, new word message signs may be used without the need for experimentation. With the exception of symbols and colors, minor modifications in the specific design elements of a device may be made provided the essential appearance characteristics are preserved. Although the standard design of symbol signs cannot be modified, it may be appropriate to change the orientation of the symbol to better reflect the direction of travel.

Section 1A.04 Placement and Operation of Traffic Control Devices

Guidance:

Placement of a traffic control device should be within the road user's view so that adequate visibility is provided. To aid in conveying the proper meaning, the traffic control device should be appropriately positioned with respect to the location, object, or situation to which it applies. The location and legibility of the traffic control device should be such that a road user has adequate time to make the proper response in both day and night conditions.

Traffic control devices should be placed and operated in a uniform and consistent manner.

Unnecessary traffic control devices should be removed. The fact that a device is in good physical condition should not be a basis for deferring needed removal or change.

Section 1A.05 Maintenance of Traffic Control Devices

Guidance:

Functional maintenance of traffic control devices should be used to determine if certain devices need to be changed to meet current traffic conditions.

Physical maintenance of traffic control devices should be performed to retain the legibility and visibility of the device, and to retain the proper functioning of the device.

Support:

Clean, legible, properly mounted devices in good working condition command the respect of road users.

Section 1A.06 Uniformity of Traffic Control Devices

Support:

Uniformity of devices simplifies the task of the road user because it aids in recognition and understanding, thereby reducing perception/reaction time. Uniformity assists road users, law enforcement officers, and traffic courts by giving everyone the same interpretation. Uniformity assists public highway officials through efficiency in manufacture, installation, maintenance, and administration. Uniformity means treating similar situations in a similar way. The use of uniform traffic control devices does not, in itself, constitute uniformity. A standard device used where it is not appropriate is as objectionable as a nonstandard device; in fact, this might be worse, because such misuse might result in disrespect at those locations where the device is needed and appropriate.

Section 1A.07 Responsibility for Traffic Control Devices

Standard:

The responsibility for the design, placement, operation, maintenance, and uniformity of traffic control devices shall rest with the public agency or the official having jurisdiction. 23 CFR 655.603 adopts the Manual on Uniform Traffic Control Devices as the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel. When a State or other Federal agency

manual or supplement is required, that manual or supplement shall be in substantial conformance with the national Manual on Uniform Traffic Control Devices.

23 CFR 655.603 also states that traffic control devices on all streets and highways open to public travel in each State shall be in substantial conformance with standards issued or endorsed by the Federal Highway Administrator.

Support:

The "Uniform Vehicle Code" (see Section 1A.11) has the following provision in Section 15-104 for the adoption of a uniform Manual:

> "(a)The [State Highway Agency] shall adopt a manual and specification for a uniform system of traffic control devices consistent with the provisions of this code for use upon highways within this State. Such uniform system shall correlate with and so far as possible conform to the system set forth in the most recent edition of the Manual on Uniform Traffic Control Devices for Streets and Highways, and other standards issued or endorsed by the Federal Highway Administrator."
>
> "(b) The Manual adopted pursuant to subsection (a) shall have the force and effect of law."

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

Section 1A.08 Authority for Placement of Traffic Control Devices

Standard:

Traffic control devices, advertisements, announcements, and other signs or messages within the highway right-of-way shall be placed only as authorized by a public authority or the official having jurisdiction, for the purpose of regulating, warning, or guiding traffic.

When the public agency or the official having jurisdiction over a street or highway has granted proper authority, others such as contractors and public utility companies shall be permitted to install temporary traffic control devices in temporary traffic control zones. Such traffic control devices shall conform with the Standards of this Manual.

Guidance:

Any unauthorized traffic control device or other sign or message placed on the highway right-of-way by a private organization or individual constitutes a public nuisance and should be removed. All unofficial or nonessential traffic control devices, signs, or messages should be removed.

Standard:

All regulatory traffic control devices shall be supported by laws, ordinances, or regulations.

Support:

Provisions of this Manual are based upon the concept that effective traffic control depends upon both appropriate application of the devices and reasonable enforcement of the regulations.

Section 1A.09 Engineering Study and Engineering Judgment

Standard:

This Manual describes the application of traffic control devices, but shall not be a legal requirement for their installation.

Guidance:

The decision to use a particular device at a particular location should be made on the basis of either an engineering study or the application of engineering judgment. Thus, while this Manual provides Standards, Guidance, and Options for design and application of traffic control devices, this Manual should not be considered a substitute for engineering judgment.

Engineering judgment should be exercised in the selection and application of traffic control devices, as well as in the location and design of the roads and streets that the devices complement. Jurisdictions with responsibility for traffic control that do not have engineers on their staffs should seek engineering assistance from others, such as the State transportation agency, their County, a nearby large City, or a traffic engineering consultant.

Section 1A.10 Interpretations, Experimentations, Changes, and Interim Approvals

Standard:

Design, application, and placement of traffic control devices other than those adopted in this Manual shall be prohibited unless the provisions of this Section are followed.

Support:

Continuing advances in technology will produce changes in the highway, vehicle, and road user proficiency; therefore, portions of the system of traffic control devices in this Manual will require updating. In addition, unique situations often arise for device applications that might require interpretation or clarification of this Manual. It is important to have a procedure for recognizing these developments and for introducing new ideas and modifications into the system.

Standard:

Requests for any interpretation, permission to experiment, interim approval, or change shall be sent to the Federal Highway Administration (FHWA), Office of Transportation Operations, 400 Seventh Street, SW, HOTO, Washington, DC 20590.

Support:

An interpretation includes a consideration of the application and operation of standard traffic control devices, official meanings of standard traffic control devices, or the variations from standard device designs.

Guidance:

Requests for an interpretation of this Manual should contain the following information:

A. A concise statement of the interpretation being sought;
B. A description of the condition that provoked the need for an interpretation;
C. Any illustration that would be helpful to understand the request; and
D. Any supporting research data that is pertinent to the item to be interpreted.

Support:

Requests to experiment include consideration of field deployment for the purpose of testing or evaluating a new traffic control device, its application or manner of use, or a provision not specifically described in this Manual.

A request for permission to experiment will be considered only when submitted by the public agency or private toll facility responsible for the operation of the road or street on which the experiment is to take place.

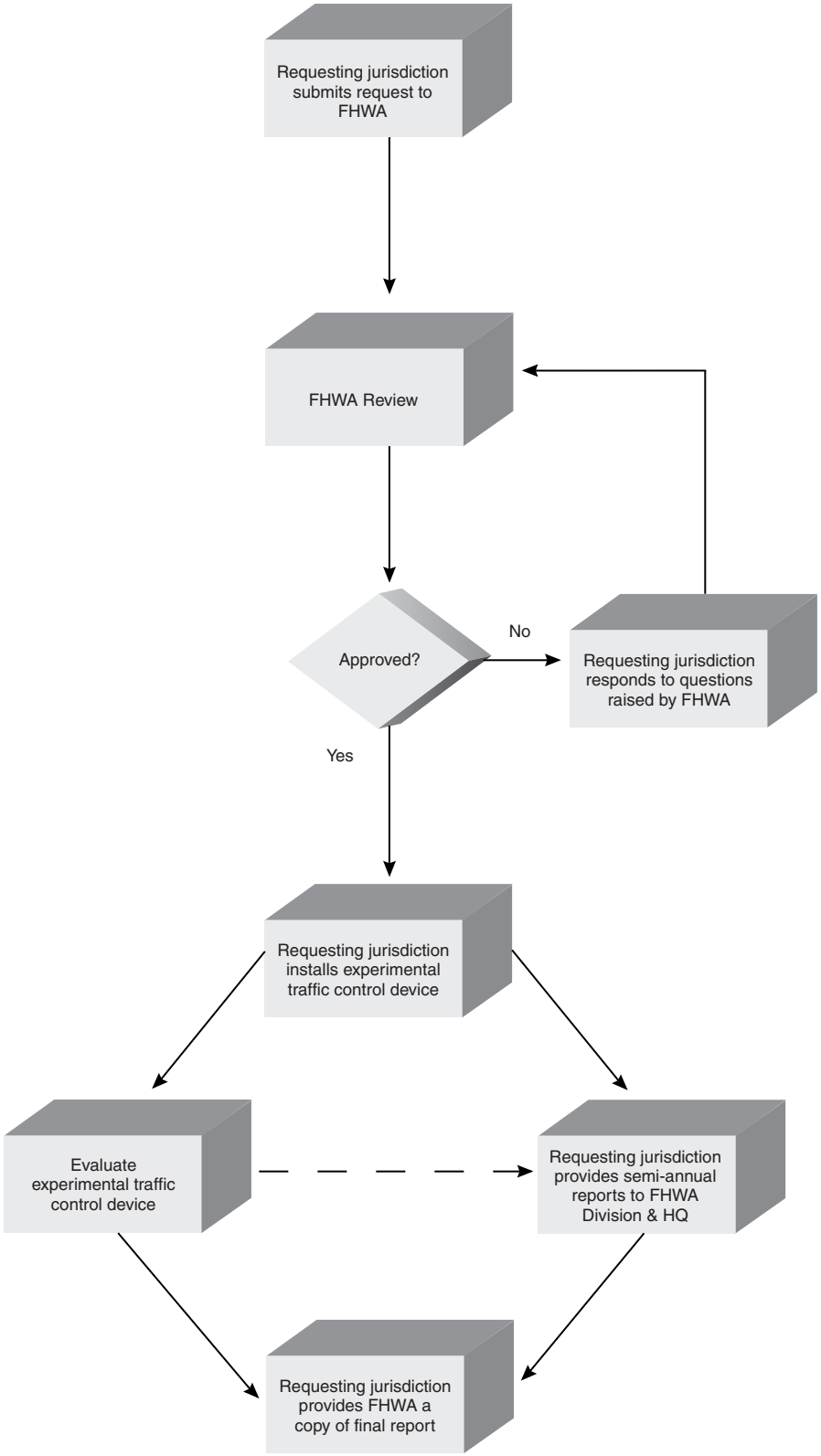
A diagram indicating the process for experimenting with traffic control devices is shown in Figure 1A-1.

Guidance:

The request for permission to experiment should contain the following:

A. A statement indicating the nature of the problem.
B. A description of the proposed change to the traffic control device or application of the traffic control device, how it was developed, the manner in which it deviates from the standard, and how it is expected to be an improvement over existing standards.
C. Any illustration that would be helpful to understand the traffic control device or use of the traffic control device.
D. Any supporting data explaining how the traffic control device was developed, if it has been tried, in what ways it was found to be adequate or inadequate, and how this choice of device or application was derived.
E. A legally binding statement certifying that the concept of the traffic control device is not protected by a patent or copyright. (An example of a traffic control device concept would be countdown pedestrian signals in general. Ordinarily an entire general concept would not be patented or copyrighted, but if it were it would not be acceptable for experimentation unless the patent or copyright owner signs a waiver of rights acceptable to the FHWA. An example of a patented or copyrighted specific device within the general concept of countdown pedestrian signals would be a manufacturer's design for its specific brand of countdown signal, including the design details of the housing or electronics that are unique to that manufacturer's product. As long as the general concept is not patented or copyrighted, it is acceptable for experimentation to incorporate the use of one or more patented devices of one or several manufacturers.)
F. The time period and location(s) of the experiment.
G. A detailed research or evaluation plan that must provide for close monitoring of the experimentation, especially in the early stages of its field implementation. The evaluation plan should include before and after studies as well as quantitative data describing the performance of the experimental device.

Figure 1A-1. Example of Process for Requesting and Conducting Experimentations for New Traffic Control Devices



H. An agreement to restore the site of the experiment to a condition that complies with the provisions of this Manual within 3 months following the end of the time period of the experiment. This agreement must also provide that the agency sponsoring the experimentation will terminate the experimentation at any time that it determines significant safety concerns are directly or indirectly attributable to the experimentation. The FHWA's Office of Transportation Operations has the right to terminate approval of the experimentation at any time if there is an indication of safety concerns. If, as a result of the experimentation, a request is made that this Manual be changed to include the device or application being experimented with, the device or application will be permitted to remain in place until an official rulemaking action has occurred.

I. An agreement to provide semiannual progress reports for the duration of the experimentation, and an agreement to provide a copy of the final results of the experimentation to the FHWA's Office of Transportation Operations within 3 months following completion of the experimentation. The FHWA's Office of Transportation Operations has the right to terminate approval of the experimentation if reports are not provided in accordance with this schedule.

Support:

A change includes consideration of a new device to replace a present standard device, an additional device to be added to the list of standard devices, or a revision to a traffic control device application or placement criteria.

Guidance:

Requests for a change to this Manual should contain the following information:

A. A statement indicating what change is proposed;
B. Any illustration that would be helpful to understand the request; and
C. Any supporting research data that is pertinent to the item to be reviewed.

Support:

Requests for interim approval include consideration of allowing interim use, pending official rulemaking, of a new traffic control device, a revision to the application or manner of use of an existing traffic control device, or a provision not specifically described in this Manual. If granted, interim approval will result in the traffic control device or application being placed into the next scheduled rulemaking process for revisions to this Manual. The device or application will be permitted to remain in place, under any conditions established in the interim approval, until an official rulemaking action has occurred.

Interim approval is considered based on the results of successful experimentation, results of analytical or laboratory studies, and/or review of non-U.S. experience with a traffic control device or application. Interim approval considerations include an assessment of relative risks, benefits, and costs. Interim approval includes conditions that jurisdictions agree to comply with in order to use the traffic control device or application until an official rulemaking action has occurred.

Guidance:

The request for permission to place a traffic control device under interim approval should contain the following:

A. A statement indicating the nature of the problem.
B. A description of the proposed change to the traffic control device or application of the traffic control device, how it was developed, the manner in which it deviates from the standard, and how it is expected to be an improvement over existing standards.
C. The location(s) where it will be used and any illustration that would be helpful to understand the traffic control device or use of the traffic control device.
D. A legally-binding statement certifying that the concept of the traffic control device is not protected by a patent or copyright. (An example of a traffic control device concept would be countdown pedestrian signals in general. Ordinarily an entire general concept would not be patented or copyrighted, but if it were it would not be acceptable for interim approval unless the patent or copyright owner signs a waiver of rights acceptable to the FHWA. An example of a patented or copyrighted specific device within the general concept of countdown pedestrian signals would be a manufacturer's design for its specific brand of countdown signal, including the design details of the housing or electronics that are unique to that manufacturer's product. Interim approval of a specific patented or copyrighted product is not acceptable.)
E. A detailed completed research or evaluation on this traffic control device.
F. An agreement to restore the site(s) of the interim approval to a condition that complies with the provisions in this Manual within 3 months following the issuance of a final rule on this traffic control device. This agreement must also provide that the agency sponsoring the interim approval will terminate use of the device or application installed under the interim approval at any time that it determines significant safety concerns are directly or indirectly attributable to the device or application. The FHWA's Office of Transportation Operations has the right to terminate the interim approval at any time if there is an indication of safety concerns.

Option:

A State may submit a request for interim approval for all jurisdictions in that State, as long as the request contains the information listed in the Guidance above.

Standard:

Once an interim approval is granted to any jurisdiction for a particular traffic control device or application, subsequent jurisdictions shall be granted interim approval for that device or application by submitting a letter to the FHWA Office of Transportation Operations indicating they will abide by Item F above and the specific conditions contained in the original interim approval.

A local jurisdiction using a traffic control device or application under an interim approval that was granted either directly to that jurisdiction or on a statewide basis based on the State's request shall inform the State of the locations of such use.

Support:

A diagram indicating the process for incorporating new traffic control devices into this Manual is shown in Figure 1A-2.

Procedures for revising this Manual are set out in the Federal Register of June 30, 1983 (48 FR 30145).

For additional information concerning interpretations, experimentation, changes, or interim approvals, write to the FHWA, 400 Seventh Street, SW, HOTO, Washington, DC 20590, or visit the MUTCD website at http://mutcd.fhwa.dot.gov.

Section 1A.11 Relation to Other Publications

Standard:

To the extent that they are incorporated by specific reference, the latest editions of the following publications, or those editions specifically noted, shall be a part of this Manual: "Standard Highway Signs" book (FHWA); and "Color Specifications for Retroreflective Sign and Pavement Marking Materials" (appendix to subpart F of Part 655 of Title 23 of the Code of Federal Regulations).

Support:

The "Standard Highway Signs" book includes standard alphabets and symbols for highway signs and pavement markings.

For information about the above publications, visit the Federal Highway Administration's MUTCD website at http://mutcd.fhwa.dot.gov, or write to the FHWA, 400 Seventh Street, SW, HOTO, Washington, DC 20590.

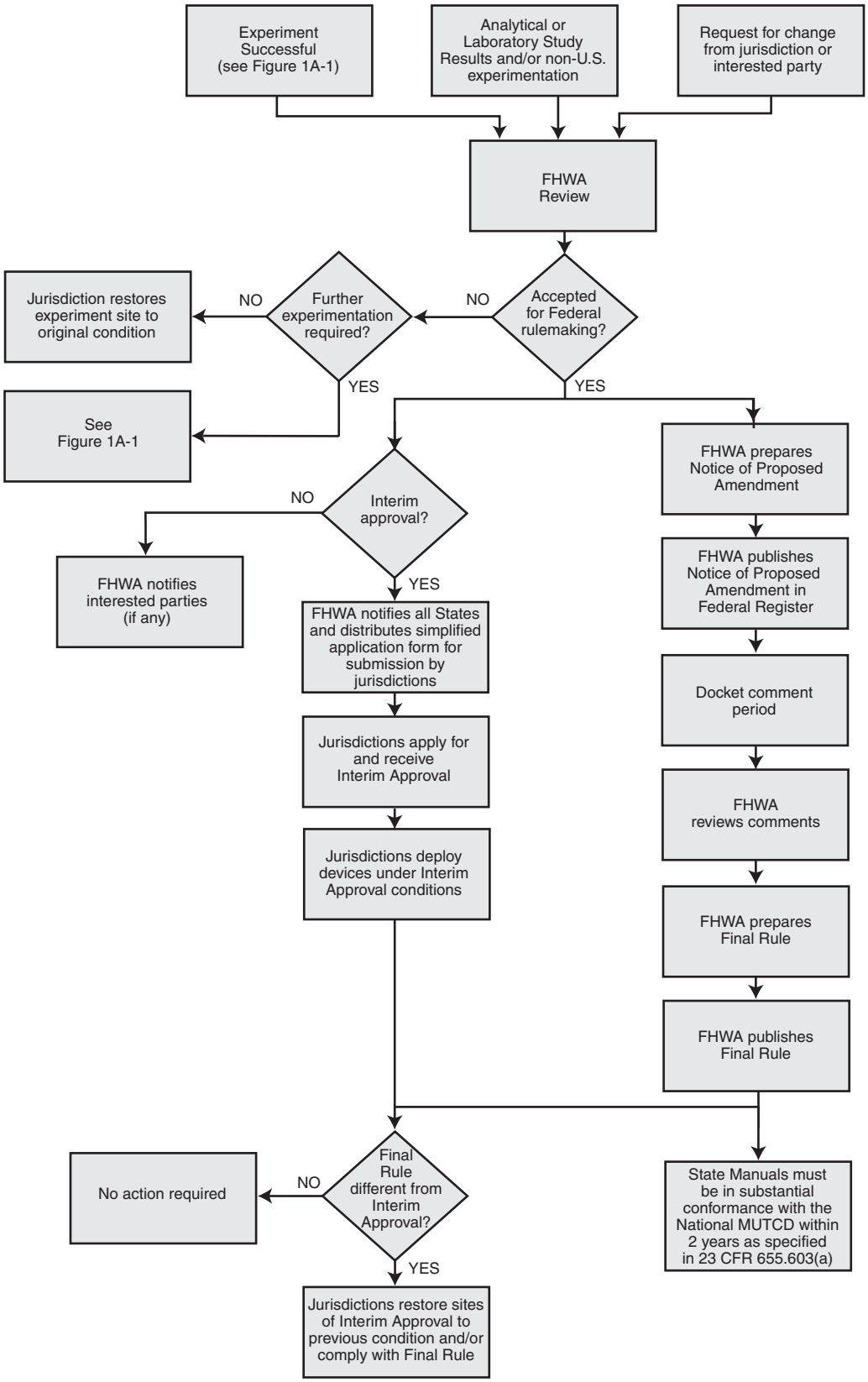
The publication entitled "Federal-Aid Highway Program Guidance on High Occupancy Vehicle (HOV) Lanes" is available at http://www.fhwa.dot.gov/operations/hovguide01.htm, or write to the FHWA, 400 Seventh Street, SW, HOTM, Washington, DC 20590.

The publication entitled "Maintaining Traffic Sign Retroreflectivity" (2007 Edition) is available at www.fhwa.dot.gov/retro, or write to the FHWA, 1200 New Jersey Avenue, SE, HSA-1, Washington, DC 20590. Rev. 2

Other publications that are useful sources of information with respect to use of this Manual are listed below. See Page i of this Manual for ordering information for the following publications:

1. "A Policy on Geometric Design of Highways and Streets," 2001 Edition (American Association of State Highway and Transportation Officials—AASHTO)
2. "Guide for the Development of Bicycle Facilities," 1999 Edition (AASHTO)
3. "Guide to Metric Conversion," 1993 Edition (AASHTO)
4. "Guidelines for the Selection of Supplemental Guide Signs for Traffic Generators Adjacent to Freeways," 2001 Edition (AASHTO)
5. "List of Control Cities for Use in Guide Signs on Interstate Highways," 2001 Edition (AASHTO)
6. "Roadside Design Guide," 2001 Edition (AASHTO)
7. "Standard Specifications for Movable Highway Bridges," 1988 Edition (AASHTO)
8. "Traffic Engineering Metric Conversion Folders— Addendum to the Guide to Metric Conversion," 1993 Edition (AASHTO)
9. "2000 AREMA Communications & Signals Manual," American Railway Engineering & Maintenance-of-Way Association (AREMA)
10. "Designing Sidewalks and Trails for Access—Part 2—Best Practices Design Guide," 2001 Edition (FHWA) [Publication No. FHWA-EP-01-027]
11. "Practice for Roadway Lighting," RP-8, 2001, Illuminating Engineering Society (IES)
12. "Safety Guide for the Prevention of Radio Frequency Radiation Hazards in the Use of Commercial Electric Detonators (Blasting Caps)," Safety Library Publication No. 20, Institute of Makers of Explosives
13. "American National Standard for High-Visibility Safety Apparel," (ANSI/ISEA 107-1999), 1999 Edition, ISEA - The Safety Equipment Association.
14. "Manual of Traffic Signal Design," 1998 Edition (Institute of Transportation Engineers—ITE)

Figure 1A-2. Example of Process for Incorporating New Traffic Control Devices into the MUTCD



15. "Manual of Transportation Engineering Studies," 1994 Edition (ITE)
16. "Pedestrian Traffic Control Signal Indications," 1985 Edition (ITE)
17. "Preemption of Traffic Signals at or Near Railroad Grade Crossings with Active Warning Devices," (ITE)
18. "Purchase Specification for Flashing and Steady Burn Warning Lights," 1981 Edition (ITE)
19. "School Trip Safety Program Guidelines," 1984 Edition (ITE)
20. "Traffic Detector Handbook," 1991 Edition (ITE)
21. "Traffic Engineering Handbook," 1999 Edition (ITE)
22. "Traffic Signal Lamps," 1980 Edition (ITE)
23. "Traffic Control Devices Handbook," 2001 Edition (ITE)
24. "Vehicle Traffic Control Signal Heads," Part 1—1985 Edition; Part 2—1998 Edition (ITE)
25. "Uniform Vehicle Code (UVC) and Model Traffic Ordinance," 2000 Edition (National Committee on Uniform Traffic Laws and Ordinances)
26. "Occupational Safety and Health Administration Regulations (Standards - 29 CFR), General Safety and Health Provisions - 1926.20," amended June 30, 1993, Occupational Safety and Health Administration (OSHA)
27. "Highway Capacity Manual," 2000 Edition (Transportation Research Board—TRB)
28. "Recommended Procedures for the Safety Performance Evaluation of Highway Features," (NCHRP Report 350), 1993 Edition (Transportation Research Board - TRB)
29. "Accessible Pedestrian Signals," A-37, 1998 Edition, U.S. Architectural and Transportation Barriers Compliance Board (The U.S. Access Board)
30. "Building a True Community—Final Report—Public Rights-of-Way Access Advisory Committee (PRWAAC)," 2001 Edition (The U.S. Access Board)
31. "The Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)," July 1998 Edition (The U.S. Access Board)
32. "Highway-Rail Intersection Architecture," U.S. Department of Transportation, Federal Railroad Administration (USDOT/FRA)

Section 1A.12 Color Code

Support:

The following color code establishes general meanings for 10 colors of a total of 13 colors that have been identified as being appropriate for use in conveying traffic control information. Central values and tolerance limits for each color are available from the Federal Highway Administration, 400 Seventh Street, SW, HOTO, Washington, DC 20590, and at FHWA's MUTCD website at http://mutcd.fhwa.dot.gov.

The three colors for which general meanings have not yet been assigned are being reserved for future applications that will be determined only by FHWA after consultation with the States, the engineering community, and the general public. The meanings described in this Section are of a general nature. More specific assignments of colors are given in the individual Parts of this Manual relating to each class of devices.

Standard:

The general meaning of the 13 colors shall be as follows:

A. Black—regulation
B. Blue—road user services guidance, tourist information, and evacuation route
C. Brown—recreational and cultural interest area guidance
D. Coral—unassigned
E. Fluorescent Pink—incident management
F. Fluorescent Yellow-Green—pedestrian warning, bicycle warning, playground warning, school bus and school warning
G. Green—indicated movements permitted, direction guidance
H. Light Blue—unassigned
I. Orange—temporary traffic control
J. Purple—unassigned
K. Red—stop or prohibition
L. White—regulation
M. Yellow—warning

Section 1A.13 Definitions of Words and Phrases in This Manual

Standard:

Unless otherwise defined herein, or in the other Parts of this Manual, definitions contained in the most recent edition of the "Uniform Vehicle Code," "AASHTO Transportation Glossary (Highway Definitions)," and other publications specified in Section 1A.11 are also incorporated and adopted by reference.

The following words and phrases, when used in this Manual, shall have the following meanings:

1. **Active Grade Crossing Warning System—the flashing-light signals, with or without warning gates, together with the necessary control equipment used to inform road users of the approach or presence of trains at highway-rail or highway-light rail transit grade crossings.**
2. **Approach—all lanes of traffic moving towards an intersection or a midblock location from one direction, including any adjacent parking lane(s).**
3. **Arterial Highway (Street)—a general term denoting a highway primarily used by through traffic, usually on a continuous route or a highway designated as part of an arterial system.**
4. **Average Day—a day representing traffic volumes normally and repeatedly found at a location. Where volumes are primarily influenced by employment, the average day is typically a weekday. When volumes are primarily influenced by entertainment or recreation, the average day is typically a weekend day.**
5. **Beacon—a highway traffic signal with one or more signal sections that operates in a flashing mode.**
6. **Bicycle—a pedal-powered vehicle upon which the human operator sits.**
7. **Bicycle Lane—a portion of a roadway that has been designated by signs and pavement markings for preferential or exclusive use by bicyclists.**
8. **Centerline Markings—the yellow pavement marking line(s) that delineates the separation of traffic lanes that have opposite directions of travel on a roadway. These markings need not be at the geometrical center of the pavement.**
9. **Changeable Message Sign—a sign that is capable of displaying more than one message, changeable manually, by remote control, or by automatic control. These signs are referred to as Dynamic Message Signs in the National Intelligent Transportation Systems (ITS) Architecture.**
10. **Channelizing Line Marking—a wide or double solid white line used to form islands where traffic in the same direction of travel is permitted on both sides of the island.**
11. **Circular Intersection—an intersection that has an island, generally circular in design, located in the center of the intersection where traffic passes to the right of the island. Circular intersections include roundabouts, rotaries, and traffic circles.**
12. **Clear Zone—the total roadside border area, starting at the edge of the traveled way, that is available for an errant driver to stop or regain control of a vehicle. This area might consist of a shoulder, a recoverable slope, and/or a nonrecoverable, traversable slope with a clear run-out area at its toe.**
13. **Concurrent Flow HOV Lane—an HOV lane that is operated in the same direction as the adjacent mixed flow lanes, separated from the adjacent general purpose freeway lanes by a standard lane stripe, painted buffer, or barrier.**
14. **Contraflow Lane—a lane operating in a direction opposite to the normal flow of traffic designated for peak direction of travel during at least a portion of the day. Contraflow lanes are usually separated from the off-peak direction lanes by plastic pylons, or by moveable or permanent barrier.**
15. **Conventional Road—a street or highway other than a low-volume road (as defined in Section 5A.01), expressway, or freeway.**
16. **Collector Highway—a term denoting a highway that in rural areas connects small towns and local highways to arterial highways, and in urban areas provides land access and traffic circulation within residential, commercial, and business areas and connects local highways to the arterial highways.**
17. **Crashworthy—a characteristic of a roadside appurtenance that has been successfully crash tested in accordance with a national standard such as the National Cooperative Highway Research Program Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features."**

18. **Crosswalk—(a) that part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or in the absence of curbs, from the edges of the traversable roadway, and in the absence of a sidewalk on one side of the roadway, the part of a roadway included within the extension of the lateral lines of the sidewalk at right angles to the centerline; (b) any portion of a roadway at an intersection or elsewhere distinctly indicated as a pedestrian crossing by lines on the surface, which may be supplemented by contrasting pavement texture, style, or color.**
19. **Crosswalk Lines—white pavement marking lines that identify a crosswalk.**
20. **Delineator—a retroreflective device mounted on the roadway surface or at the side of the roadway in a series to indicate the alignment of the roadway, especially at night or in adverse weather.**
21. **Detectable—having a continuous edge within 150 mm (6 in) of the surface so that pedestrians who have visual disabilities can sense its presence and receive usable guidance information.**
22. **Dynamic Envelope—the clearance required for the train and its cargo overhang due to any combination of loading, lateral motion, or suspension failure.**
23. **Edge Line Markings—white or yellow pavement marking lines that delineate the right or left edge(s) of a traveled way.**
24. **End-of-Roadway Marker—a device used to warn and alert road users of the end of a roadway in other than temporary traffic control zones.**
25. **Engineering Judgment—the evaluation of available pertinent information, and the application of appropriate principles, Standards, Guidance, and practices as contained in this Manual and other sources, for the purpose of deciding upon the applicability, design, operation, or installation of a traffic control device. Engineering judgment shall be exercised by an engineer, or by an individual working under the supervision of an engineer, through the application of procedures and criteria established by the engineer. Documentation of engineering judgment is not required.**
26. **Engineering Study—the comprehensive analysis and evaluation of available pertinent information, and the application of appropriate principles, Standards, Guidance, and practices as contained in this Manual and other sources, for the purpose of deciding upon the applicability, design, operation, or installation of a traffic control device. An engineering study shall be performed by an engineer, or by an individual working under the supervision of an engineer, through the application of procedures and criteria established by the engineer. An engineering study shall be documented.**
27. **Expressway—a divided highway with partial control of access.**
28. **Flashing—an operation in which a signal indication is turned on and off repetitively.**
29. **Freeway—a divided highway with full control of access.**
30. **Guide Sign—a sign that shows route designations, destinations, directions, distances, services, points of interest, or other geographical, recreational, or cultural information.**
31. **High Occupancy Vehicle (HOV)—a motor vehicle carrying at least two or more persons, including carpools, vanpools, and buses.**
32. **Highway—a general term for denoting a public way for purposes of travel by vehicular travel, including the entire area within the right-of-way.**
33. **Highway-Rail Grade Crossing—the general area where a highway and a railroad's right-of-way cross at the same level, within which are included the railroad tracks, highway, and traffic control devices for highway traffic traversing that area.**
34. **Highway Traffic Signal—a power-operated traffic control device by which traffic is warned or directed to take some specific action. These devices do not include signals at toll plazas, power-operated signs, illuminated pavement markers, warning lights (see Section 6F.78), or steady burning electric lamps.**
35. **HOV Lane—any preferential lane designated for exclusive use by high-occupancy vehicles for all or part of a day—including a designated lane on a freeway, other highway, street, or independent roadway on a separate right-of-way.**
36. **Inherently Low Emission Vehicle (ILEV)—any kind of vehicle that is certified by the U.S. Environmental Protection Agency and that because of inherent properties of the fuel system design, will not have significant evaporative emissions, even if its evaporative emission control system has failed.**
37. **Interchange—a system of interconnecting roadways providing for traffic movement between two or more highways that do not intersect at grade.**
38. **Intermediate Interchange—an interchange with an urban or rural route that is not a major or minor interchange as defined herein.**

39. **Intersection—(a) the area embraced within the prolongation or connection of the lateral curb lines, or if none, the lateral boundary lines of the roadways of two highways that join one another at, or approximately at, right angles, or the area within which vehicles traveling on different highways that join at any other angle might come into conflict; (b) the junction of an alley or driveway with a roadway or highway shall not constitute an intersection.**
40. **Island—a defined area between traffic lanes for control of vehicular movements or for pedestrian refuge. It includes all end protection and approach treatments. Within an intersection area, a median or an outer separation is considered to be an island.**
41. **Lane Line Markings—white pavement marking lines that delineate the separation of traffic lanes that have the same direction of travel on a roadway.**
42. **Lane-Use Control Signal—a signal face displaying indications to permit or prohibit the use of specific lanes of a roadway or to indicate the impending prohibition of such use.**
43. **Legend—see Sign Legend.**
44. **Logo—a distinctive emblem, symbol, or trademark that identifies a product or service.**
45. **Longitudinal Markings—pavement markings that are generally placed parallel and adjacent to the flow of traffic such as lane lines, centerlines, edge lines, channelizing lines, and others.**
46. **Major Interchange—an interchange with another freeway or expressway, or an interchange with a high-volume multi-lane highway, principal urban arterial, or major rural route where the interchanging traffic is heavy or includes many road users unfamiliar with the area.**
47. **Major Street—the street normally carrying the higher volume of vehicular traffic.**
48. **Median—the area between two roadways of a divided highway measured from edge of traveled way to edge of traveled way. The median excludes turn lanes. The median width might be different between intersections, interchanges, and at opposite approaches of the same intersection.**
49. **Minor Interchange—an interchange where traffic is local and very light, such as interchanges with land service access roads. Where the sum of the exit volumes is estimated to be lower than 100 vehicles per day in the design year, the interchange is classified as local.**
50. **Minor Street—the street normally carrying the lower volume of vehicular traffic.**
51. **Object Marker—a device used to mark obstructions within or adjacent to the roadway.**
52. **Occupancy Requirement—any restriction that regulates the use of a facility for any period of the day based on a specified number of persons in a vehicle.**
53. **Occupant—a person driving or riding in a car, truck, bus, or other vehicle.**
54. **Paved—a bituminous surface treatment, mixed bituminous concrete, or Portland cement concrete roadway surface that has both a structural (weight bearing) and a sealing purpose for the roadway.**
55. **Pedestrian—a person afoot, in a wheelchair, on skates, or on a skateboard.**
56. **Pedestrian Facilities—a general term denoting improvements and provisions made to accommodate or encourage walking.**
57. **Platoon—a group of vehicles or pedestrians traveling together as a group, either voluntarily or involuntarily, because of traffic signal controls, geometrics, or other factors.**
58. **Principal Legend—place names, street names, and route numbers placed on guide signs.**
59. **Public Road—any road or street under the jurisdiction of and maintained by a public agency and open to public travel.**
60. **Raised Pavement Marker—a device with a height of at least 10 mm (0.4 in) mounted on or in a road surface that is intended to be used as a positioning guide or to supplement or substitute for pavement markings or to mark the position of a fire hydrant.**
61. **Regulatory Sign—a sign that gives notice to road users of traffic laws or regulations.**
62. **Retroreflectivity—a property of a surface that allows a large portion of the light coming from a point source to be returned directly back to a point near its origin.**
63. **Right-of-Way [Assignment]—the permitting of vehicles and/or pedestrians to proceed in a lawful manner in preference to other vehicles or pedestrians by the display of sign or signal indications.**
64. **Road—see Roadway.**
65. **Roadway—that portion of a highway improved, designed, or ordinarily used for vehicular travel and parking lanes, but exclusive of the sidewalk, berm, or shoulder even though such sidewalk, berm, or shoulder is used by persons riding bicycles or other human-powered vehicles. In the event a highway includes two or more separate roadways, the term roadway as used herein shall refer to any such roadway separately, but not to all such roadways collectively.**
66. **Roadway Network—a geographical arrangement of intersecting roadways.**
67. **Road User—a vehicle operator, bicyclist, or pedestrian within the highway, including persons with disabilities.**

68. Roundabout Intersection—a circular intersection with yield control of all entering traffic, channelized approaches, and appropriate geometric curvature, such that travel speeds on the circulatory roadway are typically less than 50 km/h (30 mph).
69. Rumble Strip—a series of intermittent, narrow, transverse areas of rough-textured, slightly raised, or depressed road surface that is installed to alert road users to unusual traffic conditions.
70. Rural Highway—a type of roadway normally characterized by lower volumes, higher speeds, fewer turning conflicts, and less conflict with pedestrians.
71. Shared Roadway—a roadway that is officially designated and marked as a bicycle route, but which is open to motor vehicle travel and upon which no bicycle lane is designated.
72. Shared-Use Path—a bikeway outside the traveled way and physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent alignment. Shared-use paths are also used by pedestrians (including skaters, users of manual and motorized wheelchairs, and joggers) and other authorized motorized and non-motorized users.
73. Sidewalk—that portion of a street between the curb line, or the lateral line of a roadway, and the adjacent property line or on easements of private property that is paved or improved and intended for use by pedestrians.
74. Sign—any traffic control device that is intended to communicate specific information to road users through a word or symbol legend. Signs do not include traffic control signals, pavement markings, delineators, or channelization devices.
75. Sign Assembly—a group of signs, located on the same support(s), that supplement one another in conveying information to road users.
76. Sign Illumination—either internal or external lighting that shows similar color by day or night. Street or highway lighting shall not be considered as meeting this definition.
77. Sign Legend—all word messages, logos, and symbol designs that are intended to convey specific meanings.
78. Sign Panel—a separate panel or piece of material containing a word or symbol legend that is affixed to the face of a sign.
79. Speed—speed is defined based on the following classifications:
  (a) Advisory Speed—a recommended speed for all vehicles operating on a section of highway and based on the highway design, operating characteristics, and conditions.
  (b) Average Speed—the summation of the instantaneous or spot-measured speeds at a specific location of vehicles divided by the number of vehicles observed.
  (c) Design Speed—a selected speed used to determine the various geometric design features of a roadway.
  (d) 85th-Percentile Speed—The speed at or below which 85 percent of the motor vehicles travel.
  (e) Operating Speed—a speed at which a typical vehicle or the overall traffic operates. Operating speed might be defined with speed values such as the average, pace, or 85th-percentile speeds.
  (f) Pace Speed—the highest speed within a specific range of speeds that represents more vehicles than in any other like range of speed. The range of speeds typically used is 10 km/h or 10 mph.
  (g) Posted Speed—the speed limit determined by law and shown on Speed Limit signs.
  (h) Statutory Speed—a speed limit established by legislative action that typically is applicable for highways with specified design, functional, jurisdictional and/or location characteristic and is not necessarily shown on Speed Limit signs.
80. Speed Limit—the maximum (or minimum) speed applicable to a section of highway as established by law.
81. Speed Measurement Marking—a white transverse pavement marking placed on the roadway to assist the enforcement of speed regulations.
82. Speed Zone—a section of highway with a speed limit that is established by law but which might be different from a legislatively specified statutory speed limit.
83. Stop Line—a solid white pavement marking line extending across approach lanes to indicate the point at which a stop is intended or required to be made.
84. Street—see Highway.
85. Temporary Traffic Control Zone—an area of a highway where road user conditions are changed because of a work zone or incident by the use of temporary traffic control devices, flaggers, uniformed law enforcement officers, or other authorized personnel.
86. Traffic—pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other conveyances either singularly or together while using any highway for purposes of travel.

87. Traffic Control Device—a sign, signal, marking, or other device used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, pedestrian facility, or shared-use path by authority of a public agency having jurisdiction.
88. Traffic Control Signal (Traffic Signal)—any highway traffic signal by which traffic is alternately directed to stop and permitted to proceed.
89. Train—one or more locomotives coupled, with or without cars, that operates on rails or tracks and to which all other traffic must yield the right-of-way by law at highway-rail grade crossings.
90. Transverse Markings—pavement markings that are generally placed perpendicular and across the flow of traffic such as shoulder markings, word and symbol markings, stop lines, crosswalk lines, speed measurement markings, parking space markings, and others.
91. Traveled Way—the portion of the roadway for the movement of vehicles, exclusive of the shoulders, berms, sidewalks, and parking lanes.
92. Urban Street—a type of street normally characterized by relatively low speeds, wide ranges of traffic volumes, narrower lanes, frequent intersections and driveways, significant pedestrian traffic, and more businesses and houses.
93. Vehicle—every device in, upon, or by which any person or property can be transported or drawn upon a highway, except trains and light rail transit operating in exclusive or semiexclusive alignments. Light rail transit operating in a mixed-use alignment, to which other traffic is not required to yield the right-of-way by law, is a vehicle.
94. Warning Sign—a sign that gives notice to road users of a situation that might not be readily apparent.
95. Warrant—a warrant describes threshold conditions to the engineer in evaluating the potential safety and operational benefits of traffic control devices and is based upon average or normal conditions. Warrants are not a substitute for engineering judgment. The fact that a warrant for a particular traffic control device is met is not conclusive justification for the installation of the device.
95. Wrong-Way Arrow—a slender, elongated, white pavement marking arrow placed upstream from the ramp terminus to indicate the correct direction of traffic flow. Wrong-way arrows are intended primarily to warn wrong-way road users that they are going in the wrong direction.

Section 1A.14 Abbreviations Used on Traffic Control Devices

Standard:

When the word messages shown in Table 1A-1 need to be abbreviated in connection with traffic control devices, the abbreviations shown in Table 1A-1 shall be used.

Guidance:

The abbreviations for the words listed in Table 1A-2 should not be used in connection with traffic control devices unless the prompt word shown in Table 1A-2 either precedes or follows the abbreviation.

Standard:

The abbreviations shown in Table 1A-3 shall not be used in connection with traffic control devices because of their potential to be misinterpreted by road users.

Guidance:

Where multiple abbreviations are permitted in Tables 1A-1 or 1A-2, the same abbreviation should be used throughout a single jurisdiction.

Table 1A-1. Acceptable Abbreviations

Word Message	Standard Abbreviation
Afternoon / Evening	PM
Alternate	ALT
Avenue	AVE, AV
Bicycle	BIKE
Boulevard	BLVD
Cannot	CANT
CB Radio	CB
Center	CNTR
Circle	CIR
Civil Defense	CD
Compressed Natural Gas	CNG
Court	CT
Crossing (other than highway-rail)	XING
Diesel Fuel	D
Do Not	DONT
Drive	DR
East	E
Eastbound	E-BND
Electric Vehicle	EV
Emergency	EMER
Entrance, Enter	ENT
Expressway	EXPWY
Feet	FT
FM Radio	FM
Freeway	FRWY, FWY
Friday	FRI
Hazardous Material	HAZMAT
High Occupancy Vehicle	HOV
Highway	HWY
Highway-Rail Grade Crossing Pavement Marking	RXR
Hospital	H
Hour(s)	HR
Information	INFO
Inherently Low Emission Vehicle	ILEV
It Is	ITS
Junction / Intersection	JCT
Kilogram	kg
Kilometer(s)	km
Kilometers Per Hour	km/h
Lane	LN
Left	LFT
Liquid Propane Gas	LP-GAS

Word Message	Standard Abbreviation
Maintenance	MAINT
Meter(s)	m
Metric Ton	t
Mile(s)	MI
Miles Per Hour	MPH
Minute(s)	MIN
Monday	MON
Morning / Late Night	AM
Normal	NORM
North	N
Northbound	N-BND
Parking	PKING
Parkway	PKWY
Pedestrian	PED
Place	PL
Pounds	LBS
Right	RHT
Road	RD
Saturday	SAT
Service	SERV
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	S-BND
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Terrace	TER
Thursday	THURS
Tires With Lugs	LUGS
Tons of Weight	T
Traffic	TRAF
Trail	TR
Travelers	TRAVLRS
Tuesday	TUES
Two-Way Intersection	2-WAY
Two-Wheeled Vehicles	CYCLES
US Numbered Route	US
Vehicle(s)	VEH
Warning	WARN
Wednesday	WED
West	W
Westbound	W-BND
Will Not	WONT

Table 1A-2. Abbreviations That Are Acceptable Only with a Prompt Word

Word	Abbreviation	Prompt Word
Access	ACCS	Road
Ahead	AHD	Fog*
Blocked	BLKD	Lane*
Bridge	BRDG	[Name]*
Chemical	CHEM	Spill
Condition	COND	Traffic*
Congested	CONG	Traffic*
Construction	CONST	Ahead
Downtown	DWNTN	Traffic
Exit	EX, EXT	Next*
Express	EXP	Lane
Frontage	FRNTG	Road
Hazardous	HAZ	Driving
Interstate	I	[Number]
Local	LOC	Traffic
Lower	LWR	Level
Major	MAJ	Accident
Minor	MNR	Accident
Oversized	OVRSZ	Load
Prepare	PREP	To Stop
Pavement	PVMT	Wet*
Quality	QLTY	Air*
Roadwork	RDWK	Ahead [Distance]
Route	RT, RTE	Best*
Township	TWNSHP	Limits
Turnpike	TRNPK	[Name]*
Upper	UPR	Level

* These prompt words should precede the abbreviation

Table 1A-3. Unacceptable Abbreviations

Abbreviation	Intended Word	Common Misinterpretations
ACC	Accident	Access (Road)
CLRS	Clears	Colors
DLY	Delay	Daily
FDR	Feeder	Federal
L	Left	Lane (Merge)
LT	Light (Traffic)	Left
PARK	Parking	Park
POLL	Pollution (Index)	Poll
RED	Reduce	Red
STAD	Stadium	Standard
WRNG	Warning	Wrong

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Part 2
Signs

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Federal Highway Administration

PART 2. SIGNS

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CHAPTER 2A. GENERAL

Section 2A.01 Function and Purpose of Signs

Support:

This Manual contains Standards, Guidance, and Options for the signing within the right-of-way of all types of highways open to public travel. The functions of signs are to provide regulations, warnings, and guidance information for road users. Both words and symbols are used to convey the messages. Signs are not typically used to confirm rules of the road.

Detailed sign requirements are located in the following Chapters of Part 2:

Chapter 2B—Regulatory Signs

Chapter 2C—Warning Signs

Chapter 2D—Guide Signs (Conventional Roads)

Chapter 2E—Guide Signs (Freeways and Expressways)

Chapter 2F—Specific Service (Logo) Signs

Chapter 2G—Tourist-Oriented Direction Signs

Chapter 2H—Recreational and Cultural Interest Area Signs

Chapter 2I—Emergency Management Signs

Standard:

Because the requirements and standards for signs depend on the particular type of highway upon which they are to be used, the following definitions shall apply:

A. Freeway—a divided highway with full control of access;
B. Expressway—a divided highway with partial control of access;
C. Conventional Road—a street or highway other than a low-volume road (as defined in Section 5A.01), a freeway, or an expressway; and
D. Special Purpose Road—a low-volume, low-speed road that serves recreational areas or resource development activities, or that provides local access.

Section 2A.02 Definitions

Support:

Definitions that are applicable to signs are given in Sections 1A.13 and 2A.01.

Section 2A.03 Standardization of Application

Support:

It is recognized that urban traffic conditions differ from those in rural environments, and in many instances signs are applied and located differently. Where pertinent and practical, this Manual sets forth separate recommendations for urban and rural conditions.

Guidance:

Signs should be used only where justified by engineering judgment or studies, as noted in Section 1A.09.

Results from traffic engineering studies of physical and traffic factors should indicate the locations where signs are deemed necessary or desirable.

Roadway geometric design and sign application should be coordinated so that signing can be effectively placed to give the road user any necessary regulatory, warning, guidance, and other information.

Standard:

Each standard sign shall be displayed only for the specific purpose as prescribed in this Manual. Determination of the particular signs to be applied to a specific condition shall be made in accordance with the criteria set forth in Part 2. Before any new highway, detour, or temporary route is opened to traffic, all necessary signs shall be in place. Signs required by road conditions or restrictions shall be removed when those conditions cease to exist or the restrictions are withdrawn.

Section 2A.04 Excessive Use of Signs

Guidance:

Regulatory and warning signs should be used conservatively because these signs, if used to excess, tend to lose their effectiveness. If used, route signs and directional signs should be used frequently because they promote reasonably safe and efficient operations by keeping road users informed of their location.

Section 2A.05 Classification of Signs

Standard:

Signs shall be defined by their function as follows:

A. Regulatory signs give notice of traffic laws or regulations.
B. Warning signs give notice of a situation that might not be readily apparent.
C. Guide signs show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information.

Section 2A.06 Design of Signs

Support:

This Manual shows many typical standard signs approved for use on streets, highways, bikeways, and pedestrian crossings.

In the specifications for individual signs, the general appearance of the legend, color, and size are shown in the accompanying tables and illustrations, and are not always detailed in the text.

Detailed drawings of standard signs and alphabets are shown in the "Standard Highway Signs" book. Section 1A.11 contains information regarding how to obtain this publication.

The basic requirements of a highway sign are that it be legible to those for whom it is intended and that it be understandable in time to permit a proper response. Desirable attributes include:

A. High visibility by day and night; and
B. High legibility (adequately sized letters or symbols, and a short legend for quick comprehension by a road user approaching a sign).

Standardized colors and shapes are specified so that the several classes of traffic signs can be promptly recognized. Simplicity and uniformity in design, position, and application are important.

Standard:

The term legend shall include all word messages and symbol designs that are intended to convey specific meanings.

Uniformity in design shall include shape, color, dimensions, legends, borders, and illumination or retroreflectivity.

Where a standard word message is applicable, the wording shall be as herein provided. Standardization of these designs does not preclude further improvement by minor changes in the proportion or orientation of symbols, width of borders, or layout of word messages, but all shapes and colors shall be as indicated.

In situations where word messages are required other than those herein provided, the signs shall be of the same shape and color as standard signs of the same functional type.

Except as stated in the Option below, Internet addresses shall not be shown on any sign, supplemental plaque, sign panel (including logo panels on specific service signs), or changeable message sign.

Guidance:

Unless otherwise stated in this Manual for a specific sign, and except as stated in the Option below, phone numbers of more than four characters should not be shown on any sign, supplemental plaque, sign panel (including logo panels on specific service signs), or changeable message sign.

Option:

Internet addresses or phone numbers with more than four characters may be shown on signs, supplemental plaques, sign panels, and changeable message signs that are intended for viewing only by pedestrians, bicyclists, occupants of parked vehicles, or drivers of vehicles on low-speed roadways where engineering judgment indicates that drivers can reasonably safely stop out of the traffic flow to read the message.

State and local highway agencies may develop special word message signs in situations where roadway conditions make it necessary to provide road users with additional regulatory, warning, or guidance information.

Section 2A.07 Changeable Message Signs

Standard:

To the extent practical, changeable message signs, which are traffic control devices designed to display variable messages, shall conform to the principles established in this Manual, and with the design and applications prescribed in Sections 2E.21, 6F.02, and 6F.55.

Guidance:

Except for safety or transportation-related messages, changeable message signs should not be used to display information other than regulatory, warning, and guidance information related to traffic control.

Support:

Changeable message signs, with more sophisticated technologies, are gaining widespread use to inform road users of variable situations, particularly along congested traffic corridors. Highway and transportation organizations are encouraged to develop and experiment (see Section 1A.10) with changeable message signs and to carefully evaluate such installations so that experience is gained toward adoption of future standards.

Information regarding the design and application of portable changeable message signs in temporary traffic control zones is contained in Section 6F.55. Section 1A.14 contains information regarding the use of abbreviations on traffic control devices, including changeable message signs.

Option:

Changeable message signs (including portable changeable message signs) that display a regulatory or warning message may use a black background with a white, yellow, orange, red, or fluorescent yellow-green legend as appropriate, except where specifically restricted in this Manual for a particular sign.

Changeable message signs, both permanent and portable, may be used by State and local highway agencies to display safety or transportation-related messages. State and local highway agencies may develop and establish a policy regarding the display of safety and transportation-related messages on permanent and changeable message signs that specifies the allowable messages and applications, consistent with the provisions of this Manual.

Support:

Examples of safety messages include SEAT BELTS BUCKLED? and DON'T DRINK AND DRIVE. Examples of transportation-related messages include STADIUM EVENT SUNDAY, EXPECT DELAYS NOON TO 4 PM and OZONE ALERT CODE RED—USE TRANSIT.

Guidance:

When a changeable message sign is used to display a safety or transportation-related message, the requirements of Section 6F.55 should be followed. The message should be simple, brief, legible, and clear. A changeable message sign should not be used to display a safety or transportation-related message if doing so would adversely affect the respect for the sign. "CONGESTION AHEAD" or other overly simplistic or vague messages should not be displayed alone. These messages should be supplemented with a message on the location or distance to the congestion or incident, how much delay is expected, alternative route, or other similar messages.

Standard:

When a changeable message sign is used to display a safety or transportation-related message, the display format shall not be of a type that could be considered similar to advertising displays. The display format shall not include animation, rapid flashing, or other dynamic elements that are characteristic of sports scoreboards or advertising displays.

Section 2A.08 Retroreflectivity and Illumination

Support:

There are many materials currently available for retroreflection and various methods currently available for the illumination of signs. New materials and methods continue to emerge. New materials and methods can be used as long as the signs meet the standard requirements for color, both by day and by night.

Standard:

Regulatory, warning, and guide signs shall be retroreflective or illuminated to show the same shape and similar color by both day and night, unless specifically stated otherwise in the text discussion in this Manual of a particular sign or group of signs.

The requirements for sign illumination shall not be considered to be satisfied by street or highway lighting.

Guidance:

All overhead sign installations should be illuminated unless an engineering study shows that retroreflection will perform effectively without illumination.

Option:

Sign elements may be illuminated by the means shown in Table 2A-1.

Retroreflection of sign elements may be accomplished by the means shown in Table 2A-2.

Table 2A-1. Illumination of Sign Elements

Means of Illumination	Sign Element To Be Illuminated
Light behind the sign face	• Symbol or word message • Background • Symbol, word message, and background (through a translucent material)
Attached or independently mounted light source designed to direct essentially uniform illumination onto the sign face	• Entire sign face
Light emitting diodes (LEDs)	• Symbol or word message • Portions of the sign border
Other devices, or treatments that highlight the sign shape, color, or message: Luminous tubing Fiber optics Incandescent light bulbs Luminescent panels	• Symbol or word message • Entire sign face

Table 2A-2. Retroreflection of Sign Elements

Means of Retroreflection	Sign Element
Reflector “buttons” or similar units	Symbol Word message Border
A material that has a smooth, sealed outer surface over a microstructure that reflects light	Symbol Word message Border Background

---

Light Emitting Diode (LED) units may be used individually within the face of a sign and in the border of a sign, except for Changeable Message Signs, to improve the conspicuity, increase the legibility of sign legends and borders, or provide a changeable message. Individual LED pixels may be used in the border of a sign.

Standard:

If used, the LEDs shall be the same color as the sign legend, border, or background. If flashed, all LED units shall flash simultaneously at a rate of more than 50 and less than 60 times per minute. The uniformity of the sign design shall be maintained without any decrease in visibility, legibility, or driver comprehension during either daytime or nighttime conditions.

A module of multiple LED units used as a closely-spaced, single light source shall only be used within the sign face for legends or symbols.

Support:

Information regarding the use of retroreflective material on the sign support is contained in Section 2A.21.

Section 2A.09 Maintaining Minimum Retroreflectivity

Support:

Retroreflectivity is one of several factors associated with maintaining nighttime sign visibility (see Section 2A.22).

Standard:

Public agencies or officials having jurisdiction shall use an assessment or management method that is designed to maintain sign retroreflectivity at or above the minimum levels in Table 2A-3.

Support:

Compliance with the above Standard is achieved by having a method in place and using the method to maintain the minimum levels established in Table 2A-3. Provided that an assessment or management method is being used, an agency or official having jurisdiction would be in compliance with the above Standard even if there are some individual signs that do not meet the minimum retroreflectivity levels at a particular point in time.

Guidance:

Except for those signs specifically identified in the Option in this Section, one or more of the following assessment or management methods should be used to maintain sign retroreflectivity:

A. Visual Nighttime Inspection – The retroreflectivity of an existing sign is assessed by a trained sign inspector conducting a visual inspection from a moving vehicle during nighttime conditions. Signs that are visually identified by the inspector to have retroreflectivity below the minimum levels should be replaced.
B. Measured Sign Retroreflectivity – Sign retroreflectivity is measured using a retroreflectometer. Signs with retroreflectivity below the minimum levels should be replaced.
C. Expected Sign Life – When signs are installed, the installation date is labeled or recorded so that the age of a sign is known. The age of the sign is compared to the expected sign life. The expected sign life is based on the experience of sign retroreflectivity degradation in a geographic area compared to the minimum levels. Signs older than the expected life should be replaced. Rev. 2
D. Blanket Replacement – All signs in an area/corridor, or of a given type, should be replaced at specified intervals. This eliminates the need to assess retroreflectivity or track the life of individual signs. The replacement interval is based on the expected sign life, compared to the minimum levels, for the shortest-life material used on the affected signs.
E. Control Signs – Replacement of signs in the field is based on the performance of a sample of control signs. The control signs might be a small sample located in a maintenance yard or a sample of signs in the field. The control signs are monitored to determine the end of retroreflective life for the associated signs. All field signs represented by the control sample should be replaced before the retroreflectivity levels of the control sample reach the minimum levels.
F. Other Methods – Other methods developed based on engineering studies can be used.

Support:

Additional information about these methods is contained in the 2007 Edition of FHWA's "Maintaining Traffic Sign Retroreflectivity" (see Section 1A.11).

Option:

Highway agencies may exclude the following signs from the retroreflectivity maintenance guidelines described in this Section:

A. Parking, Standing, and Stopping signs (R7 and R8 series)
B. Walking/Hitchhiking/Crossing signs (R9 series, R10-1 through R10-4b)
C. Adopt-A-Highway signs
D. All signs with blue or brown backgrounds
E. Bikeway signs that are intended for exclusive use by bicyclists or pedestrians

Section 2A.10 Shapes

Standard:

Particular shapes, as shown in Table 2A-4, shall be used exclusively for specific signs or series of signs, unless specifically stated otherwise in the text discussion in this Manual for a particular sign or class of signs. Rev. 2

Section 2A.11 Sign Colors

Standard:

The colors to be used on standard signs and their specific use on these signs shall be as indicated in the applicable Sections of this Manual. The color coordinates and values shall be as described in 23 CFR, Part 655, Subpart F, Appendix.

Table 2A-3. Minimum Maintained Retroreflectivity Levels ①

Sign Color	Sheeting Type (ASTM D4956-04)				Additional Criteria
	Beaded Sheeting			Prismatic Sheeting	
	I	II	III	III, IV, VI, VII, VIII, IX, X	
White on Green	W*; G ≥ 7	W*; G ≥ 15	W*; G ≥ 25	W ≥ 250; G ≥ 25	Overhead
	W*; G ≥ 7	W ≥ 120; G ≥ 15			Ground-mounted
Black on Yellow or Black on Orange	Y*; O*	Y ≥ 50; O ≥ 50			②
	Y*; O*	Y ≥ 75; O ≥ 75			③
White on Red	W ≥ 35; R ≥ 7				④
Black on White	W ≥ 50				–

① The minimum maintained retroreflectivity levels shown in this table are in units of cd/lx/m² measured at an observation angle of 0.2° and an entrance angle of -4.0°.
② For text and fine symbol signs measuring at least 1200 mm (48 in) and for all sizes of bold symbol signs
③ For text and fine symbol signs measuring less than 1200 mm (48 in)
④ Minimum Sign Contrast Ratio ≥ 3:1 (white retroreflectivity ÷ red retroreflectivity)
* This sheeting type should not be used for this color for this application.

Bold Symbol Signs

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- W1-1, -2 – Turn and Curve
- W1-3, -4 – Reverse Turn and Curve
- W1-5 – Winding Road
- W1-6, -7 – Large Arrow
- W1-8 – Chevron
- W1-10 – Intersection in Curve
- W1-11 – Hairpin Curve
- W1-15 – 270 Degree Loop
- W2-1 – Cross Road
- W2-2, -3 – Side Road
- W2-4, -5 – T and Y Intersection
- W2-6 – Circular Intersection
- W3-1 – Stop Ahead
- W3-2 – Yield Ahead
- W3-3 – Signal Ahead
- W4-1 – Merge
- W4-2 – Lane Ends
- W4-3 – Added Lane
- W4-5 – Entering Roadway Merge
- W4-6 – Entering Roadway Added Lane
- W6-1, -2 – Divided Highway Begins and Ends
- W6-3 – Two-Way Traffic
- W10-1, -2, -3, -4, -11, -12 – Highway-Railroad Advance Warning
- W11-2 – Pedestrian Crossing
- W11-3 – Deer Crossing
- W11-4 – Cattle Crossing
- W11-5 – Farm Equipment
- W11-6 – Snowmobile Crossing
- W11-7 – Equestrian Crossing
- W11-8 – Fire Station
- W11-10 – Truck Crossing
- W12-1 – Double Arrow
- W16-5p, -6p, -7p – Pointing Arrow Plaques
- W20-7a – Flagger
- W21-1a – Worker

Fine Symbol Signs – Symbol signs not listed as Bold Symbol Signs.

Special Cases

- W3-1 – Stop Ahead: Red retroreflectivity ≥ 7
- W3-2 – Yield Ahead: Red retroreflectivity ≥ 7; White retroreflectivity ≥ 35
- W3-3 – Signal Ahead: Red retroreflectivity ≥ 7; Green retroreflectivity ≥ 7
- W3-5 – Speed Reduction: White retroreflectivity ≥ 50
- For non-diamond shaped signs such W14-3 (No Passing Zone), W4-4p (Cross Traffic Does Not Stop), or W13-1, -2, -3, -5 (Speed Advisory Plaques), use largest sign dimension to determine proper minimum retroreflectivity level.

Support:

Rev. 2 As a quick reference, common uses of sign colors are shown in Table 2A-5. Color schemes on specific signs are shown in the illustrations located in each appropriate Section.

Whenever white is specified herein as a color, it is understood to include silver-colored retroreflective coatings or elements that reflect white light.

The colors coral, purple, and light blue are being reserved for uses that will be determined in the future by the Federal Highway Administration.

Information regarding color coding of destinations on guide signs is contained in Section 2D.03.

Table 2A-4. Use of Sign Shapes

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Shape	Signs
Octagon	* Stop
Equilateral Triangle (1 point down)	* Yield
Circle	* Highway-Rail Grade Crossing (Advance Warning)
Pennant Shape / Isosceles Triangle (longer axis horizontal)	* No Passing
Pentagon (pointed up)	* School Advance Warning Sign * County Route Sign
Crossbuck (two rectangles in an "X" configuration)	* Highway-Rail Grade Crossing
Diamond	Warning Series
Rectangle (including square)	Regulatory Series ** Guide Series Warning Series
Trapezoid	Recreational and Cultural Interest Area Series National Forest Route Sign

* This sign shall be exclusively the shape shown.

** Guide series includes general service, specific service, recreation, and emergency management signs.

Section 2A.12 Dimensions

Support:

Sign sizes for use on the different classes of highways are shown in Sections 2B.03, 2C.04, 2D.04, 5A.03, 6F.02, 7B.01, 8B.02, and 9B.02, and in the "Standard Highway Signs" book.

The "Standard Highway Signs" book (see Section 1A.11) prescribes design details for up to five different sizes depending on the type of traffic facility, including bikeways. Smaller sizes are designed to be used on bikeways and some other off-road applications. Larger sizes are designed for use on freeways and expressways, and can also be used to enhance road user safety and convenience on other facilities, especially on multi-lane divided highways and on undivided highways having five or more lanes of traffic and/or high speeds. The intermediate sizes are designed to be used on other highway types.

Standard:

The sign dimensions prescribed in this Manual and in the "Standard Highway Signs" book shall be used unless engineering judgment determines that other sizes are appropriate. Where engineering judgment determines that sizes smaller than the prescribed dimensions are appropriate for use, the sign dimensions shall not be less than the minimum dimensions specified in this Manual. Where engineering judgment determines that sizes larger than the prescribed dimensions are appropriate for use, standard shapes and colors shall be used and standard proportions shall be retained as much as practical.

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Table 2A-5. Common Uses of Sign Colors

Type of Sign	Legend					Background									
	Black	Green	Red	White	Yellow	Black	Blue	Brown	Green	Orange	Red	White	Yellow	Fluorescent Yellow-Green	Fluorescent Pink
Regulatory	X		X	X		X					X	X			
Prohibitive			X	X							X	X			
Permissive		X										X			
Warning	X												X		
Pedestrian	X												X	X	
Bicycle	X												X	X	
Guide				X					X						
Interstate Route				X			X				X				
State Route	X											X			
US Route	X											X			
County Route					X		X								
Forest Route				X				X							
Street Name				X					X						
Destination				X					X						
Reference Location				X					X						
Information				X			X		X						
Evacuation Route				X			X								
Road User Service				X			X								
Recreational				X				X	X						
Temporary Traffic Control	X									X					
Incident Management	X									X					X
Changeable Message Signs *				X	X	X									
School	X												X	X	

* Reverse colors or fluorescent yellow-green pixels may also be used on changeable message signs

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Guidance:

Increases above the prescribed sizes should be used where greater legibility or emphasis is needed. Wherever practical, the overall sign dimensions should be increased in 150 mm (6 in) increments.

Section 2A.13 Symbols

Support:

Sometimes a change from word messages to symbols requires significant time for public education and transition. Therefore, this Manual includes the practice of using educational plaques to accompany some new symbol signs.

Standard:

Symbol designs shall in all cases be unmistakably similar to those shown in this Manual and in the "Standard Highway Signs" book (see Section 1A.11). New symbol designs shall be adopted by the Federal Highway Administration based on research evaluations to determine road user comprehension, sign conspicuity, and sign legibility.

Guidance:

New warning or regulatory symbol signs not readily recognizable by the public should be accompanied by an educational plaque.

Option:

State and/or local highway agencies may conduct research studies to determine road user comprehension, sign conspicuity, and sign legibility.

Educational plaques may be left in place as long as they are in serviceable condition.

Although most standard symbols are oriented facing left, mirror images of these symbols may be used where the reverse orientation might better convey to road users a direction of movement.

Section 2A.14 Word Messages

Standard:

Except as noted in Section 2A.06, all word messages shall use standard wording and letters as shown in this Manual and in the "Standard Highway Signs" book (see Section 1A.11).

Guidance:

Word messages should be as brief as possible and the lettering should be large enough to provide the necessary legibility distance. A minimum specific ratio, such as 25 mm (1 in) of letter height per 12 m (40 ft) of legibility distance, should be used.

Support:

Some research indicates that a ratio of 25 mm (1 in) of letter height per 10 m (33 ft) of legibility distance could be beneficial.

Guidance:

Abbreviations (see Section 1A.14) should be kept to a minimum, and should include only those that are commonly recognized and understood, such as AVE (for Avenue), BLVD (for Boulevard), N (for North), or JCT (for Junction).

Standard:

All sign lettering shall be in capital letters as provided in the "Standard Highway Signs" book, except as indicated in the Option below.

Option:

Word messages on street name signs and destinations on guide signs may be composed of a combination of lower-case letters with initial upper-case letters.

Section 2A.15 Sign Borders

Standard:

Unless specifically stated otherwise, each sign illustrated herein shall have a border of the same color as the legend, at or just inside the edge.

The corners of all sign borders shall be rounded, except for STOP signs.

Guidance:

A dark border on a light background should be set in from the edge, while a light border on a dark background should extend to the edge of the panel. A border for 750 mm (30 in) signs with a light background should be from 13 to 19 mm (0.5 to 0.75 in) in width, 13 mm (0.5 in) from the edge. For similar signs with a light border, a width of 25 mm (1 in) should be used. For other sizes, the border width should be of similar proportions, but should not exceed the stroke-width of the major lettering of the sign. On signs exceeding 1800 x 3000 mm (72 x 120 in) in size, the border should be 50 mm (2 in) wide, or on larger signs, 75 mm (3 in) wide. Except for STOP signs and as otherwise provided in Section 2E.15, the corners of the sign should be rounded to fit the border.

Section 2A.16 Standardization of Location

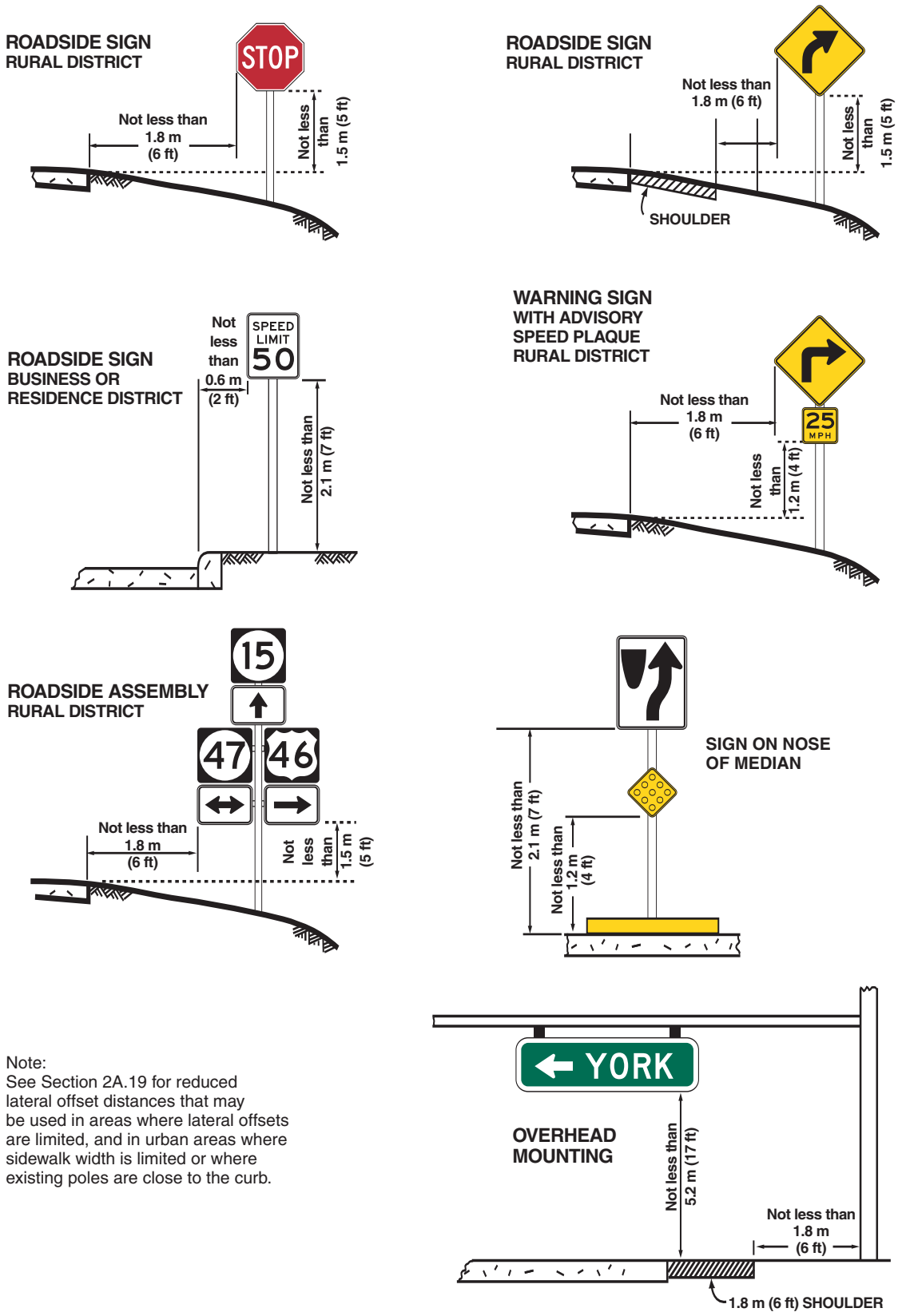
Support:

Standardization of position cannot always be attained in practice. Examples of heights and lateral locations of signs for typical installations are illustrated in Figure 2A-1, and examples of locations for some typical signs at intersections are illustrated in Figure 2A-2.

Standard:

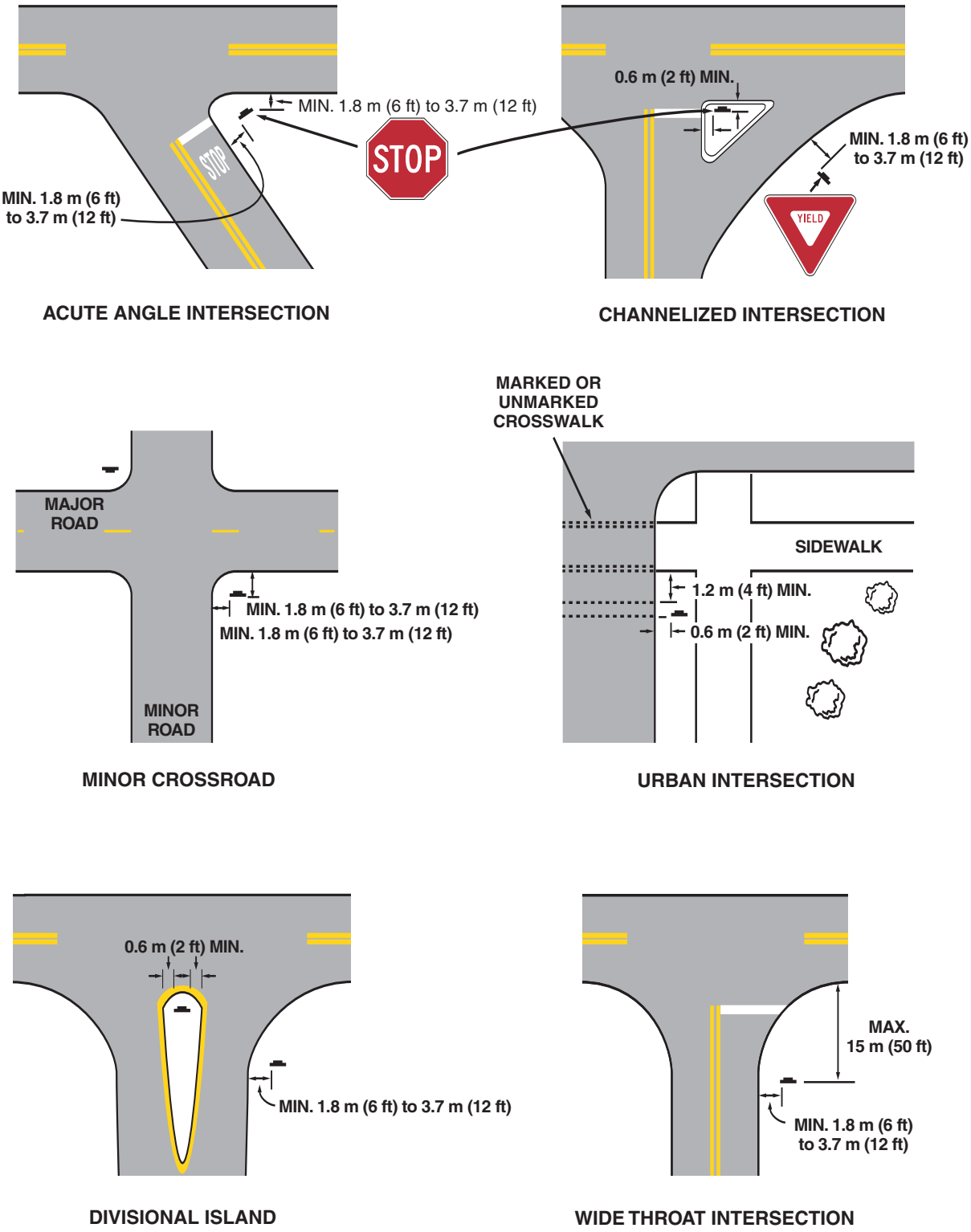
Signs requiring different decisions by the road user shall be spaced sufficiently far apart for the required decisions to be made reasonably safely. One of the factors considered when determining the appropriate spacing shall be the posted or 85th-percentile speed.

Figure 2A-1. Examples of Heights and Lateral Locations of Signs for Typical Installations



Note:
See Section 2A.19 for reduced lateral offset distances that may be used in areas where lateral offsets are limited, and in urban areas where sidewalk width is limited or where existing poles are close to the curb.

Figure 2A-2. Examples of Locations for Some Typical Signs at Intersections



Note: Lateral offset is a minimum of 1.8 m (6 ft) measured from the edge of the shoulder, or 3.7 m (12 ft) measured from the edge of the traveled way. See Section 2A.19 for lower minimums that may be used in urban areas, or where lateral offset space is limited.

Guidance:

Signs should be located on the right side of the roadway where they are easily recognized and understood by road users. Signs in other locations should be considered only as supplementary to signs in the normal locations, except as otherwise indicated.

Signs should be individually installed on separate posts or mountings except where:

A. One sign supplements another, or
B. Route or directional signs are grouped to clarify information to motorists, or
C. Regulatory signs that do not conflict with each other are grouped, such as turn prohibition signs posted with one-way signs, street name signs posted with a stop or yield sign, or a parking regulation sign posted with a speed limit sign.

Signs should be located so that they:

A. Are outside the clear zone unless placed on a breakaway or yielding support (see Section 2A.19);
B. Optimize nighttime visibility;
C. Minimize the effects of mud splatter and debris;
D. Do not obscure each other; and
E. Are not hidden from view.

Support:

The clear zone is the total roadside border area, starting at the edge of the traveled way, available for use by errant vehicles. The width of the clear zone is dependent upon traffic volumes, speeds, and roadside geometry. Additional information can be found in the "AASHTO Roadside Design Guide" (see Page i for AASHTO's address).

Guidance:

With the increase in traffic volumes and the desire to provide road users regulatory, warning, and guidance information, an order of priority for sign installation should be established.

Support:

An order of priority is especially critical where space is limited for sign installation and there is a demand for several different types of signs. Overloading road users with too much information is not desirable.

Guidance:

Because regulatory and warning information is more critical to the road user than guidance information, regulatory and warning signing whose location is critical should be displayed rather than guide signing in cases where conflicts occur. Information of a less critical nature should be moved to less critical locations or omitted.

Option:

Under some circumstances, such as on curves to the right, signs may be placed on median islands or on the left side of the road. A supplementary sign located on the left of the roadway may be used on a multi-lane road where traffic in the right lane might obstruct the view to the right.

Guidance:

In urban areas where crosswalks exist, signs should not be placed within 1.2 m (4 ft) in advance of the crosswalk.

Section 2A.17 Overhead Sign Installations

Guidance:

Overhead signs should be used on freeways and expressways, at locations where some degree of lane-use control is desirable, and at locations where space is not available at the roadside.

Support:

The operational requirements of the present highway system are such that overhead signs have value at many locations. The factors to be considered for the installation of overhead sign displays are not definable in specific numerical terms.

Option:

The following conditions (not in priority order) may be considered in an engineering study to determine if overhead signs would be beneficial:

A. Traffic volume at or near capacity;
B. Complex interchange design;
C. Three or more lanes in each direction;
D. Restricted sight distance;

E. Closely spaced interchanges;
F. Multi-lane exits;
G. Large percentage of trucks;
H. Street lighting background;
I. High-speed traffic;
J. Consistency of sign message location through a series of interchanges;
K. Insufficient space for ground-mounted signs;
L. Junction of two freeways; and
M. Left exit ramps.

Over-crossing structures may serve for the support of overhead signs, and under some circumstances, may be the only practical solution that will provide adequate viewing distance. Use of such structures as sign supports may eliminate the need for the foundations and sign supports along the roadside.

Section 2A.18 Mounting Height

Support:

The provisions of this Section apply unless specifically stated otherwise for a particular sign elsewhere in this Manual.

Standard:

Signs installed at the side of the road in rural districts shall be at least 1.5 m (5 ft), measured from the bottom of the sign to the near edge of the pavement.

Where parking or pedestrian movements occur, the clearance to the bottom of the sign shall be at least 2.1 m (7 ft).

Directional signs on freeways and expressways shall be installed with a minimum height of 2.1 m (7 ft). If a secondary sign is mounted below another sign, the major sign shall be installed at least 2.4 m (8 ft) and the secondary sign at least 1.5 m (5 ft) above the level of the pavement edge. All route signs, warning signs, and regulatory signs on freeways and expressways shall be at least 2.1 m (7 ft) above the level of the pavement edge.

Option:

The height to the bottom of a secondary sign mounted below another sign may be 0.3 m (1 ft) less than the height specified above.

Where signs are placed 9 m (30 ft) or more from the edge of the traveled way, the height to the bottom of such signs may be 1.5 m (5 ft) above the level of the pavement edge.

A route sign assembly consisting of a route sign and auxiliary signs (see Section 2D.27) may be treated as a single sign for the purposes of this Section.

The mounting height may be adjusted when supports are located near the edge of the right-of-way on a steep backslope.

Support:

Without this flexibility regarding steep backslopes, some agencies might decide to relocate the sign closer to the road, which might be less desirable.

Standard:

Overhead mounted signs shall provide a vertical clearance of not less than 5.2 m (17 ft) to the sign, light fixture, or sign bridge, over the entire width of the pavement and shoulders except where a lesser vertical clearance is used for the design of other structures.

Option:

If the vertical clearance of other structures is less than 4.9 m (16 ft), the vertical clearance to overhead sign structures or supports may be as low as 0.3 m (1 ft) higher than the vertical clearance of the other structures.

In special cases it may be necessary to reduce the clearance to overhead signs because of substandard dimensions in tunnels and other major structures such as double-deck bridges.

Support:

Figure 2A-1 illustrates some examples of the mounting height requirements contained in this Section.

Section 2A.19 Lateral Offset

Standard:

For overhead sign supports, the minimum lateral offset from the edge of the shoulder (or if no shoulder exists, from the edge of the pavement) to the near edge of overhead sign supports (cantilever or sign bridges) shall be 1.8 m (6 ft). Overhead sign supports shall have a barrier or crash cushion to shield them if they are within the clear zone.

Ground-mounted sign supports shall be breakaway, yielding, or shielded with a longitudinal barrier or crash cushion if within the clear zone.

Guidance:

For ground-mounted signs, the minimum lateral offset should be 3.7 m (12 ft) from the edge of the traveled way. If a shoulder wider than 1.8 m (6 ft) exists, the minimum lateral offset for ground-mounted signs should be 1.8 m (6 ft) from the edge of the shoulder.

Support:

The minimum lateral offset is intended to keep trucks and cars that use the shoulders from striking the signs or supports.

Guidance:

All supports should be located as far as practical from the edge of the shoulder. Advantage should be taken to place signs behind existing roadside barriers, on over-crossing structures, or other locations that minimize the exposure of the traffic to sign supports.

Option:

Where permitted, signs may be placed on existing supports used for other purposes, such as highway traffic signal supports, highway lighting supports, and utility poles.

Standard:

If signs are placed on existing supports, they shall meet other placement criteria contained in this Manual.

Option:

Lesser lateral offsets may be used on connecting roadways or ramps at interchanges, but not less than 1.8 m (6 ft) from the edge of the traveled way.

In areas where lateral offsets are limited, a minimum lateral offset of 0.6 m (2 ft) may be used.

A minimum offset of 0.3 m (1 ft) from the face of the curb may be used in urban areas where sidewalk width is limited or where existing poles are close to the curb.

Support:

Figures 2A-1 and 2A-2 illustrate some examples of the lateral offset requirements contained in this Section.

Section 2A.20 Orientation

Guidance:

Unless otherwise stated in this Manual, signs should be vertically mounted at right angles to the direction of, and facing, the traffic that they are intended to serve.

Where mirror reflection from the sign face is encountered to such a degree as to reduce legibility, the sign should be turned slightly away from the road. Signs that are placed 9 m (30 ft) or more from the pavement edge should be turned toward the road. On curved alignments, the angle of placement should be determined by the direction of approaching traffic rather than by the roadway edge at the point where the sign is located.

Option:

On grades, sign faces may be tilted forward or back from the vertical position to improve the viewing angle.

Section 2A.21 Posts and Mountings

Standard:

Sign posts, foundations, and mountings shall be so constructed as to hold signs in a proper and permanent position, and to resist swaying in the wind or displacement by vandalism.

Support:

The latest edition of AASHTO's "Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" contains additional information regarding posts and mounting (see Page i for AASHTO's address).

Option:

Where engineering judgment indicates a need to draw attention to the sign during nighttime conditions, a strip of retroreflective material may be used on regulatory and warning sign supports.

Standard:

If a strip of retroreflective material is used on the sign support, it shall be at least 50 mm (2 in) in width, it shall be placed for the full length of the support from the sign to within 0.6 m (2 ft) above the edge of the roadway, and its color shall match the background color of the sign, except that the color of the strip for the YIELD and DO NOT ENTER signs shall be red.

Section 2A.22 Maintenance

Guidance:

Maintenance activities should consider proper position, cleanliness, legibility, and daytime and nighttime visibility (see Section 2A.09). Damaged or deteriorated signs should be replaced. Rev. 2

To assure adequate maintenance, a schedule for inspecting (both day and night), cleaning, and replacing signs should be established. Employees of highway, law enforcement, and other public agencies whose duties require that they travel on the roadways should be encouraged to report any damaged, deteriorated, or obscured signs at the first opportunity.

Steps should be taken to see that weeds, trees, shrubbery, and construction, maintenance, and utility materials and equipment do not obscure the face of any sign.

A regular schedule of replacement of lighting elements for illuminated signs should be maintained.

Section 2A.23 Median Opening Treatments for Divided Highways with Wide Medians

Guidance:

Where divided highways are separated by median widths at the median opening itself of 9 m (30 ft) or more, median openings should be signed as two separate intersections.

CHAPTER 2B. REGULATORY SIGNS

Section 2B.01 Application of Regulatory Signs

Standard:

Regulatory signs shall be used to inform road users of selected traffic laws or regulations and indicate the applicability of the legal requirements.

Regulatory signs shall be installed at or near where the regulations apply. The signs shall clearly indicate the requirements imposed by the regulations and shall be designed and installed to provide adequate visibility and legibility in order to obtain compliance.

Regulatory signs shall be retroreflective or illuminated to show the same shape and similar color by both day and night, unless specifically stated otherwise in the text discussion of a particular sign or group of signs (see Section 2A.08).

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

Section 2B.02 Design of Regulatory Signs

Support:

Most regulatory signs are rectangular, with the longer dimension vertical. The shapes and colors of regulatory signs are listed in Tables 2A-4 and 2A-5, respectively. Exceptions are specifically noted in the following Sections. Rev. 2

The use of educational plaques to supplement symbol signs is described in Section 2A.13.

Guidance:

Changeable message signs displaying a regulatory message incorporating a prohibitory message that includes a red circle and slash on a static sign should display a red symbol that approximates the same red circle and slash as closely as possible.

Section 2B.03 Size of Regulatory Signs

Standard:

The sizes for regulatory signs shall be as shown in Table 2B-1.

Guidance:

The Freeway and Expressway sizes should be used for higher-speed applications to provide larger signs for increased visibility and recognition.

Option:

The Minimum size may be used on low-speed roadways where the reduced legend size would be adequate for the regulation or where physical conditions preclude the use of the other sizes.

The Oversized size may be used for those special applications where speed, volume, or other factors result in conditions where increased emphasis, improved recognition, or increased legibility would be desirable.

Signs larger than those shown in Table 2B-1 may be used (see Section 2A.12).

Section 2B.04 STOP Sign (R1-1)

Standard:

When a sign is used to indicate that traffic is always required to stop, a STOP (R1-1) sign (see Figure 2B-1) shall be used.

The STOP sign shall be an octagon with a white legend and border on a red background. Secondary legends shall not be used on STOP sign faces. If appropriate, a supplemental plaque (R1-3 or R1-4) shall be used to display a secondary legend. Such plaques (see Figure 2B-1) shall have a white legend and border on a red background. If the number of approach legs controlled by STOP signs at an intersection is three or more, the numeral on the supplemental plaque, if used, shall correspond to the actual number of legs controlled by STOP signs.

At intersections where all approaches are controlled by STOP signs (see Section 2B.07), a supplemental plaque (R1-3 or R1-4) shall be mounted below each STOP sign.

Option:

The ALL WAY (R1-4) supplemental plaque may be used instead of the 4-WAY (R1-3) supplemental plaque.

Support:

The design and application of Stop Beacons are described in Section 4K.05.

Table 2B-1. Regulatory Sign Sizes (Sheet 1 of 5)

Sign	MUTCD Code	Section	Conventional Road	Expressway	Freeway	Minimum	Oversized
Stop	R1-1	2B.04	750 x 750 (30 x 30)	900 x 900 (36 x 36)	—	600 x 600 (24 x 24)	1200 x 1200 (48 x 48)
Yield	R1-2	2B.08	900 x 900 x 900 (36 x 36 x 36)	1200 x 1200 x 1200 (48 x 48 x 48)	1500 x 1500 x 1500 (60 x 60 x 60)	750 x 750 x 750 (30 x 30 x 30)	—
To Oncoming Traffic	R1-2a	—	600 x 300 (24 x 12)	—	—	—	—
4-Way	R1-3	2B.04	300 x 150 (12 x 6)	—	—	—	—
All Way	R1-4	2B.04	450 x 150 (18 x 6)	—	—	—	—
Yield Here to Peds	R1-5	2B.11	450 x 450 (18 x 18)	—	—	—	—
Yield Here to Pedestrians	R1-5a	2B.11	450 x 600 (18 x 24)	—	—	—	—
In-Street Ped Crossing	R1-6,6a	2B.12	300 x 900 (12 x 36)	—	—	—	—
Speed Limit (English)	R2-1	2B.13	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	—	—
Speed Limit (Metric)	R2-1	2B.13	600 x 900 (24 x 36)	900 x 1350 (36 x 54)	1200 x 1650 (48 x 66)	—	—
Truck Speed Limit (English)	R2-2	2B.14	600 x 600 (24 x 24)	900 x 900 (36 x 36)	1200 x 1200 (48 x 48)	—	—
Truck Speed Limit (Metric)	R2-2	2B.14	600 x 750 (24 x 30)	900 x 1050 (36 x 42)	1200 x 1350 (48 x 54)	—	—
Night Speed Limit (English)	R2-3	2B.15	600 x 600 (24 x 24)	900 x 900 (36 x 36)	1200 x 1200 (48 x 48)	—	—
Night Speed Limit (Metric)	R2-3	2B.15	600 x 750 (24 x 30)	900 x 1050 (36 x 42)	1200 x 1350 (48 x 54)	—	—
Minimum Speed Limit (English)	R2-4	2B.16	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	—	—
Minimum Speed Limit (Metric)	R2-4	2B.16	600 x 900 (24 x 36)	900 x 1350 (36 x 54)	1200 x 1650 (48 x 66)	—	—
Combined Speed Limit (English)	R2-4a	2B.16	600 x 1200 (24 x 48)	900 x 1800 (36 x 72)	1200 x 2400 (48 x 96)	—	—
Combined Speed Limit (Metric)	R2-4a	2B.16	600 x 1350 (24 x 54)	900 x 1950 (36 x 78)	1200 x 2550 (48 x 102)	—	—
Fines Higher	R2-6	2B.17	600 x 600 (24 x 24)	900 x 900 (36 x 36)	1200 x 1200 (48 x 48)	—	—
Turn Prohibition	R3-1,2,3,4, 18	2B.19	600 x 600 (24 x 24)	900 x 900 (36 x 36)	—	—	1200 x 1200 (48 x 48)
Mandatory Movement Lane Control	R3-5 series	2B.21	750 x 900 (30 x 36)	—	—	—	—
Optional Movement Lane Control	R3-6	2B.22	750 x 900 (30 x 36)	—	—	—	—
Mandatory Movement Lane Control	R3-7	2B.21	750 x 750 (30 x 30)	—	—	—	—
Advance Intersection Lane Control	R3-8,8a,8b	2B.23	variable x 750 (variable x 30)	—	—	—	—
Two-Way Left Turn Only (overhead mounted)	R3-9a	2B.24	750 x 900 (30 x 36)	—	—	—	—
Two-Way Left Turn Only (ground mounted)	R3-9b	2B.24	600 x 900 (24 x 36)	—	—	—	900 x 1200 (36 x 48)
Reversible Lane Control (symbol)	R3-9d	2B.25	2700 x 1200 (108 x 48)	—	—	—	—
Reversible Lane Control (ground mounted)	R3-9f	2B.25	750 x 1050 (30 x 42)	—	—	—	—
Advance Reversible Lane Control Transition Signing	R3-9g,9h	2B.25	2700 x 900 (108 x 36)	—	—	—	—
End Reverse Lane	R3-9i	2B.25	2700 x 1200 (108 x 48)	—	—	—	—
Preferential Only Lane Ahead (ground mounted)	R3-10 series	2B.26	750 x 1050 (30 x 42)	900 x 1500 (36 x 60)	1950 x 2400 (78 x 96)	—	—
Preferential Only Lane Operation (ground mounted)	R3-11 series	2B.26	750 x 1050 (30 x 42)	—	1950 x 2400 (78 x 96)	—	—

Table 2B-1. Regulatory Sign Sizes (Sheet 2 of 5)

Sign	MUTCD Code	Section	Conventional Road	Expressway	Freeway	Minimum	Oversized
Preferential Only Lane Ends (ground mounted)	R3-12 series	2B.26	750 x 1050 (30 x 42)	900 x 1500 (36 x 60)	1200 x 2100 (48 x 84) 1200 x 2400 (48 x 96)	—	—
Preferential Only Lane Ahead (overhead mounted)	R3-13 series	2B.26	1650 x 900 (66 x 36)	2100 x 1200 (84 x 48)	3600 x 1950 (144 x 78) 3600 x 2400 (144 x 96)	—	—
Preferential Only Lane Operation (overhead mounted)	R3-14 series	2B.26	1800 x 1500 (72 x 60)	2400 x 1800 (96 x 72)	3600 x 2650 (144 x 106) 3600 x 3100 (144 x 124) 3600 x 2250 (144 x 90)	—	—
HOV 2+ Lane Ends (overhead mounted)	R3-15 series	2B.26	1650 x 900 (66 x 36)	2100 x 1200 (84 x 48)	2550 x 1500 (102 x 60)	—	—
Do Not Pass	R4-1	2B.29	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	450 x 600 (18 x 24)	—
Pass With Care	R4-2	2B.30	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	450 x 600 (18 x 24)	—
Slower Traffic Keep Right	R4-3	2B.31	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	—	—
Trucks Use Right Lane	R4-5	2B.32	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	—	—
Truck Lane XX Meters (XX Feet)	R4-6	2B.32	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	—	—
Keep Right	R4-7,7a,7b	2B.33	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	450 x 600 (18 x 24)	—
Keep Left	R4-8	2B.33	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	450 x 600 (18 x 24)	—
Do Not Enter	R5-1	2B.34	750 x 750 (30 x 30)	900 x 900 (36 x 36)	1200 x 1200 (48 x 48)	—	—
Wrong Way	R5-1a	2B.35	900 x 600 (36 x 24)	900 x 600 (36 x 24)	1050 x 750 (42 x 30)	—	—
No Trucks	R5-2,2a	2B.36	600 x 600 (24 x 24)	750 x 750 (30 x 30)	900 x 900 (36 x 36)	—	1200 x 1200 (48 x 48)
No Motor Vehicles	R5-3	2B.36	600 x 600 (24 x 24)	—	—	—	—
Commercial Vehicles Excluded	R5-4	2B.36	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	—	—
Vehicles with Lugs Prohibited	R5-5	2B.36	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	—	—
No Bicycles	R5-6	2B.36	600 x 600 (24 x 24)	750 x 750 (30 x 30)	900 x 900 (36 x 36)	—	1200 x 1200 (48 x 48)
Non-Motorized Traffic Prohibited	R5-7	2B.36	750 x 600 (30 x 24)	1050 x 600 (42 x 24)	1200 x 750 (48 x 30)	—	—
Motor-Driven Cycles Prohibited	R5-8	2B.36	750 x 600 (30 x 24)	1050 x 600 (42 x 24)	1200 x 750 (48 x 30)	—	—
Pedestrians, Bicycles, Motor-Driven Cycles Prohibited	R5-10a	2B.36	750 x 900 (30 x 36)	—	—	—	—
Pedestrians and Bicycles Prohibited	R5-10b	2B.36	750 x 450 (30 x 18)	—	—	—	—
Pedestrians Prohibited	R5-10c	2B.36	600 x 300 (24 x 12)	—	—	—	—
One Way	R6-1	2B.37	900 x 300 (36 x 12)	1350 x 450 (54 x 18)	1350 x 450 (54 x 18)	—	—
One Way	R6-2	2B.37	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	900 x 1200 (36 x 48)	450 x 600 (18 x 24)	—
Divided Highway Crossing	R6-3,3a	2B.38	750 x 600 (30 x 24)	900 x 750 (36 x 30)	—	600 x 450 (24 x 18)	—

Table 2B-1. Regulatory Sign Sizes (Sheet 3 of 5)

Sign	MUTCD Code	Section	Conventional Road	Expressway	Freeway	Minimum	Oversized
No Parking	R7-1,2,2a,3, 4,5,6,7,8, 107,108	2B.39	300 x 450 (12 x 18)	—	—	—	—
Van Accessible	R7-8a,8b	2B.40	450 x 225 (18 x 9)	—	—	300 x 150 (12 x 6)	—
No Parking, Bike Lane	R7-9,9a	9B.09	300 x 450 (12 x 18)	—	—	—	—
No Parking (with transit logo)	R7-107a	2B.39	300 x 750 (12 x 30)	—	—	—	—
No Parking / Restricted Parking (combined sign)	R7-200	2B.40	600 x 450 (24 x 18) 300 x 750 (12 x 30)	—	—	—	—
Tow Away Zone	R7-201,201a	2B.40	300 x 150 (12 x 6)	—	—	—	—
This Side of Sign	R7-202	2B.39	300 x 150 (12 x 6)	—	—	—	—
No Parking on Pavement	R8-1	2B.39	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	—	—
No Parking Except on Shoulder	R8-2	2B.39	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	—	—
No Parking	R8-3	2B.39	600 x 750 (24 x 30)	900 x 900 (36 x 36)	1200 x 1200 (48 x 48)	450 x 600 (18 x 24)	—
No Parking (symbol)	R8-3a	2B.39	600 x 600 (24 x 24)	900 x 900 (36 x 36)	1200 x 1200 (48 x 48)	300 x 300 (12 x 12)	—
Emergency Parking Only	R8-4	2B.42	750 x 600 (30 x 24)	750 x 600 (30 x 24)	1200 x 900 (48 x 36)	—	—
No Stopping on Pavement	R8-5	2B.39	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	—	—
No Stopping Except on Shoulder	R8-6	2B.39	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	—	—
Emergency Stopping Only	R8-7	2B.42	750 x 600 (30 x 24)	1200 x 900 (48 x 36)	—	—	—
Do Not Stop on Tracks	R8-8	2B.42	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	—	—	—
Tracks Out of Service	R8-9	8B.09	600 x 600 (24 x 24)	900 x 900 (36 x 36)	—	450 x 450 (18 x 18)	—
Stop Here When Flashing	R8-10	8B.10	600 x 900 (24 x 36)	—	—	600 x 750 (24 x 30)	—
Walk on Left Facing Traffic	R9-1	2B.43	450 x 600 (18 x 24)	—	—	—	—
Cross Only at Crosswalks	R9-2	2B.44	300 x 450 (12 x 18)	—	—	—	—
No Pedestrian Crossing	R9-3	2B.44	300 x 450 (12 x 18)	—	—	—	—
No Pedestrian Crossing (symbol)	R9-3a	2B.44	450 x 450 (18 x 18)	600 x 600 (24 x 24)	750 x 750 (30 x 30)	—	—
Use Crosswalk	R9-3b	2B.44	450 x 300 (18 x 12)	—	—	—	—
No Hitch Hiking	R9-4	2B.43	450 x 600 (18 x 24)	—	—	450 x 450 (18 x 18)	—
Hitch Hiking Prohibition (symbol)	R9-4a	2B.43	450 x 450 (18 x 18)	—	—	—	—
Bicyclists (symbol) Use Ped Signal	R9-5	9B.10	300 x 450 (12 x 18)	—	—	—	—
Bicyclists (symbol) Yield to Peds	R9-6	9B.10	300 x 450 (12 x 18)	—	—	—	—
Keep Left/Right to Pedestrians & Bicyclists (symbols) – Travel-path Restriction	R9-7	9B.11	300 x 450 (12 x 18)	—	—	—	—
Pedestrian Crosswalk	R9-8	6F.12	900 x 450 (36 x 18)	—	—	—	—
Sidewalk Closed	R9-9	6F.13	750 x 450 (30 x 18)	—	—	—	—

Table 2B-1. Regulatory Sign Sizes (Sheet 4 of 5)

Sign	MUTCD Code	Section	Conventional Road	Expressway	Freeway	Minimum	Oversized
Sidewalk Closed, Use Other Side	R9-10	6F.13	1200 x 600 (48 x 24)	—	—	—	—
Sidewalk Closed Ahead, Cross Here	R9-11	6F.13	1200 x 900 (48 x 36)	—	—	—	—
Sidewalk Closed, Cross Here	R9-11a	6F.13	1200 x 600 (48 x 24)	—	—	—	—
Cross On Green Light Only	R10-1	2B.45	300 x 450 (12 x 18)	—	—	—	—
Pedestrian Traffic Signal Signs	R10-2, 2a,3,3a,3b, 3c,3d,4,4a,4b	2B.45	225 x 300 (9 x 12)	—	—	—	—
Countdown Pedestrian Sign	R10-3e	2B.45	225 x 375 (9 x 15)	—	—	—	—
Left on Green Arrow Only	R10-5	2B.45	600 x 750 (24 x 30)	—	—	—	1200 x 1500 (48 x 60)
Stop Here on Red	R10-6	2B.45	600 x 900 (24 x 36)	—	—	—	—
Stop Here on Red	R10-6a	2B.45	600 x 750 (24 x 30)	—	—	—	—
Do Not Block Intersection	R10-7	2B.45	600 x 750 (24 x 30)	—	—	—	—
Use Lane with Green Arrow	R10-8	2B.45	600 x 750 (24 x 30)	900 x 1050 (36 x 42)	—	—	1500 x 1800 (60 x 72)
Left (Right) Turn Signal	R10-10	2B.45	600 x 750 (24 x 30)	—	—	—	—
No Turn on Red	R10-11,11a	2B.45	600 x 750 (24 x 30)	—	—	—	1200 x 1200 (48 x 48)
No Turn on Red	R10-11b	2B.45	600 x 600 (24 x 24)	—	—	—	750 x 750 (30 x 30)
Left Turn Yield on Green	R10-12	2B.45	600 x 750 (24 x 30)	—	—	—	—
Emergency Signal	R10-13	2B.45	900 x 600 (36 x 24)	—	—	—	—
Turning Traffic Must Yield To Pedestrians	R10-15	2B.45	750 x 900 (30 x 36)	—	—	—	—
U-Turn Yield to Right Turn	R10-16	2B.45	750 x 900 (30 x 36)	—	—	—	—
Right on Red Arrow After Stop	R10-17a	2B.45	750 x 900 (30 x 36)	—	—	—	—
Traffic Laws Photo Enforced	R10-18	2B.46	900 x 450 (36 x 18)	1200 x 750 (48 x 30)	1800 x 900 (72 x 36)	—	—
Photo Enforced	R10-19	2B.46	600 x 450 (24 x 18)	900 x 750 (36 x 30)	1200 x 900 (48 x 36)	—	—
MON—FRI (and times) (3 lines)	R10-20a	2B.45	600 x 600 (24 x 24)	—	—	—	—
SUNDAY (and times) (2 lines)	R10-20a	2B.45	600 x 450 (24 x 18)	—	—	—	—
Left Turn Signal— Yield on Green	R10-21	2B.45	750 x 900 (30 x 36)	—	—	—	—
Bike Actuation	R10-22	9B.12	300 x 450 (12 x 18)	—	—	—	—

Table 2B-1. Regulatory Sign Sizes *(Sheet 5 of 5)*

Sign	MUTCD Code	Section	Conventional Road	Expressway	Freeway	Minimum	Oversized
Keep Off Median	R11-1	2B.47	600 x 750 (24 x 30)	—	—	—	—
Road Closed	R11-2	2B.48	1200 x 750 (48 x 30)	—	—	—	—
Road Closed - Local Traffic Only	R11-3,3a, 3b,4	2B.48	1500 x 750 (60 x 30)	—	—	—	—
Weight Limit	R12-1,2	2B.49	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	—	—	900 x 1200 (36 x 48)
Weight Limit	R12-3	2B.49	600 x 900 (24 x 36)	—	—	—	—
Weight Limit	R12-4	2B.49	900 x 600 (36 x 24)	—	—	—	—
Weight Limit	R12-5	2B.49	600 x 900 (24 x 36)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	—	—
Metric Plaque	R12-6	2B.49	600 x 225 (24 x 9)	—	—	—	—
Weigh Station	R13-1	2B.50	1800 x 1200 (72 x 48)	2400 x 1650 (96 x 66)	3000 x 1100 (120 x 84)	—	—
Truck Route	R14-1	2B.51	600 x 450 (24 x 18)	—	—	—	—
Hazardous Material	R14-2,3	2B.52	600 x 600 (24 x 24)	750 x 750 (30 x 30)	900 x 900 (36 x 36)	—	1050 x 1050 (42 x 42)
National Network	R14-4,5	2B.53	600 x 600 (24 x 24)	750 x 750 (30 x 30)	900 x 900 (36 x 36)	—	1050 x 1050 (42 x 42)
Railroad Crossbuck	R15-1	8B.03	1200 x 225 (48 x 9)	—	—	—	—
Look	R15-8	8B.16	900 x 450 (36 x 18)	—	—	—	—

Notes:
1. Larger signs may be used when appropriate.
2. Dimensions are shown in millimeters followed by inches in parentheses and are shown as width x height.

Section 2B.05 STOP Sign Applications

Guidance:

STOP signs should be used if engineering judgment indicates that one or more of the following conditions exist:

A. Intersection of a less important road with a main road where application of the normal right-of-way rule would not be expected to provide reasonable compliance with the law;
B. Street entering a through highway or street;
C. Unsignalized intersection in a signalized area; and/or
D. High speeds, restricted view, or crash records indicate a need for control by the STOP sign.

Standard:

Because the potential for conflicting commands could create driver confusion, STOP signs shall not be installed at intersections where traffic control signals are installed and operating except as noted in Section 4D.01.

Portable or part-time STOP signs shall not be used except for emergency and temporary traffic control zone purposes.

Guidance:

STOP signs should not be used for speed control.

STOP signs should be installed in a manner that minimizes the numbers of vehicles having to stop. At intersections where a full stop is not necessary at all times, consideration should be given to using less restrictive measures such as YIELD signs (see Section 2B.08).

Once the decision has been made to install two-way stop control, the decision regarding the appropriate street to stop should be based on engineering judgment. In most cases, the street carrying the lowest volume of traffic should be stopped.

A STOP sign should not be installed on the major street unless justified by a traffic engineering study.

Support:

The following are considerations that might influence the decision regarding the appropriate street upon which to install a STOP sign where two streets with relatively equal volumes and/or characteristics intersect:

A. Stopping the direction that conflicts the most with established pedestrian crossing activity or school walking routes;
B. Stopping the direction that has obscured vision, dips, or bumps that already require drivers to use lower operating speeds;
C. Stopping the direction that has the longest distance of uninterrupted flow approaching the intersection; and
D. Stopping the direction that has the best sight distance to conflicting traffic.

The use of the STOP sign at highway-railroad grade crossings is described in Section 8B.08. The use of the STOP sign at highway-light rail transit grade crossings is described in Section 10C.04.

Section 2B.06 STOP Sign Placement

Standard:

The STOP sign shall be installed on the right side of the approach to which it applies. When the STOP sign is installed at this required location and the sign visibility is restricted, a Stop Ahead sign (see Section 2C.29) shall be installed in advance of the STOP sign.

The STOP sign shall be located as close as practical to the intersection it regulates, while optimizing its visibility to the road user it is intended to regulate.

STOP signs and YIELD signs shall not be mounted on the same post.

Guidance:

Other than a DO NOT ENTER sign, no sign should be mounted back-to-back with a STOP sign in a manner that obscures the shape of the STOP sign.

Support:

Section 2A.16 contains additional information about separate and combined mounting of other signs with STOP signs.

Guidance:

Stop lines, when used to supplement a STOP sign, should be located at the point where the road user should stop (see Section 3B.16).

If only one STOP sign is installed on an approach, the STOP sign should not be placed on the far side of the intersection.

Where two roads intersect at an acute angle, the STOP sign should be positioned at an angle, or shielded, so that the legend is out of view of traffic to which it does not apply.

Where there is a marked crosswalk at the intersection, the STOP sign should be installed in advance of the crosswalk line nearest to the approaching traffic.

Option:

At wide-throat intersections or where two or more approach lanes of traffic exist on the signed approach, observance of the stop control may be improved by the installation of an additional STOP sign on the left side of the road and/or the use of a stop line. At channelized intersections, the additional STOP sign may be effectively placed on a channelizing island.

Support:

Figure 2A-2 shows examples of some typical placements of STOP signs.

Section 2B.07 Multiway Stop Applications

Support:

Multiway stop control can be useful as a safety measure at intersections if certain traffic conditions exist. Safety concerns associated with multiway stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Multiway stop control is used where the volume of traffic on the intersecting roads is approximately equal.

The restrictions on the use of STOP signs described in Section 2B.05 also apply to multiway stop applications.

Guidance:

The decision to install multiway stop control should be based on an engineering study.

The following criteria should be considered in the engineering study for a multiway STOP sign installation:

A. Where traffic control signals are justified, the multiway stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.
B. A crash problem, as indicated by 5 or more reported crashes in a 12-month period that are susceptible to correction by a multiway stop installation. Such crashes include right- and left-turn collisions as well as right-angle collisions.
C. Minimum volumes:
   1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day, and
   2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour, but
   3. If the 85th-percentile approach speed of the major-street traffic exceeds 65 km/h or exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the above values.
D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

Option:

Other criteria that may be considered in an engineering study include:

A. The need to control left-turn conflicts;
B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;
C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to reasonably safely negotiate the intersection unless conflicting cross traffic is also required to stop; and
D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multiway stop control would improve traffic operational characteristics of the intersection.

Section 2B.08 YIELD Sign (R1-2)

Standard:

The YIELD (R1-2) sign (see Figure 2B-1) shall be a downward-pointing equilateral triangle with a wide red border and the legend YIELD in red on a white background.

Support:

The YIELD sign assigns right-of-way to traffic on certain approaches to an intersection. Vehicles controlled by a YIELD sign need to slow down or stop when necessary to avoid interfering with conflicting traffic.

Section 2B.09 YIELD Sign Applications

Option:

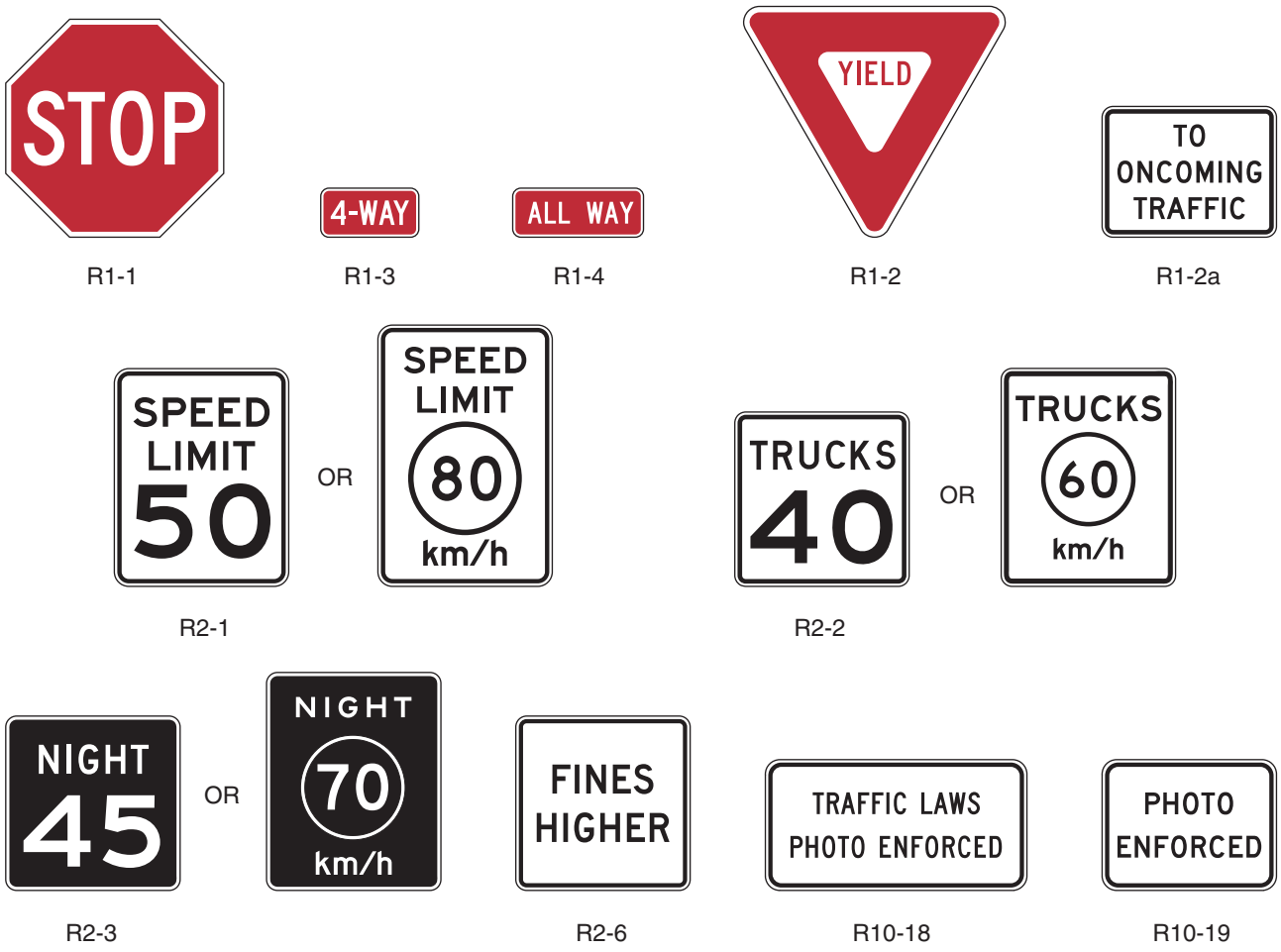
YIELD signs may be used instead of STOP signs if engineering judgment indicates that one or more of the following conditions exist:

A. When the ability to see all potentially conflicting traffic is sufficient to allow a road user traveling at the posted speed, the 85th-percentile speed, or the statutory speed to pass through the intersection or to stop in a reasonably safe manner.
B. If controlling a merge-type movement on the entering roadway where acceleration geometry and/or sight distance is not adequate for merging traffic operation.
C. The second crossroad of a divided highway, where the median width at the intersection is 9 m (30 ft) or greater. In this case, a STOP sign may be installed at the entrance to the first roadway of a divided highway, and a YIELD sign may be installed at the entrance to the second roadway.
D. An intersection where a special problem exists and where engineering judgment indicates the problem to be susceptible to correction by the use of the YIELD sign.

Standard:

A YIELD (R1-2) sign shall be used to assign right-of-way at the entrance to a roundabout intersection.

Figure 2B-1. STOP, YIELD, Speed Limit, FINES HIGHER, and Photo Enforcement Signs



Section 2B.10 <u>YIELD Sign Placement</u>

Standard:

The YIELD sign shall be installed on the right side of the approach to which it applies. YIELD signs shall be placed on both the left and right sides of approaches to roundabout intersections with more than one lane on the signed approach where raised splitter islands are available on the left side of the approach. When the YIELD sign is installed at this required location and the sign visibility is restricted, a Yield Ahead sign (see Section 2C.29) shall be installed in advance of the YIELD sign.

The YIELD sign shall be located as close as practical to the intersection it regulates, while optimizing its visibility to the road user it is intended to regulate.

YIELD signs and STOP signs shall not be mounted on the same post.

Guidance:

Other than a DO NOT ENTER sign, no sign should be mounted back-to-back with a YIELD sign in a manner that obscures the shape of the YIELD sign.

Support:

Section 2A.16 contains additional information about separate and combined mounting of other signs with YIELD signs.

Guidance:

Yield lines, when used to supplement a YIELD sign, should be located at a point where the road user should yield (see Section 3B.16).

Where two roads intersect at an acute angle, the YIELD sign should be positioned at an angle, or shielded, so that the legend is out of view of traffic to which it does not apply.

Except at roundabout intersections, where there is a marked crosswalk at the intersection, the YIELD sign should be installed in advance of the crosswalk line nearest to the approaching traffic.

At a roundabout intersection, to prevent circulating vehicles from yielding unnecessarily, the face of the YIELD sign should not be visible from the circulatory roadway.

Option:

At wide-throat intersections or where two or more approach lanes of traffic exist on the signed approach, observance of the yield control may be improved by the installation of an additional YIELD sign on the left side of the road and/or the use of a yield line. At channelized intersections, the additional YIELD sign may be effectively placed on a channelizing island.

Section 2B.11 Yield Here To Pedestrians Signs (R1-5, R1-5a)

Standard:

If yield lines are used in advance of an unsignalized marked midblock crosswalk, Yield Here To Pedestrians (R1-5 or R1-5a) signs (see Figure 2B-2) shall be placed 6.1 to 15 m (20 to 50 ft) in advance of the nearest crosswalk line (see Section 3B.16 and Figure 3B-15).

Section 2B.12 In-Street Pedestrian Crossing Signs (R1-6, R1-6a)

Option:

The In-Street Pedestrian Crossing (R1-6 or R1-6a) sign (see Figure 2B-2) may be used to remind road users of laws regarding right of way at an unsignalized pedestrian crossing. The legend STATE LAW may be shown at the top of the sign if applicable. The legends STOP FOR or YIELD TO may be used in conjunction with the appropriate symbol.

Guidance:

If an island (see Chapter 3G) is available, the In-Street Pedestrian Crossing sign, if used, should be placed on the island.

Standard:

The In-Street Pedestrian Crossing sign shall not be used at signalized locations.

The STOP FOR legend shall only be used in States where the State law specifically requires that a driver must stop for a pedestrian in a crosswalk.

If used, the In-Street Pedestrian Crossing sign shall have a black legend (except for the red STOP or YIELD sign symbols) and border on either a white and/or fluorescent yellow-green background.

If the In-Street Pedestrian Crossing sign is placed in the roadway, the sign support shall comply with the breakaway requirements of the latest edition of AASHTO's "Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" (see Page i).

Support:

The Provisions of Section 2A.18 concerning mounting height are not applicable for the In-Street Pedestrian Crossing sign.

Option:

The In-Street Pedestrian Crossing sign may be used seasonably to prevent damage in winter because of plowing operations, and may be removed at night if the pedestrian activity at night is minimal.

Section 2B.13 Speed Limit Sign (R2-1)

Standard:

After an engineering study has been made in accordance with established traffic engineering practices, the Speed Limit (R2-1) sign (see Figure 2B-1) shall display the limit established by law, ordinance, regulation, or as adopted by the authorized agency. The speed limits shown shall be in multiples of 10 km/h or 5 mph.

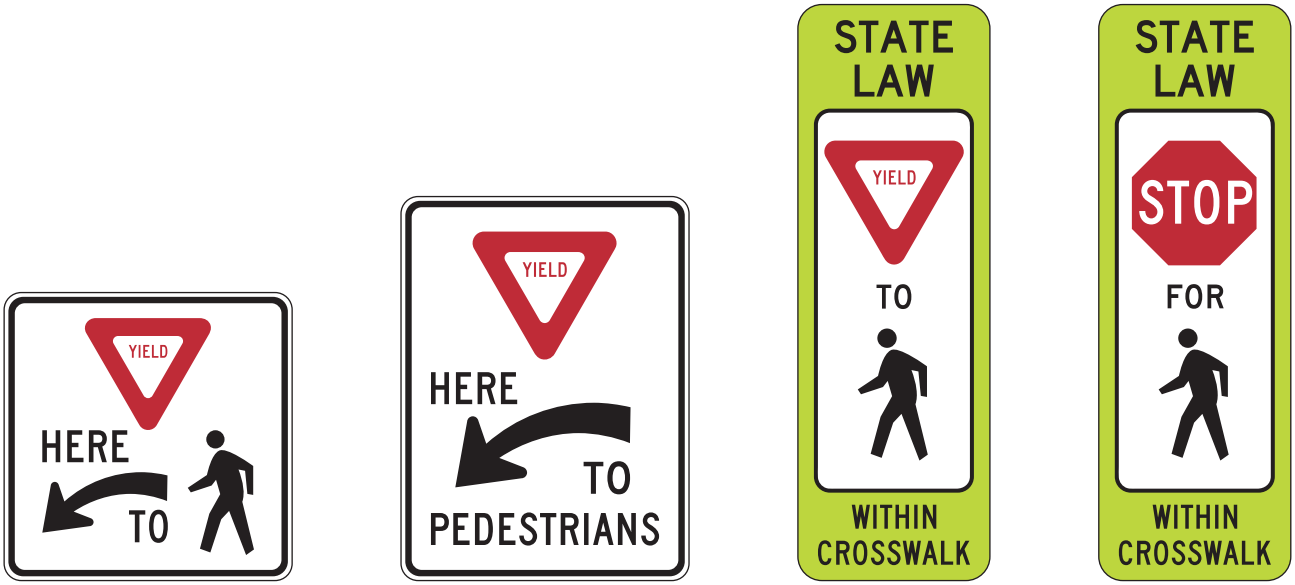
Guidance:

At least once every 5 years, States and local agencies should reevaluate non-statutory speed limits on segments of their roadways that have undergone a significant change in roadway characteristics or surrounding land use since the last review.

No more than three speed limits should be displayed on any one Speed Limit sign or assembly.

When a speed limit is to be posted, it should be within 10 km/h or 5 mph of the 85th-percentile speed of free-flowing traffic.

Figure 2B-2. Unsignalized Pedestrian Crosswalk Signs



R1-5 R1-5a R1-6 R1-6a

Option:

Other factors that may be considered when establishing speed limits are the following:

A. Road characteristics, shoulder condition, grade, alignment, and sight distance;
B. The pace speed;
C. Roadside development and environment;
D. Parking practices and pedestrian activity; and
E. Reported crash experience for at least a 12-month period.

Two types of Speed Limit signs may be used: one to designate passenger car speeds, including any nighttime information or minimum speed limit that might apply; and the other to show any special speed limits for trucks and other vehicles.

A changeable message sign that changes the speed limit for traffic and ambient conditions may be installed provided that the appropriate speed limit is shown at the proper times.

A changeable message sign that displays to approaching drivers the speed at which they are traveling may be installed in conjunction with a Speed Limit sign.

Guidance:

If a changeable message sign displaying approach speeds is installed, the legend YOUR SPEED XX km/h (MPH) or such similar legend should be shown. The color of the changeable message legend should be a yellow legend on a black background or the reverse of these colors.

Support:

Advisory Speed signs are discussed in Sections 2C.36 and 2C.46 and Temporary Traffic Control Zone Speed signs are discussed in Part 6.

Section 2B.14 Truck Speed Limit Sign (R2-2)

Standard:

Where a special speed limit applies to trucks or other vehicles, the legend TRUCKS XX or such similar legend shall be shown on the same panel as the Speed Limit sign or on a separate R2-2 sign (see Figure 2B-1) below the standard legend.

Section 2B.15 Night Speed Limit Sign (R2-3)

Standard:

Where different speed limits are prescribed for day and night, both limits shall be posted.

Guidance:

A Night Speed Limit (R2-3) sign (see Figure 2B-1) should be reversed using a white retroreflectorized legend and border on a black background.

Option:

A Night Speed Limit sign may be combined with or installed below the standard Speed Limit (R2-1) sign.

Section 2B.16 Minimum Speed Limit Sign (R2-4)

Standard:

A Minimum Speed Limit (R2-4) sign (see Figure 2B-3) shall be displayed only in combination with a Speed Limit sign.

Option:

Where engineering judgment determines that slow speeds on a highway might impede the normal and reasonable movement of traffic, the Minimum Speed Limit sign may be installed below a Speed Limit (R2-1) sign to indicate the minimum legal speed. If desired, these two signs may be combined on the R2-4a sign (see Figure 2B-3).

Section 2B.17 FINES HIGHER Plaque (R2-6)

Option:

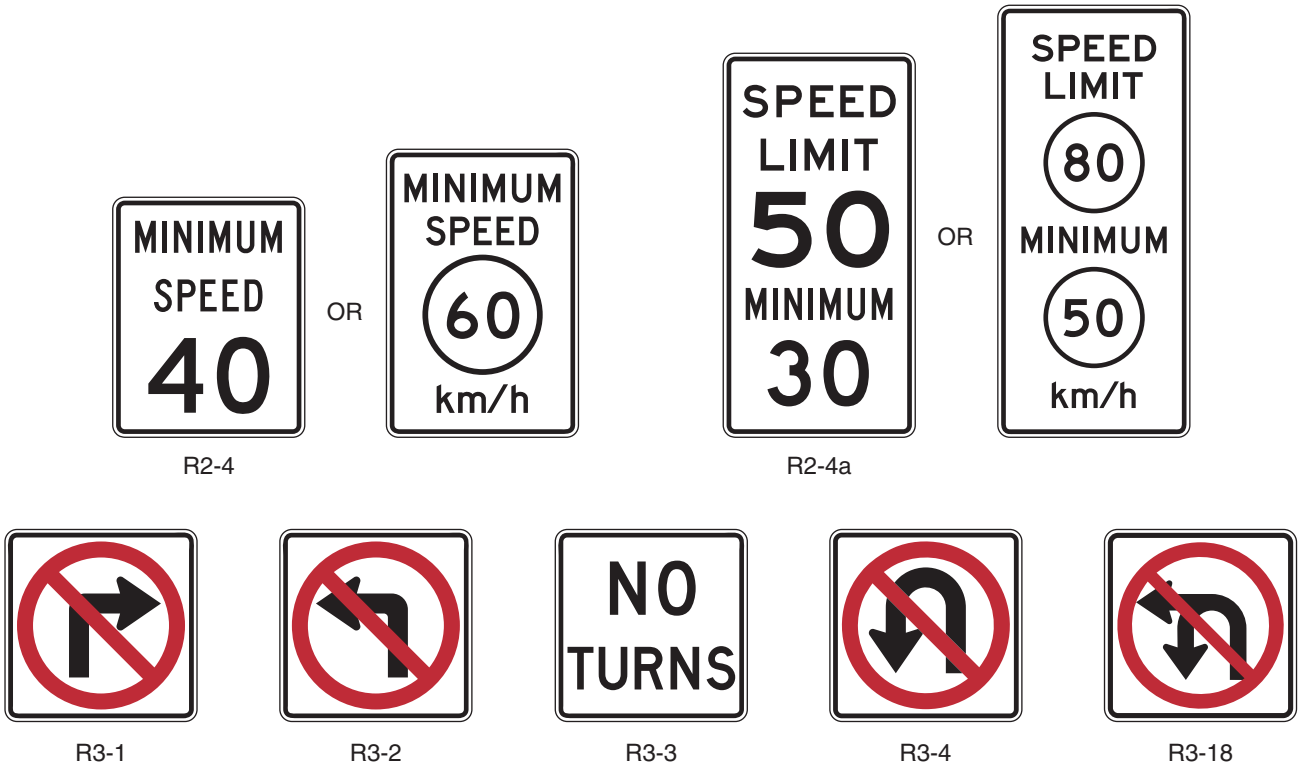
The FINES HIGHER (R2-6) plaque (see Figure 2B-1) may be used to advise road users when increased fines are imposed for traffic violations within designated roadway segments.

The FINES HIGHER plaque may be mounted below an applicable regulatory or warning sign in a temporary traffic control zone, a school zone, or other applicable designated zones.

The following may be mounted below the FINES HIGHER plaque:

A. A supplemental plaque specifying the times that the higher fines are in effect (similar to the S4-1 plaque shown in Figure 7B-1); or

Figure 2B-3. Speed Limit and Turn Prohibition Signs



B. A supplemental plaque WHEN CHILDREN (WORKERS) ARE PRESENT; or
C. A supplemental plaque WHEN FLASHING (similar to the S4-4 plaque shown in Figure 7B-1) if used in conjunction with a yellow flashing beacon.

The legend FINES HIGHER may be replaced by multiple values such as FINES DOUBLE or FINES TRIPLE, or by a specific value such as $150 FINE.

Standard:

The FINES HIGHER plaque shall be a rectangle with a black legend and border on a white background.

All supplemental plaques mounted below the FINES HIGHER plaque shall be rectangles with black legends and borders on white backgrounds.

The FINES HIGHER plaque shall include a SCHOOL, WORK ZONE, or other applicable designated zone plaque mounted above the applicable regulatory or warning sign. The SCHOOL supplemental plaque shall be rectangular in shape with a black legend and border on a yellow or fluorescent yellow-green background (same as the S4-3 plaque). The WORK ZONE supplemental plaque shall be rectangular in shape with a black legend and border on an orange background.

Guidance:

If used, the FINES HIGHER plaque should be located at the beginning of the temporary traffic control zone, school zone, or other applicable designated zone and just beyond any interchanges, major intersections, or other major traffic generators.

Agencies should limit the use of the FINES HIGHER plaque to locations where work is actually underway, or to locations where the roadway, shoulder, or other conditions, including the presence of a school, require a speed reduction or extra caution on the part of the road user.

Section 2B.18 Location of Speed Limit Signs

Standard:

Speed Limit (R2-1) signs, indicating speed limits for which posting is required by law, shall be located at the points of change from one speed limit to another.

At the end of the section to which a speed limit applies, a Speed Limit sign showing the next speed limit shall be installed. Additional Speed Limit signs shall be installed beyond major intersections and at other locations where it is necessary to remind road users of the speed limit that is applicable.

Speed Limit signs indicating the statutory speed limits shall be installed at entrances to the State and at jurisdictional boundaries of metropolitan areas.

Section 2B.19 Turn Prohibition Signs (R3-1 through R3-4, and R3-18)

Standard:

Except as noted in the Option, where turns are prohibited, Turn Prohibition signs shall be installed.

Guidance:

Turn Prohibition signs should be placed where they will be most easily seen by road users who might be intending to turn.

If No Right Turn (R3-1) signs (see Figure 2B-3) are used, at least one should be placed either over the roadway or at a right corner of the intersection.

If No Left Turn (R3-2) signs (see Figure 2B-3) are used, at least one should be placed either over the roadway, at the far left corner of the intersection, on a median, or in conjunction with the STOP sign or YIELD sign located on the near right corner.

Except as noted in the Option, if NO TURNS (R3-3) signs (see Figure 2B-3) are used, two signs should be used, one at a location specified for a No Right Turn sign and one at a location specified for a No Left Turn sign.

If No U-Turn (R3-4) signs (see Figure 2B-3) are used, at least one should be used at a location specified for No Left Turn signs.

If combination No U-Turn/No Left Turn (R3-18) signs (see Figure 2B-3) are used, at least one should be used at a location specified for No Left Turn signs.

Option:

If signals are present:

A. The No Right Turn sign may be installed adjacent to a signal face viewed by road users in the right lane.
B. The No Left Turn (or No U-Turn or combination No U-Turn/No Left Turn) sign may be installed adjacent to a signal face viewed by road users in the left lane.

C. A NO TURNS sign may be placed adjacent to a signal face viewed by all road users on that approach, or two signs may be used.

If signals are present, an additional Turn Prohibition sign may be ground mounted to supplement the sign mounted overhead.

Where ONE WAY signs are used (see Section 2B.32), Turn Prohibition signs may be omitted.

When the movement restriction applies during certain time periods only, the following Turn Prohibition signing alternatives may be used and are listed in order of preference:

A. Changeable message signs, especially at signalized intersections.
B. Permanently mounted signs incorporating a supplementary legend showing the hours and days during which the prohibition is applicable.
C. Portable signs, installed by proper authority, located off the roadway at each corner of the intersection. The portable signs are only to be used during the time that the turn prohibition is applicable.

Turn Prohibition signs may be omitted at a ramp entrance to an expressway or a channelized intersection where the design is such as to indicate clearly the one-way traffic movement on the ramp or turning lane.

If both left turns and U-turns are prohibited, the R3-18 sign may be used instead of separate R3-2 and R3-4 signs.

Section 2B.20 Intersection Lane Control Signs (R3-5 through R3-8)

Standard:

Intersection Lane Control signs, if used, shall require road users in certain lanes to turn, shall permit turns from a lane where such turns would otherwise not be permitted, shall require a road user to stay in the same lane and proceed straight through an intersection, or shall indicate permitted movements from a lane.

Intersection Lane Control signs (see Figure 2B-4) shall have three applications:

A. Mandatory Movement Lane Control (R3-5, R3-5a, and R3-7) signs;
B. Optional Movement Lane Control (R3-6) sign; and
C. Advance Intersection Lane Control (R3-8 series) signs.

Guidance:

When Intersection Lane Control signs are mounted overhead, each sign should be placed over the lane or a projection of the lane to which it applies.

Standard:

Use of an overhead sign for one approach lane shall not require installation of overhead signs for the other lanes of that approach.

Option:

Where the number of through lanes on an approach is two or less, the Intersection Lane Control signs (R3-5, R3-6, or R3-8) may be overhead or ground mounted.

Intersection Lane Control signs may be omitted where:

A. Turning bays have been provided by physical construction or pavement markings, and
B. Only the road users using such turning bays are permitted to make a similar turn.

Section 2B.21 Mandatory Movement Lane Control Signs (R3-5, R3-5a, and R3-7)

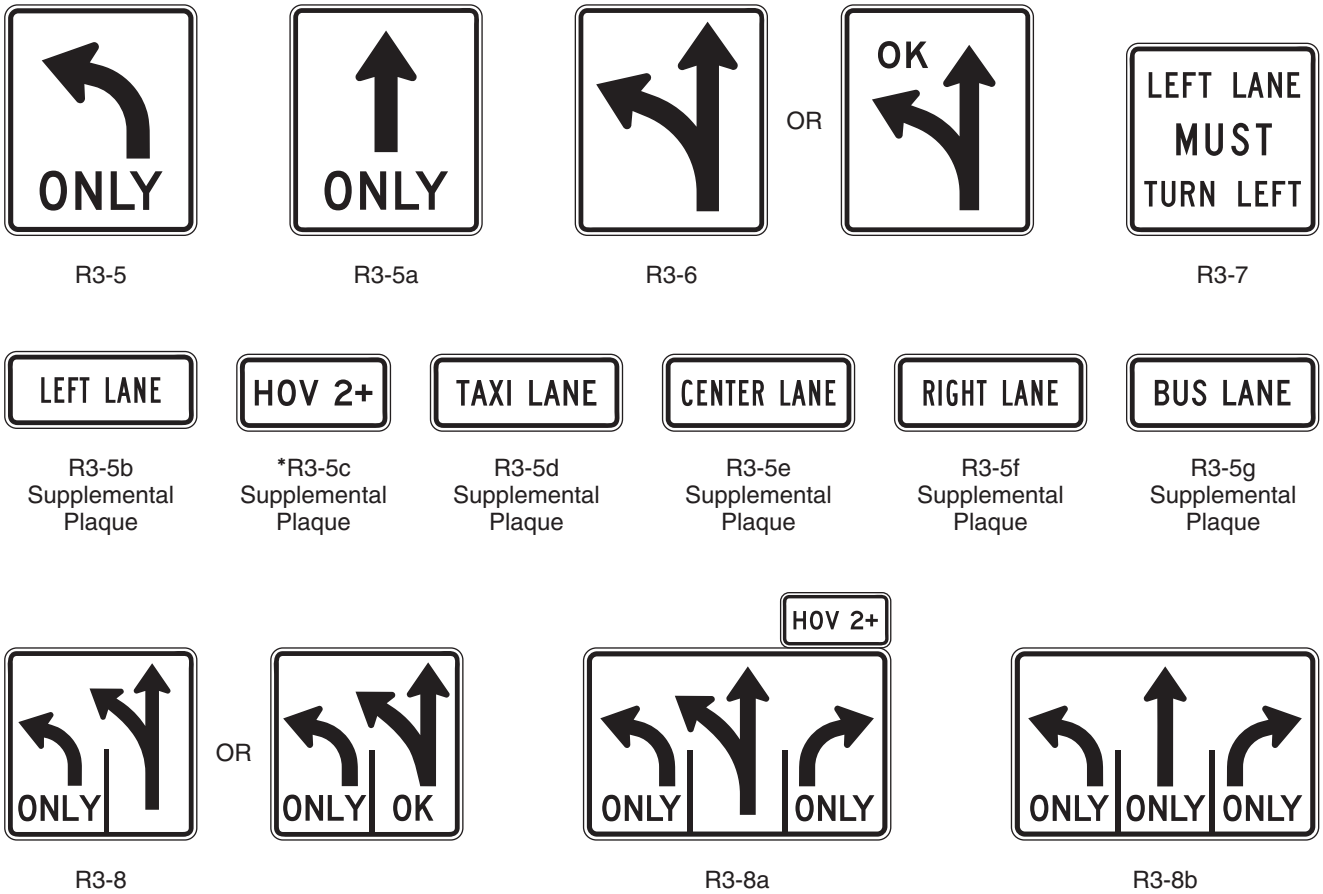
Standard:

If used, Mandatory Movement Lane Control (R3-5, R3-5a, and R3-7) signs (see Figure 2B-4) shall indicate only those vehicle movements that are required from each lane and shall be located where the regulation applies. When the mandatory movement applies to lanes exclusively designated for HOV traffic, the R3-5c supplemental plaque shall be used. When the mandatory movement applies to lanes that are not HOV facilities, but are lanes exclusively designated for buses and/or taxis, the word message R3-5d and/or R3-5g supplemental plaques shall be used. The R3-7 word message sign shall be for ground mounting only.

If the R3-5 sign is ground mounted on a multi-lane approach, a supplemental plaque (see Figure 2B-4), such as LEFT LANE (R3-5b), HOV 2+ (R3-5c), TAXI LANE (R3-5d), CENTER LANE (R3-5e), RIGHT LANE (R3-5f), BUS LANE (R3-5g), or LEFT 2 LANES, indicating the lane with the appropriate movement shall be added below.

The Mandatory Movement Lane Control (R3-7) sign shall include the legend RIGHT (LEFT) LANE MUST TURN RIGHT (LEFT). The Mandatory Movement Lane Control symbol signs (R3-5 and R3-5a) shall include the legend ONLY.

Figure 2B-4. Intersection Lane Control Signs



* The diamond symbol may be used instead of the word message "HOV".
The minimum vehicle occupancy level may vary, such as 2+, 3+, 4+.
The words "LANE" or "ONLY" may be used with this sign when appropriate.

Guidance:

Mandatory Movement Lane Control signs should be accompanied by lane use arrow markings, especially where traffic volumes are high, where there is a high percentage of commercial vehicles, or where other distractions exist.

Option:

The Straight Through Only (R3-5a) sign may be used to require a road user in a particular lane to proceed straight through an intersection.

When the Mandatory Movement Lane Control sign for a left-turn lane is installed back-to-back with a Keep Right (R4-7) sign, the dimensions of the Mandatory Movement Lane Control (R3-5) sign may be the same as the Keep Right sign.

Except for the R3-7 sign, Mandatory Movement Lane Control signs may be overhead or ground mounted.

The diamond symbol may be used instead of the word message HOV on the R3-5c supplemental plaque.

Section 2B.22 Optional Movement Lane Control Sign (R3-6)

Standard:

If used, the Optional Movement Lane Control (R3-6) sign (see Figure 2B-4) shall be used for two or more movements from a specific lane or to emphasize permitted movements. If used, the Optional Movement Lane Control sign shall be located at the intersection.

If used, the Optional Movement Lane Control sign shall indicate all permissible movements from specific lanes.

Optional Movement Lane Control signs shall be used for two or more movements from a specific lane where a movement, not normally allowed, is permitted.

The Optional Movement Lane Control sign shall not be used alone to effect a turn prohibition.

Option:

The word message OK may be used within the border in combination with the arrow symbols of the R3-6 sign.

Section 2B.23 Advance Intersection Lane Control Signs (R3-8 Series)

Option:

Advance Intersection Lane Control (R3-8, R3-8a, and R3-8b) signs (see Figure 2B-4) may be used to indicate the configuration of all lanes ahead.

The word messages ONLY, OK, THRU, ALL, or HOV 2+ may be used within the border in combination with the arrow symbols of the R3-8 sign series. The HOV 2+ (R3-5c) supplemental plaque may be installed at the top outside border of the R3-8 sign over the applicable lane. The diamond symbol may be used instead of the word message HOV. The minimum allowable vehicle occupancy requirement may vary based on the level established for a particular facility.

Guidance:

If used, an Advance Intersection Lane Control sign should be placed at an adequate distance in advance of the intersection so that road users can select the appropriate lane. If used, the Advance Intersection Lane Control sign should be installed either in advance of the tapers or at the beginning of the turn lane.

Section 2B.24 Two-Way Left Turn Only Signs (R3-9a, R3-9b)

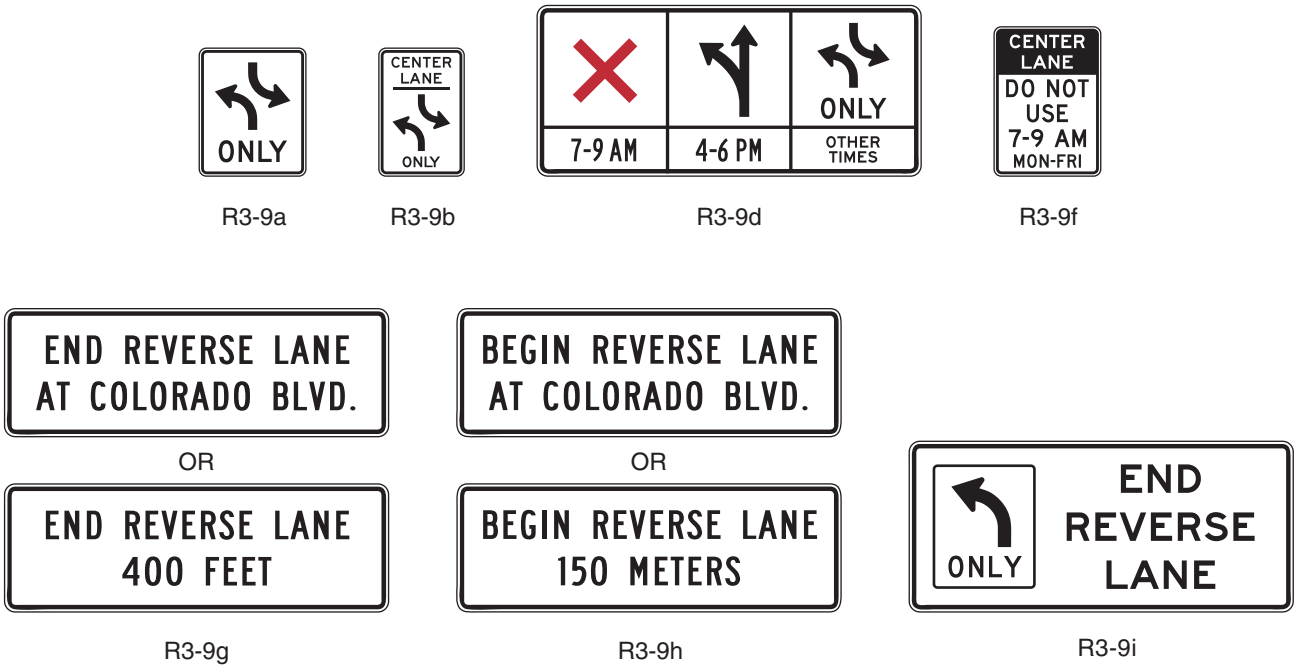
Guidance:

Two-Way Left Turn Only (R3-9a or R3-9b) signs (see Figure 2B-5) should be used in conjunction with the required pavement markings where a nonreversible lane is reserved for the exclusive use of left-turning vehicles in either direction and is not used for passing, overtaking, or through travel.

Option:

The ground-mounted R3-9b sign may be used as an alternate to or a supplement to the overhead-mounted R3-9a sign. The legend BEGIN or END may be used within the border of the main sign itself, or on a plaque mounted immediately above it.

Figure 2B-5. Center and Reversible Lane Control Signs



Support:

Signing is especially helpful to drivers in areas where the two-way left turn only maneuver is new, in areas subject to environmental conditions that frequently obscure the pavement markings, and on peripheral streets with two-way left turn only lanes leading to an extensive system of routes with two-way left turn only lanes.

Section 2B.25 Reversible Lane Control Signs (R3-9d, R3-9f through R3-9i)

Option:

A reversible lane may be used for through traffic (with left turns either permitted or prohibited) in alternating directions during different periods of the day, and the lane may be used for exclusive left turns in one or both directions during other periods of the day as well. Reversible Lane Control (R3-9d, R3-9f through R3-9i) signs (see Figure 2B-5) may either be static type or changeable message type. These signs may be either ground or overhead mounted.

Standard:

Ground-mounted Reversible Lane Control signs shall be used only as a supplement to overhead signs or signals. Ground-mounted signs shall be identical in design to the overhead signs and an additional legend such as CENTER LANE shall be added to the sign (R3-9f) to indicate which lane is controlled. For both word messages and symbols, this legend shall be at the top of the sign.

Where it is determined by an engineering study that lane-use control signals or physical barriers are not necessary, the lane shall be controlled by overhead Reversible Lane Control signs (see Figure 2B-6).

Option:

Reversing traffic flow may be controlled with pavement markings and Reversible Lane Control signs (without the use of lane control signals), when all of the following conditions are met:

A. Only one lane is being reversed.
B. An engineering study indicates that the use of Reversible Lane Control signs alone would result in an acceptable level of safety and efficiency.
C. There are no unusual or complex operations in the reversible lane pattern.

Standard:

Reversible Lane Control signs shall contain the legend or symbols designating the allowable uses of the lane and the time periods such uses are allowed. Where symbols and legend are used, their meanings shall be as shown in Table 2B-2.

Reversible Lane Control signs shall consist of a white background with a black legend and border, except for the R3-9d sign, where the color red is used.

Symbol signs, such as the R3-9d sign, shall consist of the appropriate symbol in the upper portion of the sign with the appropriate times of the day and days of the week below it. All times of the day and days of the week shall be accounted for on the sign to eliminate confusion to the road user.

In situations where more than one message is conveyed to the road user, such as on the R3-9d sign, the sign legend shall be arranged as follows:

A. The prohibition or restriction message is the primary legend and shall be on the top for word message signs and to the far left for symbol signs;
B. The permissive use message shall be shown as the second legend; and
C. The OTHER TIMES message shall be shown at the bottom for word message signs and to the far right for symbol signs.

Option:

The symbol signs may also include a downward pointing arrow with the legend THIS LANE. The term OTHER TIMES may be used for either the symbol or word message sign.

Standard:

A Reversible Lane Control sign shall be mounted over the center of the lane that is being reversed and shall be perpendicular to the roadway alignment.

If the vertical or horizontal alignment is curved to the degree that a driver would be unable to see at least one sign, and preferably two signs, then additional overhead signs shall be installed. The placement of the signs shall be such that the driver will have a definite indication of the lanes specifically reserved for use at any given time. Special consideration shall be given to major generators introducing traffic between the normal sign placement.

Figure 2B-6. Location of Reversible Two-Way Left-Turn Signs

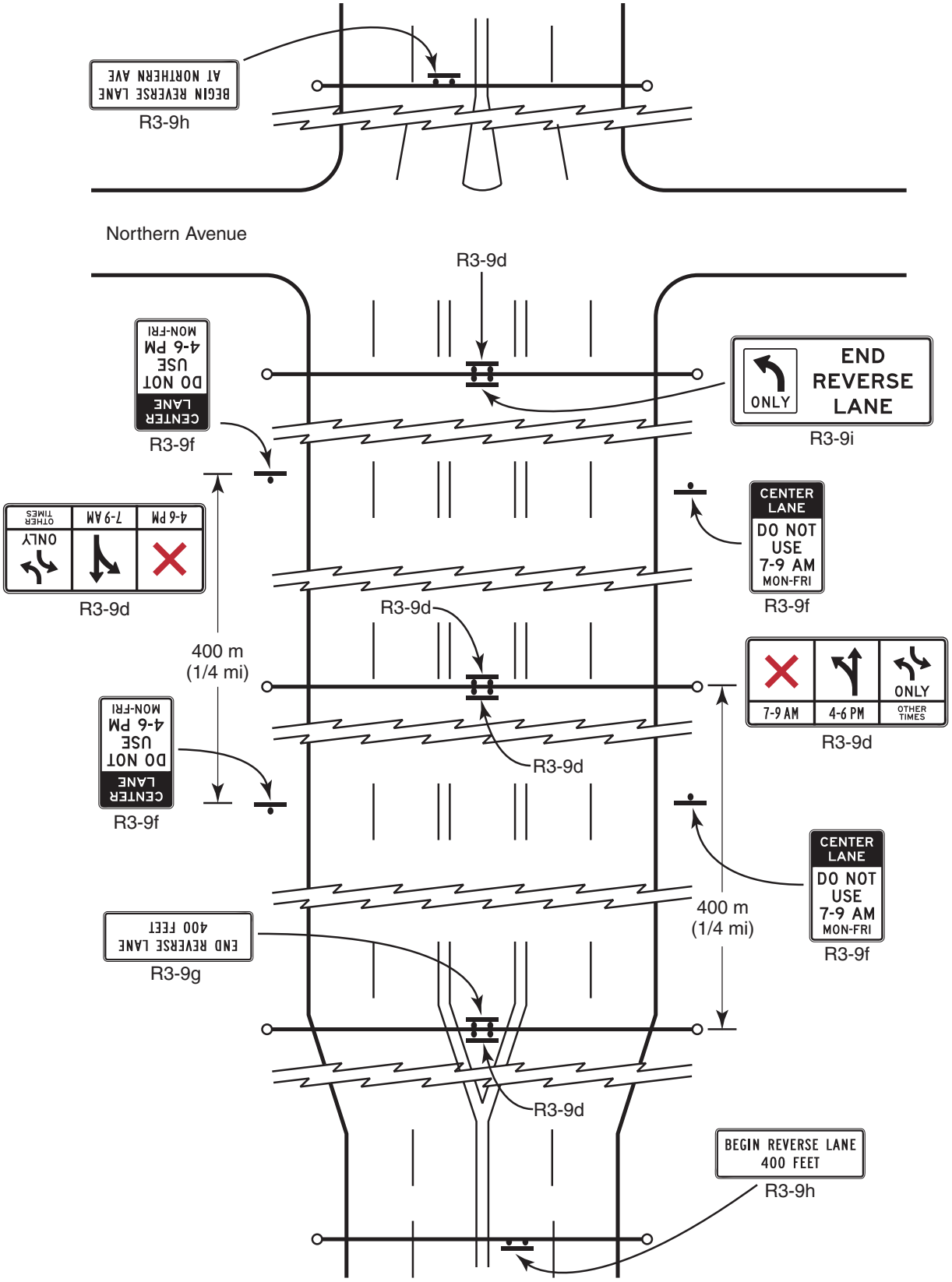


Table 2B-2. Meanings of Symbols and Legends on Reversible Lane Control Signs

Symbol / Word Message	Meaning
Red X on white background.	Lane Closed
Upward pointing black arrow on white background. If left turns are permitted, the arrow shall be modified to show left / through arrow.	Lane open for through travel and any turns not otherwise prohibited.
Black two-way left turn arrows on white background and legend ONLY.	Lane may be used only for left turns in either direction (i.e., as a two-way left turn lane).
Black single left turn arrow on white background and legend ONLY.	Lane may be used only for left turns in one direction (without opposing left turns in the same lane).

Transitions at the entry to and exit from a section of roadway with reversible lanes shall be carefully reviewed, and advance signs shall be installed to notify or warn drivers of the boundaries of the reversible lane controls. The R3-9g or R3-9h signs shall be used for this purpose.

Option:

More than one sign may be used at the termination of the reversible lane to emphasize the importance of the message (R3-9i).

Standard:

Flashing beacons, if used to accentuate the overhead Reversible Lane Control signs, shall comply with the applicable requirements for flashing beacons in Chapter 4K.

When used in conjunction with Reversible Lane Control signs, the Turn Prohibition signs (R3-1 to R3-4, R3-18) shall be mounted overhead and separate from the Reversible Lane Control signs. The Turn Prohibition signs shall be designed and installed in accordance with Section 2B.19.

Guidance:

For additional emphasis, a supplemental plaque stating the distance of the prohibition, such as NEXT 1.6 km (NEXT 1 MILE), should be added to the Turn Prohibition signs that are used in conjunction with Reversible Lane Control signs.

If used, overhead signs should be located at intervals not greater than 400 m (0.25 mi). The bottom of the overhead Reversible Lane Control signs should not be more than 5.8 m (19 ft) above the pavement grade.

Where more than one sign is used at the termination of a reversible lane, they should be at least 75 m (250 ft) apart. Longer distances between signs are appropriate for streets with speeds over 60 km/h (35 mph), but the separation should not exceed 300 m (1,000 ft).

Left-turning vehicles have a significant impact on the safety and efficiency of a reversible lane operation. If an exclusive left-turn lane or two-way left-turn lane cannot be incorporated into the lane-use pattern for a particular peak or off-peak period, consideration should be given to prohibiting left turns and U-turns during that time period.

Section 2B.26 Preferential Only Lane Signs (R3-10 through R3-15)

Support:

Preferential only lanes are lanes designated for special traffic uses such as high-occupancy vehicles (HOVs), light rail, buses, taxis, or bicycles. Preferential only lane treatments might be as simple as restricting a turning lane to a certain class of vehicles during peak periods, or as sophisticated as providing a separate roadway system within a highway corridor for certain vehicles.

Information regarding Preferential Only Lane signs for bicycle lanes is contained in Section 9B.04.

Option:

Preferential only lane assignments may be made on a full-time or part-time basis.

Guidance:

Preferential Only Lane sign spacing should be determined by engineering judgment based on prevailing speed, block length, distances from adjacent intersections, and other considerations.

Support:

The symbol and word message that appears on a particular Preferential Only Lane sign will vary based on the specific type of allowed traffic and on other related operational constraints that have been established for a particular lane, such as an HOV lane, a bus lane, or a taxi lane. Section 2B.27 contains information regarding the restriction of the use of the diamond symbol to HOV lanes only. The requirements for guide and regulatory signs in advance of all preferential only lanes on freeways are provided in Section 2E.59.

Standard:

When a preferential only lane is established, the Preferential Only Lane signs (see Figure 2B-7) and pavement markings (see Sections 3B.22 and 3B.23) for these lanes shall be used to advise road users.

At the end of a preferential only lane, a Lane Ends (R3-12a or R3-15a) sign shall be used.

Guidance:

Ground-mounted Preferential Only Lane (R3-10, R3-11, and R3-12 series) signs should be installed where preferential only lanes are implemented on freeways, expressways, and conventional roads.

Support:

The sizes for Preferential Only Lane signs will differ to reflect the design speeds for each type of roadway facility. Table 2B-1 provides sizes for each type of roadway facility.

Guidance:

The size of the ground-mounted Preferential Only Lane Operational (R3-11 series) signs should remain consistent to accommodate any manual addition or subtraction of a single line of text for each sign.

Support:

Consistent sign sizes are beneficial for agencies when ordering sign materials, as well as when making text changes to existing signs if changes occur to operating times or occupancy restrictions in the future. For example, the R3-11c sign has space for one line located below "24 HOURS" if an agency desires to add additional information (such as "Mon. – Fri."), yet the R3-11c sign has the same dimensions as the other R3-11 series signs.

Guidance:

The decision to use a specific ground-mounted or overhead sign for a preferential only lane should be based on an engineering study that considers the available space, the existing signs for adjoining general purpose lanes, roadway and traffic characteristics, the proximity of other overhead signing, the ability to install overhead signs, and any other unique local factors.

Support:

Figures 2E-46 through 2E-52 show example signing layouts using the R3-10 through R3-15 series signs for various preferential only lane applications.

Standard:

The R3-10, R3-11, R3-11a, R3-11c, R3-13, R3-13a, R3-14 and R3-14a signs shall be used exclusively with preferential only lanes for high-occupancy vehicles to indicate the particular occupancy requirement and time restrictions applying to that lane. The R3-10a, R3-11b, and R3-14b signs shall be used in situations where a preferential only lane is not an HOV lane, but is designated for use by other types of vehicles (such as bus and/or taxi use).

When used, the ground-mounted Preferential Only Lane Operational (R3-11 series) signs shall be located adjacent to the preferential only lane, and the overhead Preferential Only Lane Operational (R3-14 series) signs shall be mounted directly over the lane.

The legend format of the ground-mounted Preferential Only Lane Operational (R3-11 series) signs shall have the following sequence:

A. Top Lines: Lanes applicable, such as "RIGHT LANE", "RIGHT 2 LANES", or "THIS LANE"
B. Middle Lines: Eligible uses, such as "HOV 2+ ONLY" (or 3+ or 4+), "BUSES ONLY", or other applicable turning movements
C. Bottom Lines: Applicable time and day, such as "7 – 9 AM" or "6:30 – 9:30 AM, MON-FRI"

Figure 2B-7. Examples of Preferential Only Lane Signs

GROUND-MOUNTED PREFERENTIAL ONLY LANE SIGNS

R3-10

R3-10a

R3-10b

R3-11

R3-11a

R3-11b

R3-11c

R3-12

R3-12a

R3-12b

OVERHEAD PREFERENTIAL ONLY LANE SIGNS

R3-13

R3-13a

R3-14

R3-14a

R3-14b

R3-15

R3-15a

Notes:
- The diamond symbol may be used instead of the word message HOV.
- The minimum vehicle occupancy requirement may vary for each facility (such as 2+, 3+, 4+).
- The occupancy requirement may be added to the first line of the R3-12a, R3-15, and R3-15a signs.
- Some of the legends shown on these signs are for example purposes only. The specific legend for a particular application should be based upon local conditions, ordinances, and State statutes.

The legend format of the overhead Preferential Only Lane Operational (R3-14 series) signs shall have the following sequence:

A. Top Line: Eligible uses, such as "HOV 2+ ONLY" (or 3+ or 4+), "BUSES ONLY", or other types of vehicles

B. Bottom Lines: Applicable time and day, with the time and day placed above the down arrow, such as "7 – 9 AM" or "6:30 – 9:30 AM, MON-FRI". When the operating periods exceed the available line width, the hours and days of the week shall be stacked as shown for the R3-14a sign in Figure 2B-7.

Option:

The diamond symbol may be used instead of the word message HOV.

Standard:

When the diamond symbol (or HOV abbreviation) is used without text on the ground-mounted Preferential Only Lane (R3-10 series, R3-11 series, and R3-12 series) signs, it shall be centered on the top line of the sign. When the diamond symbol (or HOV abbreviation) is used with associated text on the ground-mounted Preferential Only Lane (R3-10 series, R3-11 series, and R3-12 series) signs, it shall appear to the left of the associated text. When the diamond symbol is used on the overhead Preferential Only Lane (R3-13, R3-13a, R3-14, and R3-14a) signs, it shall appear in the top left quadrant. The diamond symbol shall not be used on the bus, taxi, or bicycle Preferential Only Lane signs. The diamond symbol for the R3-15 and R3-15a signs shall appear on the left side of the sign.

Guidance:

The Preferential Only Lane Ahead (R3-10a, R3-12, and R3-15) signs should be used for advance notification of preferential only lanes.

Standard:

The R3-10, R3-10b, R3-13, and R3-13a signs shall be used in situations where agencies determine it is appropriate to provide a sign that defines the operational strategy (such as minimum occupancy or types of vehicles) that is being used to manage or regulate the vehicles that are permitted to use a preferential only lane.

Guidance:

The legend format of the R3-10 and R3-13 signs should have this sequence:

A. Top Line: "HOV 2+ ONLY" (or 3+ or 4+ if appropriate)

B. Bottom Lines: "2 OR MORE PERSONS PER VEHICLE" (or 3 or 4 if appropriate)

Option:

Changeable message signs may be used to supplement static signs where travel conditions change or where multiple types of operational strategies (such as variable occupancy requirements, vehicle types, or pricing policies) are used and varied throughout the day or week to manage the use of, control of, or access to preferential only lanes.

Standard:

When changeable message signs (see Section 2A.07) are used as regulatory signs for preferential only lanes, they shall be the required sign size and shall display the required letter height and legend format that corresponds to the type of roadway facility and design speed.

Option:

The ground-mounted Preferential Only Lane Operational (R3-11 series) signs and the overhead Preferential Only Lane Operational (R3-14 series) signs may be used to supplement changeable message signs that are used to convey preferential only lane restrictions.

Where additional movements are permitted from a preferential only lane on an approach to an intersection, the format and words used in the legend in the middle lines on the ground-mounted Preferential Only Lane Operational (R3-11 series) signs and on the overhead Preferential Only Lane Operational (R3-14 series) signs may be modified to accommodate the permitted movements (such as "RIGHT TURNS ONLY").

Guidance:

The Inherently Low Emission Vehicle (ILEV) (R3-10b) sign should be used when it is permissible for a properly labeled and certified ILEV, regardless of the number of occupants, to use an HOV lane. When used, the ILEV signs should be ground-mounted in advance of and at intervals along the HOV lane based upon engineering judgment. The R3-10b sign is only applicable to HOV lanes and should not to be used with other preferential only lane applications.

Support:

Inherently low emission vehicles are defined by the Environmental Protection Agency (EPA) as vehicles having no fuel vapor (hydrocarbon) emissions. These vehicles must be certified by the EPA as meeting the emissions standards and requirements specified in 40 CFR 88-311-93 and 40 CFR 88.312-93 (c).

Section 2B.27 Preferential Only Lanes for High-Occupancy Vehicles (HOVs)

Standard:

The agencies that own and operate preferential only lanes for high-occupancy vehicles (HOV lanes) shall have the authority and responsibility to determine how they are operated and the occupancy requirements for vehicles operating in HOV lanes. The minimum occupancy requirement shall be two occupants per vehicle.

The requirements for a minimum number of occupants in a vehicle to use an HOV lane shall be in effect for most, or all, of at least one of the usual times of the day when the demand to travel is greatest (such as morning or afternoon peak travel periods) and the traffic congestion problems on the roadway and adjoining transportation corridor are at their worst.

The HOV signs (see Section 2B.26) shall display the minimum allowable vehicle occupancy requirement established for each HOV lane.

The vehicle occupancy requirement established for an HOV lane shall be referenced immediately after the word message HOV or the diamond symbol. The diamond symbol shall be restricted for use with HOV lanes only.

The Federal Highway Administration (FHWA) shall be consulted if a significant operational change is proposed that could reasonably be expected to affect a specific HOV lane or portions of the HOV system that were funded or approved by FHWA. This shall include portions of the local, regional, or Federal-aid highway system, where operational changes might significantly impact the operation of one HOV lane or portions of the regional HOV system. To assure consistency with the provisions of Titles 23 and 49 of the United States Code (USC), the important issues and possible impacts of any significant operational changes shall be reviewed to determine if any Federal approval is required.

In accordance with the "Federal-Aid Highway Program Guidance on High Occupancy Vehicle (HOV) Lanes" (see Section 1A.11), a proposed project, including a proposed test or demonstration project, that seeks to significantly change the operation of the HOV lanes for any length of time shall require a Federal review as outlined in Section 2 of the "Federal-Aid Highway Program Guidance on High Occupancy Vehicle (HOV) Lanes" prior to initiating such a project.

Support:

FHWA Division Offices, with involvement from the Federal Transit Administration (FTA), are responsible for reviewing proposals to significantly change the operation of HOV lanes. Federal interests in this review include commitments made during the National Environmental Policy Act process as described in Title 23 CFR, Part 771, in project agreements, transportation planning requirements, and transportation conformity requirements under the Clean Air Act (40 CFR, Part 51).

Proposals to adjust only the HOV lane hours of operation during the day (for example, minor changes in hours during peak travel periods) or the occupancy requirements (for example, HOV 3+ to HOV 2+) are not typically considered significant operational changes and might not require an explicit Federal review or approval.

Any action that has the potential to adversely affect the area's flow of traffic, roadway and traveler safety, or the environment might be considered to be a significant operational change. Any proposal to significantly adjust the hours of operation, or to convert an HOV lane to a general purpose travel lane, would be considered a significant operational change to the original project design concept or scope. Examples of significant operational changes could include:

A. Switching from 24-hour HOV lane operations to only a portion of the day or week;
B. Implementing a pricing option to an existing HOV lane (such as HOT lane or toll lane);
C. Significantly reducing the hours of operation of an HOV lane that is operational during only one peak travel period; or
D. Managing or operating the HOV lane in a manner that renders it functionally inoperable or obsolete (such as not providing enforcement of the occupancy requirement).

Guidance:

An engineering study based on the current and estimated future travel demand for a corridor and facility should be the basis for determining when, during a typical day, there should be a minimum occupancy requirement for a vehicle to use an HOV lane.

Option:

HOV lanes may be operated on a 24-hour basis for extended periods of the day, during peak travel periods only, during special events, or during other activities.

HOV lanes may take many forms depending on the level of usage and the design of the facility. They may be physically separated from the other travel lanes by a barrier or median, or they may be concurrent with other travel lanes and be separated only by longitudinal pavement markings. Physically separated HOV lanes may be operated in a constant direction or may be operated as reversible lanes.

Agencies may select from either the HOV abbreviation or the diamond symbol to reference the HOV lane designation.

Support:

Inherently low emission vehicle (ILEV) eligibility, testing and certification requirements, labeling, and other regulatory provisions are developed and administered through the Environmental Protection Agency (EPA). EPA is the only entity with the authority to certify ILEVs. Vehicle manufacturers must request the EPA to grant an ILEV certification for any vehicle to be considered and labeled as meeting those standards. According to the EPA, 1996 was the first year that they certified any ILEVs. EPA regulations specify that ILEVs must meet the emission standards specified in 40 CFR 88.311-93 and their labeling must be in accordance with 40 CFR 88.312-93(c). EPA established the ILEV concept to recognize vehicles with no fuel vapor (hydrocarbons) emissions. Zero emission vehicles (electric powered vehicles) that have no emissions are the only other type of clean fuel vehicles that are allowed to use HOV lanes.

Option:

Agencies may permit a vehicle with less than the required number of occupants to operate on HOV lanes if:

A. The vehicle is properly labeled and certified as an ILEV and the lane is not a bus only HOV lane; or
B. The HOV lanes are part of a project that is participating in the FHWA Value Pricing Pilot Program (see Section 2 of the "Federal-Aid Highway Program Guidance on High Occupancy Vehicle (HOV) Lanes").

Standard:

Motorcycles shall be permitted to use HOV lanes that receive Federal-aid program funding.

Section 2B.28 Preferential Only Lane Sign Applications and Placement

Standard:

Overhead Preferential Only Lane (R3-13 series, R3-14 series, and R3-15 series) signs shall only be installed along preferential only lanes on freeways and expressways. These overhead signs shall be installed on the side of the roadway where the entrance to the preferential only lane is located and any appropriate adjustments shall be made to the sign message. The sign sizes shall differ between freeways and expressways as provided in Table 2B-1 to reflect the different design speeds for each type of roadway.

An R3-13 or R3-13a sign, which defines the occupancy requirement, shall be installed at least 800 m (0.5 mi) in advance of the beginning or initial entry point to an HOV lane. These signs shall only be displayed in advance of the beginning or initial entry point to HOV lanes.

A ground-mounted Preferential Only Lane Operational (R3-11, R3-11a, R3-11b, or R3-11d) sign shall be installed at the beginning, initial entry point, intermediate access points, and direct access ramps to all types of preferential only lanes. The overhead Preferential Only Lane Operational (R3-14 series) signs shall be installed only at the beginning or initial entry point to all types of preferential only lanes.

The ground-mounted Preferential Only Lane Ends 800 m (1/2 Mile) (R3-12b) sign shall be installed at least 800 m (0.5 mi) in advance of the termination of an HOV lane. The ground-mounted Preferential Only Lane Ends (R3-12a) sign shall be installed at the point where the preferential only lane restriction ends. All longitudinal pavement markings, as well as word and symbol pavement markings, associated with the preferential only lane shall end where the R3-12a sign designating the end of the preferential only lane restriction is installed.

Option:

Additional ground-mounted Preferential Only Lane (R3-10, R3-11, R3-11a, R3-11b, or R3-11c) signs may be provided along the length of a preferential only lane.

Overhead Preferential Only Lane Ahead (R3-15) signs may be placed approximately 1.6 km (1 mi) and 3.2 km (2 mi) in advance of the beginning or initial entry points to any type of preferential only lane.

The ground-mounted Preferential Only Lane Ahead (R3-12) sign may be installed at a minimum of 1.6 km (1 mi) in advance of the beginning or initial entry point to any type of preferential only lane.

Guidance:

When Preferential Only Lane signs are used, the decision to use a specific ground-mounted or overhead sign should be based on an engineering study that considers the available space, the existing signs for the adjoining general purpose traffic lanes, roadway and traffic characteristics, the proximity to existing overhead signing, the ability to install overhead signs, and any other unique local factors.

Standard:

For all barrier-separated preferential only lanes, an overhead Preferential Only Lane Operational (R3-14 series) sign shall be used at the beginning or initial entry point, and at any intermediate access points or gaps in the barrier where vehicles are allowed to legally access the barrier-separated preferential only lanes. Ground-mounted Preferential Only Lane Operational (R3-11 series) signs shall be used only as a supplement to the overhead signs at the beginning or initial entry point, or at any intermediate access points or gaps in the barrier.

Guidance:

For all barrier-separated preferential only lanes, an overhead Preferential Only Lane Ahead (R3-15) sign should be installed and located at least 1.6 km (1 mi) in advance of the beginning or initial entry point.

Option:

For barrier-separated preferential only lanes, ground-mounted R3-10 signs defining the occupancy requirement may be alternated in series with Preferential Only Lane Operational (R3-11, R3-11a, R3-11b, or R3-11c) signs. These signs may be located at intervals of approximately 1 km (0.6 mi) along the length of the preferential only lane, at intermediate entry points, and at designated enforcement areas as defined by the operating agency.

For barrier-separated reversible-flow preferential only lanes, Preferential Only Lane signs may be either static or changeable message type.

Standard:

For buffer-separated preferential only lanes (painted buffer of 0.6 m (2 ft) or more), an overhead Preferential Only Lane Operational (R3-14 series) sign shall be used at the beginning or initial entry point, and at intermediate access points or gaps where vehicles are allowed to legally access the buffer-separated preferential only lane. Ground-mounted R3-10 signs defining the occupancy requirement shall be located and alternated with Preferential Only Lane Operational (R3-11 series) signs in series at intervals not greater than 1 km (0.6 mi) along the length of the preferential only lane, at designated gaps in the buffer where vehicles are allowed to legally access the preferential only lane, and within designated enforcement areas as defined by the operating agency.

Option:

For buffer-separated preferential only lanes, overhead Preferential Only Lane Operational (R3-14 series) signs may be used at specific locations and intervals along the length of the preferential only lane to supplement the ground-mounted R3-10 signs defining the occupancy requirement and the Preferential Only Lane Operational (R3-11 series) signs based on an engineering study.

Standard:

For concurrent-flow preferential only lanes, ground-mounted R3-10 signs defining the occupancy requirement shall be located and alternated with Preferential Only Lane Operational (R3-11 series) signs in series at intervals not greater than 1 km (0.6 mi) along the length of the preferential only lane.

Option:

For concurrent-flow preferential only lanes, overhead Preferential Only Lane Operational (R3-14 series) signs may be used at specific locations and intervals along the length of the preferential only lane to supplement the ground-mounted R3-10 signs defining the occupancy requirement and the Preferential Only Lane Operational (R3-11 series) signs based on an engineering study.

Standard:

For direct access ramps to preferential only lanes, a ground-mounted R3-10 sign defining the occupancy requirement and a Preferential Only Lane Operational (R3-11 series) sign shall be used at the beginning or initial entry point for all types of direct access ramps that provide access or lead to preferential only lanes.

Option:

For direct access ramps to preferential only lanes, an overhead Preferential Only Lane Operational (R3-14 series) sign may be used at the beginning or initial entry point to supplement the required ground-mounted signs.

Support:

Section 2B.26 contains provisions regarding the use of changeable message signs for preferential only lanes.

Section 2E.59 contains additional provisions regarding signing for preferential only lanes on freeway and expressway facilities. Figures 2E-46 through 2E-52 show application and placement examples for Preferential Only Lane signs for a variety of preferential only lane situations.

Section 2B.29 DO NOT PASS Sign (R4-1)

Option:

The DO NOT PASS (R4-1) sign (see Figure 2B-8) may be used in addition to pavement markings (see Section 3B.02) to emphasize the restriction on passing. The DO NOT PASS sign may be used at the beginning of, and at intervals within, a zone through which sight distance is restricted or where other conditions make overtaking and passing inappropriate.

If signing is needed on the left side of the roadway for additional emphasis, NO PASSING ZONE (W14-3) signs may be used (see Section 2C.35).

Support:

Standards for determining the location and extent of no-passing zone pavement markings are set forth in Section 3B.02.

Section 2B.30 PASS WITH CARE Sign (R4-2)

Guidance:

The PASS WITH CARE (R4-2) sign (see Figure 2B-8) should be installed at the end of a no-passing zone if a DO NOT PASS sign has been installed at the beginning of the zone.

Section 2B.31 SLOWER TRAFFIC KEEP RIGHT Sign (R4-3)

Option:

The SLOWER TRAFFIC KEEP RIGHT (R4-3) sign (see Figure 2B-8) may be used on multi-lane roadways to reduce unnecessary lane changing.

Guidance:

If used, the SLOWER TRAFFIC KEEP RIGHT sign should be installed just beyond the beginning of a multi-lane pavement, and at selected locations where there is a tendency on the part of some road users to drive in the left lane (or lanes) below the normal speed of traffic. This sign should not be used on the approach to an interchange or through an interchange area.

Section 2B.32 Slow Moving Traffic Lane Signs (R4-5, R4-6)

Support:

The Slow Moving Traffic Lane signs (see Figure 2B-8) are used to direct vehicles into an extra lane that has been provided for slow-moving vehicles.

Guidance:

If an extra lane has been provided for slow-moving traffic, a SLOWER TRAFFIC KEEP RIGHT (R4-3) sign, TRUCKS USE RIGHT LANE (R4-5) sign, or other appropriate sign should be installed at the beginning of the lane. A TRUCK LANE (R4-6) sign, with the appropriate distance shown, should be installed in advance of the lane.

Option:

The SLOWER TRAFFIC KEEP RIGHT sign may be used as a supplement or as an alternative to the TRUCKS USE RIGHT LANE sign. Both signs may be used on multi-lane roadways to improve capacity and reduce lane changing.

Guidance:

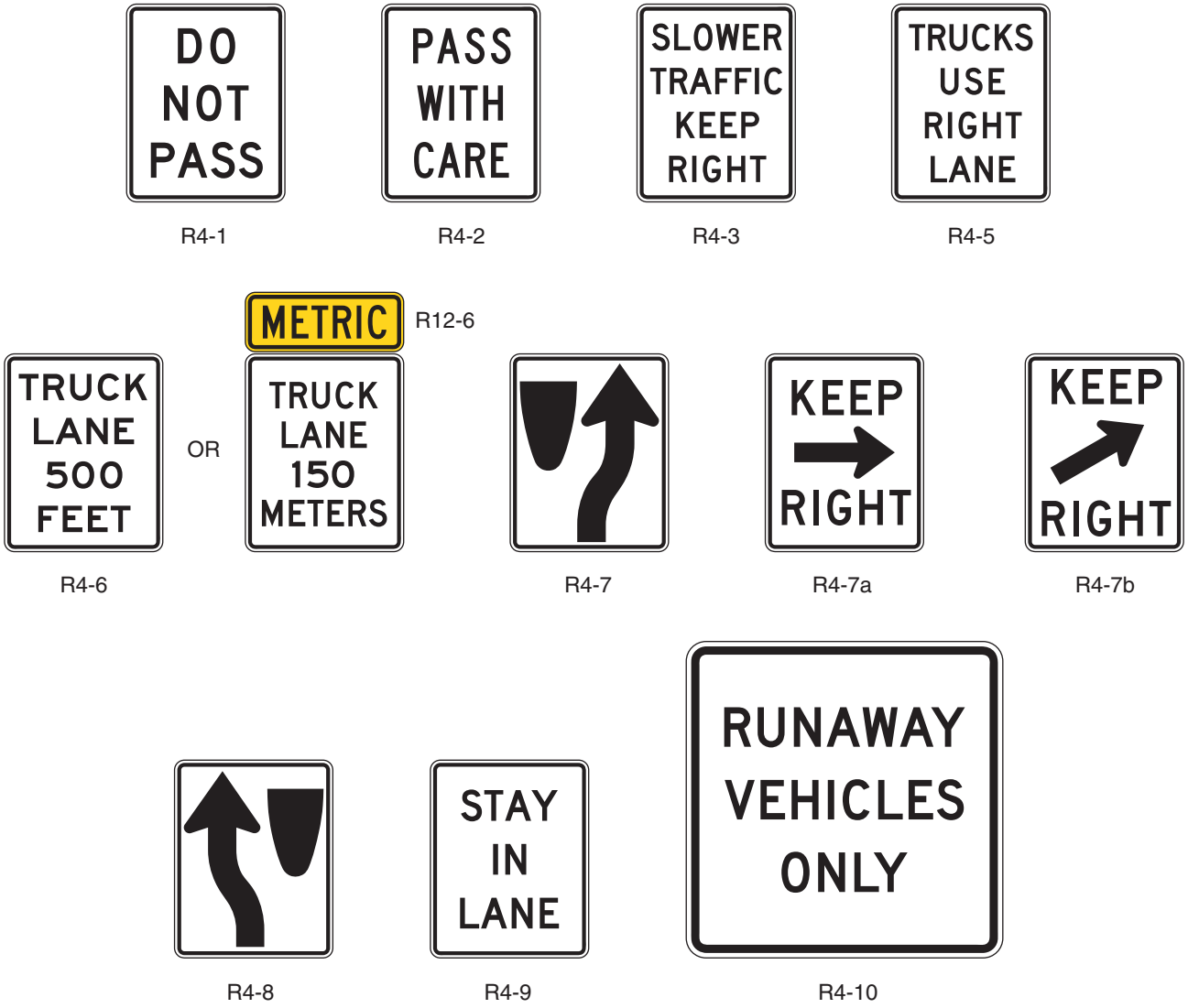
If an extra lane has been provided for slow-moving traffic, a Lane Ends sign (see Section 2C.33) should be installed in advance of the point where the extra lane ends. Appropriate pavement markings should be installed at both the beginning and the end of the extra lane (see Section 3B.09 and Figure 3B-12).

Section 2B.33 Keep Right and Keep Left Signs (R4-7, R4-8)

Option:

The Keep Right (R4-7) sign (see Figure 2B-8) may be used at locations where it is necessary for traffic to pass only to the right of a roadway feature or obstruction. The Keep Left (R4-8) sign (see Figure 2B-8) may be used at locations where it is necessary for traffic to pass only to the left of a roadway feature or obstruction.

Figure 2B-8. Passing, Keep Right, and Truck Lane Signs



Guidance:

If used, the Keep Right sign should be installed as close as practical to approach ends of raised medians, parkways, islands, underpass piers, and at other locations where it is not readily apparent that traffic is required to keep to the right. The sign should be mounted on the face of or just in front of a pier or other obstruction separating opposite directions of traffic in the center of the highway such that traffic will have to pass to the right of the sign.

Standard:

The Keep Right sign shall not be installed on the right side of the roadway in a position where traffic must pass to the left of the sign.

Option:

The Keep Right sign may be omitted at intermediate ends of divisional islands and medians.

Word message KEEP RIGHT (LEFT) with an arrow (R4-7a or R4-7b) signs (see Figure 2B-8) may be used instead of the R4-7 or R4-8 symbol signs.

Where the obstruction obscures the Keep Right sign, the minimum placement height may be increased for better sign visibility.

Section 2B.34 DO NOT ENTER Sign (R5-1)

Standard:

The DO NOT ENTER (R5-1) sign (see Figure 2B-9) shall be used where traffic is prohibited from entering a restricted roadway.

Guidance:

The DO NOT ENTER sign, if used, should be placed directly in view of a road user at the point where a road user could wrongly enter a divided highway, one-way roadway, or ramp (see Figure 2B-10). The sign should be mounted on the right side of the roadway, facing traffic that might enter the roadway or ramp in the wrong direction.

If the DO NOT ENTER sign would be visible to traffic to which it does not apply, the sign should be turned away from, or shielded from, the view of that traffic.

Option:

The DO NOT ENTER sign may be installed where it is necessary to emphasize the one-way traffic movement on a ramp or turning lane.

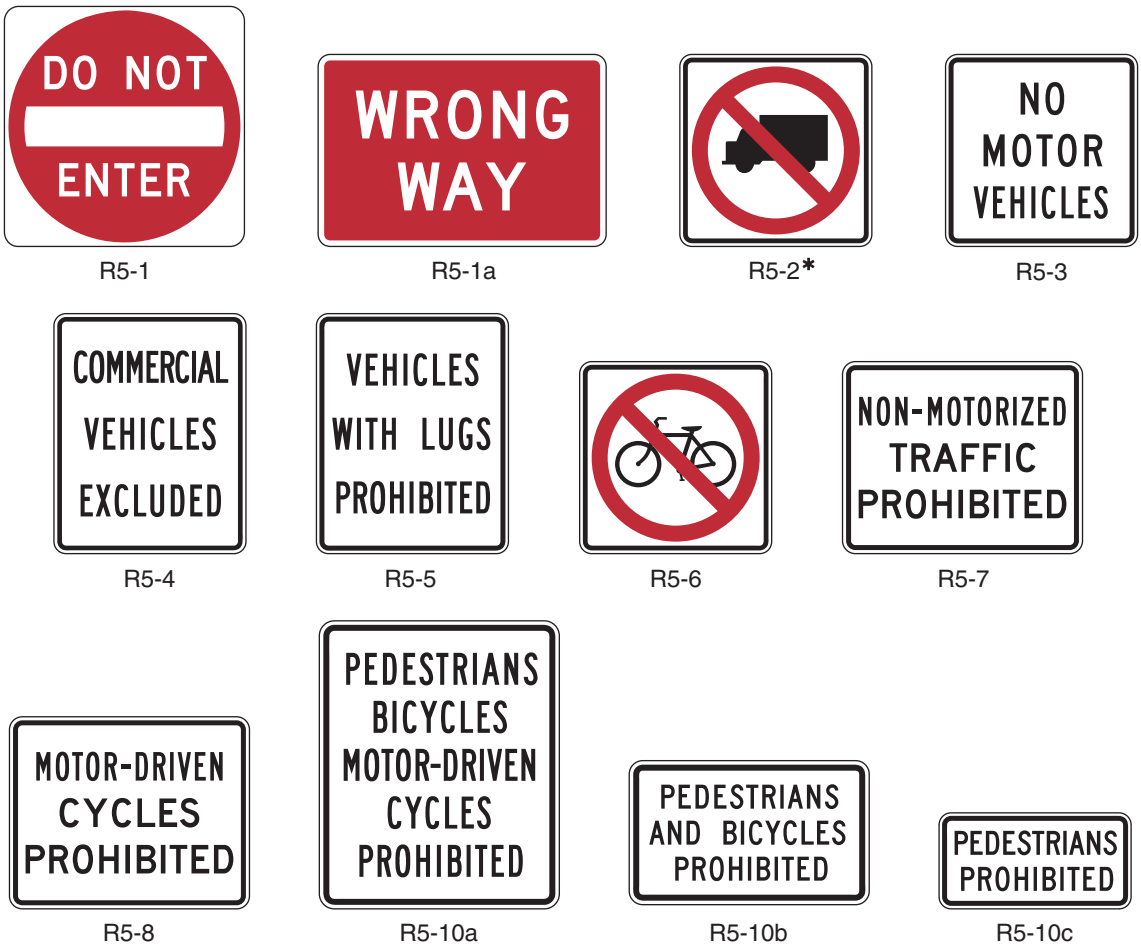
A second DO NOT ENTER sign on the left side of the roadway may be used, particularly where traffic approaches from an intersecting roadway (see Figure 2B-10).

Section 2B.35 WRONG WAY Sign (R5-1a)

Option:

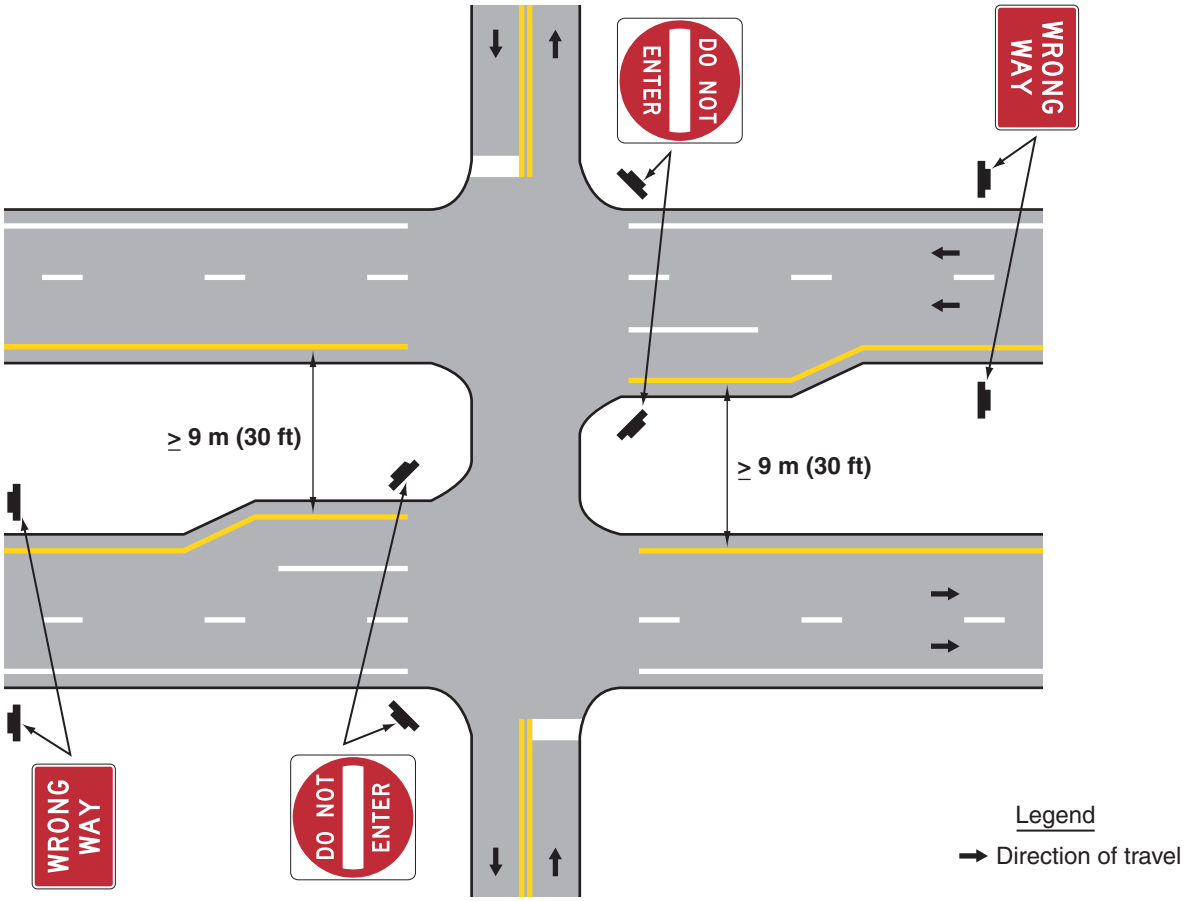
The WRONG WAY (R5-1a) sign (see Figure 2B-9) may be used as a supplement to the DO NOT ENTER sign where an exit ramp intersects a crossroad or a crossroad intersects a one-way roadway in a manner that does not physically discourage or prevent wrong-way entry (see Figure 2B-10).

Figure 2B-9. Traffic Prohibition Signs



* An optional word message sign is shown in the “Standard Highway Signs” book

Figure 2B-10. Example of Wrong-Way Signing for a Divided Highway with a Median Width of 9 m (30 ft) or Greater



Guidance:

If used, the WRONG WAY sign should be placed at a location along the exit ramp or the one-way roadway farther from the crossroad than the DO NOT ENTER sign (see Section 2E.50).

Section 2B.36 Selective Exclusion Signs

Support:

Selective Exclusion signs (see Figure 2B-9) give notice to road users that State or local statutes or ordinances exclude designated types of traffic from using particular roadways or facilities.

Standard:

If used, Selective Exclusion signs shall clearly indicate the type of traffic that is excluded.

Support:

Typical exclusion messages include:

A. No Trucks (R5-2);
B. NO MOTOR VEHICLES (R5-3);
C. COMMERCIAL VEHICLES EXCLUDED (R5-4);
D. TRUCKS (VEHICLES) WITH LUGS PROHIBITED (R5-5);
E. No Bicycles (R5-6);
F. NON-MOTORIZED TRAFFIC PROHIBITED (R5-7);
G. MOTOR-DRIVEN CYCLES PROHIBITED (R5-8); and
H. Hazardous Material Prohibited (R14-3) (see Section 2B.52).

Option:

Appropriate combinations or groupings of these legends into a single sign, such as PEDESTRIANS BICYCLES MOTOR-DRIVEN CYCLES PROHIBITED (R5-10a), or PEDESTRIANS AND BICYCLES PROHIBITED (R5-10b) may be used.

Guidance:

If an exclusion is governed by vehicle weight, a Weight Limit sign (see Section 2B.49) should be used instead of a Selective Exclusion sign.

The Selective Exclusion sign should be placed on the right side of the roadway at an appropriate distance from the intersection so as to be clearly visible to all road users turning into the roadway that has the exclusion. The PEDESTRIANS PROHIBITED (R5-10c) or No Pedestrian Crossing (R9-3a) sign should be installed so as to be clearly visible to pedestrians at a location where an alternative route is available.

Option:

The NO TRUCKS (R5-2a) sign may be used as an alternate to the No Trucks (R5-2) symbol sign.

The PEDESTRIANS PROHIBITED (R5-10c) or No Pedestrian Crossing (R9-3a) sign may also be used at underpasses or elsewhere where pedestrian facilities are not provided.

Section 2B.37 ONE WAY Signs (R6-1, R6-2)

Standard:

Except as noted in the Option, the ONE WAY (R6-1 or R6-2) sign (see Figure 2B-11) shall be used to indicate streets or roadways upon which vehicular traffic is allowed to travel in one direction only.

ONE WAY signs shall be placed parallel to the one-way street at all alleys and roadways that intersect one-way roadways as shown in Figures 2B-12 through 2B-15.

Guidance:

Where divided highways are separated by median widths at the intersection itself of 9 m (30 ft) or more, ONE WAY signs should be placed, visible to each crossroad approach, on the near right and far left corners of each intersection with the directional roadways as shown in Figures 2B-12 and 2B-13.

Option:

ONE WAY signs may be omitted on the one-way roadways of divided highways, where the design of interchanges indicates the direction of traffic on the separate roadways.

ONE WAY signs may be omitted (see Figure 2B-14) at intersections with divided highways that have median widths at the intersection itself of less than 9 m (30 ft).

Standard:

At unsignalized intersections, ONE WAY signs shall be placed on the near right and the far left corners of the intersection facing traffic entering or crossing the one-way street.

At signalized intersections, ONE WAY signs shall be placed either near the appropriate signal faces, on the poles holding the traffic signals, on the mast arm or span wire holding the signals, or at the locations specified for unsignalized intersections.

Section 2B.38 Divided Highway Crossing Signs (R6-3, R6-3a)

Option:

The Divided Highway Crossing (R6-3 or R6-3a) sign (see Figure 2B-11) may be used to advise road users that they are approaching an intersection with a divided highway.

Standard:

When the Divided Highway Crossing sign is used at a four-legged intersection, the R6-3 sign shall be used. When used at a T-intersection, the R6-3a sign shall be used.

Option:

The Divided Highway Crossing sign may be located on the near right corner of the intersection and may be mounted beneath a STOP or YIELD sign or on a separate support.

Figure 2B-11. ONE WAY and Divided Highway Crossing Signs

R6-1 R6-2 R6-3 R6-3a

Figure 2B-12. Examples of Locations of ONE WAY Signs
(Sheet 1 of 2)

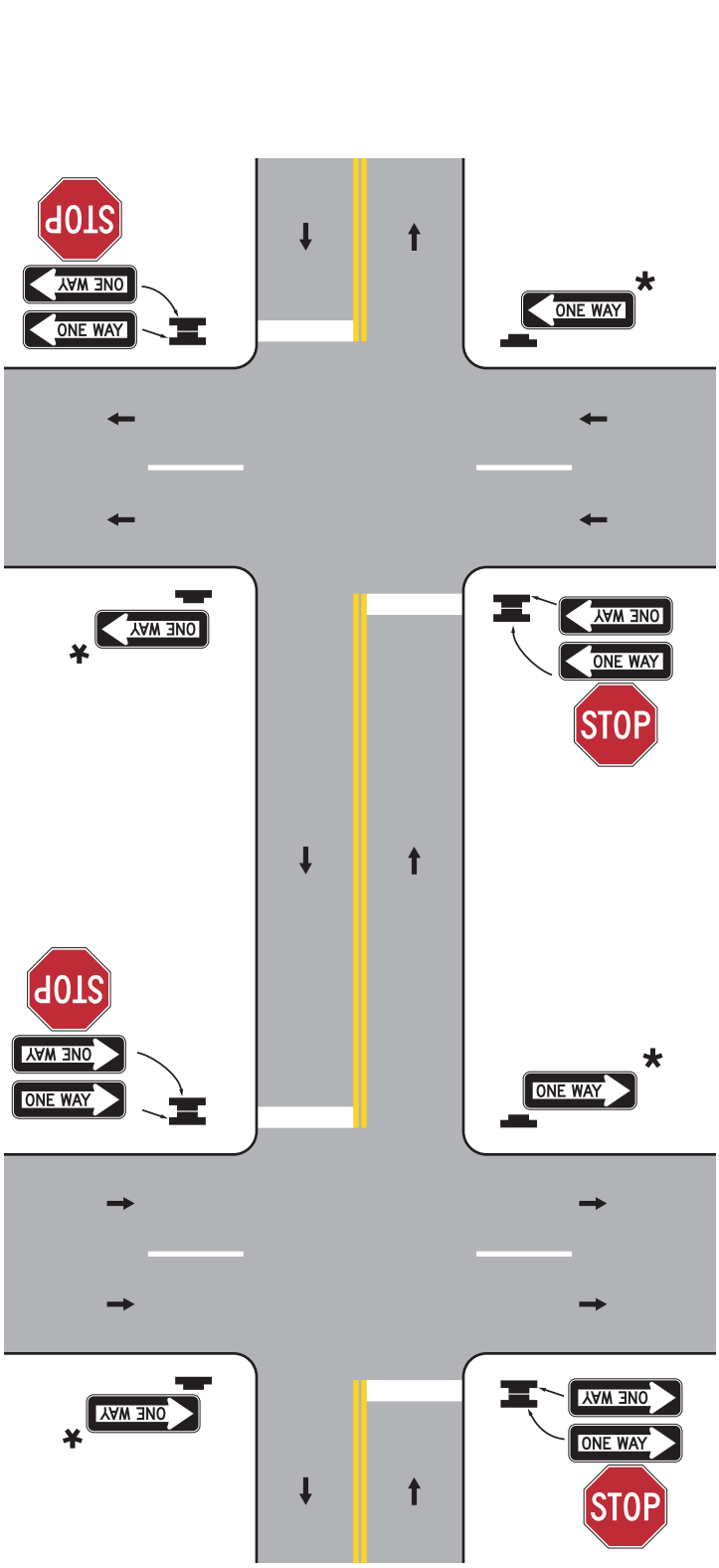


Figure 2B-12. Examples of Locations of ONE WAY Signs
(Sheet 2 of 2)

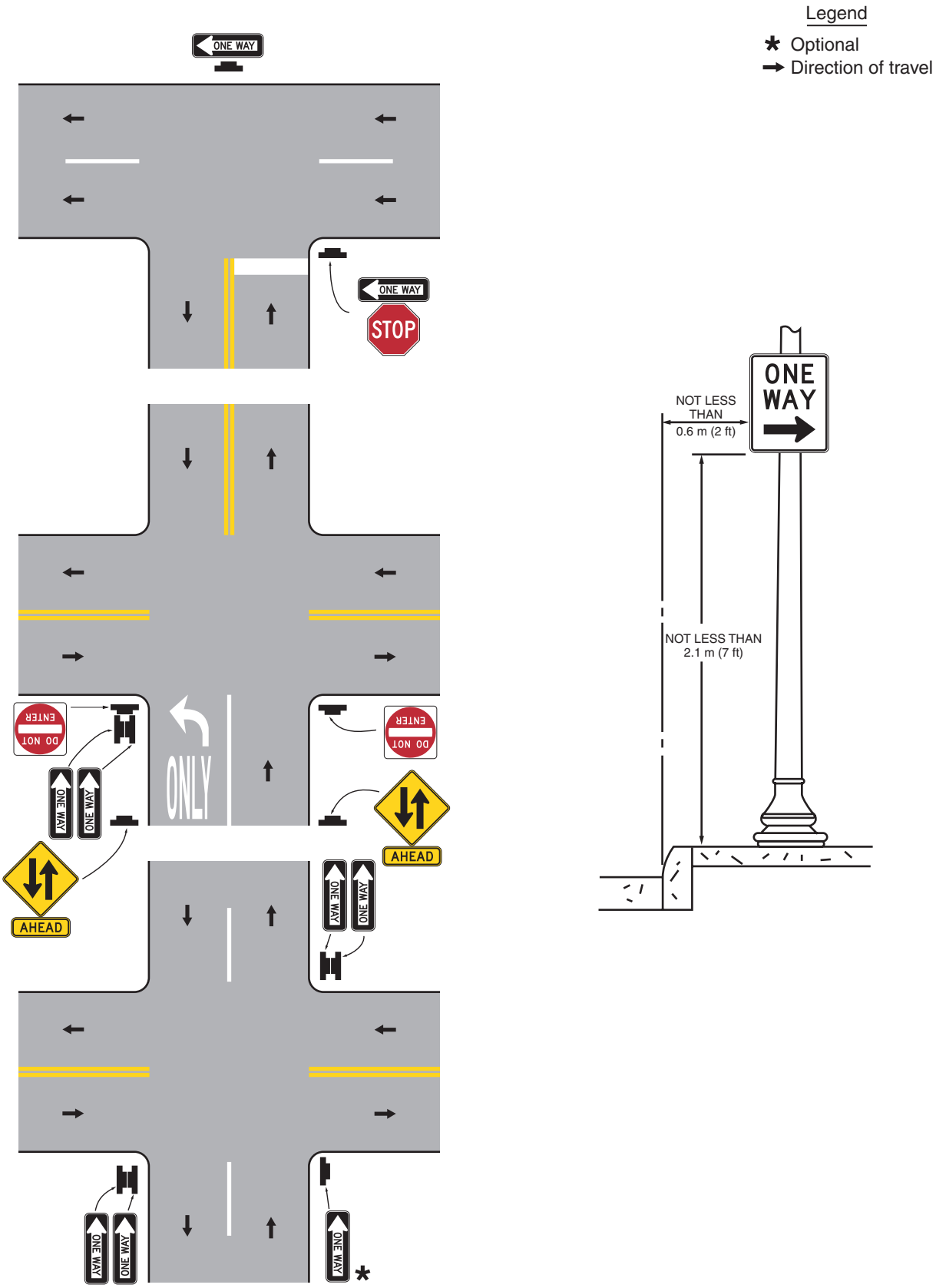
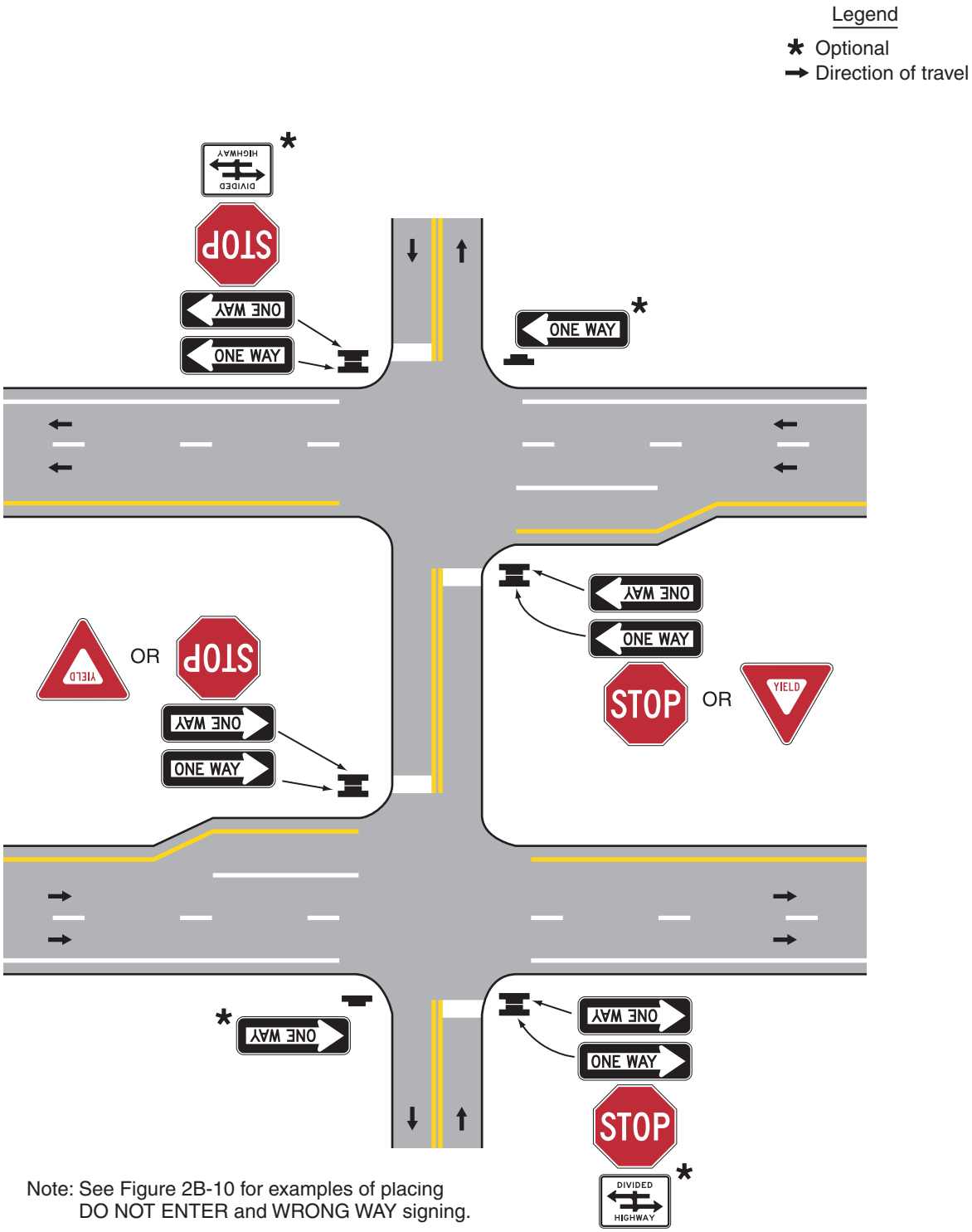
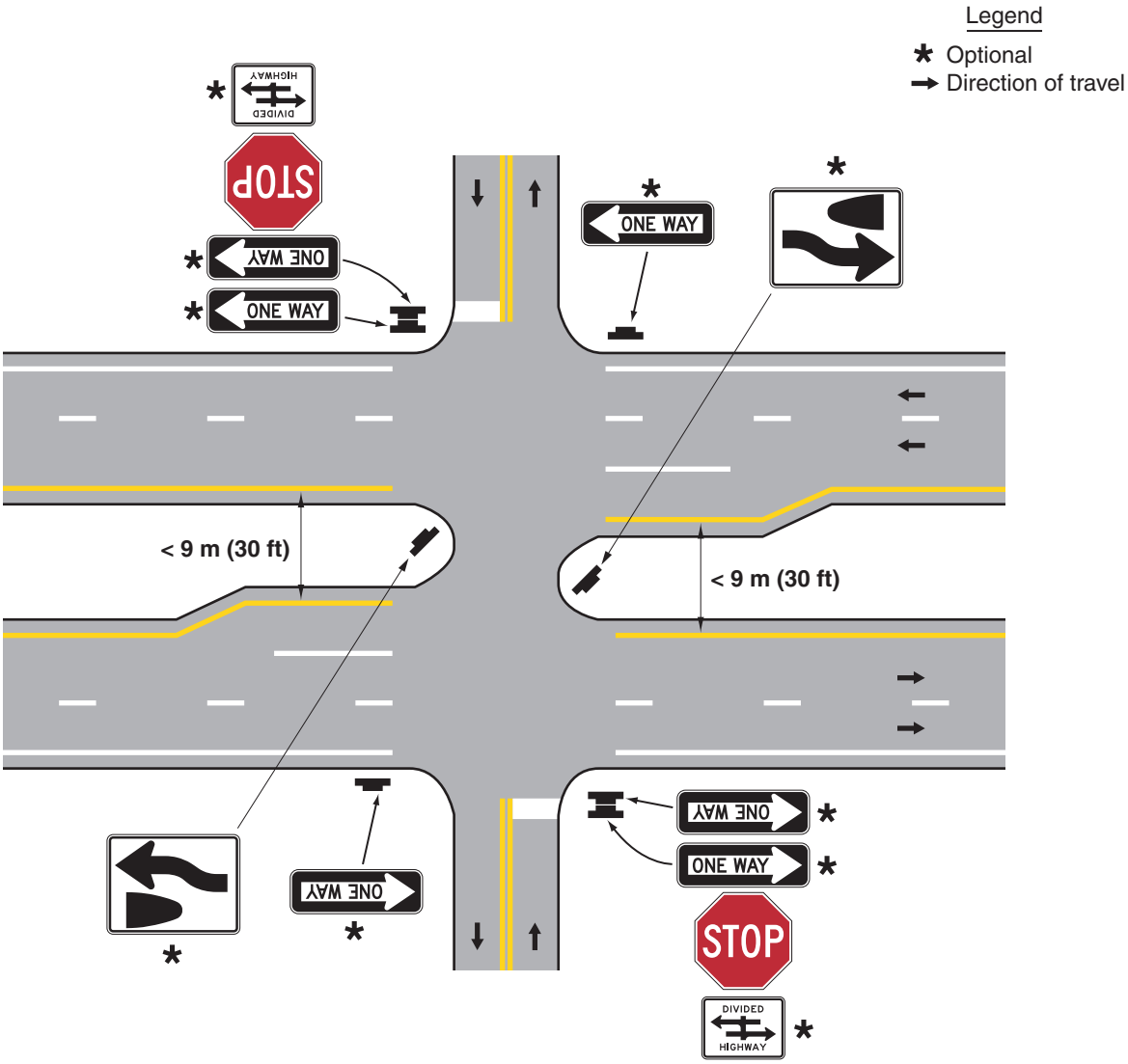


Figure 2B-13. Examples of ONE WAY Signing for Divided Highways with Medians of 9 m (30 ft) or Greater



Note: See Figure 2B-10 for examples of placing DO NOT ENTER and WRONG WAY signing.

Figure 2B-14. Examples of ONE WAY Signing for Divided Highways with Medians Less Than 9 m (30 ft)

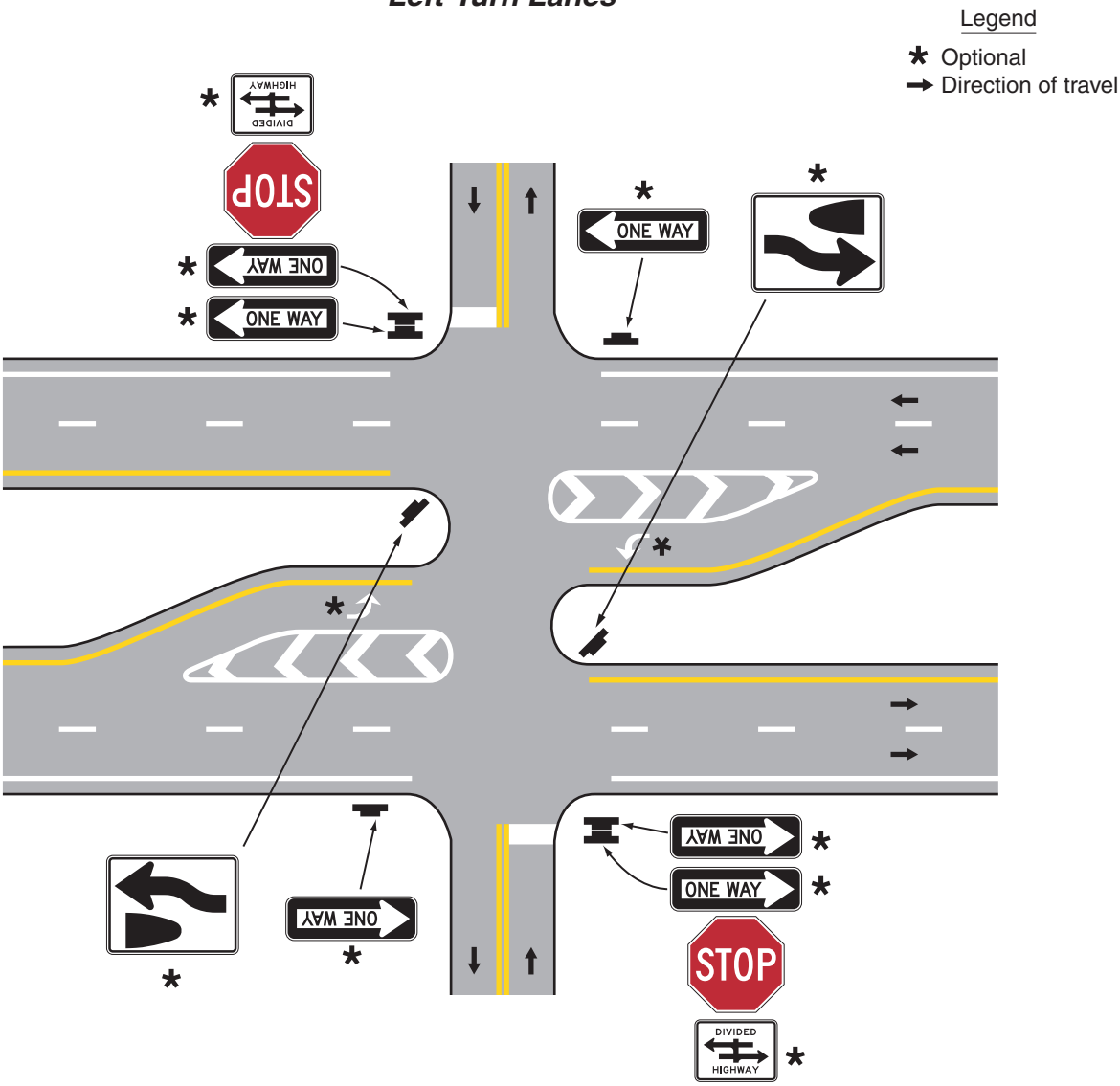


Notes:
All signs shown are optional except the STOP signs.

See Figure 2B-10 for examples of placing DO NOT ENTER and WRONG WAY signing.

Typical Mounting

Figure 2B-15. Examples of ONE WAY Signing for Divided Highways with Medians Less Than 9 m (30 ft) and Separated Left-Turn Lanes



Notes:

All signs shown are optional except the STOP signs.

See Figure 2B-10 for examples of placing DO NOT ENTER and WRONG WAY signing.

Typical Mounting

Section 2B.39 Parking, Standing, and Stopping Signs (R7 and R8 Series)

Support:

Signs governing the parking, stopping, and standing of vehicles cover a wide variety of regulations, and only general guidance can be provided here. The word "standing" when used on the R7 and R8 series of signs refers to the practice of a driver keeping the vehicle in a stationary position while continuing to occupy the vehicle. Typical examples of parking, stopping, and standing signs (see Figures 2B-16 and 2B-17) are as follows:

A. NO PARKING ANY TIME (R7-1);
B. NO PARKING 8:30 AM TO 5:30 PM (R7-2);
C. NO PARKING EXCEPT SUNDAYS AND HOLIDAYS (R7-3);
D. NO STANDING ANY TIME (R7-4);
E. ONE HOUR PARKING 9 AM-7 PM (R7-5);
F. NO PARKING LOADING ZONE (R7-6);
G. NO PARKING BUS STOP (R7-7, R7-107, R7-107a);
H. RESERVED PARKING for persons with disabilities (R7-8);
I. NO PARKING ON PAVEMENT (R8-1);
J. NO PARKING EXCEPT ON SHOULDER (R8-2);
K. NO PARKING (R8-3);
L. No Parking (R8-3a); and
M. NO STOPPING ON PAVEMENT (R8-5).

Section 2B.40 Design of Parking, Standing, and Stopping Signs

Support:

Discussions of parking signs and parking regulations in this Section apply not only to parking, but also to standing and stopping.

Standard:

The legend on parking signs shall state applicable regulations. Parking signs shall conform to the standards of shape, color, and location.

Where parking is prohibited at all times or at specific times, the basic design for parking signs shall have a red legend and border on a white background (Parking Prohibition signs). Where only limited-time parking or parking in a particular manner are permitted, the signs shall have a green legend and border on a white background (Permissive Parking signs).

Guidance:

Parking signs should display the following information from top to bottom of the sign, in the order listed:

A. The restriction or prohibition;
B. The times of the day that it is applicable, if not at all hours; and
C. The days of the week that it is applicable, if not every day.

If the parking restriction applies to a limited area or zone, the limits of the restriction should be shown by arrows or supplemental plaques. If arrows are used and if the sign is at the end of a parking zone, there should be a single-headed arrow pointing in the direction that the regulation is in effect. If the sign is at an intermediate point in a zone, there should be a double-headed arrow pointing both ways. When a single sign is used at the transition point between two parking zones, it should display a right and left arrow pointing in the direction that the respective restrictions apply.

Where special parking restrictions are imposed during heavy snowfall, Snow Emergency signs should be installed. The legend will vary according to the regulations, but the signs should be vertical rectangles, having a white background with the upper part of the plate a red background.

When used to direct drivers to van-accessible parking facilities, a VAN ACCESSIBLE (R7-8a) plaque (see Figure 2B-16) should be mounted below the D4-1 sign. Where parking spaces that are reserved for persons with disabilities are designated to accommodate wheelchair vans, a VAN ACCESSIBLE (R7-8b) plaque (see Figure 2B-16) should be mounted below the R7-8 sign.

Option:

To minimize the number of parking signs, blanket regulations that apply to a given district may, if legal, be posted at district boundary lines.

As an alternate to the use of arrows to show designated restriction zones, word messages such as BEGIN, END, HERE TO CORNER, HERE TO ALLEY, THIS SIDE OF SIGN, or BETWEEN SIGNS may be used.

Where parking is prohibited during certain hours and time-limited parking or parking in a particular manner is permitted during certain other time periods, the red Parking Prohibition and green Permissive Parking signs may be designed as follows:

Figure 2B-16. No Parking Signs (R7 Series)

R7-1

R7-2

R7-2a

R7-3

R7-4

R7-5

R7-6

R7-7

R7-8

R7-8a

R7-8b

R7-107

R7-107a

R7-108

OR

R7-200

R7-201

R7-201a

R7-202

R7-203

Figure 2B-17. No Parking Signs (R8 Series)

A. Two 300 x 450 mm (12 x 18 in) parking signs may be used with the red Parking Prohibition sign installed above or to the left of the green Permissive Parking sign; or
B. The red Parking Prohibition sign and the green Permissive Parking sign may be combined to form an R7-200 sign on a single 600 x 450 mm (24 x 18 in) sign, or on a single 300 x 750 mm (12 x 30 in) sign.

At the transition point between two parking zones, a single sign or two signs mounted side by side may be used.

The words NO PARKING may be used as an alternative to the No Parking symbol. The supplemental educational plaque, NO PARKING, with a red legend and border on a white background, may be used above signs incorporating the No Parking symbol.

Alternate designs for the R7-107 sign may be developed such as the R7-107a sign (see Figure 2B-16). Alternate designs may include, on a single panel, a transit logo, an approved bus symbol, a parking prohibition, the words BUS STOP, and an arrow. The preferred bus symbol color is black, but other dark colors may be used. Additionally, the transit logo may be shown on the bus face in the appropriate colors instead of placing the logo separately. The reverse side of the sign may contain bus routing information.

To make the parking regulations more effective and to improve public relations by giving a definite warning, a sign (see Figure 2B-16) reading TOW-AWAY ZONE (R7-201) may be appended to, or incorporated in, any parking prohibition sign. The Tow-Away Zone (R7-201a) symbol sign may be used instead of the R7-201 word message sign. The R7-201a sign may have either a black or red legend and border on a white background.

In rural areas, the legend NO PARKING ON PAVEMENT (R8-1) is generally suitable and may be used. If a roadway has paved shoulders, the NO PARKING EXCEPT ON SHOULDER sign (R8-2) may be used as it is less likely to cause confusion. The R8-3a symbol sign or the word message NO PARKING (R8-3) sign may be used to prohibit any parking along a given highway. Word message supplemental plaques (see Figure 2B-17), such as ON PAVEMENT (R8-3c) or ON BRIDGE (R8-3d), may be mounted below the R8-3 or R8-3a sign.

Section 2B.41 Placement of Parking, Stopping, and Standing Signs

Guidance:

When signs with arrows are used to indicate the extent of the restricted zones, the signs should be set at an angle of not less than 30 degrees nor more than 45 degrees with the line of traffic flow in order to be visible to approaching traffic.

Spacing of signs should be based on legibility and sign orientation.

If the zone is unusually long, signs showing a double arrow should be used at intermediate points within the zone.

Standard:

If the signs are mounted at an angle of 90 degrees to the curb line, two signs shall be mounted back to back at the transition point between two parking zones, each with the appended message THIS SIDE OF SIGN.

Guidance:

At intermediate points within a zone, a single sign without any arrow or appended plaque should be used, facing in the direction of approaching traffic. Otherwise the standards of placement should be the same as for signs using directional arrows.

Section 2B.42 Emergency Restriction Signs (R8-4, R8-7, R8-8)

Option:

The EMERGENCY PARKING ONLY (R8-4) sign (see Figure 2B-17) or the EMERGENCY STOPPING ONLY (R8-7) sign (see Figure 2B-17) may be used to discourage or prohibit shoulder parking, particularly where scenic or other attractions create a tendency for road users to stop temporarily, even though turnout or rest areas have not been provided.

The DO NOT STOP ON TRACKS (R8-8) sign (see Figure 8B-3) may be used to discourage or prohibit parking or stopping on railroad tracks (see Section 8B.07).

Standard:

Emergency Restriction signs shall be rectangular and shall have a red or black legend and border on a white background.

Section 2B.43 WALK ON LEFT FACING TRAFFIC and No Hitchhiking Signs (R9-1, R9-4, R9-4a)

Option:

The WALK ON LEFT FACING TRAFFIC (R9-1) sign (see Figure 2B-18) may be used on highways where no sidewalks are provided.

Standard:

If used, the WALK ON LEFT FACING TRAFFIC sign shall be installed on the right side of the road where pedestrians walk on the pavement or shoulder in the absence of pedestrian pathways or sidewalks.

Option:

The No Hitchhiking (R9-4a) sign (see Figure 2B-18) may be used to prohibit standing in or adjacent to the roadway for the purpose of soliciting a ride. The R9-4 word message sign (see Figure 2B-18) may be used as an alternate to the R9-4a symbol sign.

Section 2B.44 Pedestrian Crossing Signs (R9-2, R9-3)

Option:

Pedestrian Crossing signs (see Figure 2B-18) may be used to limit pedestrian crossing to specific locations.

Standard:

If used, Pedestrian Crossing signs shall be installed to face pedestrian approaches.

Option:

Where crosswalks are clearly defined, the CROSS ONLY AT CROSSWALKS (R9-2) sign may be used to discourage jaywalking or unauthorized crossing.

The No Pedestrian Crossing (R9-3a) sign may be used to prohibit pedestrians from crossing a roadway at an undesirable location or in front of a school or other public building where a crossing is not designated.

The NO PEDESTRIAN CROSSING (R9-3) word message sign may be used as an alternate to the R9-3a symbol sign. The USE CROSSWALK (R9-3b) supplemental plaque, along with an arrow, may be installed below either sign to designate the direction of the crossing.

Support:

One of the most frequent uses of the Pedestrian Crossing signs is at signalized intersections that have three crossings that can be used and one leg that cannot be crossed.

Guidance:

The R9-3b sign should not be installed in combination with educational plaques.

Figure 2B-18. Pedestrian Signs

R9-1

R9-2

R9-3

R9-3a

R9-3b

R9-4

R9-4a

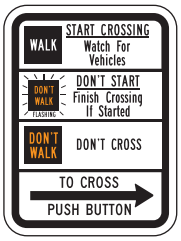
R10-1

R10-2a

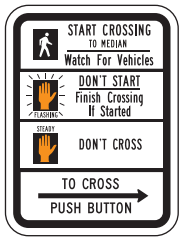
R10-3

R10-3a

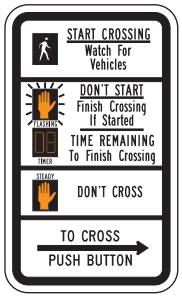
R10-3b



R10-3c



R10-3d



R10-3e

R10-4

R10-4a

R10-4b

Section 2B.45 Traffic Signal Signs (R10-1 through R10-21)

Option:

To supplement traffic signal control, Traffic Signal signs R10-1 through R10-21 may be used to regulate road users.

Guidance:

When used, Traffic Signal signs should be located adjacent to the signal face to which they apply.

Standard:

Traffic Signal signs applicable to pedestrian actuation (see Figure 2B-18) shall be mounted immediately above or incorporated in pedestrian pushbutton units (see Section 4E.08).

Support:

Traffic Signal signs applicable to pedestrians include:

A. CROSS ON GREEN LIGHT ONLY (R10-1);
B. CROSS ON WALK SIGNAL ONLY (R10-2);
C. PUSH BUTTON FOR GREEN LIGHT (R10-3); and
D. PUSH BUTTON FOR WALK SIGNAL (R10-4).

Option:

The following signs may be used as an alternate for the R10-3 and R10-4 signs:

A. TO CROSS STREET (arrow), PUSH BUTTON WAIT FOR GREEN LIGHT (R10-3a); and
B. TO CROSS STREET (arrow), PUSH BUTTON WAIT FOR WALK SIGNAL (R10-4a).

The symbol sign R10-2a may be used as an alternate to sign R10-2. Where symbol-type pedestrian signal indications are used, an educational sign (R10-3b) may be used to improve pedestrian understanding of pedestrian indications at signalized intersections. Where word-type pedestrian signal indications are being retained for the remainder of their useful service life, the legends WALK/DONT WALK may be substituted for the symbols on the educational sign R10-3b, thus creating sign R10-3c. The R10-3d sign may be used if the pedestrian clearance time is sufficient only for the pedestrian to cross to the median. The diagrammatic sign R10-4b may also be used as an alternate to sign R10-4. At intersections where pedestrians cross in two stages using a median refuge island, the word message “CROSS TO MEDIAN” may be placed on the near corner of the refuge island along with the educational plaque.

Traffic Signal signs (see Figure 2B-19) may be installed at certain locations to clarify signal control. Among the legends for this purpose are LEFT ON GREEN ARROW ONLY (R10-5), STOP HERE ON RED (R10-6 or R10-6a) for observance of stop lines, DO NOT BLOCK INTERSECTION (R10-7) for avoidance of traffic obstructions, USE LANE(S) WITH GREEN ARROW (R10-8) for obedience to Lane Control signals, LEFT TURN YIELD ON GREEN (symbolic green ball) (R10-12), and LEFT TURN SIGNAL YIELD ON GREEN (symbolic green ball) (R10-21) (see Section 4D.06).

In situations where traffic control signals are coordinated for progressive timing, the Traffic Signal Speed (I1-1) sign may be used (see Section 2D.47).

Standard:

The NO TURN ON RED (R10-11a, R10-11b) sign (see Figure 2B-19) shall be used to prohibit a right turn on red (or a left turn on red from a one-way street to a one-way street).

Option:

A symbolic NO TURN ON RED (R10-11) sign (see Figure 2B-19) may be used as an alternate to the R10-11a and R10-11b signs.

Guidance:

If used, the NO TURN ON RED sign should be installed near the appropriate signal head.

A NO TURN ON RED sign should be considered when an engineering study finds that one or more of the following conditions exists:

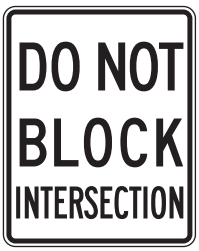
A. Inadequate sight distance to vehicles approaching from the left (or right, if applicable);
B. Geometrics or operational characteristics of the intersection that might result in unexpected conflicts;
C. An exclusive pedestrian phase;
D. An unacceptable number of pedestrian conflicts with right-turn-on-red maneuvers, especially involving children, older pedestrians, or persons with disabilities; and
E. More than three right-turn-on-red accidents reported in a 12-month period for the particular approach.

Figure 2B-19. Traffic Signal Signs

R10-5

R10-6

R10-6a



R10-7

R10-8

R10-10

R10-11

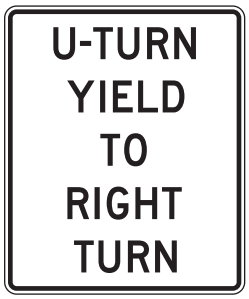
R10-11a

R10-11b

R10-12

R10-13

R10-15



R10-16

R10-17a

OR

R10-20a

R10-21

Where turns on red are permitted and the signal indication is a RED ARROW, the RIGHT (LEFT) ON RED ARROW AFTER STOP (R10-17a) sign (see Figure 2B-19) should be installed adjacent to the RED ARROW signal indication.

Option:

In order to remind drivers who are making turns to yield to pedestrians, especially at intersections where right turn on red is permitted and pedestrian crosswalks are marked, a TURNING TRAFFIC MUST YIELD TO PEDESTRIANS (R10-15) sign may be used (see Figure 2B-19).

A supplemental R10-20a plaque (see Figure 2B-19) showing times of day (similar to the S4-1 plaque shown in Figure 7B-1) with a black legend and border on a white background may be mounted below a NO TURN ON RED sign to indicate that the restriction is in place only during certain times.

Standard:

The EMERGENCY SIGNAL (R10-13) sign (see Figure 2B-19) shall be used in conjunction with emergency-vehicle traffic control signals (see Section 4F.02).

Option:

A U-TURN YIELD TO RIGHT TURN (R10-16) sign (see Figure 2B-19) may be installed near the left-turn signal face if U-turns are allowed on a protected left-turn movement on an approach from which drivers making a right turn from the conflicting approach to their left are simultaneously being shown a right-turn GREEN ARROW signal indication.

Section 2B.46 Photo Enforced Signs (R10-18, R10-19)

Option:

A TRAFFIC LAWS PHOTO ENFORCED (R10-18) sign (see Figure 2B-1) may be installed at a jurisdictional boundary to advise road users that some of the traffic regulations within that jurisdiction are being enforced by photographic equipment.

A PHOTO ENFORCED (R10-19) sign (see Figure 2B-1) may be mounted below a regulatory sign to advise road users that the regulation is being enforced by photographic equipment.

Standard:

If used below a regulatory sign, the PHOTO ENFORCED (R10-19) sign shall be a rectangle with a black legend and border on a white background.

Section 2B.47 KEEP OFF MEDIAN Sign (R11-1)

Option:

The KEEP OFF MEDIAN (R11-1) sign (see Figure 2B-20) may be used to prohibit driving into or parking on the median.

Guidance:

The KEEP OFF MEDIAN sign should be installed on the left of the roadway within the median at random intervals as needed wherever there is a tendency for encroachment.

Section 2B.48 ROAD CLOSED Sign (R11-2) and LOCAL TRAFFIC ONLY Signs (R11-3 Series, R11-4)

Guidance:

The ROAD CLOSED (R11-2) sign should be installed where roads have been closed to all traffic (except authorized vehicles).

ROAD CLOSED—LOCAL TRAFFIC ONLY (R11-3) or ROAD CLOSED TO THRU TRAFFIC (R11-4) signs should be used where through traffic is not permitted, or for a closure some distance beyond the sign, but where the highway is open for local traffic up to the point of closure.

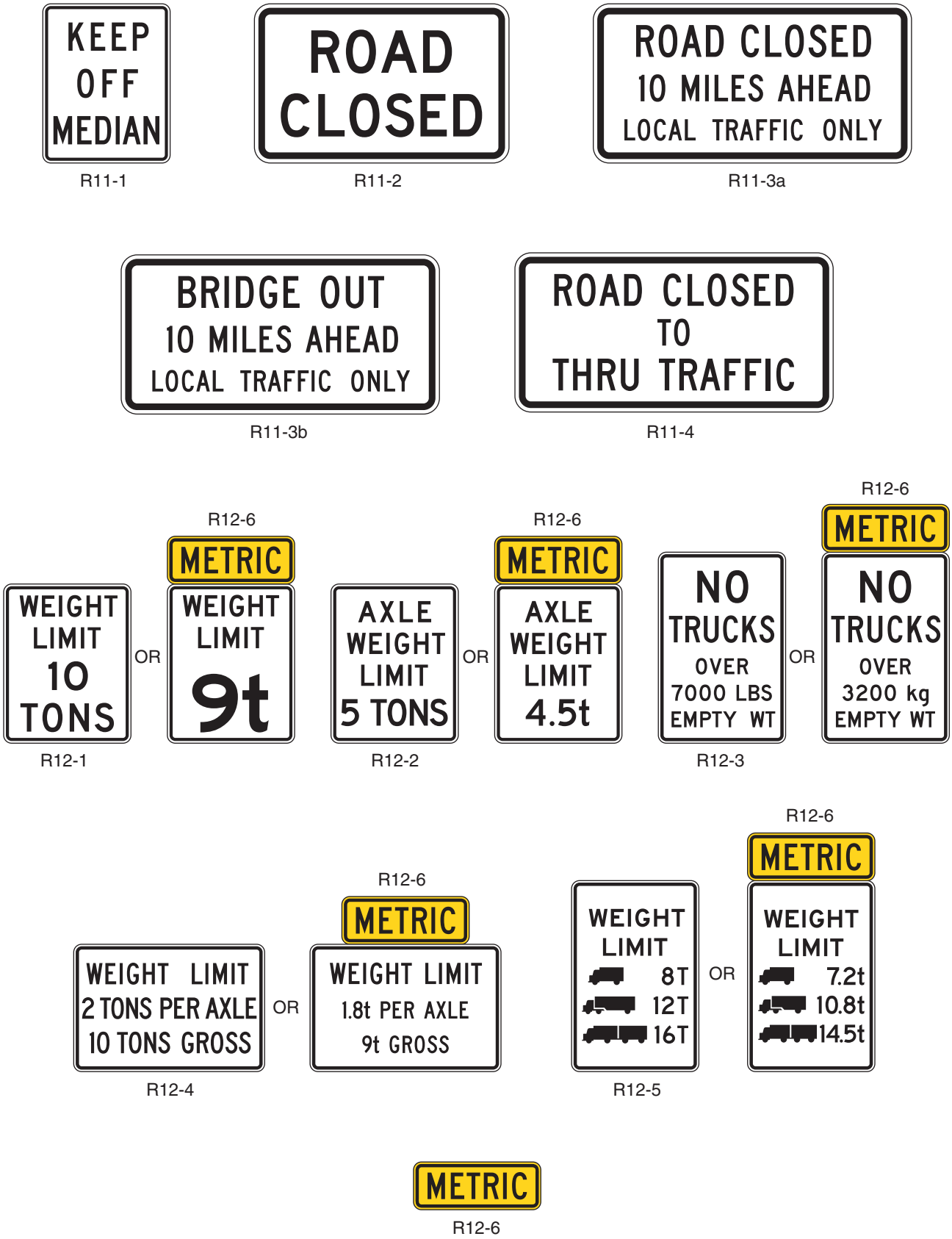
Standard:

The Road Closed (R11-2, R11-3 series, and R11-4) signs (see Figure 2B-20) shall be designed as horizontal rectangles. These signs shall be preceded by the applicable Advance Road Closed warning sign with the secondary legend AHEAD and, if applicable, an Advance Detour warning sign (see Section 6F.18).

Option:

The word message BRIDGE OUT may be substituted for the ROAD CLOSED message where applicable.

Figure 2B-20. Road Closed and Weight Limit Signs



Section 2B.49 Weight Limit Signs (R12-1 through R12-5)

Option:

The Weight Limit (R12-1) sign carrying the legend WEIGHT LIMIT X t (XX TONS) may be used to indicate vehicle weight restrictions including load.

Where the restriction applies to axle weight rather than gross load, the legend may be AXLE WEIGHT LIMIT X t (XX TONS) or AXLE WEIGHT LIMIT XXXX kg (XXXX LBS) (R12-2).

To restrict trucks of certain sizes by reference to empty weight in residential districts, the legend may be NO TRUCKS OVER X t (XX TONS) EMPTY WT or NO TRUCKS OVER XXXX kg (XXXX LBS) EMPTY WT (R12-3).

In areas where multiple regulations of the type described above are applicable, a sign combining the necessary messages on a single panel may be used, such as WEIGHT LIMIT X t (XX TONS) PER AXLE, X t (XX TONS) GROSS (R12-4).

Posting of specific load limits may be accomplished by use of the Weight Limit symbol sign (R12-5). A sign containing the legend WEIGHT LIMIT on the top two lines, and showing three different truck symbols and their respective weight limits for which restrictions apply may be used, with the weight limits shown to the right of each symbol as X t (XX T). A bottom line of legend stating GROSS WT may be included if needed for enforcement purposes.

Standard:

If used, the Weight Limit sign (see Figure 2B-20) shall be located in advance of the applicable section of highway or structure.

Guidance:

If used, the Weight Limit sign with an advisory distance ahead legend should be placed at approach road intersections or other points where prohibited vehicles can detour or turn around.

Section 2B.50 Weigh Station Signs (R13 Series)

Guidance:

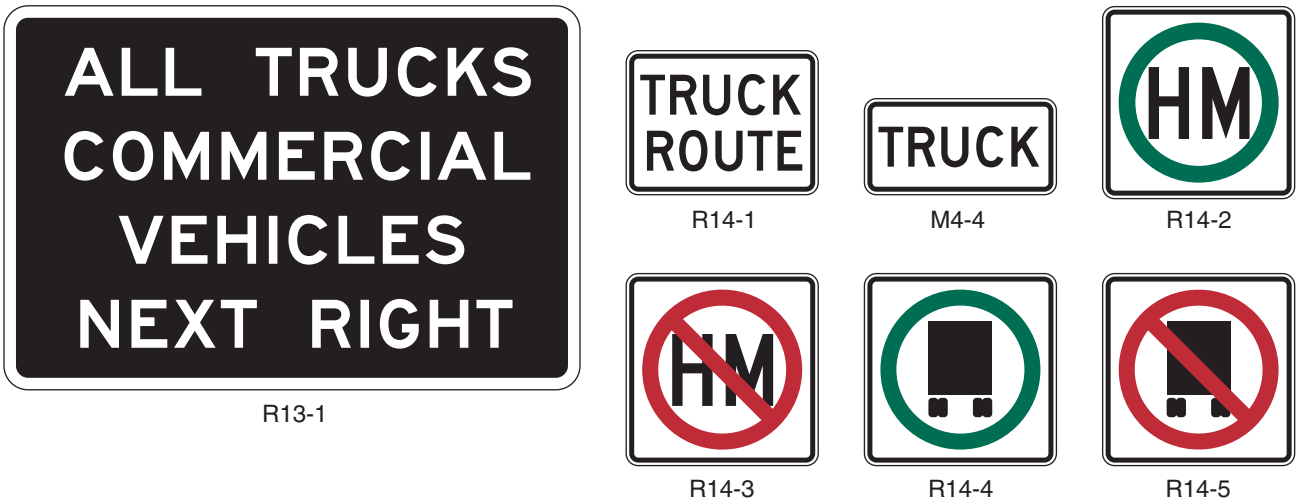
An ALL TRUCKS/COMMERCIAL VEHICLES NEXT RIGHT (R13-1) sign (see Figure 2B-21) should be used to direct appropriate traffic into a weigh station.

The R13-1 sign should be supplemented by the D8 series of guide signs (see Section 2D.44).

Option:

The reverse color combination, a white legend and border on a black background, may be used for the R13-1 sign.

Figure 2B-21. Truck Signs



Section 2B.51 TRUCK ROUTE Sign (R14-1)

Guidance:

The TRUCK ROUTE (R14-1) sign (see Figure 2B-21) should be used to mark a route that has been designated to allow truck traffic.

Option:

On a numbered highway, the TRUCK auxiliary sign may be used (see Section 2D.20).

Section 2B.52 Hazardous Material Signs (R14-2, R14-3)

Option:

The Hazardous Material Route (R14-2) sign (see Figure 2B-21) may be used to identify routes that have been designated by proper authority for vehicles transporting hazardous material.

On routes where the transporting of hazardous material is prohibited, the Hazardous Material Prohibition (R14-3) sign (see Figure 2B-21) may be used.

Guidance:

If used, the Hazardous Material Prohibition sign should be installed on a street or roadway at a point where vehicles transporting hazardous material have the opportunity to take an alternate route.

Section 2B.53 National Network Signs (R14-4, R14-5)

Support:

The signing of the National Network routes for trucking is optional.

Standard:

When a National Network route is signed, the National Network (R14-4) sign (see Figure 2B-21) shall be used.

Option:

The National Network Prohibition (R14-5) sign (see Figure 2B-21) may be used to identify routes, portions of routes, and ramps where trucks are prohibited. The R14-5 sign may also be used to mark the ends of designated routes.

Section 2B.54 Other Regulatory Signs

Option:

Regulatory word message signs other than those classified and specified in this Manual and the "Standard Highways Sign" book may be developed to aid the enforcement of other laws or regulations.

Except for symbols on regulatory signs, minor modifications in the design may be permitted provided that the essential appearance characteristics are met.

Standard:

When a seat belt symbol is used, the symbol shown in Figure 2B-22 shall be used.

Guidance:

The seat belt symbol should not be used alone but in connection with mandatory seat belt regulatory messages.

Figure 2B-22. Seat Belt Symbol

CHAPTER 2C. WARNING SIGNS

Section 2C.01 Function of Warning Signs

Support:

Warning signs call attention to unexpected conditions on or adjacent to a highway or street and to situations that might not be readily apparent to road users. Warning signs alert road users to conditions that might call for a reduction of speed or an action in the interest of safety and efficient traffic operations.

Section 2C.02 Application of Warning Signs

Standard:

The use of warning signs shall be based on an engineering study or on engineering judgment.

Guidance:

The use of warning signs should be kept to a minimum as the unnecessary use of warning signs tends to breed disrespect for all signs. In situations where the condition or activity is seasonal or temporary, the warning sign should be removed or covered when the condition or activity does not exist.

Support:

The categories of warning signs are shown in Table 2C-1.

Warning signs specified herein cover most of the conditions that are likely to be encountered. Additional warning signs for low-volume roads (as defined in Section 5A.01), temporary traffic control zones, school areas, highway-rail grade crossings, bicycle facilities, and highway-light rail transit grade crossings are discussed in Parts 5 through 10, respectively.

Option:

Word message warning signs other than those specified in this Manual may be developed and installed by State and local highway agencies.

Section 2C.03 Design of Warning Signs

Standard:

All warning signs shall be diamond-shaped (square with one diagonal vertical) with a black legend and border on a yellow background unless specifically designated otherwise. Warning signs shall be designed in accordance with the sizes, shapes, colors, and legends contained in the "Standard Highway Signs" book (see Section 1A.11).

Option:

Warning signs regarding conditions associated with pedestrians, bicyclists, playgrounds, school buses, and schools may have a black legend and border on a yellow background or a black legend and border on a fluorescent yellow-green background.

Section 2C.04 Size of Warning Signs

Standard:

The sizes for warning signs shall be as shown in Table 2C-2.

Guidance:

The Conventional Road size should be used on conventional roads.

The Freeway and Expressway sizes should be used for higher-speed applications to provide larger signs for increased visibility and recognition.

Option:

The Minimum size may be used on low-speed roadways where the reduced legend size would be adequate for the warning or where physical conditions preclude the use of the other sizes.

Oversized signs and larger sizes may be used for those special applications where speed, volume, or other factors result in conditions where increased emphasis, improved recognition, or increased legibility would be desirable.

Standard:

The minimum size for supplemental warning plaques shall be as shown in Table 2C-3.

Option:

Signs larger than those shown in Tables 2C-2 and 2C-3 may be used (see Section 2A.12).

Table 2C-1. Categories of Warning Signs

Category	Group	Section	Signs	MUTCD Codes
Roadway Related	Changes in Horizontal Alignment	2C.06	Turn, Curve, Reverse Turn, Reverse Curve, Winding Road, Hairpin Curve, 270-Degree Curve	W1-1 through W1-5, W1-11, W1-15
		2C.07	Combination Horizontal Alignment/Advisory Speed	W1-1a, W1-2a
		2C.08	Combination Horizontal Alignment/Intersection	W1-10
		2C.09	Large Arrow (one direction)	W1-6
		2C.10	Chevron Alignment	W1-8
		2C.11	Truck Rollover	W1-13
	Vertical Alignment	2C.12	Hill	W7-1, W7-1a, W7-1b
		2C.13	Truck Escape Ramp	W7-4, W7-4a
		2C.14	Hill Blocks View	W7-6
	Cross Section	2C.15	Road Narrows	W5-1
		2C.16-17	Narrow Bridge, One Lane Bridge	W5-2, W5-3
		2C.18-20	Divided Road, Divided Road Ends, Double Arrow	W6-1, W6-2, W12-1
		2C.21	Dead End, No Outlet	W14-1, W14-1a, W14-2, W14-2a
		2C.22	Low Clearance	W12-2, W12-2p
	Roadway Surface Condition	2C.23-24	Bump, Dip, Speed Hump	W8-1, W8-2, W17-1
		2C.25	Pavement Ends	W8-3
		2C.26	Shoulder	W8-4, W8-9, W8-9a
		2C.27	Slippery When Wet	W8-5
		2C.28	Bridge Ices Before Road	W8-13
Traffic Related	Advance Traffic Control	2C.29-30	Stop Ahead, Yield Ahead, Signal Ahead, Be Prepared To Stop, Speed Reduction	W3-1, W3-2, W3-3, W3-4, W3-5, W3-5a
	Traffic Flow	2C.31-35	Merge, Lane Ends, Added Lane, Two-Way Traffic, Right Lane Ends, Lane Ends Merge Left, No Passing Zone	W4-1, W4-2, W4-3, W4-5, W4-6, W6-3, W9-1, W9-2, W14-3
	Change in Speed	2C.36	Advisory Speed	W13-2, W13-3, W13-5
	Intersections	2C.37	Cross Road, Side Road, T, Y, and Circular Intersection	W2-1 through W2-6
		2C.38	Large Arrow (two directions)	W1-7
		2C.39	Oncoming Extended Green	W25-1, W25-2
	Vehicular Traffic	2C.40	Truck Crossing, Truck (symbol), Emergency Vehicle, Tractor, Bicycle, Golf Cart, Horse-Drawn Vehicle	W8-6, W11-1, W11-5, W11-5a, W11-8, W11-10, W11-11, W11-12p, W11-14
	Nonvehicular	2C.41-42	Pedestrian, Deer, Cattle, Snowmobile, Horse, Wheelchair, Playground	W11-2, W11-3, W11-4, W11-6, W11-7, W11-9, W15-1
Supplemental Plaques	Distance	2C.45	XX Feet, XX Miles, Next XX Feet, Next XX MI	W16-2, W16-3, W16-4, W7-3a
	Speed	2C.46	Advisory Speed	W13-1
	Arrow	2C.47	Advance Arrow, Directional Arrow, Diagonal Arrow	W16-5p, W16-6p, W16-7p
	Hill-Related	2C.48	Trucks Use Low Gear, X% Grade	W7-2, W7-3
	Street Name Plaque	2C.49	Advance Street Name	W16-8
	Intersection	2C.50	Cross Traffic Does Not Stop	W4-4p
	Share The Road	2C.51	Share The Road	W16-1
	HOV	2C.52	High-Occupancy Vehicle	W16-11
	Photo Enforced	2C.53	Photo Enforced	W16-10
	Traffic Circle	2C.37	Traffic Circle	W16-12p

Table 2C-2. Warning Sign Sizes

Description		Conventional Road	Express-way	Freeway	Minimum	Oversized
Shape	Sign Series					
Diamond	W1, W2, W7, W8, W9, W11, W14, W15-1, W17-1	750 x 750 (30 x 30)	900 x 900 (36 x 36)	1200 x 1200 (48 x 48)	600 x 600 (24 x 24)	_____
	W1 Combination, W3, W4, W5, W6, W8-3, W10, W12	900 x 900 (36 x 36)	1200 x 1200 (48 x 48)	1200 x 1200 (48 x 48)	750 x 750 (30 x 30)	_____
Rectangular	W1 - Arrows	1200 x 600 (48 x 24)	_____	_____	900 x 450 (36 x 18)	1500 x 750 (60 x 30)
	W1 - Chevron	450 x 600 (18 x 24)	750 x 900 (30 x 36)	900 x1200 (36 x 48)	300 x 450 (12 x 18)	_____
	W7-4	1950 x 1200 (78 x 48)	1950 x 1200 (78 x 48)	1950 x 1200 (78 x 48)	_____	_____
	W7-4b, 4c	1950 x 1500 (78 x 60)	1950 x 1500 (78 x 60)	1950 x 1500 (78 x 60)	_____	_____
	W10-9, 10	600 x 450 (24 x 18)	_____	_____	_____	_____
	W12-2p	2100 x 600 (84 x 24)	2100 x 600 (84 x 24)	2100 x 600 (84 x 24)	_____	_____
	W13-2, 3, 5, W25	600 x 750 (24 x 30)	900 x1200 (36 x 48)	1200 x 1500 (48 x 60)	600 x 750 (24 x 30)	1200 x 1500 (48 x 60)
Pennant	W14-3	900 x 1200 x 1200 (36 x 48 x 48)	_____	_____	750 x 1000 x 1000 (30 x 40 x 40)	1200 x 1600 x 1600 (48 x 64 x 64)
Circular	W10-1	900 (36) Dia.	1200 (48) Dia.	_____	750 (30) Dia.	1200 (48) Dia.

Notes: 1. Larger signs may be used when appropriate
2. Dimensions are shown in millimeters followed by inches in parentheses and are shown as width x height

Section 2C.05 Placement of Warning Signs

Support:

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

The total time needed to perceive and complete a reaction to a sign is the sum of the times necessary for Perception, Identification (understanding), Emotion (decision making), and Volition (execution of decision), and is called the PIEV time. The PIEV time can vary from several seconds for general warning signs to 6 seconds or more for warning signs requiring high road user judgment.

Table 2C-4 lists suggested sign placement distances for two conditions. This table is provided as an aid for determining warning sign location.

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

Size of Warning Sign	Size of Supplemental Plaque			
	Rectangular			Square
	1 Line	2 Lines	Arrow	
600 x 600 (24 x 24) 750 x 750 (30 x 30)	600 x 300 (24 x 12)	600 x 450 (24 x 18)	600 x 300 (24 x 12)	450 x 450 (18 x 18)
900 x 900 (36 x 36) 1200 x 1200 (48 x 48)	750 x 450 (30 x 18)	750 x 600 (30 x 24)	750 x 450 (30 x 18)	600 x 600 (24 x 24)

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

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Guidance:

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

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

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

Option:

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

Section 2C.06 Horizontal Alignment Signs (W1-1 through W1-5, W1-11, W1-15)

Option:

The horizontal alignment Turn (W1-1), Curve (W1-2), Reverse Turn (W1-3), Reverse Curve (W1-4), or Winding Road (W1-5) signs (see Figure 2C-1) may be used in advance of situations where the horizontal roadway alignment changes. A One-Direction Large Arrow (W1-6) sign (see Figure 2C-1 and Section 2C.09) may be used on the outside of the turn or curve.

If the change in horizontal alignment is 135 degrees or more, the Hairpin Curve (W1-11) sign (see Figure 2C-1) may be used.

If the change in horizontal alignment is approximately 270 degrees, such as on a cloverleaf interchange ramp, the 270-degree Loop (W1-15) sign (see Figure 2C-1) may be used.

Guidance:

The application of these signs should conform to Table 2C-5.

When the Hairpin Curve sign or the 270-degree Loop sign is installed, either a One-Direction Large Arrow (W1-6) sign or Chevron Alignment (W1-8) signs should be installed on the outside of the turn or curve.

Option:

An Advisory Speed (W13-1) plaque (see Section 2C.46) may be used to indicate the speed for the change in horizontal alignment. The supplemental distance plaque NEXT XX km (NEXT XX MILES) (W7-3a) may be installed below the Winding Road sign where continuous roadway curves exist (see Section 2C.45). The combination Horizontal Alignment/Advisory Speed sign (see Section 2C.07), combination Horizontal Alignment/Intersection sign (see Section 2C.08), or the Curve Speed sign (see Section 2C.36) may also be used.

Table 2C-4. Guidelines for Advance Placement of Warning Signs
(Metric Units)

Posted or 85th-Percentile Speed (km/h)	Advance Placement Distance [1]												
	Condition A: Speed Reduction and Lane Changing in Heavy Traffic[2]	Condition B: Deceleration to the listed advisory speed (km/h) for the condition[4]											
		0[3]	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**
30	60 m	N/A[5]	N/A[5]	N/A[5]	—	—	—	—	—	—	—	—	—
40	100 m	N/A[5]	N/A[5]	N/A[5]	N/A[5]	—	—	—	—	—	—	—	—
50	150 m	N/A[5]	N/A[5]	N/A[5]	N/A[5]	N/A[5]	—	—	—	—	—	—	—
60	180 m	30 m	N/A[5]	N/A[5]	N/A[5]	N/A[5]	N/A[5]	—	—	—	—	—	—
70	220 m	50 m	40 m	30 m	N/A[5]	N/A[5]	N/A[5]	N/A[5]	—	—	—	—	—
80	260 m	80 m	60 m	55 m	50 m	40 m	30 m	N/A[5]	N/A[5]	—	—	—	—
90	310 m	110 m	90 m	80 m	70 m	60 m	40 m	N/A[5]	N/A[5]	N/A[5]	—	—	—
100	350 m	130 m	120 m	115m	110 m	100 m	90 m	70 m	60 m	40 m	N/A[5]	—	—
110	380 m	170 m	160 m	150 m	140 m	130 m	120 m	110 m	90 m	70 m	50 m	N/A[5]	—
120	420 m	200 m	190 m	185 m	180 m	170 m	160 m	140 m	130 m	110 m	90 m	60 m	40 m
130	460 m	230 m	230 m	230 m	220 m	210 m	200 m	180 m	170 m	150 m	120 m	100 m	70 m

Notes:

[1] The distances are adjusted for a sign legibility distance of 50 m for Condition A. The distances for Condition B have been adjusted for a sign legibility distance of 75 m, which is appropriate for an alignment warning symbol sign.

[2] Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge and Right Lane Ends. The distances are determined by providing the driver a PIEV time of 14.0 to 14.5 seconds for vehicle maneuvers (2001 AASHTO Policy, Exhibit 3-3, Decision Sight Distance, Avoidance Maneuver E) minus the legibility distance of 50 m for the appropriate sign.

[3] Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, Signal Ahead, and Intersection Warning signs. The distances are based on the 2001 AASHTO Policy, Stopping Sight Distance, Exhibit 3-1, providing a PIEV time of 2.5 seconds, a deceleration rate of 3.4 m/second^2, minus the sign legibility distance of 50 m.

[4] Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve. The distance is determined by providing a 2.5 second PIEV time, a vehicle deceleration rate of 3 m/second^2, minus the sign legibility distance of 75 m.

[5] No suggested distances are provided for these speeds, as the placement location is dependent on site conditions and other signing to provide an adequate advance warning for the driver.

Table 2C-4. Guidelines for Advance Placement of Warning Signs
(English Units)

Posted or 85th-Percentile Speed	Advance Placement Distance [1]								
	Condition A: Speed reduction and lane changing in heavy traffic[2]	Condition B: Deceleration to the listed advisory speed (mph) for the condition[4]							
		0[3]	10	20	30	40	50	60	70
20 mph	225 ft	N/A[5]	N/A[5]	—	—	—	—	—	—
25 mph	325 ft	N/A[5]	N/A[5]	N/A[5]	—	—	—	—	—
30 mph	450 ft	N/A[5]	N/A[5]	N/A[5]	—	—	—	—	—
35 mph	550 ft	N/A[5]	N/A[5]	N/A[5]	N/A[5]	—	—	—	—
40 mph	650 ft	125 ft	N/A[5]	N/A[5]	N/A[5]	—	—	—	—
45 mph	750 ft	175 ft	125 ft	N/A[5]	N/A[5]	N/A[5]	—	—	—
50 mph	850 ft	250 ft	200 ft	150 ft	100 ft	N/A[5]	—	—	—
55 mph	950 ft	325 ft	275 ft	225 ft	175 ft	100 ft	N/A[5]	—	—
60 mph	1100 ft	400 ft	350 ft	300 ft	250 ft	175 ft	N/A[5]	—	—
65 mph	1200 ft	475 ft	425 ft	400 ft	350 ft	275 ft	175 ft	N/A[5]	—
70 mph	1250 ft	550 ft	525 ft	500 ft	425 ft	350 ft	250 ft	150 ft	—
75 mph	1350 ft	650 ft	625 ft	600 ft	525 ft	450 ft	350 ft	250 ft	100 ft

Notes:

[1] The distances are adjusted for a sign legibility distance of 175 ft for Condition A. The distances for Condition B have been adjusted for a sign legibility distance of 250 ft, which is appropriate for an alignment warning symbol sign.

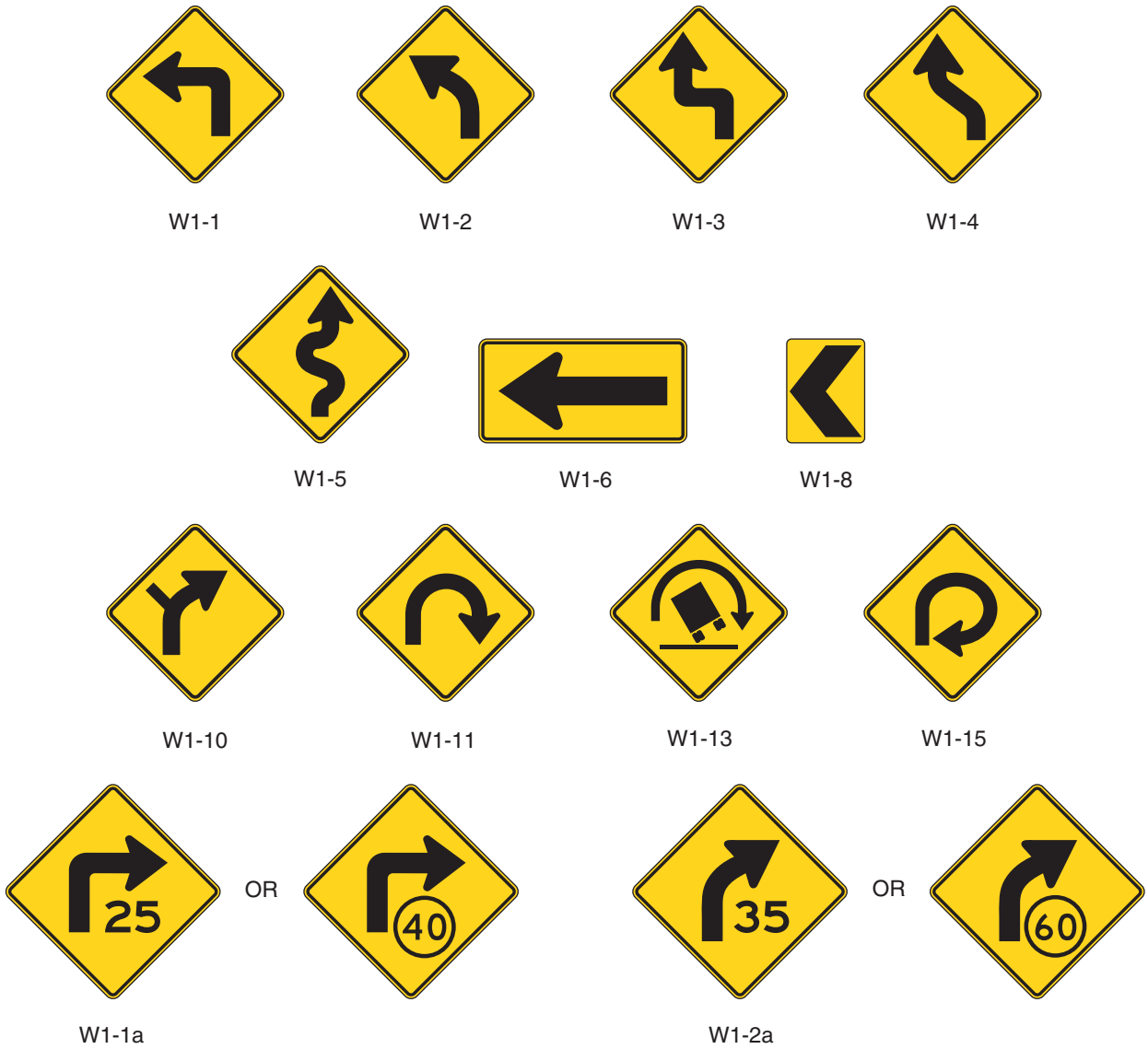
[2] Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge and Right Lane Ends. The distances are determined by providing the driver a PIEV time of 14.0 to 14.5 seconds for vehicle maneuvers (2001 AASHTO Policy, Exhibit 3-3, Decision Sight Distance, Avoidance Maneuver E) minus the legibility distance of 175 ft for the appropriate sign.

[3] Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, Signal Ahead, and Intersection Warning signs. The distances are based on the 2001 AASHTO Policy, Stopping Sight Distance, Exhibit 3-1, providing a PIEV time of 2.5 seconds, a deceleration rate of 11.2 ft/second^2, minus the sign legibility distance of 175 ft.

[4] Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve. The distance is determined by providing a 2.5 second PIEV time, a vehicle deceleration rate of 10 ft/second^2, minus the sign legibility distance of 250 ft.

[5] No suggested distances are provided for these speeds, as the placement location is dependent on site conditions and other signing to provide an adequate advance warning for the driver.

Figure 2C-1. Horizontal Alignment Signs



Standard:

When engineering judgment determines the need for a horizontal alignment sign, one of the W1-1 through W1-5, W1-10, W1-11 or W1-15 signs shall be used.

Option:

If the reduction in speed is 20 km/h (15 mph) or greater, a supplemental combination Horizontal Alignment/Advisory Speed sign or Curve Speed (W13-5) sign may be installed as near as practical to the point of curvature. If the reduction in speed is 40 km/h (25 mph) or greater, one or more additional Curve Speed signs may be installed along the curve.

Section 2C.07 Combination Horizontal Alignment/Advisory Speed Signs (W1-1a, W1-2a)

Option:

The Turn (W1-1) sign or the Curve (W1-2) sign may be combined with the Advisory Speed (W13-1) plaque (see Section 2C.46) to create a combination Turn/Advisory Speed (W1-1a) sign (see Figure 2C-1), or combination Curve/Advisory Speed (W1-2a) sign (see Figure 2C-1).

Standard:

When used, the combination Horizontal Alignment/Advisory Speed sign shall supplement other advance warning signs and shall be installed at the beginning of the turn or curve.

Table 2C-5. Horizontal Alignment Sign Usage

Number of Alignment Changes	Advisory Speed	
	≤ 50 km/h (≤ 30 MPH)	> 50 km/h (> 30 MPH)
1	Turn (W1-1)[1]	Curve (W1-2)[1]
2[2]	Reverse Turn[3] (W1-3)	Reverse Curve[3] (W1-4)
3 or more[2]	Winding Road[3] (W1-5)	

Notes:

[1] Engineering judgment should be used to determine whether the Turn or Curve sign should be used.

[2] Alignment changes are in opposite directions and are separated by a tangent distance of 180 m (600 ft) or less.

[3] A Right Reverse Turn (W1-3R), Right Reverse Curve (W1-4R), or Right Winding Road (W1-5R) sign is used if the first change in alignment is to the right; a Left Reverse Turn (W1-3L), Left Reverse Curve (W1-4L), or Left Winding Road (W1-5L) sign is used if the first change in alignment is to the left.

Section 2C.08 Combination Horizontal Alignment/Intersection Sign (W1-10)

Option:

The Turn (W1-1) sign or the Curve (W1-2) sign may be combined with the Cross Road (W2-1) sign or the Side Road (W2-2 or W2-3) sign to create a combination Horizontal Alignment/Intersection (W1-10) sign (see Figure 2C-1) that depicts the condition where an intersection occurs within a turn or curve.

Guidance:

Elements of the combination Horizontal Alignment/Intersection sign related to horizontal alignment should conform to Section 2C.06, and elements related to intersection configuration should conform to Section 2C.37. No more than one Cross Road or two Side Road symbols should be shown on any one combination Horizontal Alignment/Intersection sign.

Section 2C.09 One-Direction Large Arrow Sign (W1-6)

Option:

A One-Direction Large Arrow (W1-6) sign (see Figure 2C-1) may be used to delineate a change in horizontal alignment.

Standard:

The One-Direction Large Arrow sign shall be a horizontal rectangle with an arrow pointing to the left or right.

If used, the One-Direction Large Arrow sign shall be installed on the outside of a turn or curve in line with and at approximately a right angle to approaching traffic.

The One-Direction Large Arrow sign shall not be used where there is no alignment change in the direction of travel, such as at the beginnings and ends of medians or at center piers.

Guidance:

The One-Direction Large Arrow sign should be visible for a sufficient distance to provide the road user with adequate time to react to the change in alignment.

Section 2C.10 Chevron Alignment Sign (W1-8)

Option:

The Chevron Alignment (W1-8) sign (see Figure 2C-1) may be used to provide additional emphasis and guidance for a change in horizontal alignment. A Chevron Alignment sign may be used as an alternate or supplement to standard delineators on curves or to the One-Direction Large Arrow (W1-6) sign.

Standard:

The Chevron Alignment sign shall be a vertical rectangle. No border shall be used on the Chevron Alignment sign.

If used, Chevron Alignment signs shall be installed on the outside of a turn or curve, in line with and at approximately a right angle to approaching traffic.

Option:

A Chevron Alignment sign may be used on the far side of an intersection to inform drivers of a change of horizontal alignment for through traffic.

Guidance:

Spacing of Chevron Alignment signs should be such that the road user always has at least two in view, until the change in alignment eliminates the need for the signs.

Chevron Alignment signs should be visible for a sufficient distance to provide the road user with adequate time to react to the change in alignment.

Section 2C.11 Truck Rollover Warning Sign (W1-13)

Option:

A Truck Rollover Warning (W1-13) sign (see Figure 2C-1) may be used to warn drivers of vehicles with a high center of gravity, such as trucks, tankers, and recreational vehicles, of a curve or turn having geometric conditions that are prone to cause such vehicles to lose control and overturn.

Standard:

When the Truck Rollover Warning (W1-13) sign is used, it shall be accompanied by an Advisory Speed (W13-1) plaque indicating the recommended speed for vehicles with a higher center of gravity.

Option:

The Truck Rollover Warning sign may be displayed either as a static sign, a static sign supplemented by a flashing warning beacon, or as a changeable message sign activated by the detection of an approaching vehicle with a high center of gravity that is traveling in excess of the recommended speed for the condition.

Support:

The curved arrow on the Truck Rollover Warning sign shows the direction of roadway curvature. The truck tips in the opposite direction.

Section 2C.12 Hill Signs (W7-1, W7-1a, W7-1b)

Guidance:

The Hill (W7-1) sign (see Figure 2C-2) should be used in advance of a downgrade where the length, percent of grade, horizontal curvature, and/or other physical features require special precautions on the part of road users.

The Hill sign and supplemental grade (W7-3) plaque (see Section 2C.48) used in combination, or the W7-1b sign used alone, should be installed in advance of downgrades for the following conditions:

A. 5% grade that is more than 900 m (3,000 ft) in length;
B. 6% grade that is more than 600 m (2,000 ft) in length;
C. 7% grade that is more than 300 m (1,000 ft) in length;
D. 8% grade that is more than 230 m (750 ft) in length; or
E. 9% grade that is more than 150 m (500 ft) in length.

These signs should also be installed for steeper grades or where crash experience and field observations indicate a need.

Supplemental plaques (see Section 2C.48) and larger signs should be used for emphasis or where special hill characteristics exist. On longer grades, the use of the Hill sign with a distance (W7-3a) plaque or the combination distance/grade (W7-3b) plaque at periodic intervals of approximately 1.6 km (1 mi) spacing should be considered.

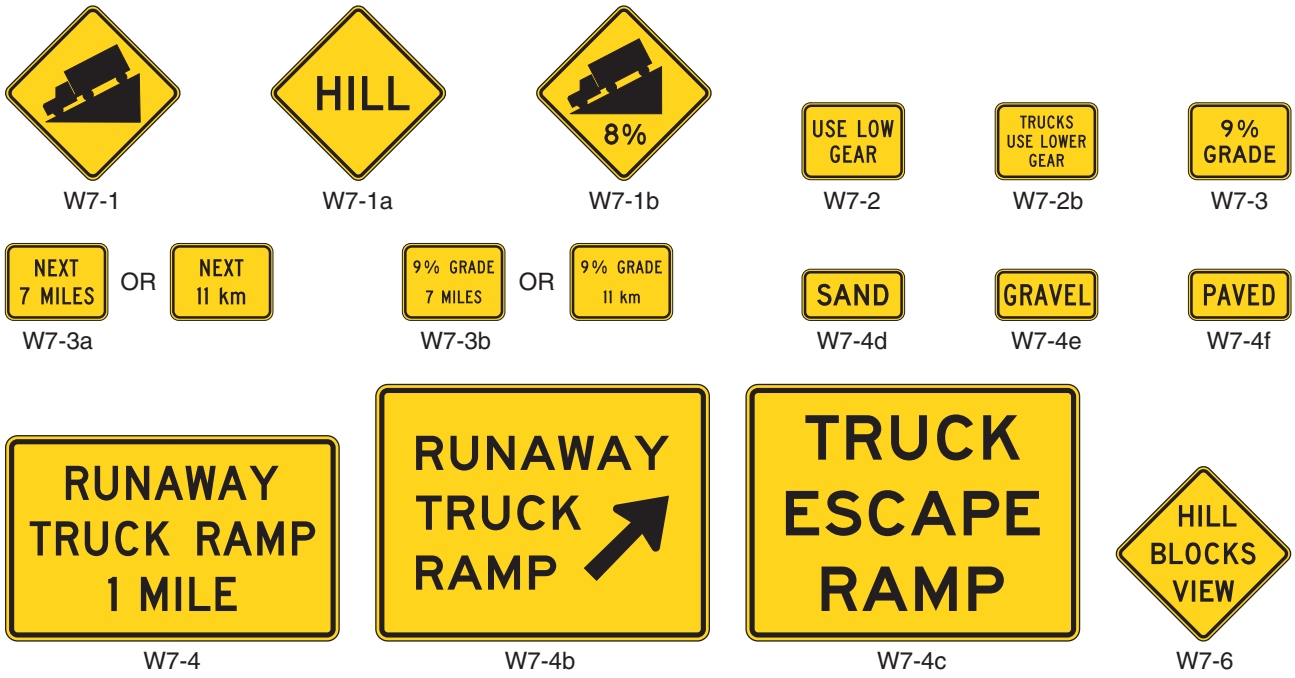
Standard:

When the percent grade is shown, the message X% plaque shall be placed below the inclined ramp/truck symbol (W7-1) or the word message HILL (W7-1a) sign.

Option:

The word message HILL (W7-1a) sign may be used as an alternate to the symbol (W7-1) sign. The percent grade message may be included within these signs.

Figure 2C-2. Vertical Grade Signs



Section 2C.13 Truck Escape Ramp Signs (W7-4 Series)

Guidance:

Where applicable, truck escape (or runaway truck) ramp advance warning signs (see Figure 2C-2) should be located approximately 1.6 km (1 mi), and 800 m (0.5 mi) in advance of the grade, and of the ramp. A sign also should be placed at the gore. A RUNAWAY VEHICLES ONLY (R4-10) sign (see Figure 2B-8) should be installed near the ramp entrance to discourage other road users from entering. No Parking (R8-3) signs should be placed near the ramp entrance.

Standard:

When truck escape ramps are installed, at least one of the W7-4 series signs shall be used.

Option:

A SAND (W7-4d), GRAVEL (W7-4e), or PAVED (W7-4f) supplemental plaque (see Figure 2C-2) may be used to describe the ramp surface. State and local highway agencies may develop appropriate word message signs for the specific situation.

Section 2C.14 HILL BLOCKS VIEW Sign (W7-6)

Option:

A HILL BLOCKS VIEW (W7-6) sign (see Figure 2C-2) may be used in advance of a crest vertical curve to advise road users to reduce speed as they approach and traverse the hill as only limited stopping sight distance is available.

Guidance:

When a HILL BLOCKS VIEW sign is used, it should be supplemented by an Advisory Speed (W13-1) plaque indicating the recommended speed for traveling over the hillcrest based on available stopping sight distance.

Section 2C.15 ROAD NARROWS Sign (W5-1)

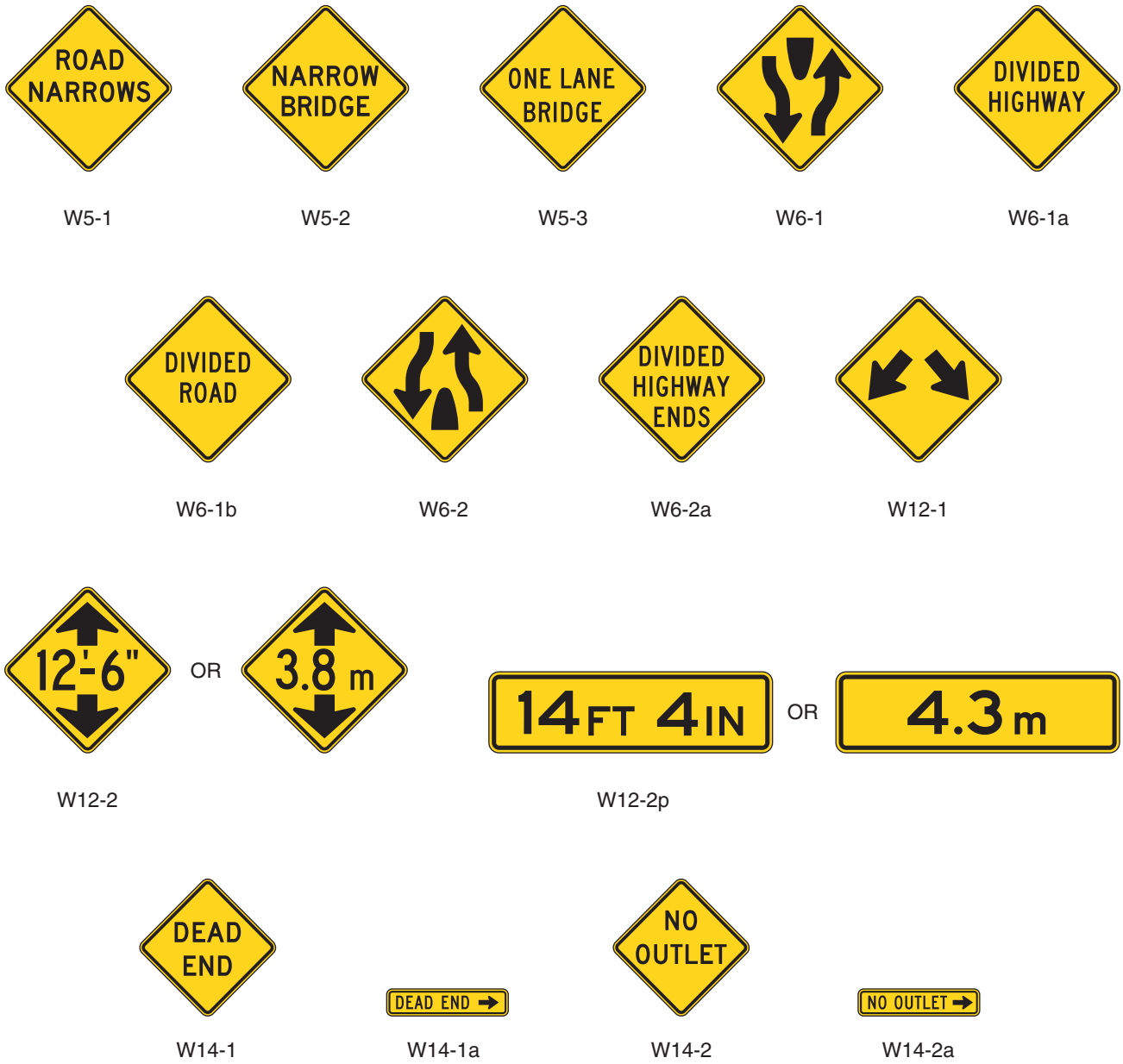
Guidance:

A ROAD NARROWS (W5-1) sign (see Figure 2C-3) should be used in advance of a transition on two-lane roads where the pavement width is reduced abruptly to a width such that vehicles might not be able to pass without reducing speed.

Option:

Additional emphasis may be provided by the use of object markers and delineators (see Chapters 3C and 3D). The Advisory Speed (W13-1) plaque (see Section 2C.46) may be used to indicate the recommended speed.

Figure 2C-3. Miscellaneous Warning Signs



Section 2C.16 NARROW BRIDGE Sign (W5-2)

Guidance:

A NARROW BRIDGE (W5-2) sign (see Figure 2C-3) should be used in advance of any bridge or culvert having a two-way roadway clearance width of 4.9 to 5.5 m (16 to 18 ft), or any bridge or culvert having a roadway clearance less than the width of the approach travel lanes.

Additional emphasis should be provided by the use of object markers, delineators, and/or pavement markings.

Option:

A NARROW BRIDGE sign may be used in advance of a bridge or culvert on which the approach shoulders are narrowed or eliminated.

Section 2C.17 ONE LANE BRIDGE Sign (W5-3)

Guidance:

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

A. Having a clear roadway width of less than 4.9 m (16 ft); or
B. Having a clear roadway width of less than 5.5 m (18 ft) when commercial vehicles constitute a high proportion of the traffic; or
C. Having a clear roadway width of 5.5 m (18 ft) or less where the sight distance is limited on the approach to the structure.

Additional emphasis should be provided by the use of object markers, delineators, and/or pavement markings.

Section 2C.18 Divided Highway (Road) Sign (W6-1)

Guidance:

A Divided Highway (W6-1) symbol sign (see Figure 2C-3) should be used on the approaches to a section of highway (not an intersection or junction) where the opposing flows of traffic are separated by a median or other physical barrier.

Option:

The word message DIVIDED HIGHWAY (W6-1a) or DIVIDED ROAD (W6-1b) sign (see Figure 2C-3) may be used as an alternate to the symbol sign.

Section 2C.19 Divided Highway (Road) Ends Sign (W6-2)

Guidance:

A Divided Highway Ends (W6-2) symbol sign (see Figure 2C-3) should be used in advance of the end of a section of physically divided highway (not an intersection or junction) as a warning of two-way traffic ahead.

Option:

The Two-Way Traffic (W6-3) symbol sign (see Section 2C.34) may be used to give warning and notice of the transition to a two-lane, two-way section.

The word message DIVIDED HIGHWAY ENDS (W6-2a) or DIVIDED ROAD ENDS (W6-2b) sign (see Figure 2C-3) may be used as an alternate to the symbol sign.

Section 2C.20 Double Arrow Sign (W12-1)

Option:

The Double Arrow (W12-1) sign (see Figure 2C-3) may be used to advise road users that traffic is permitted to pass on either side of an island, obstruction, or gore in the roadway. Traffic separated by this sign may either rejoin or change directions.

Guidance:

If used on an island, the Double Arrow sign should be mounted near the approach end.

If used in front of a pier or obstruction, the Double Arrow sign should be mounted on the face of, or just in front of, the obstruction. Where stripe markings are used on the obstruction, they should be discontinued to leave a 75 mm (3 in) space around the outside of the sign.

Section 2C.21 DEAD END/NO OUTLET Signs (W14-1, W14-1a,W14-2, W14-2a)

Option:

The DEAD END (W14-1) sign (see Figure 2C-3) may be used at the entrance of a single road or street that terminates in a dead end or cul-de-sac. The NO OUTLET (W14-2) sign may be used at the entrance to a road or road network from which there is no other exit.

DEAD END (W14-1a) or NO OUTLET (W14-2a) signs (see Figure 2C-3) may be used in combination with Street Name (D3-1) signs (see Section 2D.38) to warn turning traffic that the cross street ends in the direction indicated by the arrow.

At locations where the cross street does not have a name, the W14-1a or W14-2a signs may be used alone in place of a street name sign.

Standard:

When the W14-1 or W14-2 sign is used, the sign shall be posted as near as practical to the entry point or at a sufficient advance distance to permit the road user to avoid the dead end or no outlet condition by turning off, if possible, at the nearest intersecting street.

The DEAD END (W14-1a) or NO OUTLET (W14-2a) signs shall not be used instead of the W14-1 or W14-2 signs where traffic can proceed straight through the intersection into the dead end street or no outlet area.

Section 2C.22 Low Clearance Signs (W12-2 and W12-2p)

Standard:

The Low Clearance (W12-2) sign (see Figure 2C-3) shall be used to warn road users of clearances less than 300 mm (12 in) above the statutory maximum vehicle height.

Guidance:

The actual clearance should be shown on the Low Clearance sign to the nearest 25 mm (1 in) not exceeding the actual clearance. However, in areas that experience changes in temperature causing frost action, a reduction, not exceeding 75 mm (3 in), should be used for this condition.

Where the clearance is less than the legal maximum vehicle height, the W12-2 sign with a supplemental distance plaque should be placed at the nearest intersecting road or wide point in the road at which a vehicle can detour or turn around.

In the case of an arch or other structure under which the clearance varies greatly, two or more signs should be used as necessary on the structure itself to give information as to the clearances over the entire roadway.

Clearances should be evaluated periodically, particularly when resurfacing operations have occurred.

Option:

The Low Clearance sign may be installed on or in advance of the structure. If a sign is placed on the structure, it may be a rectangular shape (W12-2p) with the appropriate legend (see Figure 2C-3).

Section 2C.23 BUMP and DIP Signs (W8-1, W8-2)

Guidance:

BUMP (W8-1) and DIP (W8-2) signs (see Figure 2C-4) should be used to give warning of a sharp rise or depression in the profile of the road.

Option:

These signs may be supplemented with an Advisory Speed plaque (see Section 2C.46).

Standard:

The DIP sign shall not be used at a short stretch of depressed alignment that might momentarily hide a vehicle.

Guidance:

A short stretch of depressed alignment that might momentarily hide a vehicle should be treated as a no-passing zone when centerline striping is provided on a two-lane or three-lane road (see Section 3B.02).

Section 2C.24 SPEED HUMP Sign (W17-1)

Guidance:

The SPEED HUMP (W17-1) sign (see Figure 2C-4) should be used to give warning of a vertical deflection in the roadway that is designed to limit the speed of traffic.

If used, the SPEED HUMP sign should be supplemented by an Advisory Speed plaque (see Section 2C.46).

Option:

If a series of speed humps exists in close proximity, an Advisory Speed plaque may be eliminated on all but the first SPEED HUMP sign in the series.

The legend SPEED BUMP may be used instead of the legend SPEED HUMP on the W17-1 sign.

Support:

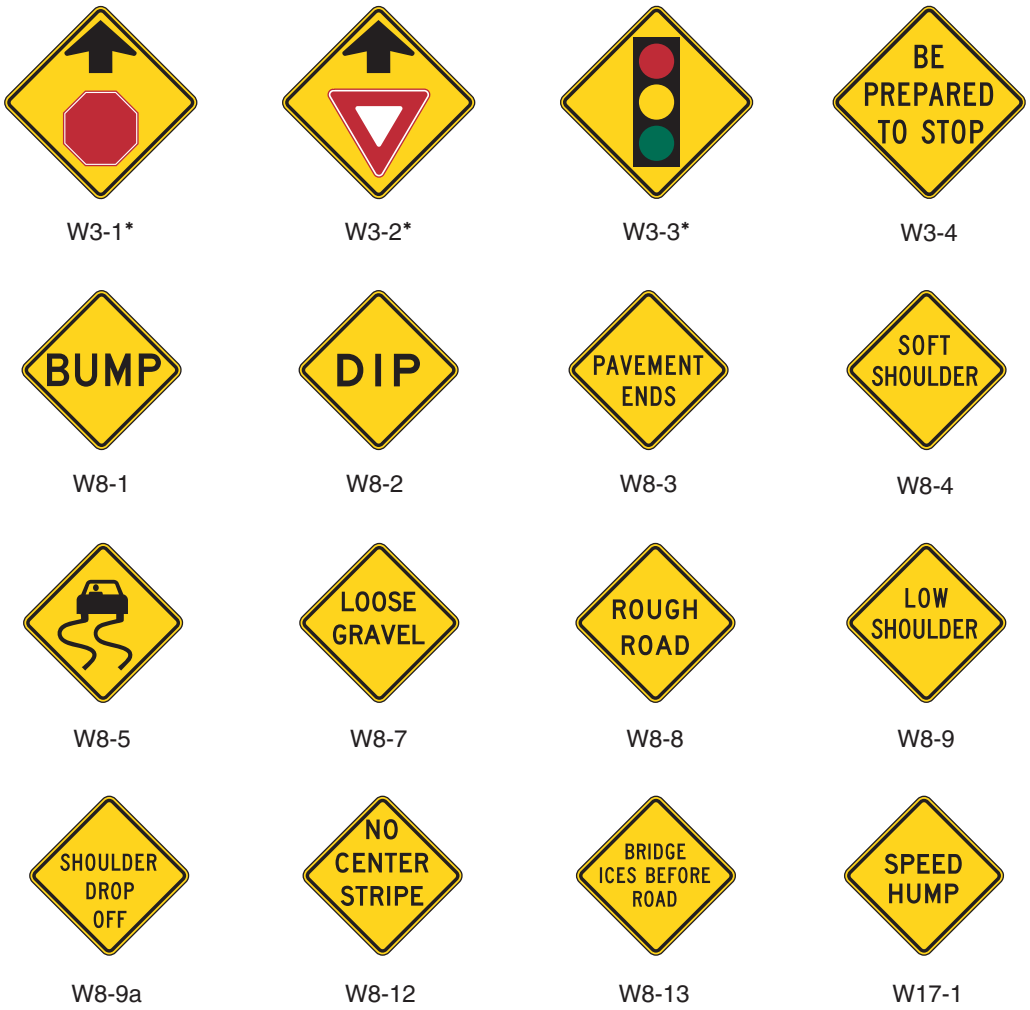
Speed humps generally provide more gradual vertical deflection than speed bumps. Speed bumps limit the speed of traffic more severely than speed humps. However, this difference in engineering terminology is not well known by the public, so for signing purposes the terms are interchangeable.

Section 2C.25 PAVEMENT ENDS Sign (W8-3)

Guidance:

A PAVEMENT ENDS (W8-3) word message sign (see Figure 2C-4) should be used where a paved surface changes to either a gravel treated surface or an earth road surface.

Figure 2C-4. Roadway Condition and Advance Traffic Control Signs



*An optional word message sign is shown in the "Standard Highway Signs" book.

Option:

An Advisory Speed plaque (see Section 2C.46) may be used when the change in roadway condition requires a reduced speed.

Section 2C.26 <u>Shoulder Signs (W8-4, W8-9, and W8-9a)</u>

Option:

The SOFT SHOULDER (W8-4) sign (see Figure 2C-4) may be used to warn of a soft shoulder condition.

The LOW SHOULDER (W8-9) sign (see Figure 2C-4) may be used to warn of a shoulder condition where there is an elevation difference of less than 75 mm (3 in) between the shoulder and the travel lane.

Guidance:

The SHOULDER DROP OFF (W8-9a) sign (see Figure 2C-4) should be used when an unprotected shoulder drop-off, adjacent to the travel lane, exceeds 75 mm (3 in) in depth for a significant continuous length along the roadway, based on engineering judgment.

Additional shoulder signs should be placed at appropriate intervals along the road where the condition continually exists.

Standard:

When used, shoulder signs shall be placed in advance of the condition (see Table 2C-4).

Section 2C.27 Slippery When Wet Sign (W8-5)

Option:

The Slippery When Wet (W8-5) sign (see Figure 2C-4) may be used to warn that a slippery condition might exist.

Guidance:

When used, a Slippery When Wet sign should be placed in advance of the beginning of the affected section (see Table 2C-4), and additional signs should be placed at appropriate intervals along the road where the condition exists.

Section 2C.28 BRIDGE ICES BEFORE ROAD Sign (W8-13)

Option:

A BRIDGE ICES BEFORE ROAD (W8-13) sign (see Figure 2C-4) may be used in advance of bridges to advise bridge users of winter weather conditions.

The BRIDGE ICES BEFORE ROAD sign may be removed or covered during seasons of the year when its message is not relevant.

Section 2C.29 Advance Traffic Control Signs (W3-1, W3-2, W3-3, W3-4)

Standard:

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

Support:

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

Guidance:

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

Option:

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

Word messages (W3-1a, W3-2a, W3-3a) may be used as alternates to the Advance Traffic Control symbol signs.

A supplemental street name plaque (see Section 2C.49) may be installed above or below an Advance Traffic Control sign.

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

A BE PREPARED TO STOP (W3-4) sign (see Figure 2C-4) may be used to warn of stopped traffic caused by a traffic control signal or in advance of a section of roadway that regularly experiences traffic congestion.

Standard:

When a BE PREPARED TO STOP sign is used in advance of a traffic control signal, it shall be used in addition to a Signal Ahead sign.

Option:

The BE PREPARED TO STOP sign may be supplemented with a warning beacon (see Section 4K.03).

Guidance:

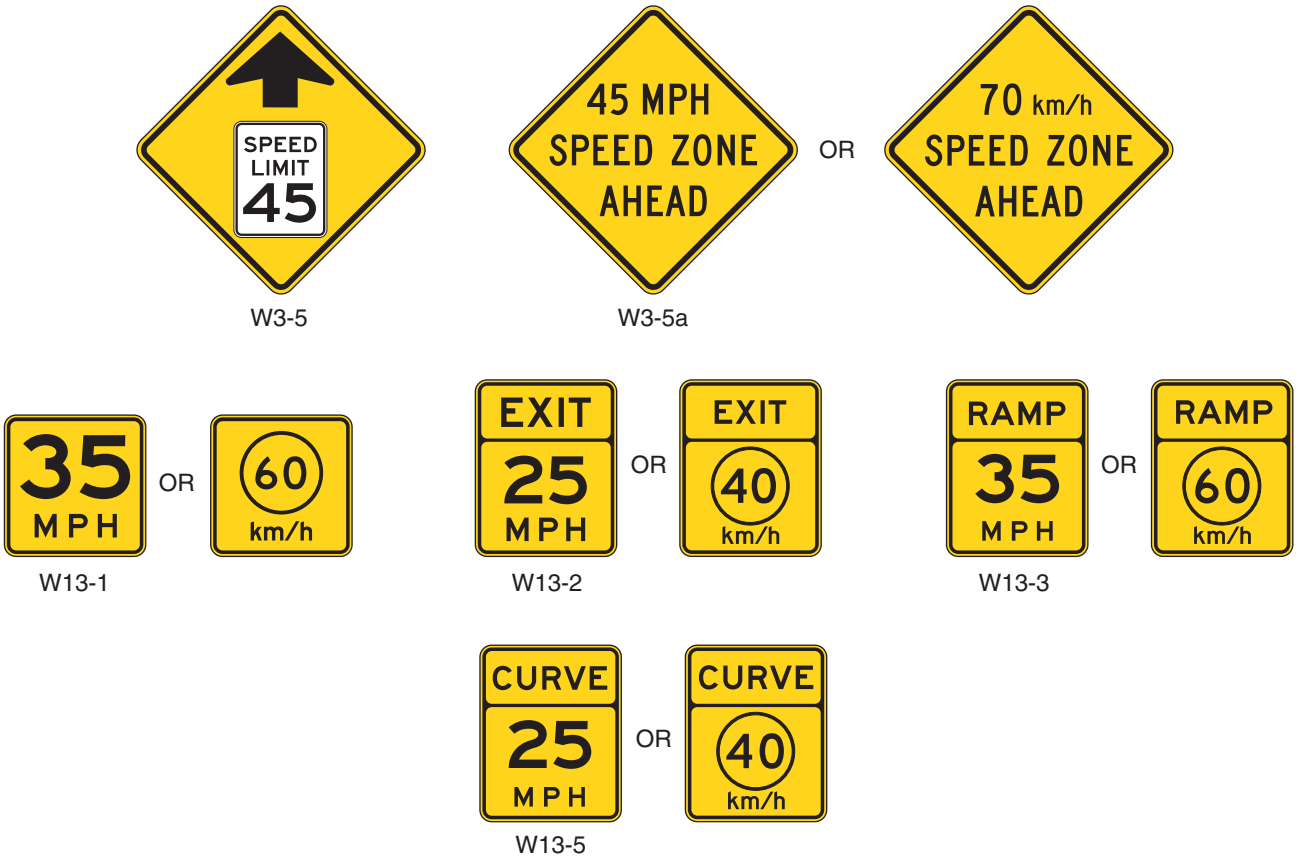
When the warning beacon is interconnected with a traffic control signal or queue detection system, the BE PREPARED TO STOP sign should be supplemented with a WHEN FLASHING plaque.

Section 2C.30 Speed Reduction Signs (W3-5, W3-5a)

Guidance:

A Speed Reduction (W3-5 or W3-5a) sign (see Figure 2C-5) should be used to inform road users of a reduced speed zone when engineering judgment indicates the need for advance notice to comply with the posted speed limit ahead.

Figure 2C-5. Advisory Speed and Speed Reduction Signs



Standard:

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

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

Section 2C.31 Merge Signs (W4-1, W4-5)

Option:

A Merge (W4-1) sign (see Figure 2C-6) may be used to warn road users on the major roadway that merging movements might be encountered in advance of a point where lanes from two separate roadways converge as a single traffic lane and no turning conflict occurs.

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

Guidance:

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

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

When a Merge sign is to be installed on an entering roadway that curves before merging with the major roadway, such as a ramp with a curving horizontal alignment as it approaches the major roadway, the Entering Roadway Merge (W4-5) sign (see Figure 2C-6) should be used to better portray the actual geometric conditions to road users on the entering roadway.

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

The Merge sign should not be used in place of a Lane Ends sign where lanes of traffic moving on a single roadway must merge because of a reduction in the actual or usable pavement width (see Section 2C.33).

Figure 2C-6. Merging and Passing Signs

Section 2C.32 Added Lane Signs (W4-3, W4-6)

Guidance:

The Added Lane (W4-3) sign (see Figure 2C-6) should be installed in advance of a point where two roadways converge and merging movements are not required. When possible, the Added Lane sign should be placed such that it is visible from both roadways; if this is not possible, an Added Lane sign should be placed on the side of each roadway.

When an Added Lane sign is to be installed on a roadway that curves before converging with another roadway that has a tangent alignment at the point of convergence, the Entering Roadway Added Lane (W4-6) sign (see Figure 2C-6) should be used to better portray the actual geometric conditions to road users on the curving roadway.

Section 2C.33 Lane Ends Signs (W4-2, W9-1, W9-2)

Guidance:

The LANE ENDS MERGE LEFT (RIGHT) (W9-2) word sign, or the Lane Ends (W4-2) symbol sign, should be used to warn of the reduction in the number of traffic lanes in the direction of travel on a multi-lane highway (see Figure 2C-6).

Option:

The RIGHT (LEFT) LANE ENDS (W9-1) word sign (see Figure 2C-6) may be used in advance of the Lane Ends (W4-2) symbol sign or the LANE ENDS MERGE LEFT (RIGHT) (W9-2) word sign as additional warning or to emphasize that the traffic lane is ending and that a merging maneuver will be required.

On one-way streets or on divided highways where the width of the median will permit, two Lane Ends signs may be placed facing approaching traffic, one on the right side and the other on the left side or median.

The reduction in the number of traffic lanes may also be delineated with roadway edge lines (see Section 3B.09) and/or roadway delineation (see Chapter 3D).

Guidance:

Where an extra lane has been provided for slower moving traffic (see Section 2B.32), a Lane Ends word sign or a Lane Ends (W4-2) symbol sign should be installed in advance of the end of the extra lane.

Lane Ends signs should not be installed in advance of the end of an acceleration lane.

Section 2C.34 Two-Way Traffic Sign (W6-3)

Guidance:

A Two-Way Traffic (W6-3) sign (see Figure 2C-6) should be used to warn road users of a transition from a multi-lane divided section of roadway to a two-lane, two-way section of roadway.

A Two-Way Traffic (W6-3) sign with an AHEAD (W16-9p) plaque (see Figure 2C-6) should be used to warn road users of a transition from a one-way street to a two-lane, two-way section of roadway (see Figure 2B-12, Sheet 2 of 2).

Option:

The Two-Way Traffic sign may be used at intervals along a two-lane, two-way roadway and may be used to supplement the Divided Highway (Road) Ends (W6-2) sign discussed in Section 2C.19.

Section 2C.35 NO PASSING ZONE Sign (W14-3)

Standard:

The NO PASSING ZONE (W14-3) sign (see Figure 2C-6) shall be a pennant-shaped isosceles triangle with its longer axis horizontal and pointing to the right. When used, the NO PASSING ZONE sign shall be installed on the left side of the roadway at the beginning of no-passing zones identified by either pavement markings or DO NOT PASS signs or both (see Sections 2B.29 and 3B.02).

Section 2C.36 Advisory Exit, Ramp, and Curve Speed Signs (W13-2, W13-3, W13-5)

Standard:

Advisory Exit, Ramp, and Curve Speed signs shall be vertical rectangles. The advisory Exit Speed (W13-2), Ramp Speed (W13-3), or Curve Speed (W13-5) signs (see Figure 2C-5) shall be used where engineering judgment indicates the need to advise road users of the recommended speed on an exit, a ramp, or a curve.

Guidance:

When used, the Exit Speed sign should be installed along the deceleration lane.

The Exit Speed sign should be visible in time for the road user to make a reasonably safe slowing and exiting maneuver.

The Ramp Speed sign should be visible in time for the road user to reduce to the recommended speed.

Option:

One or more Ramp Speed signs may be used along the deceleration lane, beyond the gore, or along the ramp (see Figure 2C-7). Based on engineering judgment, the Ramp Speed sign may be installed on the inside or outside of the curve to enhance its visibility.

A Turn (W1-1) or Curve (W1-2) sign with an Advisory Speed (W13-1) plaque may be used in place of a Ramp Speed sign if it is located such that it clearly does not apply to drivers on the main roadway.

A Curve Speed sign may be used at and beyond the beginning of a curve following a Horizontal Alignment and Advisory Speed sign combination, or when there is a need to remind road users of the recommended speed, or where the recommended speed changes because of a change in curvature (see Section 2C.06). Based on engineering judgment, the Curve Speed sign may be installed on the inside or outside of the curve to enhance its visibility.

The advisory speed may be the 85th-percentile speed of free-flowing traffic, the speed corresponding to a 16-degree ball bank indicator reading, or the speed otherwise determined by an engineering study because of unusual circumstances.

Support:

A 10-degree ball-bank indicator reading, formerly used in determining advisory speeds, is based on research from the 1930s. In modern vehicles, the 85th-percentile speed on curves approximates a 16-degree reading. This is the speed at which most drivers' judgment recognizes incipient instability along a ramp or curve.

Section 2C.37 Intersection Warning Signs (W2-1 through W2-6)

Option:

A Cross Road (W2-1) symbol, Side Road (W2-2 or W2-3) symbol, T-Symbol (W2-4), or Y-Symbol (W2-5) sign (see Figure 2C-8) may be used in advance of an intersection to indicate the presence of an intersection and the possibility of turning or entering traffic. The Circular Intersection (W2-6) symbol sign accompanied by an educational TRAFFIC CIRCLE (W16-12p) plaque (see Figure 2C-8) may be installed in advance of a circular intersection.

The relative importance of the intersecting roadways may be shown by different widths of lines in the symbol.

An advance street name plaque (see Section 2C.49) may be installed above or below an Intersection Warning sign.

Figure 2C-7. Example of Advisory Speed Signing for an Exit Ramp

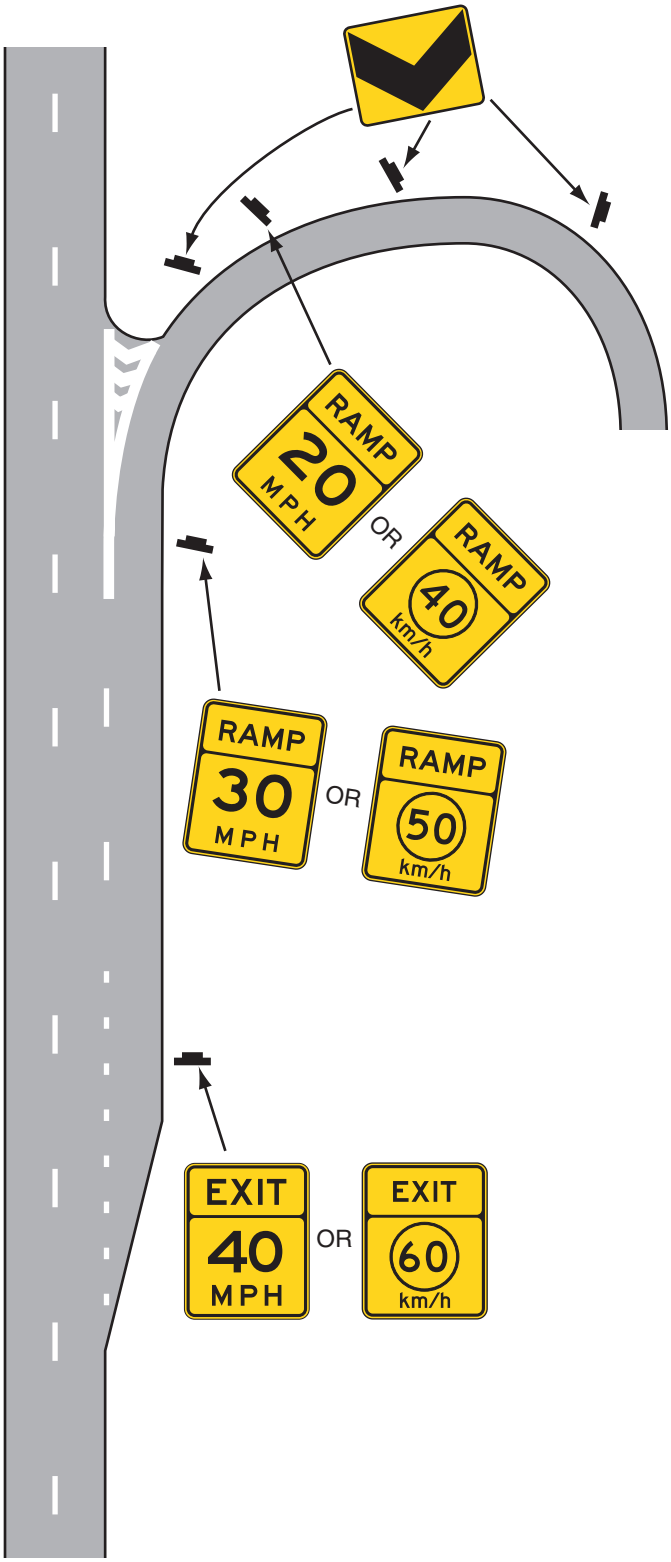
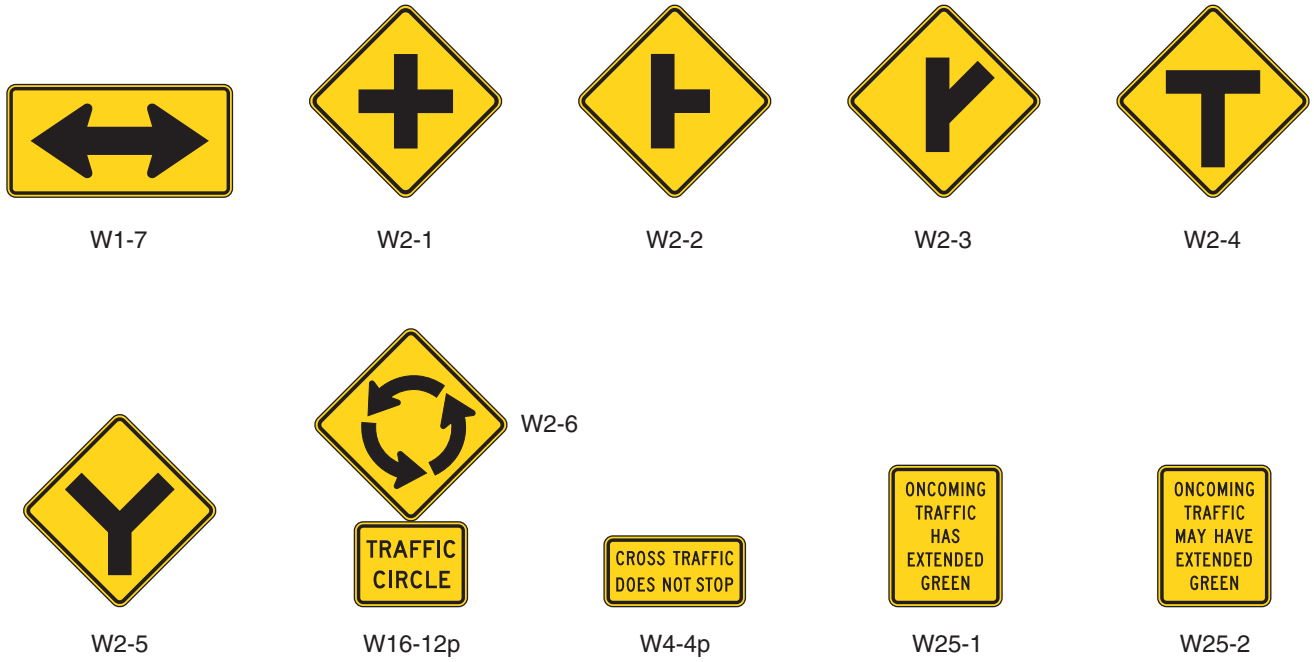


Figure 2C-8. Intersection Warning Signs



Guidance:

The Intersection Warning sign should illustrate and depict the general configuration of the intersecting roadway, such as cross road, side road, T-intersection, or Y-intersection.

Intersection Warning signs, other than the Circular Intersection symbol (W2-6) sign and the T-intersection symbol (W2-4) sign, should not be used on approaches controlled by STOP signs, YIELD signs, or signals. The Circular Intersection symbol (W2-6) sign should be installed on the approach to a YIELD sign controlled roundabout intersection.

Where the side roads are not opposite of each other, the symbol for the intersection should indicate a slight offset.

Section 2C.38 Two-Direction Large Arrow Sign (W1-7)

Standard:

The Two-Direction Large Arrow (W1-7) sign (see Figure 2C-8) shall be a horizontal rectangle.

If used, it shall be installed on the far side of a T-intersection in line with, and at approximately a right angle to, approaching traffic.

The Two-Direction Large Arrow sign shall not be used where there is no change in the direction of travel such as at the beginnings and ends of medians or at center piers.

Guidance:

The Two-Direction Large Arrow sign should be visible for a sufficient distance to provide the road user with adequate time to react to the intersection configuration.

Section 2C.39 Traffic Signal Signs (W25-1, W25-2)

Standard:

Unless a separate left-turn signal face is provided and is operated as described in Section 4D.06, if the possibility exists that a CIRCULAR YELLOW signal indication could be displayed to an approach from which drivers are turning left permissively without the simultaneous display of a CIRCULAR YELLOW signal indication to the opposing approach (see Section 4D.05), either a W25-1 or a W25-2 sign (see Figure 2C-8) shall be installed near the left-most signal head. If the operation described in the previous sentence occurs on a cycle-by-cycle basis during all times that the traffic control signal is operated in the stop-and-go mode, the ONCOMING TRAFFIC HAS EXTENDED GREEN (W25-1) sign shall be used; if the operation occurs only occasionally, the ONCOMING TRAFFIC MAY HAVE EXTENDED GREEN (W25-2) sign shall be used.

Section 2C.40 Vehicular Traffic Signs (W8-6, W11-1, W11-5, W11-5a, W11-8, W11-10, W11-11, W11-12p, W11-14)

Option:

Vehicular Traffic (W8-6, W11-1, W11-5, W11-5a, W11-8, W11-10, W11-11, W11-12p, W11-14) signs (see Figure 2C-9) may be used to alert road users to locations where unexpected entries into the roadway by trucks, bicyclists, farm vehicles, emergency vehicles, golf carts, horse-drawn vehicles, or other 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.

Support:

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

Guidance:

Vehicular Traffic 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.

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

Option:

Supplemental plaques (see Section 2C.43) with legends such as AHEAD, XX METERS (XX FEET), NEXT XX km (NEXT XX MILES), or SHARE THE ROAD may be mounted below Vehicular Traffic signs to provide advance notice to road users of unexpected entries.

Standard:

The Emergency Vehicle (W11-8) sign with the EMERGENCY SIGNAL AHEAD (W11-12p) supplemental plaque (see Figure 2C-9) shall be placed in advance of all emergency-vehicle traffic control signals (see Chapter 4F).

Option:

The Emergency Vehicle (W11-8) sign, or a word message sign indicating the type of emergency vehicle (such as rescue squad), may be used in advance of the emergency vehicle station when no emergency-vehicle traffic control signal is present.

Section 2C.41 Nonvehicular Signs (W11-2, W11-3, W11-4, W11-6, W11-7, W11-9)

Option:

Nonvehicular signs (see Figure 2C-10) may be used to alert road users in advance of locations where unexpected entries into the roadway or shared use of the roadway by pedestrians, animals, and other crossing activities might occur.

Support:

These conflicts might be relatively confined, or might occur randomly over a segment of roadway.

Option:

When used in advance of a crossing, Nonvehicular warning signs may be supplemented with supplemental plaques (see Section 2C.43) with the legend AHEAD, XX METERS (XX FEET), or NEXT XX km (NEXT XX MILES) to provide advance notice to road users of crossing activity.

Standard:

When used at the crossing, Nonvehicular signs shall be supplemented with a diagonal downward pointing arrow (W16-7p) plaque (see Figure 2C-11) showing the location of the crossing.

Option:

The crossing location may be defined with crosswalk markings (see Section 3B.17).

Pedestrian, Bicycle, and School signs and their related supplemental plaques may have a fluorescent yellow-green background with a black legend and border.

Guidance:

When a fluorescent yellow-green background 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 selected site area should be avoided.

Nonvehicular signs should be used only at locations where the crossing activity is unexpected or at locations not readily apparent.

Figure 2C-9. Vehicular Traffic Signs

W8-6

W11-1

W11-5

W11-5a

W11-8

W11-10

W11-11

W11-12p

W11-14

Figure 2C-10. Nonvehicular Traffic Signs

W11-2

W11-3

W11-4

W11-6

W11-7

W11-9

W15-1

Figure 2C-11. Supplemental Warning Plaques

Section 2C.42 Playground Sign (W15-1)

Option:

The Playground (W15-1) sign (see Figure 2C-10) may be used to give advance warning of a designated children's playground that is located adjacent to the road. The Playground sign may have a fluorescent yellow-green background with a black legend and border.

Guidance:

If the access to the playground area requires a roadway crossing, the application of crosswalk pavement markings (see Section 3B.17) and Nonvehicular signs (see Section 2C.41) should be considered.

Section 2C.43 Use of Supplemental Plaques

Option:

A supplemental plaque may be displayed with a warning sign when engineering judgment indicates that road users require additional information beyond that contained in the main message of the warning sign.

Standard:

Supplemental plaques shall be used only in combination with warning or regulatory signs. They shall not be mounted alone or displayed alone. If used, a supplemental plaque shall be installed on the same post(s) as the warning sign.

Section 2C.44 Design of Supplemental Plaques

Standard:

A supplemental plaque shall have the same color legend, border, and background as the warning sign with which it is displayed. Supplemental plaques shall be square or rectangular.

Section 2C.45 Distance Plaques (W16-2 series, W16-3 series, W16-4, W7-3a)

Option:

The Distance Ahead (W16-2 series and W16-3 series) plaques (see Figure 2C-11) may be used to inform the road user of the distance to the condition indicated by the warning sign.

The Next Distance (W7-3a and W16-4) plaques (see Figures 2C-2 and 2C-11) may be used to inform road users of the length of roadway over which the condition indicated by the warning sign exists.

Section 2C.46 Advisory Speed Plaque (W13-1)

Option:

The Advisory Speed (W13-1) plaque (see Figure 2C-5) may be used to supplement any warning sign to indicate the advisory speed for a condition.

Standard:

The Advisory Speed plaque shall be used where an engineering study indicates a need to advise road users of the advisory speed for a condition.

If used, the Advisory Speed plaque shall carry the message XX km/h (XX MPH). The speed shown shall be a multiple of 10 km/h or 5 mph.

Except in emergencies or when the condition is temporary, an Advisory Speed plaque shall not be installed until the advisory speed has been determined by an engineering study.

Guidance:

Because changes in conditions, such as roadway geometrics, surface characteristics, or sight distance, might affect the advisory speed, each location should be periodically evaluated and the Advisory Speed plaque changed if necessary.

Option:

The advisory speed may be the 85th-percentile speed of free-flowing traffic, the speed corresponding to a 16-degree ball bank indicator reading, or the speed otherwise determined by an engineering study because of unusual circumstances.

Support:

A 10-degree ball-bank indicator reading, formerly used in determining advisory speeds, is based on research from the 1930s. In modern vehicles, the 85th-percentile speed on curves approximates a 16-degree reading. This is the speed at which most drivers' judgment recognizes incipient instability along a ramp or curve.

Section 2C.47 Supplemental Arrow Plaques (W16-5p, W16-6p, W16-7p)

Guidance:

If the condition indicated by a warning sign is located on an intersecting road and the distance between the intersection and condition is not sufficient to provide adequate advance placement of the warning sign, a Supplemental Arrow (W16-5p, W16-6p, W16-7p) plaque (see Figure 2C-11) should be used below the warning sign.

Standard:

Supplemental Arrow plaques (see Figure 2C-2) shall have the same legend design as the Advance Turn Arrow and Directional Arrow auxiliary signs (see Sections 2D.25 and 2D.26) except that they shall have a black legend and border on a yellow or fluorescent yellow-green background, as appropriate.

Section 2C.48 Hill-Related Plaques (W7-2 Series, W7-3 Series)

Guidance:

Hill-Related (W7-2 series, W7-3 series) plaques (see Figure 2C-11) or other appropriate legends and larger signs should be used for emphasis or where special hill characteristics exist.

On longer grades, the use of the distance plaque (W7-3a or W7-3b) at periodic intervals of approximately 1.6 km (1 mi) spacing should be considered.

Section 2C.49 Advance Street Name Plaque (W16-8, W16-8a)

Option:

An Advance Street Name (W16-8 or W16-8a) plaque (see Figure 2C-11) may be used with any Intersection sign (W2 series) or Advance Traffic Control (W3 series) sign to identify the name of the intersecting street.

Section 2C.50 CROSS TRAFFIC DOES NOT STOP Plaque (W4-4p)

Option:

The CROSS TRAFFIC DOES NOT STOP (W4-4p) plaque (see Figure 2C-8) may be used in combination with a STOP sign when engineering judgment indicates that conditions are present that are causing or could cause drivers to misinterpret the intersection as an all-way stop.

Alternate messages such as TRAFFIC FROM LEFT (RIGHT) DOES NOT STOP or ONCOMING TRAFFIC DOES NOT STOP may be used on the W4-4p plaque when such messages more accurately describe the traffic controls established at the intersection.

Standard:

If the W4-4p plaque is used, it shall be installed below the STOP sign.

Section 2C.51 SHARE THE ROAD Plaque (W16-1)

Option:

In situations where there is a need to warn drivers to watch for other slower forms of transportation traveling along the highway, such as bicycles, golf carts, horse-drawn vehicles, or farm machinery, a SHARE THE ROAD (W16-1) plaque (see Figure 2C-11) may be used.

Section 2C.52 High-Occupancy Vehicle (HOV) Plaque (W16-11)

Option:

In situations where there is a need to warn drivers in an HOV lane of a specific condition, a HOV (W16-11) plaque (see Figure 2C-11) may be used. The HOV plaque may be used to differentiate a warning sign specific for HOV lanes when the sign is also visible to traffic on the adjoining general purpose roadway. Among the warning signs that may be possible applications of the HOV plaque are the Advisory Speed, Advisory Exit Speed, Added Lane, and Merge signs.

The diamond symbol may be used instead of the word message HOV on the W16-11 plaque. When appropriate, the words LANE or ONLY may be used on this plaque.

Section 2C.53 PHOTO ENFORCED Plaque (W16-10)

Option:

A PHOTO ENFORCED (W16-10) plaque (see Figure 2C-11) may be mounted below a warning sign to advise road users that the regulations associated with the condition being warned about (such as a traffic control signal or a toll plaza) are being enforced by photographic equipment.

Standard:

If used below a warning sign, the PHOTO ENFORCED plaque shall be a rectangle with a black legend and border on a yellow background.

CHAPTER 2D. GUIDE SIGNS—CONVENTIONAL ROADS

Section 2D.01 Scope of Conventional Road Guide Sign Standards

Standard:

Standards for conventional road guide signs shall apply to any road or street other than low-volume roads (as defined in Section 5A.01), expressways, and freeways.

Section 2D.02 Application

Support:

Guide signs are essential to direct road users along streets and highways, to inform them of intersecting routes, to direct them to cities, towns, villages, or other important destinations, to identify nearby rivers and streams, parks, forests, and historical sites, and generally to give such information as will help them along their way in the most simple, direct manner possible.

Chapter 2A addresses placement, location, and other general criteria for signs.

Section 2D.03 Color, Retroreflection, and Illumination

Support:

Requirements for illumination, retroreflection, and color are stated under the specific headings for individual guide signs or groups of signs. General provisions are given in Sections 2A.08, 2A.09, and 2A.11.

Standard:

Except where otherwise specified herein for individual signs or groups of signs, guide signs on streets and highways shall have a white message and border on a green background. All messages, borders, and legends shall be retroreflective and all backgrounds shall be retroreflective or illuminated.

Support:

Color coding is sometimes used to help road users distinguish between multiple potentially confusing destinations. Examples of valuable uses of color coding include guide signs for roadways approaching or inside an airport property with multiple terminals serving multiple airlines, and wayfinding signs for various traffic generator destinations within a community or area.

Standard:

Different color sign backgrounds shall not be used to provide color coding of destinations. The color coding shall be accomplished by the use of different colored square or rectangular panels on the face of the guide signs.

Option:

The different colored panels may include a black or white (whichever provides the better contrast with the panel color) letter, numeral, or other appropriate designation to identify the airport terminal or other destination.

Support:

Two examples of color-coded sign assemblies are shown in Figure 2D-1.

Section 2D.04 Size of Signs

Support:

For most guide signs, the legends are so variable that a standardized size is not appropriate. The sign size is determined primarily by the length of the message, and the size of lettering and spacing necessary for proper legibility. However, for signs with standardized designs, such as route signs, it is practical to use the prescribed sizes that are given in the "Standard Highway Signs" book (see Section 1A.11).

Option:

Reduced letter height, reduced interline spacing, and reduced edge spacing may be used on guide signs if sign size must be limited by factors such as lane width or vertical or lateral clearance.

Guidance:

Reduced spacing between the letters or words on a line of legend should not be used as a means of reducing the overall size of a guide sign, except where determined necessary by engineering judgment to meet unusual lateral space constraints. In such cases, the legibility distance of the sign legend should be the primary consideration in determining whether to reduce the spacing between the letters or the words or between the words and the sign border, or to reduce the letter height.

When a reduction in the prescribed size is necessary, the design used should be as similar as possible to the design for the standard size.

Figure 2D-1. Examples of Color-Coded Destination Guide Signs

a - Freeway or Expressway – Airport Terminals

b - Conventional Road or Street – Urban Areas

Section 2D.05 Lettering Style

Standard:

The design of upper-case letters, lower-case letters, capital letters, numerals, route shields, and spacing shall be as provided in the "Standard Highway Signs" book (see Section 1A.11).

The lettering for names of places, streets, and highways on conventional road guide signs shall be a combination of lower-case letters with initial upper-case letters, or all capital letters (see Section 2A.14). When a combination of upper- and lower-case letters are used, the initial upper-case letters shall be approximately 1.33 times the "loop" height of the lower-case letters.

All other word legends on conventional road guide signs shall be in capital letters.

Section 2D.06 Size of Lettering

Support:

Sign legibility is a direct function of letter size and spacing. Legibility distance has to be sufficient to give road users enough time to read and comprehend the sign. Under optimum conditions, a guide sign message can be read and understood in a brief glance. The legibility distance includes a reasonable safety factor for inattention, blocking of view by other vehicles, unfavorable weather, inferior eyesight, or other causes for delayed or slow reading. Where conditions permit, repetition of guide information on successive signs gives the road user more than one opportunity to obtain the information needed.

Standard:

Design layouts for conventional road guide signs showing interline spacing, edge spacing, and other specification details shall be as shown in the "Standard Highway Signs" book (see Section 1A.11).

The principal legend on guide signs shall be in letters and numerals at least 150 mm (6 in) in height for all capital letters, or a combination of 150 mm (6 in) in height for upper-case letters with 113 mm (4.5 in) in height for lower-case letters. On low-volume roads (as defined in Section 5A.01), and on urban streets with speeds of 40 km/h (25 mph) or less, the principal legend shall be in letters at least 100 mm (4 in) in height.

Guidance:

Lettering sizes should be consistent on any particular class of highway.

The minimum lettering sizes specified herein should be exceeded where conditions indicate a need for greater legibility.

Section 2D.07 Amount of Legend

Support:

The longer the legend on a guide sign, the longer it will take road users to comprehend it, regardless of letter size.

Guidance:

Guide signs should be limited to three lines of principal legend. Where two or more signs are included in the same overhead display, the amount of legend should be minimized. The principal legend should include only place names, route numbers, and street names.

Option:

Symbols, action information, cardinal directions, and exit numbers may be used in addition to the principal legend where sign space is available.

Section 2D.08 Arrows

Support:

Arrows are used for lane assignment and to indicate the direction toward designated routes or destinations. Figure 2D-2 shows the up-arrow and the down-arrow designs that have been approved for use on guide signs. Detailed drawings of these arrows are shown in the "Standard Highway Signs" book (see Section 1A.11).

Standard:

On overhead signs where it is desirable to indicate a lane to be followed, a down arrow shall point downward toward the center of that lane. Down arrows shall be used only on overhead guide signs that restrict the use of specific lanes to traffic bound for the destination(s) and/or route(s) indicated by these arrows. Down arrows shall not be used unless an arrow can be pointed to each lane that can be used to reach the destination shown on the sign.

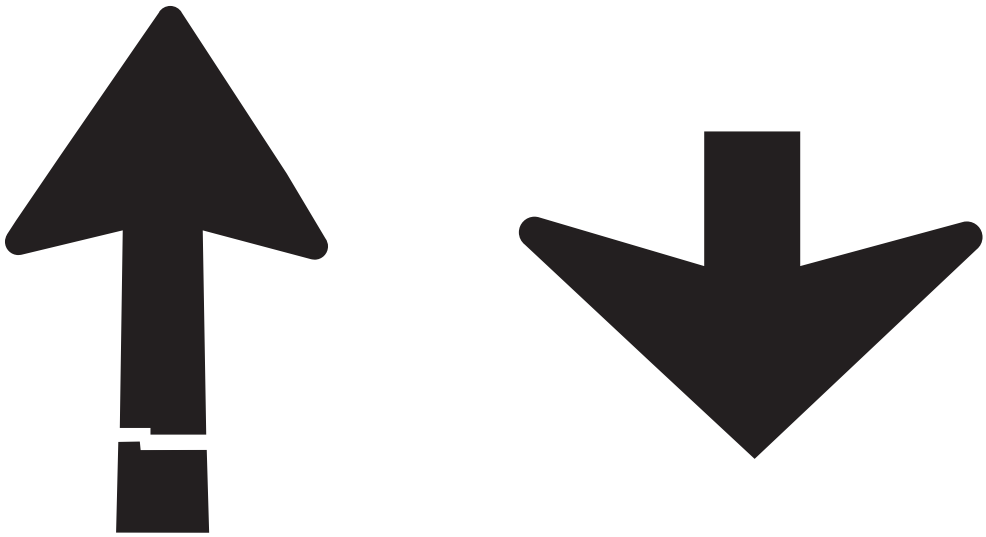
Where a roadway is leaving the through lanes, an up arrow shall point upward at an angle representative of the alignment of the exit roadway.

Guidance:

Arrows used on guide signs to indicate the directions toward designated routes or destinations should be pointed at the appropriate angle to clearly convey the direction to be taken. A horizontally oriented up-arrow design should be used at right-angle intersections.

On a ground-mounted guide sign, a directional arrow for a straight-through movement should point upward. For a turn, the arrow on a guide sign should point upward and at an angle related to the sharpness of the turn.

Figure 2D-2. Arrows for Use on Guide Signs



Up Arrow Down Arrow

Option:

Arrows may be placed below the principal sign legend or on the appropriate side of the legend.

Guidance:

At an exit, an arrow should be placed at the side of the sign which will reinforce the movement of exiting traffic. The up-arrow design should be used.

The width across the arrowhead should be at least equal to the height of the largest letter on the sign. For short downward pointing arrows on overhead signs, the width across the arrowhead should be 1.75 times the letter height.

Diagrammatic signing used on conventional roads should follow the principles set forth in Section 2E.19.

Section 2D.09 Numbered Highway Systems

Support:

The purpose of numbering and signing highway systems is to identify routes and facilitate travel.

The Interstate and United States (U.S.) highway systems are numbered by the American Association of State Highway and Transportation Officials (AASHTO) upon recommendations of the State highway organizations because the respective States own these systems. State and County road systems are numbered by the appropriate authorities.

The basic policy for numbering the U.S. and Interstate highway systems is contained in the following Purpose and Policy statements published by AASHTO (see Page i for AASHTO's address):

A. "Establishment and Development of United States Numbered Highways"; and
B. "Establishment of a Marking System of the Routes Comprising the National System of Interstate and Defense Highways."

Guidance:

The principles of these policies should be followed in establishing the above highway systems and any other systems, with effective coordination between adjacent jurisdictions. Care should be taken to avoid the use of numbers or other designations that have been assigned to Interstate, U.S., or State routes in the same geographic area. Overlapping numbered routes should be kept to a minimum.

Standard:

Route systems shall be given preference in this order: Interstate, United States, State, and County. The preference shall be given by installing the highest-priority legend on the top or the left of the sign panel.

Section 2D.10 Route Signs and Auxiliary Signs

Standard:

All numbered highway routes shall be identified by route signs and auxiliary signs.

The signs for each system of numbered highways, which are distinctive in shape and color, shall be used only on that system and the approaches thereto.

Route signs and any auxiliary signs that accompany them shall be retroreflective.

Option:

Route signs and auxiliary signs may be proportionally enlarged where greater legibility is needed.

Support:

Route signs are typically mounted in assemblies with auxiliary signs.

Section 2D.11 Design of Route Signs

Standard:

The "Standard Highway Signs" book (see Section 1A.11) shall be used for designing route signs. Other route sign designs shall be established by the authority having jurisdiction.

Interstate Route signs (see Figure 2D-3) shall consist of a cutout shield, with the route number in white letters on a blue background, the word INTERSTATE in white capital letters on a red background, and a white border. This sign shall be used on all Interstate routes and in connection with route sign assemblies on intersecting highways.

A 600 x 600 mm (24 x 24 in) minimum sign size shall be used for Interstate route numbers with one or two digits, and a 750 x 600 mm (30 x 24 in) minimum sign size shall be used for Interstate route numbers having three digits.

Figure 2D-3. Route Signs

Interstate Route Sign
M1-1

Off-Interstate Business Route Sign
M1-2 (Loop)
M1-3 (Spur)

U.S. Route Sign
M1-4

State Route Sign
M1-5

County Route Sign
M1-6

Forest Route Sign
M1-7

Option:

Interstate Route signs may contain the State name in white upper-case letters on a blue background.

Standard:

Off-Interstate Business Route signs (see Figure 2D-3) shall consist of a cutout shield carrying the number of the connecting Interstate route and the words BUSINESS and either LOOP or SPUR in capital letters. The legend and border shall be white on a green background, and the shield shall be the same shape and dimensions as the Interstate Route sign. In no instance shall the word INTERSTATE appear on the Off-Interstate Business Route sign.

Option:

The Off-Interstate Business Route sign may be used on a major highway that is not a part of the Interstate system, but one that serves the business area of a City from an interchange on the system. When used on a green guide sign, a white square or rectangle may be placed behind the shield to improve contrast.

Standard:

U.S. Route signs (see Figure 2D-3) shall consist of black numerals on a white shield surrounded by a black background without a border. This sign shall be used on all U.S. routes and in connection with route sign assemblies on intersecting highways.

A 600 x 600 mm (24 x 24 in) minimum sign size shall be used for U.S. route numbers with one or two digits, and a 750 x 600 mm (30 x 24 in) minimum sign size shall be used for U.S. route numbers having three digits.

State Route signs shall be designed by the individual State highway agencies.

Guidance:

State Route signs (see Figure 2D-3) should be rectangular and should be approximately the same size as the U.S. Route sign. State Route signs should also be similar to the U.S. Route sign by containing approximately the same size black numerals on a white area surrounded by a black background without a border. The shape of the white area should be circular in the absence of any determination to the contrary by the individual State concerned.

Standard:

If County road authorities elect to establish and identify a special system of important County roads, a statewide policy for such signing shall be established that includes a uniform numbering system to uniquely identify each route. The County Route (M1-6) sign (see Figure 2D-3) shall consist of a pentagon shape with a yellow County name and route number and border on a blue background. County Route signs displaying two digits or the equivalent (letter and numeral, or two letters) shall be a minimum size of 450 x 450 mm (18 x 18 in); those carrying three digits or the equivalent shall be a minimum size of 600 x 600 mm (24 x 24 in).

If a jurisdiction uses letters instead of numbers to identify routes, all references to numbered routes in this Chapter shall be interpreted to also include lettered routes.

Guidance:

If used with other route signs in common assemblies, the County Route sign should be of a size compatible with that of the other route signs.

Option:

When used on a green guide sign, a yellow square or rectangle may be placed behind the County Route sign to improve contrast.

Standard:

Route signs (see Figure 2D-3) for park and forest roads shall be designed with adequate distinctiveness and legibility and of a size compatible with other route signs used in common assemblies.

Section 2D.12 Design of Route Sign Auxiliaries

Standard:

Route sign auxiliaries carrying word legends, except the JCT sign, shall have a standard size of 600 x 300 mm (24 x 12 in). Those carrying arrow symbols, or the JCT sign, shall have a standard size of 525 x 375 mm (21 x 15 in). All route sign auxiliaries shall match the color combination of the route sign that they supplement.

Guidance:

Auxiliary signs carrying word messages and mounted with 750 x 600 mm (30 x 24 in) Interstate Route signs should be 750 x 375 mm (30 x 15 in). With route signs of larger sizes, auxiliary signs should be suitably enlarged, but not such that they exceed the width of the route sign.

Option:

A route sign and any auxiliary signs used with it may be combined on a single panel.

Section 2D.13 Junction Auxiliary Sign (M2-1)

Standard:

The Junction (M2-1) auxiliary sign (see Figure 2D-4) shall carry the abbreviated legend JCT and shall be mounted at the top of an assembly (see Section 2D.27) either directly above the route sign or above a sign for an alternative route (see Section 2D.16) that is part of the route designation. The minimum size of the Junction auxiliary sign shall be 525 x 375 mm (21 x 15 in) for compatibility with auxiliary signs carrying arrow symbols.

Section 2D.14 Combination Junction Sign (M2-2)

Option:

As an alternative to the standard Junction assembly where more than one route is to be intersected or joined, a rectangular sign may be used carrying the word JUNCTION above the route numbers.

Other designs may be used to accommodate State and County Route signs.

Standard:

The Combination Junction (M2-2) sign (see Figure 2D-4) shall have a green background with white border and lettering for the word JUNCTION.

Guidance:

Where U.S. or State Route signs are used as components of guide signs, only the outline of the shield or other distinctive shape should be used.

Although the size of the Combination Junction sign will depend on the number of routes involved, the numerals should be large enough for clear legibility and should be of a size comparable with those in the individual route signs.

Section 2D.15 Cardinal Direction Auxiliary Signs (M3-1 through M3-4)

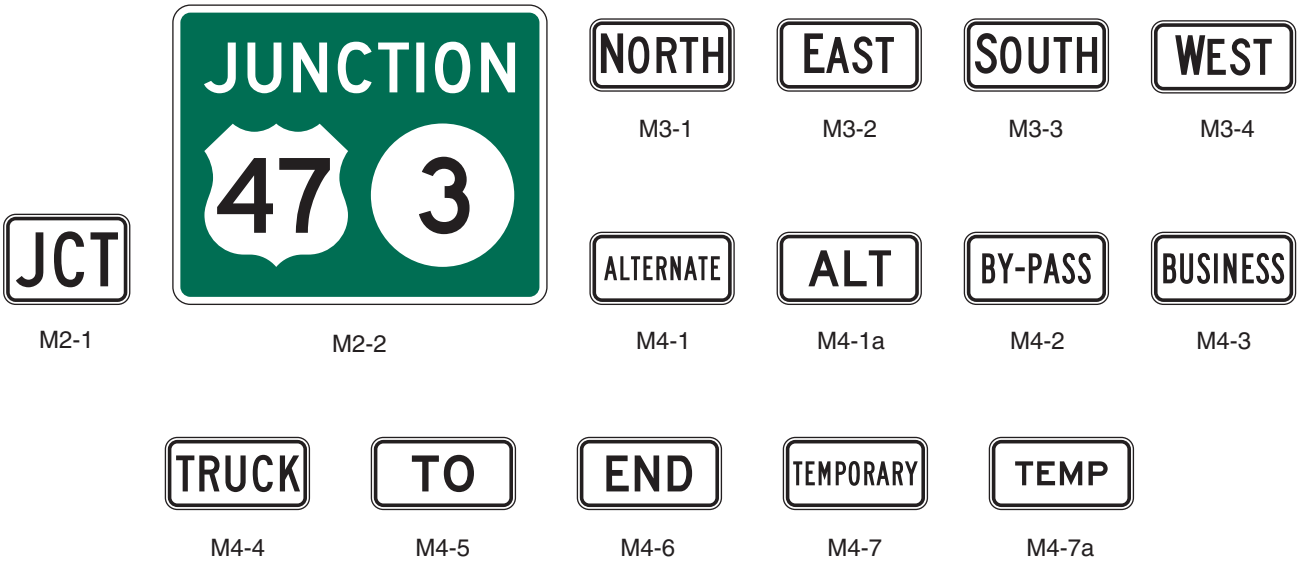
Guidance:

Cardinal Direction auxiliary signs (see Figure 2D-4) carrying the legend NORTH, EAST, SOUTH, or WEST should be used to indicate the general direction of the entire route.

Standard:

To improve the readability, the first letter of the cardinal direction words shall be ten percent larger, rounded up to the nearest whole number size.

Figure 2D-4. Route Sign Auxiliaries



If used, the Cardinal Direction auxiliary sign shall be mounted directly above a route sign or an auxiliary sign for an alternative route.

Section 2D.16 Auxiliary Signs for Alternative Routes (M4 Series)

Option:

Auxiliary signs, carrying legends such as ALTERNATE, BY-PASS, BUSINESS, or TRUCK, may be used to indicate an alternate route of the same number between two points on that route.

Standard:

If used, the auxiliary signs for alternative routes shall be mounted directly above a route sign.

Section 2D.17 ALTERNATE Auxiliary Signs (M4-1, M4-1a)

Option:

The ALTERNATE (M4-1) or the ALT (M4-1a) auxiliary sign (see Figure 2D-4) may be used to indicate an officially designated alternate routing of a numbered route between two points on that route.

Standard:

If used, the ALTERNATE or ALT auxiliary sign shall be mounted directly above a route sign.

Guidance:

The shorter (time or distance) or better-constructed route should retain the regular route number, and the longer or worse-constructed route should be designated as the alternate route.

Section 2D.18 BY-PASS Auxiliary Sign (M4-2)

Option:

The BY-PASS (M4-2) auxiliary sign (see Figure 2D-4) may be used to designate a route that branches from the numbered route through a City, bypasses a part of the City or congested area, and rejoins the numbered route beyond the City.

Standard:

If used, the BY-PASS auxiliary sign shall be mounted directly above a route sign.

Section 2D.19 BUSINESS Auxiliary Sign (M4-3)

Option:

The BUSINESS (M4-3) auxiliary sign (see Figure 2D-4) may be used to designate an alternate route that branches from a numbered route, passes through the business portion of a City, and rejoins the numbered route beyond that area.

Standard:

If used, the BUSINESS auxiliary sign shall be mounted directly above a route sign.

Section 2D.20 TRUCK Auxiliary Sign (M4-4)

Option:

The TRUCK (M4-4) auxiliary sign (see Figure 2D-4) may be used to designate an alternate route that branches from a numbered route, when it is desirable to encourage or require commercial vehicles to use the alternate route.

Standard:

If used, the TRUCK auxiliary sign shall be mounted directly above a route sign.

Section 2D.21 TO Auxiliary Sign (M4-5)

Option:

The TO (M4-5) auxiliary sign (see Figure 2D-4) may be used to provide directional guidance to a particular road facility from other highways in the vicinity (see Section 2D.32).

Standard:

If used, the TO auxiliary sign shall be mounted directly above a route sign or an auxiliary sign for an alternative route.

Section 2D.22 END Auxiliary Sign (M4-6)

Guidance:

The END (M4-6) auxiliary sign (see Figure 2D-4) should be used where the route being traveled ends, usually at a junction with another route.

Standard:

If used, the END auxiliary sign shall be mounted either directly above a route sign or above a sign for an alternative route that is part of the designation of the route being terminated.

Section 2D.23 TEMPORARY Auxiliary Signs (M4-7, M4-7a)

Option:

The TEMPORARY (M4-7) or the TEMP (M4-7a) auxiliary sign (see Figure 2D-4) may be used for an interim period to designate a section of highway that is not planned as a permanent part of a numbered route, but that connects completed portions of that route.

Standard:

If used, the TEMPORARY or TEMP auxiliary sign shall be mounted either directly above the route sign, above a Cardinal Direction sign, or above a sign for an alternate route that is a part of the route designation.

TEMPORARY or TEMP auxiliary signs shall be promptly removed when the temporary route is abandoned.

Section 2D.24 Temporary Detour and Auxiliary Signs

Support:

Chapter 6F contains information regarding Temporary Detour and Auxiliary signs.

Section 2D.25 Advance Turn Arrow Auxiliary Signs (M5-1, M5-2)

Standard:

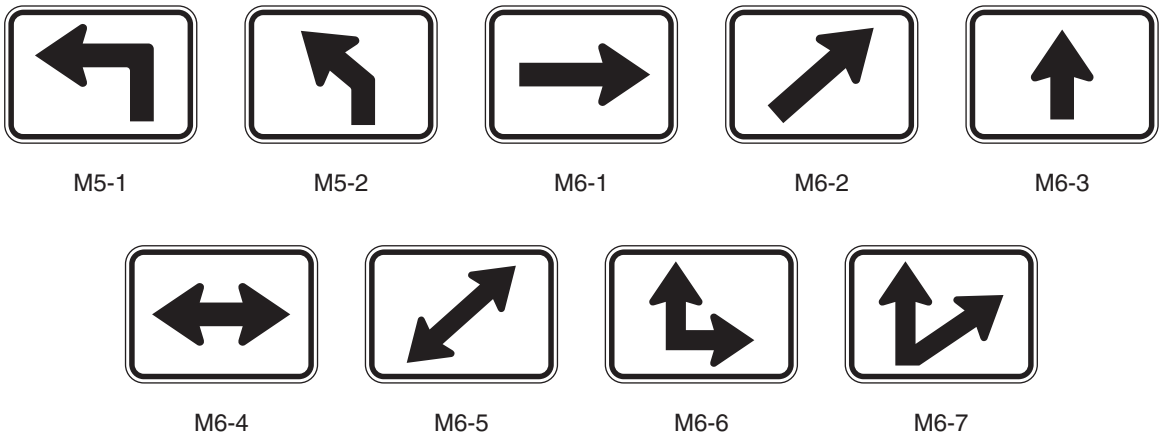
If used, the Advance Turn Arrow auxiliary sign (see Figure 2D-5) shall be mounted directly below the route sign in Advance Route Turn assemblies, and displays a right or left arrow, the shaft of which is bent at a 90-degree angle (M5-1) or at a 45-degree angle (M5-2).

Section 2D.26 Directional Arrow Auxiliary Signs (M6 Series)

Standard:

If used, the Directional Arrow auxiliary sign (see Figure 2D-5) shall be mounted below the route sign in directional assemblies, and displays a single- or double-headed arrow pointing in the general direction that the route follows.

Figure 2D-5. Directional Arrow Auxiliary Signs



Section 2D.27 Route Sign Assemblies

Standard:

A Route Sign assembly shall consist of a route sign and auxiliary signs that further identify the route and indicate the direction. Route Sign assemblies shall be installed on all approaches to numbered routes that intersect with other numbered routes.

Where two or more routes follow the same section of highway, the route signs for Interstate, U.S., State, and County routes shall be mounted in that order from the left in horizontal arrangements and from the top in vertical arrangements. Subject to this order of precedence, route signs for lower-numbered routes shall be placed at the left or top.

Within groups of assemblies, information for routes intersecting from the left shall be mounted at the left in horizontal arrangements and at the top or center of vertical arrangements. Similarly, information for routes intersecting from the right shall be at the right or bottom, and for straight-through routes at the center in horizontal arrangements or top in vertical arrangements.

Route Sign assemblies shall be mounted in accordance with the general specifications for highway signs (Chapter 2A), with the lowest sign in the assembly at the height prescribed for single signs.

Guidance:

Assemblies for two or more routes, or for different directions on the same route, should be mounted in groups on a common support.

Option:

Route Sign assemblies may be installed on the approaches to numbered routes on unnumbered roads and streets that carry an appreciable amount of traffic destined for the numbered route.

If engineering judgment indicates that groups of assemblies that include overlapping routes or multiple turns might be confusing, route signs or auxiliary signs may be omitted or combined, provided that clear directions are given to road users.

Support:

Figure 2D-6 shows typical placements of route signs.

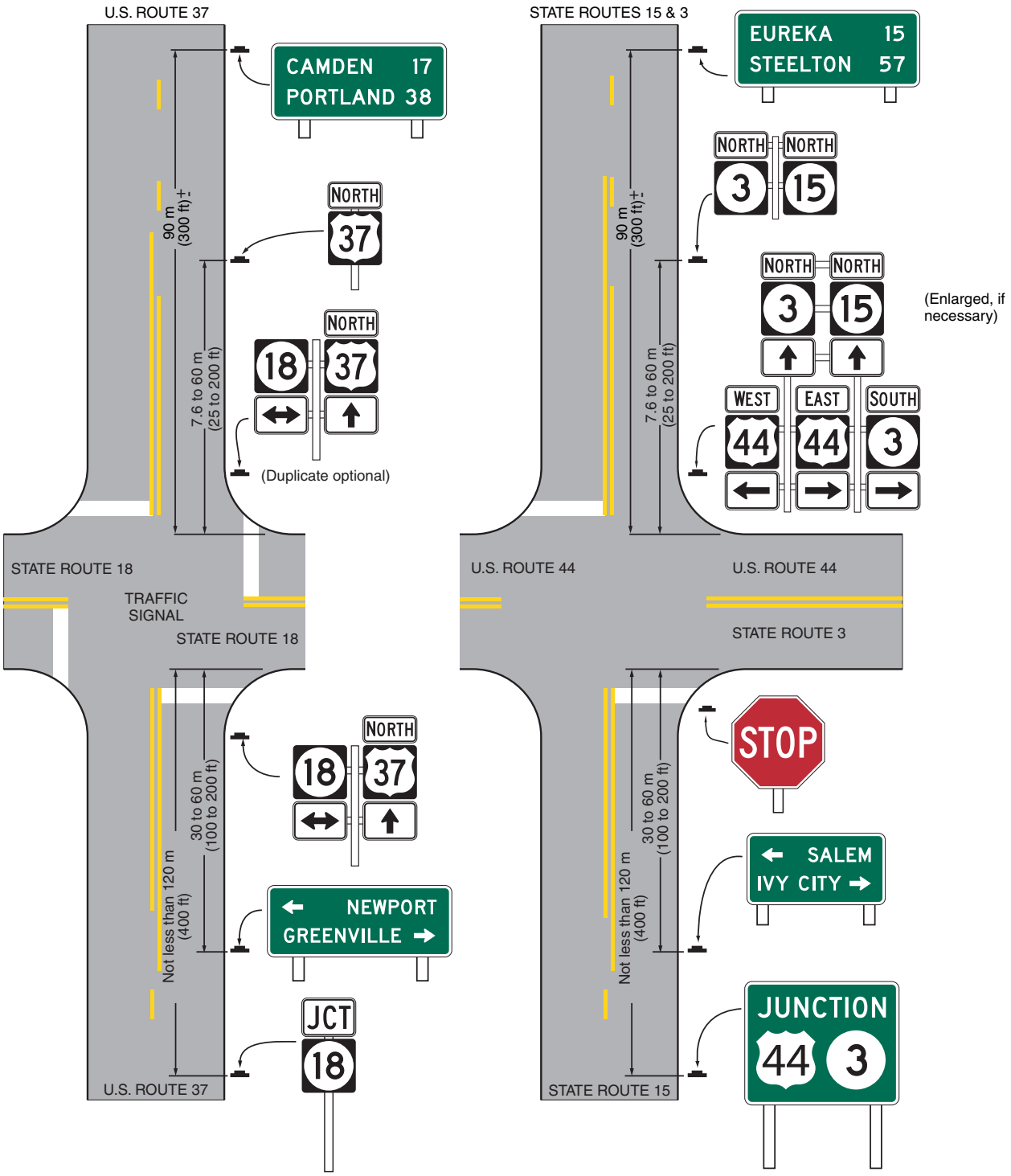
Section 2D.28 Junction Assembly

Standard:

A Junction assembly shall consist of a Junction auxiliary sign and a route sign. The route sign shall carry the number of the intersected or joined route.

The Junction assembly shall be installed in advance of every intersection where a numbered route is intersected or joined by another numbered route. In urban areas it shall be installed in the block preceding the intersection, and in rural areas it shall be installed at least 120 m (400 ft) in advance of the intersection. In rural areas, the minimum distance between the Destination sign and the Route Turn assembly shall be 60 m (200 ft), and the minimum distance between the Route Turn assembly and the Junction assembly shall be 60 m (200 ft).

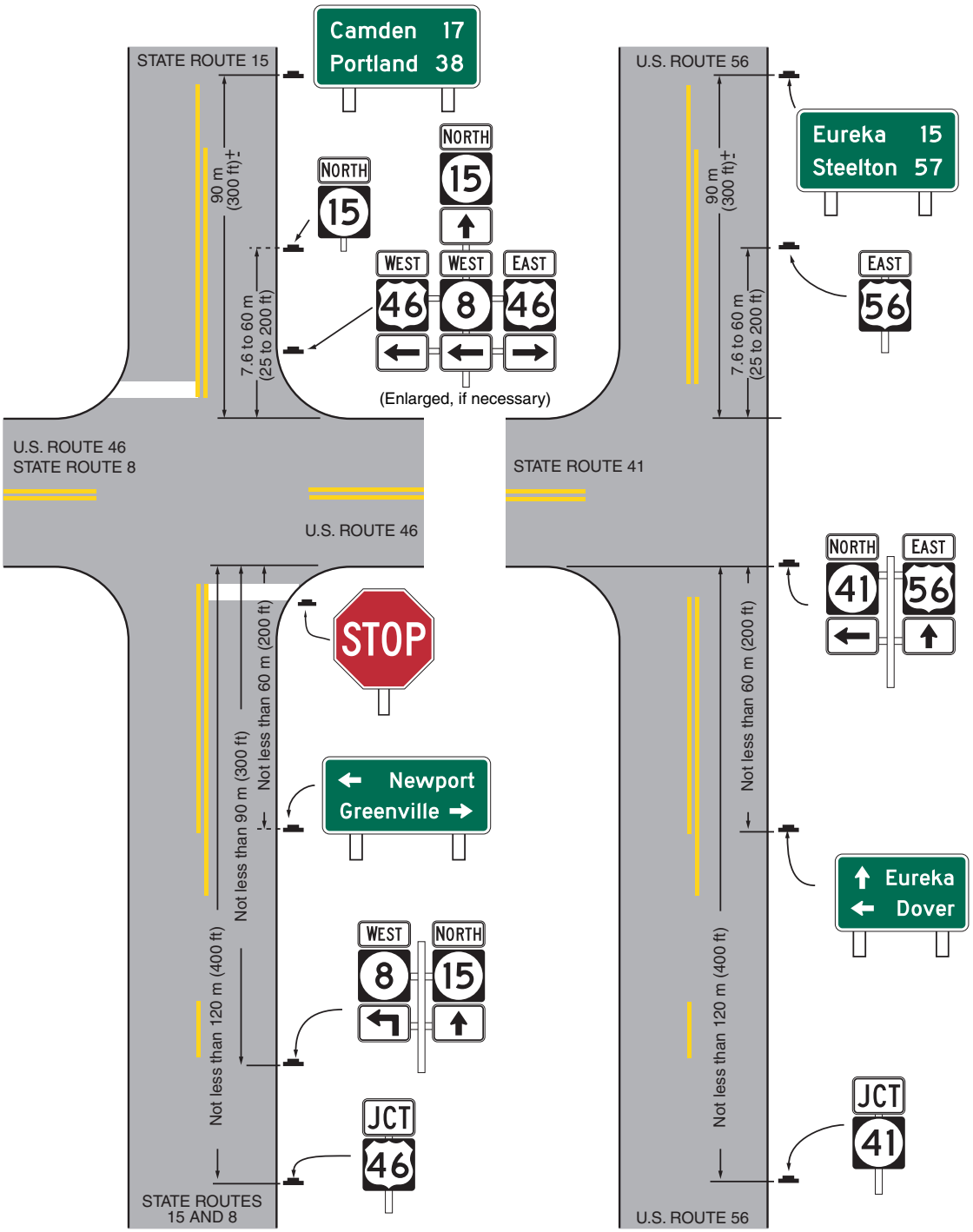
Figure 2D-6. Illustration of Directional Assemblies and Other Route Signs (For One Direction of Travel Only) *(Sheet 1 of 3)*



Notes: Lettering on Destination and Distance signs may be in all capital letters or a combination of upper-case and lower-case letters (see Section 2D.05).

See Sections 2D.28 through 2D.31 and Section 2D.35 for low-speed and/or urban conditions.

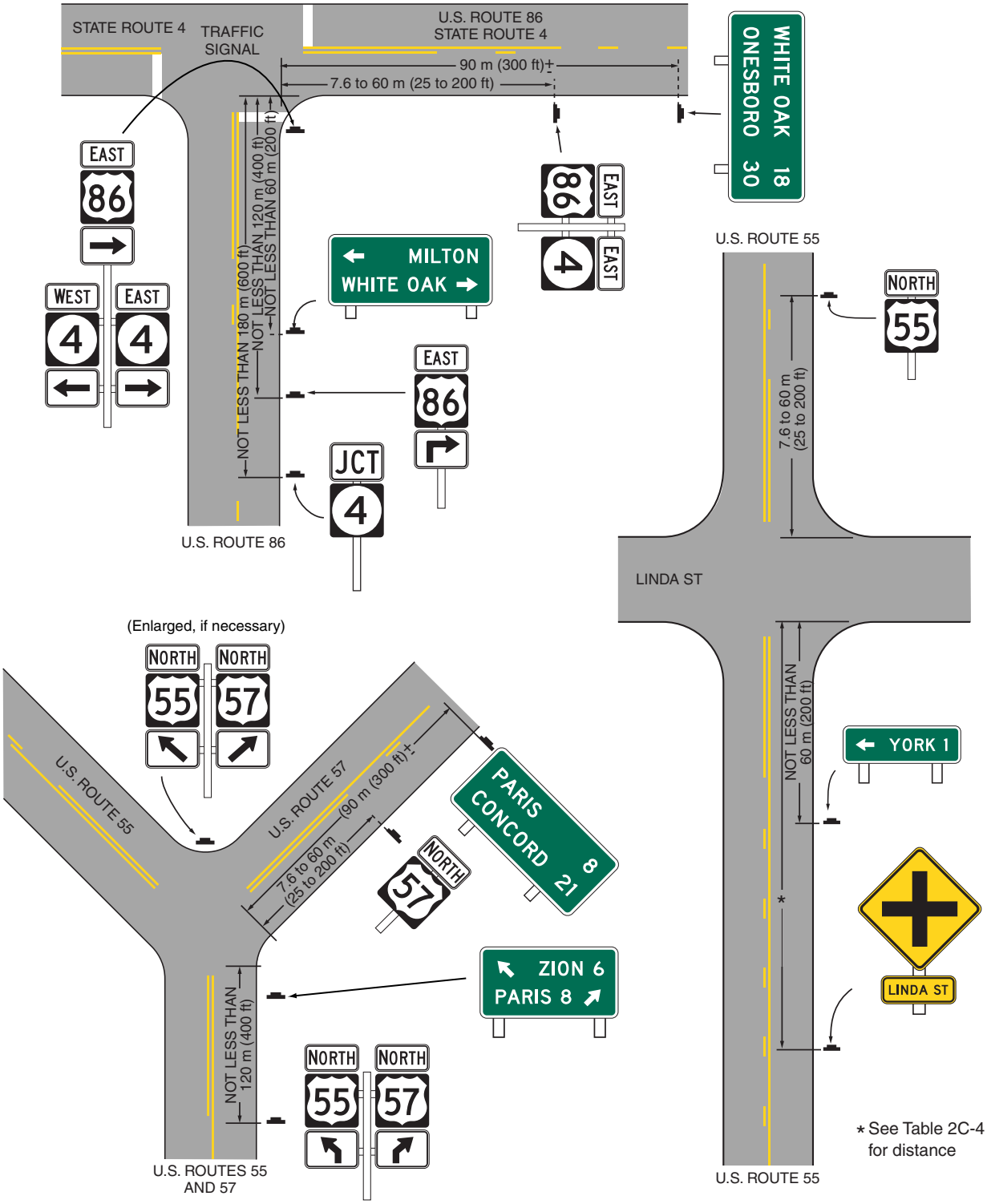
Figure 2D-6. Illustration of Directional Assemblies and Other Route Signs (For One Direction of Travel Only) *(Sheet 2 of 3)*



Notes: Lettering on Destination and Distance signs may be in all capital letters or a combination of upper-case and lower-case letters (see Section 2D.05).

See Sections 2D.28 through 2D.31 and Section 2D.35 for low-speed and/or urban conditions.

Figure 2D-6. Illustration of Directional Assemblies and Other Route Signs (For One Direction of Travel Only) *(Sheet 3 of 3)*



Notes: Lettering on Destination and Distance signs may be in all capital letters or a combination of upper-case and lower-case letters (see Section 2D.05).

See Sections 2D.28 through 2D.31 and Section 2D.35 for low-speed and/or urban conditions.

Guidance:

In urban areas where speeds are low, the Junction assembly should not be installed more than 90 m (300 ft) in advance of the intersection.

Where prevailing speeds are high, greater spacings should be used.

Option:

Where two or more routes are to be indicated, a single Junction auxiliary sign may be used for the assembly and all route signs grouped in a single mounting, or a Combination Junction sign (see Section 2D.14) may be used.

Section 2D.29 Advance Route Turn Assembly

Standard:

An Advance Route Turn assembly shall consist of a route sign, an Advance Turn Arrow or word message auxiliary sign, and a Cardinal Direction auxiliary sign, if needed. It shall be installed in advance of an intersection where a turn must be made to remain on the indicated route.

Option:

The Advance Route Turn assembly may be used to supplement the required Junction assembly in advance of intersecting routes.

Guidance:

Where a multiple-lane highway approaches an interchange or intersection with a numbered route, the Advance Route Turn assembly should be used to pre-position turning vehicles in the correct lanes from which to make their turn.

In low-speed areas, the Advance Route Turn assembly should be installed not less than 60 m (200 ft) in advance of the turn. In high-speed areas, the Advance Route Turn assembly should be installed not less than 90 m (300 ft) in advance of the turn.

Standard:

An assembly that includes an Advance Turn Arrow auxiliary sign shall not be placed where there is an intersection between it and the designated turn.

Guidance:

Sufficient distance should be allowed between the assembly and any preceding intersection that could be mistaken for the indicated turn.

Section 2D.30 Directional Assembly

Standard:

A Directional assembly shall consist of a route sign, a Directional Arrow auxiliary sign, and a Cardinal Direction auxiliary sign, if needed. The various uses of Directional assemblies shall be as outlined below:

A. Turn movements (indicated in advance by an Advance Route Turn assembly) shall be marked by a Directional assembly with a route sign displaying the number of the turning route and a single-headed arrow pointing in the direction of the turn.

B. The beginning of a route (indicated in advance by a Junction assembly) shall be marked by a Directional assembly with a route sign displaying the number of that route and a single-headed arrow pointing in the direction of the route.

C. The end of a route shall be marked by a Directional assembly with an END auxiliary sign and a route sign displaying the number of that route.

D. An intersected route (indicated in advance by a Junction assembly) shall be designated by:

1. Two Directional assemblies, each with a route sign displaying the number of the intersected route, a Cardinal Direction auxiliary sign, and a single-headed arrow pointing in the direction of movement on that route; or

2. A Directional assembly with a route sign displaying the number of the intersected route and a double-headed arrow, pointing at appropriate angles to the left, right, or ahead.

Guidance:

Straight-through movements should be indicated by a Directional assembly with a route sign displaying the number of the continuing route and a vertical arrow. A Directional assembly should not be used for a straight-through movement in the absence of other assemblies indicating right or left turns, as the Confirming assembly sign beyond the intersection normally provides adequate guidance.

Directional assemblies should be located on the near right corner of the intersection. At major intersections and at Y or offset intersections, additional Directional assemblies should be installed on the far right or left corner to confirm the near-side assemblies. When the near-corner position is not practical for Directional assemblies, the far right corner should be the preferred alternative, with oversized signs, if necessary, for legibility. Where unusual conditions exist, the location of a Directional assembly should be determined by engineering judgment with the goal being to provide the best possible combination of view and safety.

Support:

It is more important that guide signs be readable at the right time and place than to be located with absolute uniformity.

Figure 2D-6 shows typical placements of Directional assemblies.

Section 2D.31 Confirming or Reassurance Assemblies

Standard:

If used, Confirming or Reassurance assemblies shall consist of a Cardinal Direction auxiliary sign and a route sign.

Guidance:

A Confirming assembly should be installed just beyond intersections of numbered routes. It should be placed 7.6 to 60 m (25 to 200 ft) beyond the far shoulder or curb line of the intersected highway.

If used, Reassurance assemblies should be installed between intersections in urban districts as needed, and beyond the built-up area of any incorporated City or town.

Route signs for either confirming or reassurance purposes should be spaced at such intervals as necessary to keep road users informed of their routes.

Support:

Confirming and Reassurance assemblies are considered to be a type of Directional assembly.

Section 2D.32 Trailblazer Assembly

Support:

Trailblazer assemblies provide directional guidance to a particular road facility from other highways in the vicinity. This is accomplished by installing Trailblazer assemblies at strategic locations to indicate the direction to the nearest or most convenient point of access. The use of the word TO indicates that the road or street where the sign is posted is not a part of the indicated route, and that a road user is merely being directed progressively to the route.

Standard:

A Trailblazer assembly shall consist of a TO auxiliary sign, a route sign (or a special road facility symbol), and a single-headed Directional Arrow auxiliary sign pointing in the direction leading to the route.

Option:

A Cardinal Direction auxiliary sign may be used with a Trailblazer assembly.

Guidance:

The TO auxiliary sign, Cardinal Direction auxiliary sign, and Directional Arrow auxiliary sign should be of the standard size specified for auxiliary signs of their respective type. The route sign should be the size specified in Section 2D.11.

Option:

Trailblazer assemblies may be installed with other Route Sign assemblies, or alone, in the immediate vicinity of the designated facilities.

Section 2D.33 Destination and Distance Signs

Support:

In addition to guidance by route numbers, it is desirable to supply the road user information concerning the destinations that can be reached by way of numbered or unnumbered routes. This is done by means of Destination signs and Distance signs.

Option:

Route and Cardinal Direction auxiliary signs may be included on the Destination sign panel with the destinations and arrows.

Guidance:

The size of the route signs and Cardinal Direction auxiliary signs should be at least the minimum size specified for these signs.

Section 2D.34 Destination Signs (D1 Series)

Standard:

Except where special interchange signing is prescribed, the Destination (D1-1 through D1-3) sign (see Figure 2D-7), if used, shall be a horizontal rectangle carrying the name of a City, town, village, or other traffic generator, and a directional arrow.

Option:

The distance (see Section 2D.36) to the place named may also be shown on the Destination (D1-1a through D1-3a) sign (see Figure 2D-7). If several destinations are to be shown at a single point, the several names may be placed on a single panel 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 such a group of destinations.

Guidance:

Adequate separation should be made between any destinations 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 panel, or separate panels.

Standard:

An arrow pointing to the right shall be at the extreme right of the sign, and an arrow pointing left or up shall be at the extreme left. The distance figures, if used, shall be placed to the right of the destination names.

Guidance:

Unless a sloping arrow will convey a clearer indication of the direction to be followed, the directional arrows should be horizontal or vertical.

Guidance:

If several individual name panels are assembled into a group, all panels in the assembly should be of the same length.

Destination signs should be used:

A. At the intersections of U.S. or State numbered routes with Interstate, U.S., or State numbered routes; and
B. At points where they serve to direct traffic from U.S. or State numbered routes to the business section of towns, or to other destinations reached by unnumbered routes.

Standard:

Where a total of three or less destinations are provided on the Advance Guide (see Section 2E.30) and Supplemental Guide (see Section 2E.32) signs, not more than three destination names shall be used on a Destination sign. Where four destinations are provided by the Advance Guide and Supplemental Guide signs, not more than four destination names shall be used on a Destination sign.

Guidance:

If space permits, four destinations should be displayed as two separate sign panels.

Option:

Where space does not permit, or where all four destinations are in one direction, a single sign assembly may be used.

Standard:

Where a single four-name sign assembly is used, a heavy line entirely across the panel or separated sign panels shall be used to separate destinations by direction.

Guidance:

The next closest destination lying straight ahead should be at the top of the sign or assembly, and below it the closest destinations to the left and to the right, in that order. The destination shown for each direction should ordinarily be the next County seat or the next principal City, rather than a more distant destination. In the case of overlapping routes, there should be shown only one destination in each direction for each route.

Standard:

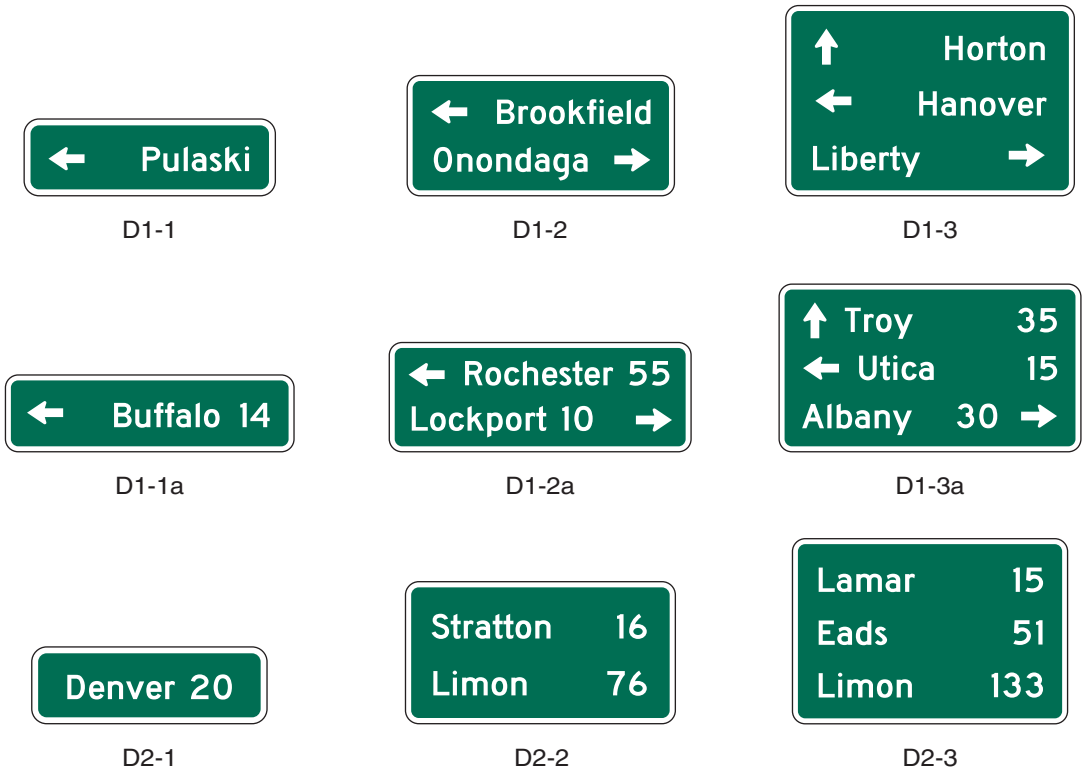
If there is more than one destination shown in the same direction, the name of the nearest destination shall appear above the names of any destinations that are further away.

Section 2D.35 Location of Destination Signs

Guidance:

When used in high-speed areas, Destination signs should be located 60 m (200 ft) or more in advance of the intersection, and following any Junction or Advance Route Turn assemblies that may be required.

Figure 2D-7. Destination and Distance Signs



Note: Lettering on Destination and Distance signs may be in all capital letters or a combination of upper-case and lower-case letters (see Section 2D.05).

Option:

In urban areas, shorter advance distances may be used.

Because the Destination sign is of lesser importance than the Junction, Advance Route Turn, or Directional assemblies, the Destination sign may be eliminated when sign spacing is critical.

Support:

Figure 2D-6 shows typical placements of Destination signs.

Section 2D.36 Distance Signs (D2 Series)

Standard:

If used, the Distance (D2-1 through D2-3) sign (see Figure 2D-7) shall be a horizontal rectangle of a size appropriate for the required legend, carrying the names of not more than three Cities, towns, junctions, or other traffic generators, and the distance (to the nearest kilometer or mile) to those places.

Guidance:

The distance shown should be selected on a case-by-case basis by the jurisdiction that owns the road or by statewide policy. A well-defined central area or central business district should be used where one exists. In other cases, the layout of the community should be considered in relation to the highway being signed and the decision based on where it appears that most drivers would feel that they are in the center of the community in question.

The top name on the Distance sign should be that of the next place on the route having a post office or a railroad station, a route number or name of an intersected highway, or any other significant geographical identity. The bottom name on the sign should be that of the next major destination or control city. If three destinations are shown, the middle line should be used to indicate communities of general interest along the route or important route junctions.

Option:

The choice of names for the middle line may be varied on successive Distance signs to give road users additional information concerning communities served by the route.

Guidance:

The control city should remain the same on all successive Distance signs throughout the length of the route until that City is reached.

Option:

If more than one distant point may properly be designated, such as where the route divides at some distance ahead to serve two destinations of similar importance, and if these two destinations cannot appear on the same sign, the two names may be alternated on successive signs.

On a route continuing into another State, destinations in the adjacent State may be shown.

Section 2D.37 Location of Distance Signs

Guidance:

If used, Distance signs should be installed on important routes leaving municipalities and just beyond intersections of numbered routes in rural areas. If used, they should be placed just outside the municipal limits or at the edge of the built-up district if it extends beyond the limits.

Where overlapping routes separate a short distance from the municipal limits, the Distance sign at the municipal limits should be omitted. The Distance sign should be installed approximately 90 m (300 ft) beyond the separation of the two routes.

Where, just outside of an incorporated municipality, two routes are concurrent and continue concurrently to the next incorporated municipality, the top name on the Distance sign should be that of the place where the routes separate; the bottom name should be that of the City to which the greater part of the through traffic is destined.

Support:

Figure 2D-6 shows typical placements of Distance signs.

Section 2D.38 Street Name Sign (D3-1)

Guidance:

Street Name (D3-1) signs (see Figure 2D-8) should be installed in urban areas at all street intersections regardless of other route signs that may be present and should be installed in rural areas to identify important roads that are not otherwise signed.

Lettering on ground-mounted Street Name signs should be at least 150 mm (6 in) high in capital letters, or 150 mm (6 in) upper-case letters with 113 mm (4.5 in) lower-case letters.

On multi-lane streets with speed limits greater than 60 km/h (40 mph), the lettering on ground-mounted Street Name signs should be at least 200 mm (8 in) high in capital letters, or 200 mm (8 in) upper-case letters with 150 mm (6 in) lower-case letters.

Option:

For local roads with speed limits of 40 km/h (25 mph) or less, the lettering height may be a minimum of 100 mm (4 in).

Supplementary lettering to indicate the type of street (such as Street, Avenue, or Road) or the section of the City (such as NW) may be in smaller lettering, at least 75 mm (3 in) high. Conventional abbreviations (see Section 1A.14) may be used except for the street name itself.

A symbol or letter designation may be used on a Street Name sign to identify the governmental jurisdiction, area of jurisdiction, or other government-approved institution.

Standard:

If a symbol or letter designation is used, the height and width of the symbol or letter designation shall not exceed the letter height of the sign.

Guidance:

The symbol or letter designation should be positioned to the left of the street name.

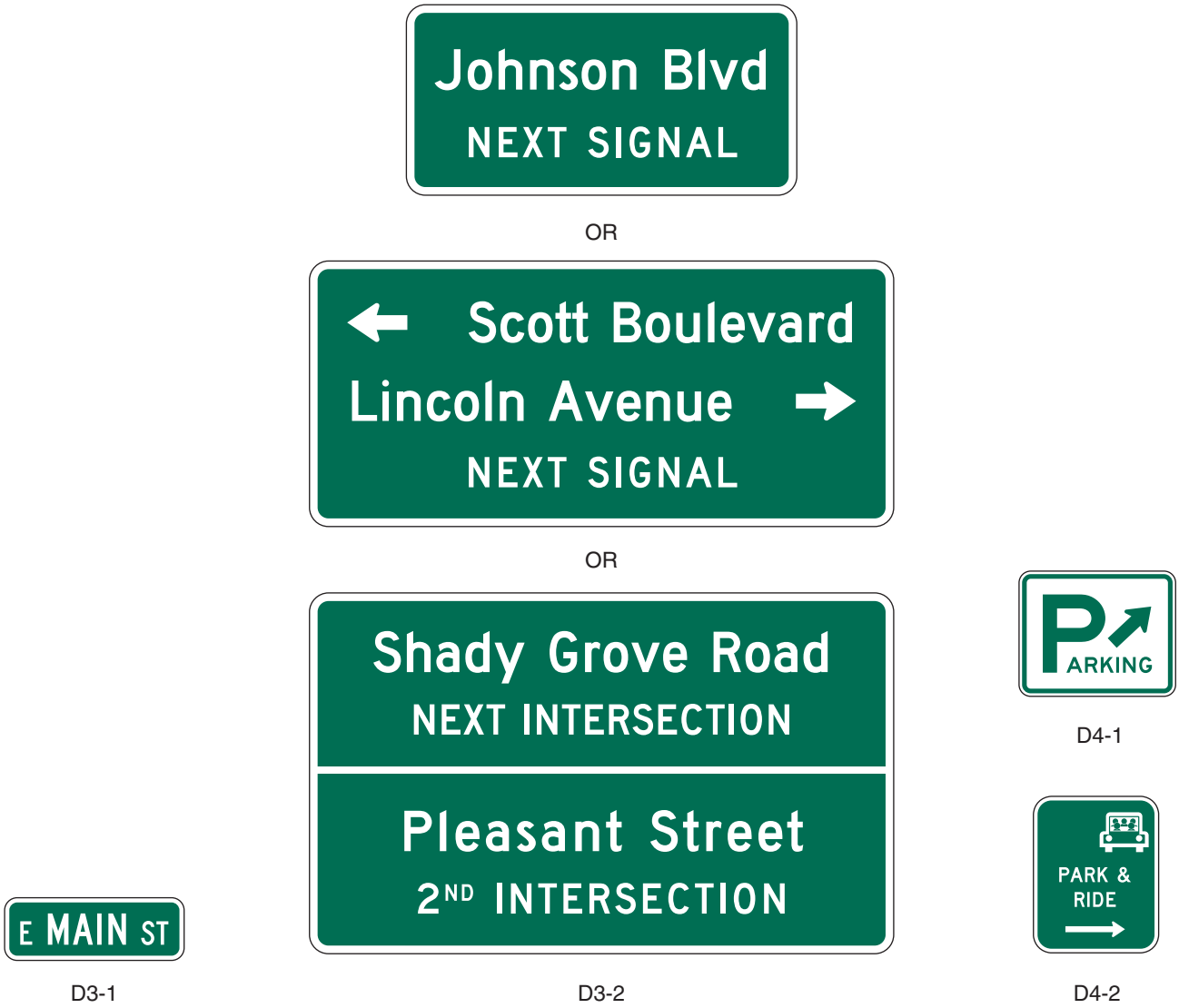
Standard:

The Street Name sign shall be retroreflective or illuminated to show the same shape and similar color both day and night. The legend and background shall be of contrasting colors.

Guidance:

Street Name signs should have a white legend on a green background. A border, if used, should be the same color as the legend.

Figure 2D-8. Street Name and Parking Signs



In business districts and on principal arterials, Street Name signs should be placed at least on diagonally opposite corners. In residential areas, at least one Street Name sign should be mounted at each intersection. Signs naming both streets should be installed at each intersection. They should be mounted with their faces parallel to the streets they name.

Option:

To optimize visibility, Street Name signs may be mounted overhead. Street Name signs may also be placed above a regulatory or STOP or YIELD sign with no required vertical separation.

At intersection crossroads where the same road has two different street names for each direction of travel, both street names may be shown on the same sign along with directional arrows.

Guidance:

In urban or suburban areas, especially where Advance Street Name signs are not used, the use of overhead-mounted Street Name signs should be considered. If overhead Street Name signs are used, the lettering should be at least 300 mm (12 in) high in capital letters, or 300 mm (12 in) upper-case letters with 225 mm (9 in) lower-case letters.

Support:

Information regarding the use of street names on supplemental plaques for use with intersection-related warning signs is contained in Section 2C.49.

Section 2D.39 Advance Street Name Signs (D3-2)

Support:

Advance Street Name (D3-2) signs (see Figure 2D-8) identify an upcoming intersection. Although this is often the next intersection, it could also be several intersections away in cases where the next signalized intersection is referenced.

Standard:

Advance Street Name (D3-2) signs, if used, shall supplement rather than be used instead of the Street Name (D3-1) signs at the intersection.

Option:

Advance Street Name (D3-2) signs may be installed in advance of signalized or unsignalized intersections to provide road users with advance information to identify the name(s) of the next intersecting street to prepare for crossing traffic and to facilitate timely deceleration and/or lane changing in preparation for a turn.

Guidance:

On arterial highways in rural areas, Advance Street Name signs should be used in advance of all signalized intersections and in advance of all intersections with exclusive turn lanes.

In urban areas, Advance Street Name signs should be used in advance of all signalized intersections on major arterial streets, except where signalized intersections are so closely spaced that advance placement of the signs is impractical.

The heights of the letters on Advance Street Name signs should be the same as those used for Street Name signs (see Section 2D.38)

Standard:

If used, Advance Street Name signs shall have a white legend and border on a green background.

If used, Advance Street Name signs shall provide the name(s) of the intersecting street(s) on the top line(s) of the legend and the distance to the intersecting streets or messages such as NEXT SIGNAL, NEXT INTERSECTION, or directional arrow(s) on the bottom line of the legend.

Option:

Directional arrow(s) may be placed to the right or left of the street name or message such as NEXT SIGNAL, as appropriate, rather than on the bottom line of the legend.

For intersecting crossroads where the same road has a different street name for each direction of travel, the different street names may be shown on the same Advance Street Name sign along with directional arrows.

In advance of two closely spaced intersections where it is not practical to install separate Advance Street Name signs, the Advance Street Name sign may include the street names for both intersections along with appropriate supplemental legends for both street names, such as NEXT INTERSECTION, 2ND INTERSECTION, or NEXT LEFT and NEXT RIGHT, or advance directional arrows.

An Advance Street Name (W16-8) plaque with black legend on a yellow background, installed supplemental to an Intersection (W2) or Advance Traffic Control (W3) series warning sign may be used instead of an Advance Street Name guide sign (see Section 2C.49).

Section 2D.40 Parking Area Sign (D4-1)

Option:

The Parking Area (D4-1) sign (see Figure 2D-8) may be used to show the direction to a nearby public parking area.

Standard:

If used, the sign shall be a horizontal rectangle with a standard size of 750 x 600 mm (30 x 24 in), or with a smaller size of 450 x 375 mm (18 x 15 in) for minor, low-speed streets. It shall carry the word PARKING, with the letter P five times the height of the remaining letters, and a directional arrow. The legend and border shall be green on a retroreflectorized white background.

Guidance:

If used, the Parking Area sign should be installed on major thoroughfares at the nearest point of access to the parking facility and where it can advise drivers of a place to park. The sign should not be used more than four blocks from the parking area.

Section 2D.41 PARK & RIDE Sign (D4-2)

Option:

PARK & RIDE (D4-2) signs (see Figure 2D-8) may be used to direct road users to park and ride facilities.

Standard:

The signs shall contain the word message PARK & RIDE and direction information (arrow or word message).

Option:

PARK & RIDE signs may contain the local transit logo and/or carpool symbol within the sign border.

Standard:

If used, the local transit logo and/or carpool symbol shall be located in the top part of the sign above the message PARK & RIDE. In no case shall the vertical dimension of the local transit logo and/or carpool symbol exceed 450 mm (18 in).

Guidance:

If the function of the parking facility is to provide parking for persons using public transportation, the local transit logo symbol should be used on the guide sign. If the function of the parking facility is to serve carpool riders, the carpool symbol should be used on the guide sign. If the parking facility serves both functions, both the logo and carpool symbol should be used.

Standard:

These signs shall have a retroreflective white legend and border on a rectangular green background. The carpool symbol shall be as shown for sign D4-2. The color of the transit logo shall be selected by the local transit authority.

Option:

To increase the target value and contrast of the transit logo, and to allow the local transit logo to retain its distinctive color and shape, the logo may be included within a white border or placed on a white background.

Section 2D.42 Rest Area Signs (D5 Series)

Standard:

Rest Area signs (see Figure 2D-9) shall be used only where parking and restroom facilities are available. Signs for this purpose shall have retroreflective white letters, symbols, and border on a blue background.

Guidance:

If used, Rest Area signs should be installed in advance of roadside parks or rest areas to permit the driver to reduce speed and leave the highway reasonably safely.

Option:

Messages such as REST AREA X km (X MILE) (D5-1), REST AREA (D5-2), PARKING AREA X km (X MILE) (D5-3), PARKING AREA (D5-4), ROADSIDE TABLE X km (X MILE), ROADSIDE PARK X km (X MILE), and PICNIC AREA X km (X MILE) may be used, as well as other appropriate messages.

Section 2D.43 Scenic Area Signs (D6 Series)

Option:

Scenic areas may be marked by signs (see Figure 2D-9) carrying the message SCENIC AREA, SCENIC VIEW, SCENIC OVERLOOK, or the equivalent, together with appropriate directional information.

Guidance:

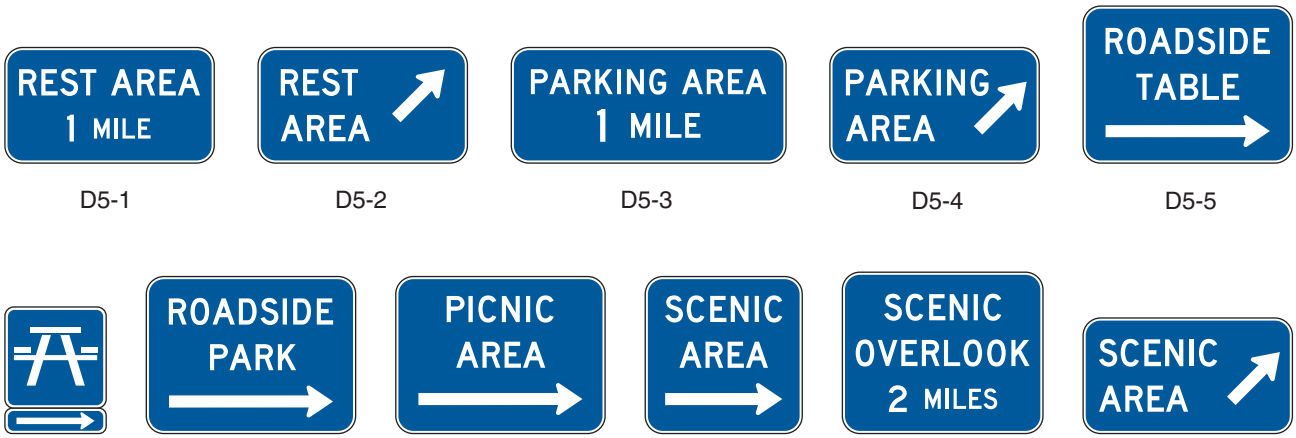
The design of the signs should be consistent with that specified for rest areas in Section 2D.42 and should be white letters, symbols, and border on a blue background. An advance sign and an additional sign at the turnoff point should be used for this kind of attraction.

Section 2D.44 Weigh Station Signing (D8 Series)

Support:

The general concept for Weigh Station signing is similar to Rest Area signing (see Section 2D.42) because in both cases traffic using either area remains within the right-of-way.

Figure 2D-9. Rest Area and Scenic Overlook Signs



Note: D6-1 through D6-3 signs may use legend AREA, VIEW, or OVERLOOK.

Standard:

The standard installation for Weigh Station signing shall include three basic signs:

A. Advance sign (D8-1);
B. Exit Direction sign (D8-2); and
C. Gore sign (D8-3).

Support:

Example locations of these signs are shown in Figure 2D-10.

Option:

Where State law requires a regulatory sign (R13-1) in advance of the Weigh Station, a fourth sign (see Section 2B.49) may be located following the Advance sign.

Guidance:

The Exit Direction sign (D8-2) or the Advance sign (D8-1) should display, either within the sign border or on a supplemental panel, the changeable message OPEN or CLOSED.

Section 2D.45 General Service Signs (D9 Series)

Support:

On conventional roads, commercial services such as gas, food, and lodging generally are within sight and are available to the road user at reasonably frequent intervals along the route. Consequently, on this class of road there usually is no need for special signs calling attention to these services. Moreover, General Service signing is usually not required in urban areas except for hospitals, law enforcement assistance, tourist information centers, and camping.

Option:

General Service signs (see Figure 2D-11) may be used where such services are infrequent and are found only on an intersecting highway or crossroad.

Standard:

All General Service signs and supplemental panels shall have white letters, symbols, and borders on a blue background.

Guidance:

General Service signs should be installed at a suitable distance in advance of the turn-off point or intersecting highway.

States that elect to provide General Service signing should establish a statewide policy or warrant for its use, and criteria for the availability of services. Local jurisdictions electing to use such signing should follow State policy for the sake of uniformity.

Figure 2D-10. Example of Weigh Station Signing

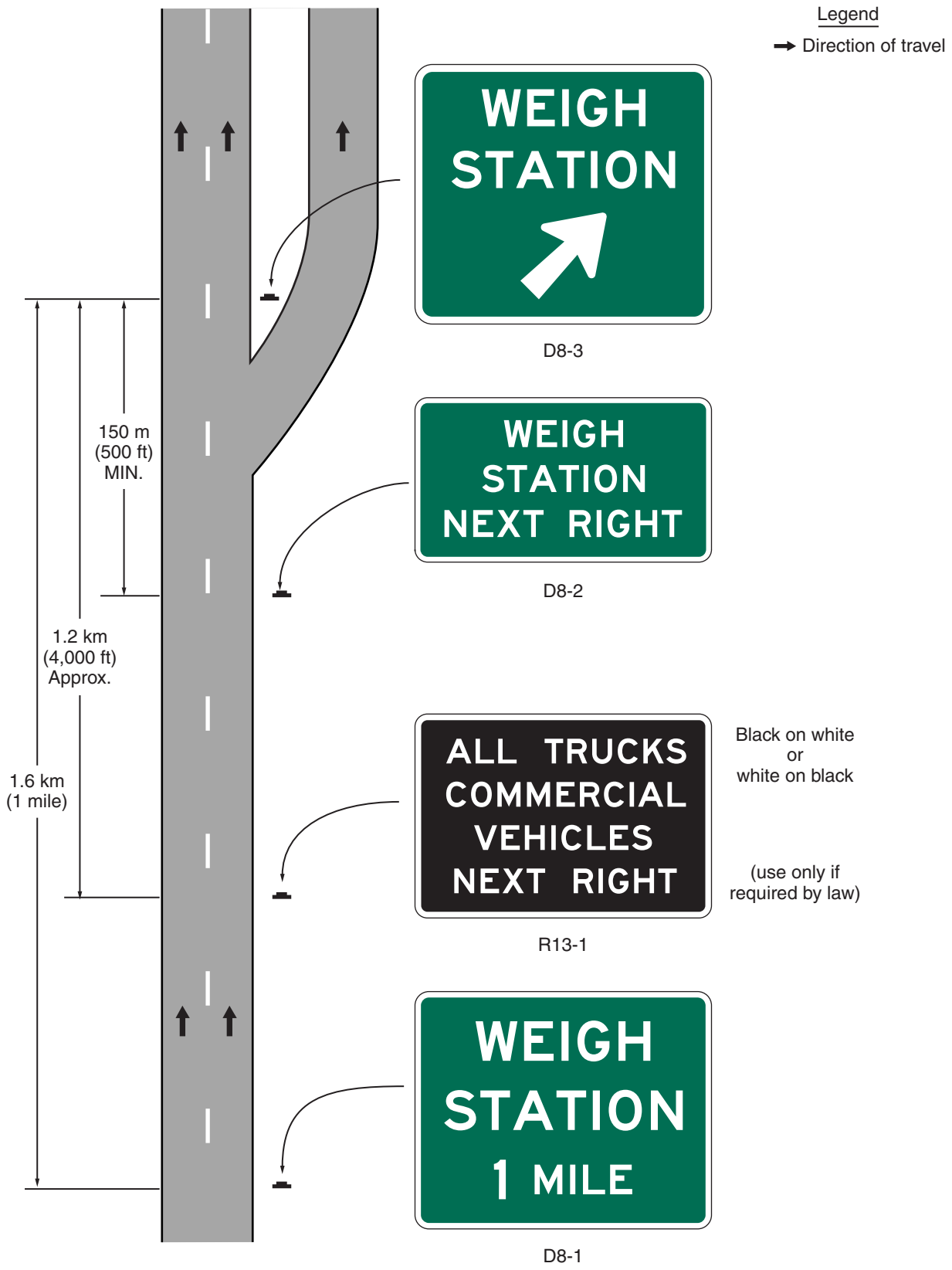
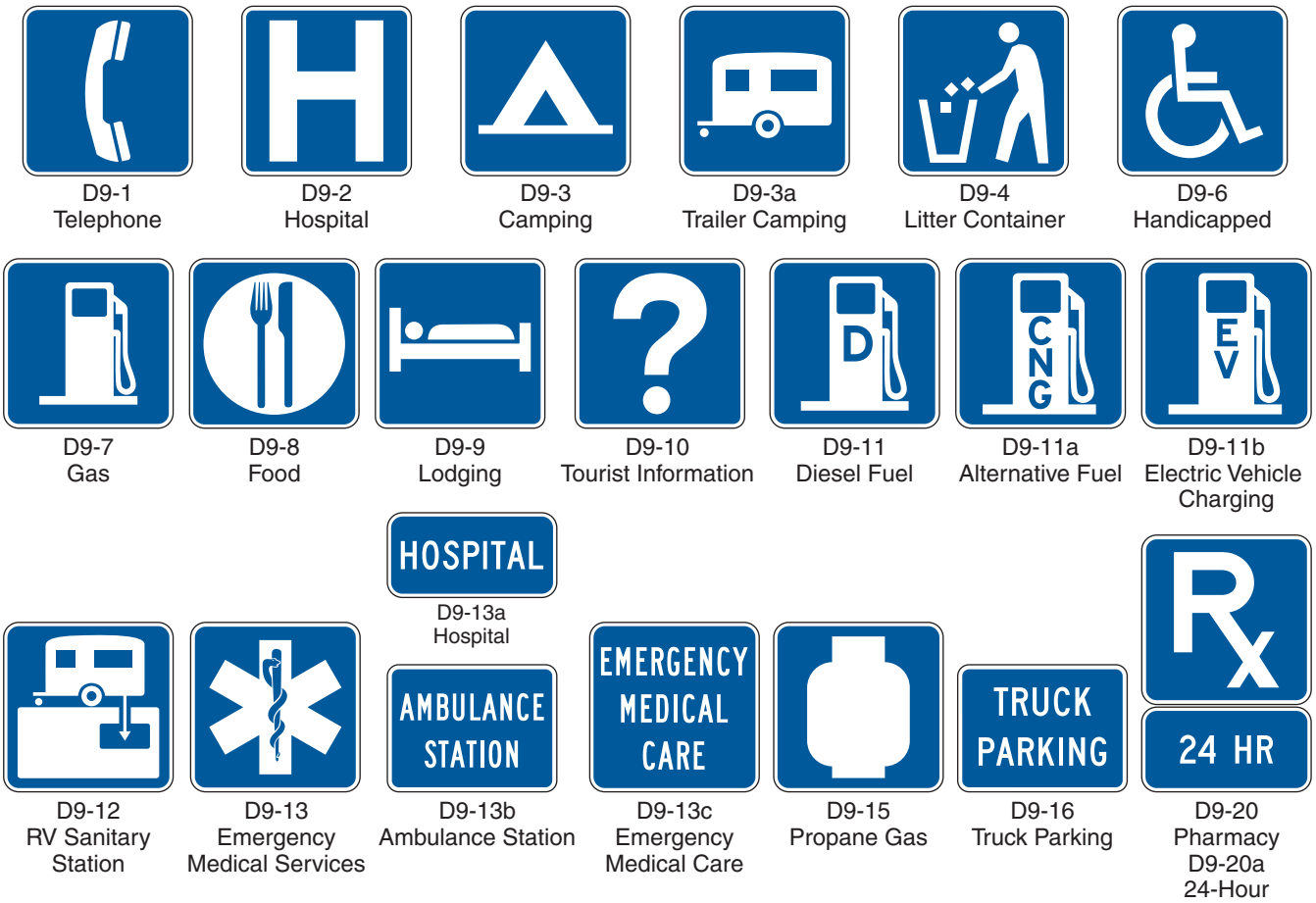


Figure 2D-11. General Service Signs



Rev. 1 (new D9-20 and D9-20a signs)

Option:

Individual States may sign for whatever alternative fuels are available at appropriate locations.

Standard:

General Service signs, if used at intersections, shall be accompanied by a directional message. Rev. 1

Option:

The General Service legends may be either symbols or word messages.

Standard:

Symbols and word message General Service legends shall not be intermixed on the same sign. The Pharmacy (D9-20) sign shall only be used to indicate the availability of a pharmacy that is open, with a State-licensed pharmacist present and on duty, 24 hours per day, 7 days per week, and that is located within 4.8 km (3 mi) of an interchange on the Federal-aid system. The D9-20 sign shall have a 24 HR (D9-20a) plaque mounted below it. Rev. 1

Guidance:

If used, the word message TRUCK PARKING (D9-16) sign should be placed on a separate panel below the other general motorist services.

Support:

Formats for displaying different combinations of these services are presented in Section 2E.51.

Option:

If the distance to the next point at which services are available is 16 km (10 mi) or more, a sign NEXT SERVICES XX km (XX MILES) (D9-17) may be used as a separate panel installed below the General Service sign (see Figure 2E-43).

The International Symbol of Accessibility for the Handicapped (D9-6) sign may be used beneath General Service signs where paved ramps and rest room facilities accessible to, and usable by, the physically handicapped are provided.

The Recreational Vehicle Sanitary Station (D9-12) sign may be used as needed to indicate the availability of facilities designed for the use of dumping wastes from recreational vehicle holding tanks.

The Litter Container (D9-4) sign may be placed in advance of roadside turnouts or rest areas, unless it distracts the driver's attention from other more important regulatory, warning, or directional signs.

A Carpool Information (D12-2) sign (see Figure 2D-12) may be installed as needed (see Section 2E.57).

A Channel 9 Monitored (D12-3) sign may be installed as needed. Official public agencies or their designees may be shown as the monitoring agency on the sign (see Section 2E.56). An EMERGENCY DIAL XXX (D12-4) sign along with the appropriate number to dial, may be used for cellular phone communications.

A TRAVEL INFO CALL 511 (D12-5) sign (see Figure 2D-12) may be installed if a 511 travel information services telephone number is available to road users for obtaining traffic, public transportation, weather, construction, or road condition information.

The logo of the transportation agency or the travel information service or program that is providing the travel information may be incorporated within the D12-5 sign either above or below the TRAVEL INFO CALL 511 legend.

Standard:

The logo of a commercial entity shall not be incorporated within the TRAVEL INFO CALL 511 sign.

The TRAVEL INFO CALL 511 sign shall have a white legend and border on a blue background.

Guidance:

If the logo of the transportation agency or the travel information service or program is used, the logo's maximum height should not exceed two times the letter height used in the legend of the sign.

Option:

The Emergency Medical Services (D9-13) symbol sign may be used to identify medical service facilities that have been included in the Emergency Medical Services system under a signing policy developed by the State and/or local highway agency.

Standard:

The Emergency Medical Services symbol sign shall not be used to identify services other than qualified hospitals, ambulance stations, and qualified free-standing emergency medical treatment centers. If used, the Emergency Medical Services symbol shall be supplemented by a sign identifying the type of service provided.

Option:

The Emergency Medical Services symbol sign may be used above the HOSPITAL (D9-13a) word message sign or H (D9-2) symbol sign or above a sign with either the legend AMBULANCE STATION (D9-13b) or EMERGENCY MEDICAL CARE (D9-13c). The Emergency Medical Services symbol sign may also be used to supplement Telephone (D9-1), Channel 9 Monitored (D12-3), or POLICE (D9-14) signs.

Standard:

The legend EMERGENCY MEDICAL CARE shall not be used for services other than qualified free-standing emergency medical treatment centers.

Guidance:

Each State should develop guidelines for the implementation of the Emergency Medical Services symbol sign.

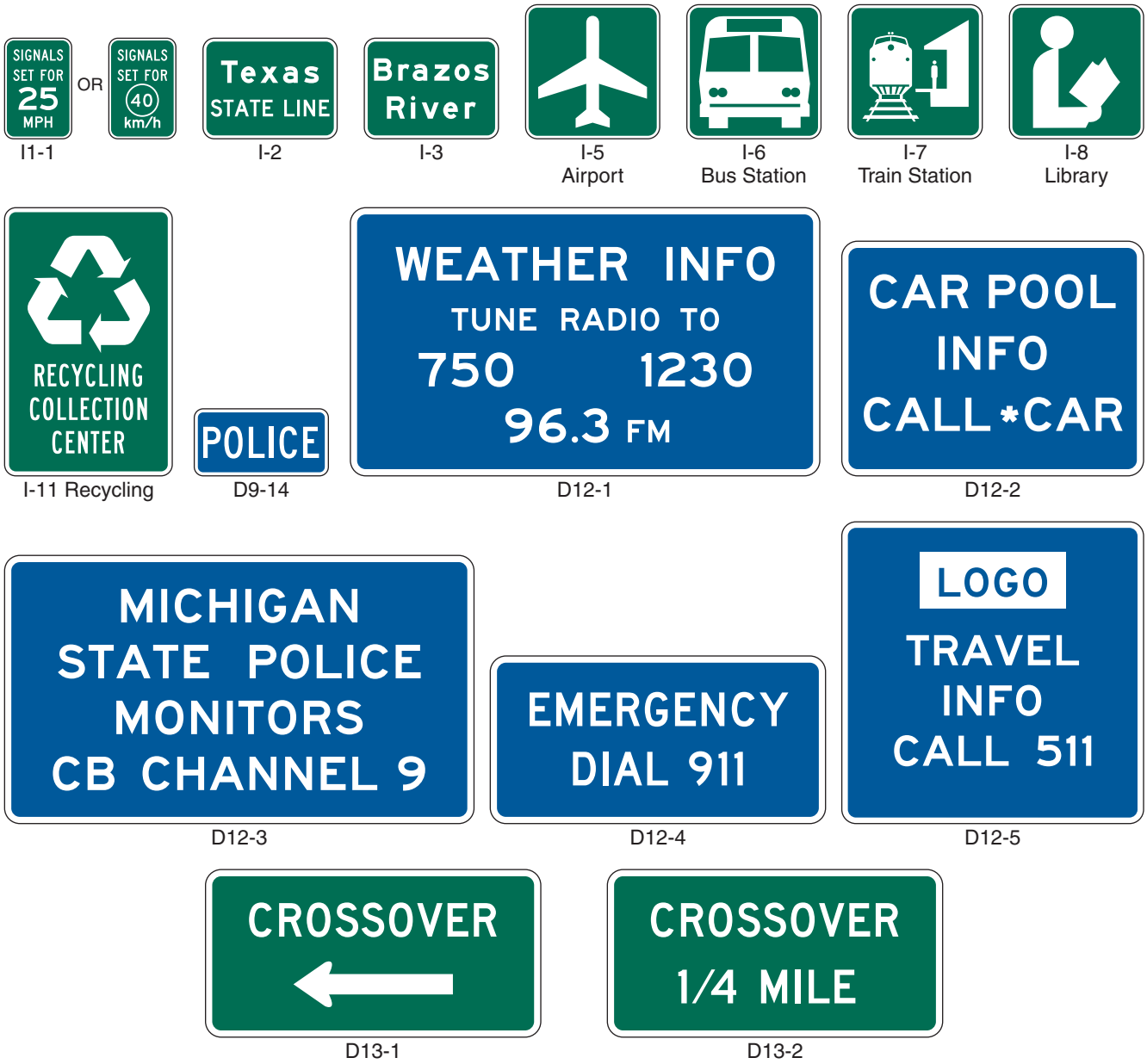
The State should consider the following guidelines in the preparation of its policy:

A. AMBULANCE
   1. 24-hour service, 7 days per week.
   2. Staffed by two State-certified persons trained at least to the basic level.
   3. Vehicular communications with a hospital emergency department.
   4. Operator should have successfully completed an emergency vehicle operator training course.

B. HOSPITAL
   1. 24-hour service, 7 days per week.
   2. Emergency department facilities with a physician (or emergency care nurse on duty within the emergency department with a physician on call) trained in emergency medical procedures on duty.
   3. Licensed or approved for definitive medical care by an appropriate State authority.
   4. Equipped for radio voice communications with ambulances and other hospitals.

C. Channel 9 Monitored
   1. Provided by either professional or volunteer monitors.
   2. Available 24 hours per day, 7 days per week.
   3. The service should be endorsed, sponsored, or controlled by an appropriate government authority to guarantee the level of monitoring.

Figure 2D-12. General Information Signs



Section 2D.46 Reference Location Signs (D10-1 through D10-3) and Intermediate Reference Location Signs (D10-1a through D10-3a)

Support:

There are two types of reference location signs:

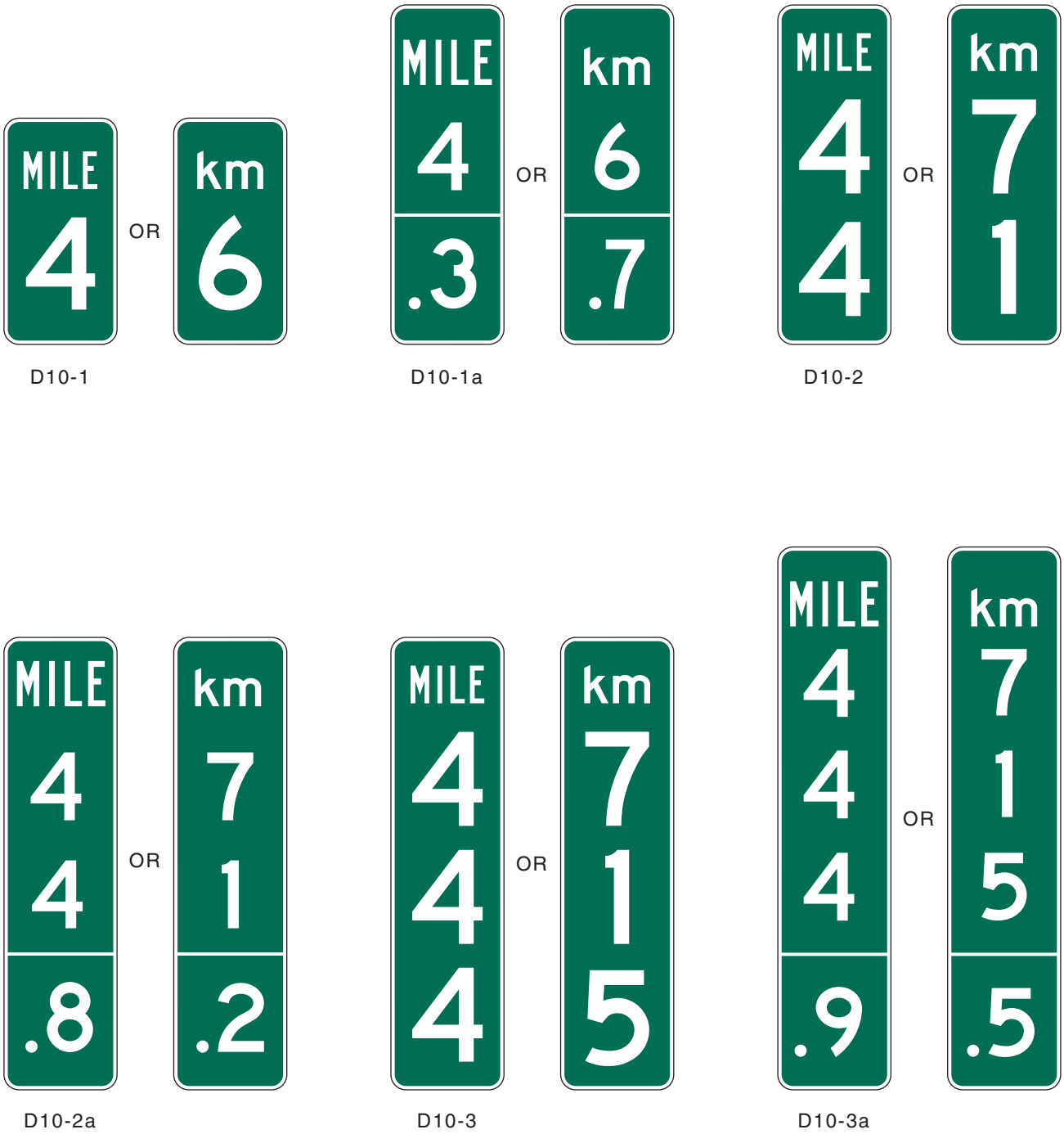
A. Reference Location signs (D10-1, 2, and 3) show an integer distance point along a highway; and
B. Intermediate Reference Location signs (D10-1a, 2a, and 3a) also show a decimal between integer distance points along a highway.

Option:

Reference Location (D10-1 to D10-3) signs (see Figure 2D-13) may be installed along any section of a highway route or ramp to assist road users in estimating their progress, to provide a means for identifying the location of emergency incidents and traffic crashes, and to aid in highway maintenance and servicing.

To augment the reference location sign system, Intermediate Reference Location (D10-1a to D10-3a) signs (see Figure 2D-13), which show the tenth of a kilometer (mile) with a decimal point, may be installed at one tenth of a kilometer (mile) intervals, or at some other regular spacing.

Figure 2D-13. Reference Location Signs



Standard:

When 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 kilometer (mile) point shall display a decimal point and a zero numeral.

When placed on freeways or expressways, Reference Location (D10-1 to D10-3) signs shall contain 250 mm (10 in) white numerals on a 300 mm (12 in) wide green background with a white border. The signs shall be 600, 900, or 1200 mm (24, 36, or 48 in) in height for one, two, or three digits, respectively, and shall contain the abbreviation km (MILE) in 100 mm (4 in) white letters.

When placed on conventional roads, Reference Location (D10-1 to D10-3) signs shall contain 150 mm (6 in) white numerals on a green background that is at least 250 mm (10 in) wide with a white border. The signs shall contain the abbreviation km (MILE) in 100 mm (4 in) white letters.

The design details for reference location signs shall be as shown in the "Standard Highway Signs" book (see Section 1A.11).

Reference location signs shall have a minimum mounting height of 1.2 m (4 ft) to the bottom of the sign in accordance with the mounting height requirements of delineators (see Section 3D.04), and shall not be governed by the mounting height requirements prescribed in Section 2A.18.

The distance numbering shall be continuous for each route within a State, except where overlaps occur (see Section 2E.28). Where routes overlap, reference location sign continuity shall be established for only one of the routes. If one of the overlapping routes is an Interstate route, that route shall be selected for continuity of distance numbering.

For divided highways, the distance measurement shall be made on the northbound and eastbound roadways. The reference location signs for southbound or westbound roadways shall be set at locations directly opposite the reference location signs for the northbound or eastbound roadways.

Guidance:

Zero distance should begin at the south and west State lines, or at the south and west terminus points where routes begin within a State.

On a route without reference location sign continuity, the first reference location sign beyond the overlap should indicate the total distance traveled on the route so that road users will have a means of correlating their travel distance between reference location signs with that shown on their odometer.

Standard:

Except as provided in the option below, reference location signs shall be installed on the right side of the roadway.

Option:

Where conditions limit or restrict the use of reference location signs on the right side of the roadway, they may be installed in the median. On two-lane conventional roadways, reference location signs may be installed on one side of the roadway only and may be installed back-to-back. Reference location signs may be placed up to 9 m (30 ft) from the edge of the pavement.

If a reference location sign cannot be installed in the correct location, it may be moved in either direction as much as 15 m (50 ft).

Guidance:

If a reference location sign cannot be placed within 15 m (50 ft) of the correct location, it should be omitted.

Option:

Enhanced reference location signs (see Section 2E.54) may also be used on conventional roads.

Section 2D.47 Traffic Signal Speed Sign (I1-1)

Option:

The Traffic Signal Speed (I1-1) sign (see Figure 2D-12), reading SIGNALS SET FOR XX km/h (XX MPH), may be used to indicate a section of street or highway on which the traffic control signals are coordinated into a progressive system timed for a specified speed at all hours during which they are operated in a coordinated mode.

Guidance:

If used, the sign should be mounted as near as practical to each intersection where the timed speed changes, and at intervals of several blocks throughout any section where the timed speed remains constant.

Standard:

The Traffic Signal Speed sign shall be a minimum of 300 x 450 mm (12 x 18 in) with the longer dimension vertical. It shall have a white message and border on a green background.

Section 2D.48 General Information Signs (I Series)

Support:

Of interest to the traveler, though not directly necessary for guidance, are numerous kinds of information that can properly be conveyed by general information signs (see Figure 2D-12). They include such items as State lines, City limits, other political boundaries, time zones, stream names, elevations, landmarks, and similar items of geographical interest, and safety and transportation-related messages. Chapter 2H contains recreational and cultural interest area symbol signs that are sometimes used in combination with general information signs.

Guidance:

General information signs should not be installed within a series of guide signs or at other equally critical locations, unless there are specific reasons for orienting the road user or identifying control points for activities that are clearly in the public interest. On all such signs, the designs should be simple and dignified, devoid of any advertising, and in general conformance with other guide signing.

Option:

An information symbol sign (I-5 through I-8, I-11) may be used to identify a route leading to a transportation or general information facility, or to provide additional guidance to the facility. The symbol sign may be supplemented by an educational plaque where necessary; also, the name of the facility may be used if needed to distinguish between similar facilities.

Guide signs for commercial service airports and noncarrier airports may be provided from the nearest Interstate, other freeway, or conventional highway intersection directly to the airport, normally not to exceed 25 km (15 mi). The Airport (I-5) symbol sign along with a supplemental plaque may be used to indicate the specific name of the airport. An Airport symbol sign, with or without a supplemental name plaque or the word AIRPORT, and an arrow may be used as a trailblazer.

Standard:

Adequate trailblazer signs shall be in place prior to installing the airport guide signs.

Support:

Location and placement of all airport guide signs depends upon the availability of longitudinal spacing on highways.

Standard:

When a sign is used to display a safety or transportation-related message, the display format shall not be of a type that would be considered similar to advertising displays. Messages and symbols that resemble any official traffic control device shall not be used on safety or transportation-related message signs.

Option:

Political jurisdiction logos may be placed on the political boundary general information signs. The logo may have different colors and shapes but should be simple, dignified, and devoid of any advertising.

Standard:

Except for political boundary and scenic by-way logos and signs, general information signs shall have white legends and borders on green rectangular-shaped backgrounds.

Option:

The Recycling Collection Center (I-11) symbol sign may be used to direct road users to recycling collection centers.

Guidance:

The Recycling Collection Center symbol sign should not be used on freeways and expressways.

Standard:

If used on freeways or expressways, the Recycling Collection Center symbol sign shall be considered one of the supplemental sign destinations.

Section 2D.49 Signing of Named Highways

Support:

Legislative bodies will occasionally adopt an act or resolution memorializing a highway, bridge, or other component of the highway.

Guidance:

Such memorial names should not appear on or along a highway, or be placed on bridges or other highway components. The requirement for signing should be carried out by placing a memorial plaque in a rest area, scenic overlook, recreational area, or other appropriate location where parking is provided with the signing inconspicuously located relative to vehicle operations along the highway.

Option:

If the installation of a memorial plaque off the main roadway is not practical, memorial signs may be installed on the mainline.

Standard:

Where such memorial signs are installed on the mainline, (1) memorial names shall not appear on directional guide signs, (2) memorial signs shall not interfere with the placement of any other necessary highway signing, and (3) memorial signs shall not compromise the safety or efficiency of traffic flow. The memorial signing shall be limited to one sign at an appropriate location in each route direction.

Option:

Guide signs may contain street or highway names if the purpose is to enhance driver communication and guidance; however, they are to be considered as supplemental information to route numbers.

Standard:

Highway names shall not replace official numeral designations. Memorial names shall not appear on supplemental signs or on any other information sign either on or along the highway or its intersecting routes.

The use of route signs shall be restricted to signs officially used for guidance of traffic in accordance with this Manual and the "Purpose and Policy" statement of the American Association of State Highway and Transportation Officials that applies to Interstate and U.S. numbered routes (see Page i for AASHTO's address).

Option:

Unnumbered routes having major importance to proper guidance of traffic may be signed if carried out in accordance with the aforementioned policies. For unnumbered highways, a name to enhance route guidance may be used where the name is applied consistently throughout its length.

Guidance:

Only one name should be used to identify any highway, whether numbered or unnumbered.

Section 2D.50 Trail Signs

Support:

Trail signs are informational signs, plaques, or shields designed to provide road users with route guidance in following a trail of particular cultural, historical, or educational significance.

Guidance:

Primary guidance should be in the form of printed literature and strip maps rather than trail signing.

Option:

Trail signs may be installed on a highway if they have been approved by the appropriate transportation agency.

Section 2D.51 Crossover Signs (D13 Series)

Option:

Crossover signs may be installed on divided highways to identify median openings not otherwise identified by warning or other guide signs.

Standard:

A CROSSOVER (D13-1) sign (see Figure 2D-12) shall not be used to identify a median opening that is permitted to be used only by official or authorized vehicles. If used, the sign shall be a horizontal rectangle of appropriate size to carry the word CROSSOVER and a horizontal directional arrow. The CROSSOVER sign shall have a white legend and border on a green background.

Guidance:

If used, the CROSSOVER sign should be installed immediately beyond the median opening, either on the right side of the roadway or in the median.

Option:

The Advance Crossover (D13-2) sign (see Figure 2D-12) may be installed in advance of the CROSSOVER sign to provide advance notice of the crossover.

Standard:

If used, the Advance Crossover sign shall be a horizontal rectangle of appropriate size to carry the word CROSSOVER and the distance to the median opening. The sign shall have white legend and border on a green background.

Guidance:

The distance shown on the Advance Crossover sign should be 2 km, 1 km, or 500 m (or should be 1 MILE, 1/2 MILE, or 1/4 MILE), unless unusual conditions require some other distance. If used, the sign should be installed either on the right side of the roadway or in the median at approximately the distance shown.

Section 2D.52 National Scenic Byways Signs (D6-4, D6-4a)

Support:

Certain roads have been designated by the U.S. Secretary of Transportation as National Scenic Byways or All-American Roads based on their archeological, cultural, historic, natural, recreational, or scenic qualities.

Option:

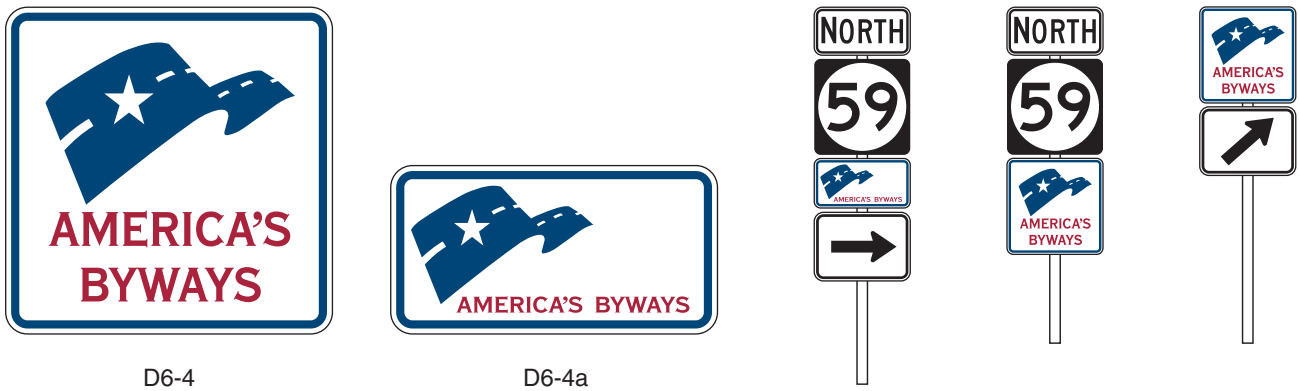
State and local highway agencies may install the National Scenic Byways (D6-4 or D6-4a) signs at entrance points to a route that has been recognized by the U.S. Secretary of Transportation as a National Scenic Byway or an All-American Road. The D6-4 or D6-4a sign may be installed on route sign assemblies (see Figure 2D-14) or as part of larger roadside structures. National Scenic Byways signs may also be installed at periodic intervals along the designated route and at intersections where the designated route turns or follows a different numbered highway. At locations where roadside features have been developed to enhance the traveler's experience such as rest areas, historic sites, interpretive facilities, or scenic overlooks, the National Scenic Byways sign may be placed on the associated sign assembly to inform travelers that the site contributes to the byway travel experience.

Standard:

When a National Scenic Byways sign is installed on a National Scenic Byway or an All-American Road, the design shown for the D6-4 or D6-4a sign in Figure 2D-14 shall be used. Use of this design shall be limited to routes that have been designated as a National Scenic Byway or All-American Road the U.S. Secretary of Transportation.

If used, the D6-4 or D6-4a sign shall be placed such that the roadway route signs have primary visibility for the road user.

Figure 2D-14. Examples of Use of the National Scenic Byways Sign



D6-4 D6-4a

CHAPTER 2E. GUIDE SIGNS—FREEWAYS AND EXPRESSWAYS

Section 2E.01 Scope of Freeway and Expressway Guide Sign Standards

Support:

These standards provide a uniform and effective system of highway signing for high-volume, high-speed motor vehicle traffic on freeways and expressways. The requirements and specifications for expressway signing exceed those for conventional roads (see Chapter 2D), but are less than those for freeway signing. Since there are many geometric design variables to be found in existing roads, a signing concept commensurate with prevailing conditions is the primary consideration. Section 2A.01 includes definitions of freeway and expressway.

Guide signs for freeways and expressways are primarily identified by the name of the sign rather than by an assigned sign code. Guidelines for the design of guide signs for freeways and expressways are provided in Chapter 8 (Design Guidelines) of the "Standard Highway Signs" book (see Section 1A.11).

Standard:

The standards prescribed herein for freeway or expressway guide signing shall apply to any highway that meets the definition of such facilities.

Section 2E.02 Freeway and Expressway Signing Principles

Support:

The development of a signing system for freeways and expressways is approached on the premise that the signing is primarily for the benefit and direction of road users who are not familiar with the route or area. The signing furnishes road users with clear instructions for orderly progress to their destinations. Sign installations are an integral part of the facility and, as such, are best planned concurrently with the development of highway location and geometric design. For optimal results, plans for signing are analyzed during the earliest stages of preliminary design, and details are correlated as final design is developed. The excessive signing found on many major highways usually is the result of using a multitude of signs that are too small and that are poorly designed and placed to accomplish the intended purpose.

Freeway and expressway signing is to be considered and developed as a planned system of installations. An engineering study is sometimes necessary for proper solution of the problems of many individual locations, but, in addition, consideration of an entire route is necessary.

Guidance:

Road users should be guided with consistent signing on the approaches to interchanges, when they drive from one State to another, and when driving through rural or urban areas. Because geographical, geometric, and operating factors regularly create significant differences between urban and rural conditions, the signing should take these conditions into account.

Guide signs on freeways and expressways should serve distinct functions as follows:

A. Give directions to destinations, or to streets or highway routes, at intersections or interchanges;
B. Furnish advance notice of the approach to intersections or interchanges;
C. Direct road users into appropriate lanes in advance of diverging or merging movements;
D. Identify routes and directions on those routes;
E. Show distances to destinations;
F. Indicate access to general motorist services, rest, scenic, and recreational areas; and
G. Provide other information of value to the road user.

Section 2E.03 General

Support:

Signs are designed so that they are legible to road users approaching them and readable in time to permit proper responses. Desired design characteristics include: (a) long visibility distances, (b) large lettering and symbols, and (c) short legends for quick comprehension.

Standard:

Standard shapes and colors shall be used so that traffic signs can be promptly recognized by road users.

Section 2E.04 Color of Guide Signs

Standard:

Guide signs on freeways and expressways, except as noted herein, shall have white letters, symbols, and borders on a green background.

Support:

Color requirements for route signs and trailblazers, signs with blank-out or changeable messages, signs for services, rest areas, park and recreational areas, and for certain miscellaneous signs are specified in the individual sections dealing with the particular sign or sign group.

Section 2E.05 Retroreflection or Illumination

Standard:

Letters, numerals, symbols, and borders of all guide signs shall be retroreflectorized. The background of all guide signs that are not independently illuminated shall be retroreflective.

Support:

Where there is no serious interference from extraneous light sources, retroreflectorized ground-mounted signs usually provide adequate nighttime visibility.

On freeways and expressways where much driving at night is done with low-beam headlights, the amount of headlight illumination incident to an overhead sign display is relatively small.

Guidance:

Overhead sign installations should be illuminated unless an engineering study shows that retroreflectorization alone will perform effectively. The type of illumination chosen should provide effective and reasonably uniform illumination of the sign face and message.

Section 2E.06 Characteristics of Urban Signing

Support:

Urban conditions are characterized not so much by City limits or other arbitrary boundaries, as by the following features:

A. Mainline roadways with more than two lanes in each direction;
B. High traffic volumes on the through roadways;
C. High volumes of traffic entering and leaving interchanges;
D. Interchanges closely spaced;
E. Roadway and interchange lighting;
F. Three or more interchanges serving the major City;
G. A loop, circumferential, or spur serving a sizable portion of the urban population; and
H. Visual clutter from roadside development.

Operating conditions and road geometrics on urban freeways and expressways usually make special sign treatments desirable, including:

A. Use of Interchange Sequence signs (see Section 2E.37);
B. Use of sign spreading to the maximum extent possible (see Section 2E.10);
C. Elimination of service signing (see Section 2E.51);
D. Reduction to a minimum of post-interchange signs (see Section 2E.35);
E. Display of advance signs at distances closer to the interchange, with appropriate adjustments in the legend (see Section 2E.30);
F. Use of overhead signs on roadway structures and independent sign supports (see Section 2E.22);
G. Use of diagrammatic signs in advance of intersections and interchanges (see Section 2E.19); and
H. Frequent use of street names as the principal message in guide signs.

Lower speeds which are often characteristic of urban operations do not justify lower signing standards. Typical traffic patterns are more complex for the road user to negotiate, and large, easy-to-read legends are, therefore, just as necessary as on rural highways.

Section 2E.07 Characteristics of Rural Signing

Support:

Rural areas ordinarily have greater distances between interchanges, which permits adequate spacing for the sequences of signs on the approach to and departure from each interchange. However, the absence of traffic in adjoining lanes and on entering or exiting ramps often adds monotony or inattention to rural driving. This increases the importance of signs that call for decisions or actions.

Guidance:

Where there are long distances between interchanges and the alignment is relatively unchanging, signs should be positioned for their best effect on road users. The tendency to group all signing in the immediate vicinity of rural interchanges should be avoided by considering the entire route in the development of sign plans. Extra effort should be given to the placement of signs at natural target locations to command the attention of the road user, particularly when the message requires an action by the road user.

Section 2E.08 Memorial Highway Signing

Guidance:

Freeways and expressways should not be signed as memorial highways. If a route, bridge, or highway component is officially designated as a memorial, and if notification of the memorial is to be made on the highway right-of-way, such notification should consist of installing a memorial plaque in a rest area, scenic overlook, recreational area, or other appropriate location where parking is provided with the signing inconspicuously located relative to vehicle operations along the highway.

Option:

If the installation of a memorial plaque off the main roadway is not practical, a memorial sign may be installed on the mainline.

Standard:

Where such memorial signs are installed on the mainline, (1) memorial names shall not appear on directional guide signs, (2) memorial signs shall not interfere with the placement of any other necessary highway signing, and (3) memorial signs shall not compromise the safety or efficiency of traffic flow. The memorial signing shall be limited to one sign at an appropriate location in each route direction.

Section 2E.09 Amount of Legend on Guide Signs

Guidance:

No more than two destination names or street names should be shown on any Advance Guide sign or Exit Direction sign. A City name and street name on the same sign should be avoided. Where two or three signs are placed on the same supports, destinations or names should be limited to one per sign, or to a total of three in the display. Sign legends should not exceed three lines of copy.

Option:

Sign legends may include symbols, route numbers, arrows, cardinal directions, and exit instructions.

Section 2E.10 Number of Signs at an Overhead Installation and Sign Spreading

Guidance:

If overhead signs are warranted, as set forth in Section 2A.17, the number of signs at these locations should be limited to only those essential in communicating pertinent destination information to the road user. Exit Direction signs for a single exit and the Advance Guide signs should have only one panel with one or two destinations. Regulatory signs, such as speed limits, should not be used in conjunction with overhead guide sign installations. Because road users have limited time to read and comprehend sign messages, there should not be more than three guide signs displayed at any one location either on the overhead structure or its support.

Option:

At overhead locations, more than one sign may be installed to advise of a multiple exit condition at an interchange. If the roadway ramp or crossing roadway has complex or unusual geometrics, additional signs with confirming messages may be provided to properly guide the road user.

Support:

Sign spreading is a concept where major overhead signs are spaced so that road users are not overloaded with a group of signs at a single location. Figure 2E-1 illustrates an example of sign spreading.

Guidance:

Where overhead signing is used, sign spreading should be used at all single exit interchanges and to the extent possible at multi-exit interchanges. Sign spreading should be accomplished by use of the following:

A. The Exit Direction sign should be the only sign used in the vicinity of the gore (other than the Gore sign). It should be located overhead near the theoretical gore and generally on an overhead sign support structure.
B. The Advance Guide sign to indicate the next interchange exit should be placed near the crossroad location. If the crossroad goes over the mainline, the Advance Guide sign should be placed on the overcrossing structure.

Figure 2E-1. Example of Guide Sign Spreading

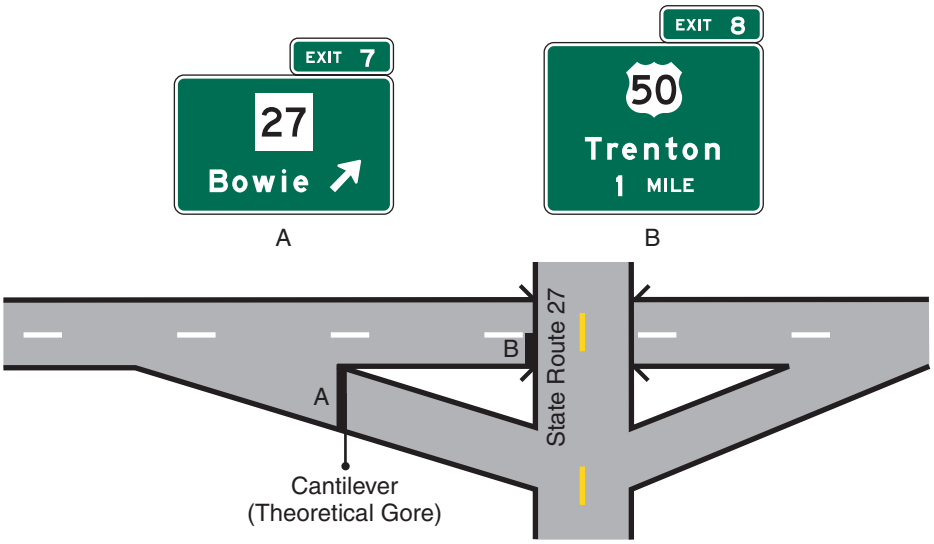


Figure 2E-2. Pull-Through Signs

E6-2

E6-2a

Section 2E.11 Pull-Through Signs

Support:

Pull-Through signs (see Figure 2E-2) are overhead lane use signs intended for through traffic.

Guidance:

Pull-Through signs should be used where the geometrics of a given interchange are such that it is not clear to the road user as to which is the through roadway, or where additional route guidance is desired. Pull-Through signs with down arrows should be used where the alignment of the through lanes is curved and the exit direction is straight ahead, where the number of through lanes is not readily evident, and at multi-lane exits where there is a reduction in the number of through lanes.

Section 2E.12 Designation of Destinations

Standard:

The direction of a freeway and the major destinations or control cities (see Section 2D.34) along it shall be clearly identified through the use of appropriate destination legends. Successive freeway guide signs shall provide continuity in destination names and consistency with available map information. At any decision point, a given destination shall be indicated by way of only one route.

Guidance:

Control city legends should be used in the following situations along a freeway:

A. At interchanges between freeways;
B. At separation points of overlapping freeway routes;
C. On directional signs on intersecting routes, to guide traffic entering the freeway;
D. On Pull-Through signs; and
E. On the bottom line of post-interchange distance signs.

Support:

Continuity of destination names is also useful on expressways serving long-distance or intrastate travel.

The determination of major destinations or control cities is important to the quality of service provided by the freeway. Control cities on freeway guide signs are selected by the States and are contained in the "List of Control Cities for Use in Guide Signs on Interstate Highways," published and available from American Association of State and Highway Transportation Officials (see Page i for AASHTO's address).

Section 2E.13 Size and Style of Letters and Signs

Standard:

With all freeway and expressway signs, the message dimensions shall be determined first, and the outside sign dimensions secondarily. Word messages in the legend of expressway guide signs shall be in letters at least 200 mm (8 in) high. Larger lettering shall be used for major guide signs at or in advance of interchanges and for all overhead signs. Minimum numeral and letter sizes for expressway guide signs according to interchange classification, type of sign and component of sign legend are shown in Tables 2E-1 and 2E-2. Minimum numeral and letter sizes for freeway guide signs, according to interchange classification, type of sign, and component of sign legend, appear in Tables 2E-3 and 2E-4. All names of places, streets, and highways on freeway and expressway guide signs shall be composed of lower-case letters with initial upper-case letters. The letters and the numerals used shall be Series E(M) of the "Standard Highway Signs" book (see Section 1A.11). Other word legends shall be in capital letters. Interline and edge spacing shall be as specified in Section 2E.14.

Lettering size on freeway and expressway signs shall be the same for both rural and urban conditions.

Support:

Sign size is determined primarily in terms of the length of the message and the size of the lettering necessary for proper legibility. Letter style and height, and arrow design have been standardized for freeway and expressway signs to assure uniform and effective application.

Designs for upper-case, lower-case, and capital alphabets together with tables of recommended letter spacing, are shown in the "Standard Highway Signs" book.

Guidance:

Where upper- and lower-case lettering is used, the initial upper-case letters should be approximately 1.33 times the "loop" height of the lower-case letters. Freeway lettering sizes (see Tables 2E-3 and 2E-4) should be used when expressway geometric design is comparable to freeway standards.

Other sign letter size requirements not specifically identified elsewhere in this Manual should be guided by these specifications. Abbreviations should be kept to a minimum.

Support:

A sign mounted over a particular roadway lane to which it applies might have to be limited in horizontal dimension to the width of the lane, so that another sign can be placed over an adjacent lane. The necessity to maintain proper vertical clearance might also place a further limitation on the size of the overhead sign and the legend that can be accommodated.

Section 2E.14 Interline and Edge Spacing

Guidance:

Interline spacing of upper-case letters should be approximately three-fourths the average of upper-case letter heights in adjacent lines of letters.

The spacings to the top and bottom borders should be equal to the average of the letter height of the adjacent line of letters. The lateral spacing to the vertical borders should be essentially the same as the height of the largest letter.

Table 2E-1. Minimum Letter and Numeral Sizes for Expressway Guide Signs According to Interchange Classification
(sizes shown in millimeters)

Type of Sign	Type of Interchange (see Section 2E.29)				
	Major				
	Category a	Category b	Intermediate	Minor	Overhead
A. Advance Guide, Exit Direction, and Overhead Guide Signs					
Exit Plaque					
Word	250	250	250	200	250
Numeral & Letter	375	375	375	300	375
Interstate Route Sign					
Numeral	450	—	—	—	450
1or 2 Digit Shield	900 x 900	—	—	—	900 x 900
3 Digit Shield	1125 x 900	—	—	—	1125 x 900
U.S. or State Route Sign					
Numeral	450	450	450	300	450
1 or 2 Digit Shield	900 x 900	900 x 900	900 x 900	600 x 600	900 x 900
3 Digit Shield	1125 x 900	1125 x 900	1125 x 900	750 x 600	1125 x 900
Alternate (Example: U.S. Alt. 56)					
Letters	375	300	300	250	300
Numeral	450	375	375	300	375
Cardinal Direction					
First Letter	450	375	300	250	375
Rest of Word	375	300	250	200	300
Name of Destination					
Upper-Case Letters	500	400	330	265	400
Lower-Case Letters	375	300	250	200	300
Distance Number	450	375	300	250	375
Distance Fraction	300	250	250	200	250
Distance Word	300	250	250	200	250
Action Message Word	250	250	250	200	250
B. Gore Signs					
Word	250	250	250	200	—
Numeral & Letter	300	300	300	250	—

Section 2E.15 Sign Borders

Standard:

Signs shall have a border of the same color as the legend in order to outline their distinctive shape and thereby give them easy recognition and a finished appearance.

Guidance:

For guide signs larger than 3000 x 1800 mm (120 x 72 in), the border should have a width of 50 mm (2 in). For smaller guide signs, a border width of 31 mm (1.25 in) should be used, but the width should not exceed the stroke width of the major lettering on the sign.

Corner radii of sign borders should be one-eighth of the minimum sign dimension on guide signs, except that the radii should not exceed 300 mm (12 in) on any sign.

Option:

The sign material in the area outside of the corner radius may be trimmed.

Table 2E-1. Minimum Letter and Numeral Sizes for Expressway Guide Signs According to Interchange Classification
(sizes shown in inches)

Type of Sign	Type of Interchange (see Section 2E.29)				
	Major				
	Category a	Category b	Intermediate	Minor	Overhead
A. Advance Guide, Exit Direction, and Overhead Guide Signs					
Exit Plaque					
Word	10	10	10	8	10
Numeral & Letter	15	15	15	12	15
Interstate Route Sign					
Numeral	18	—	—	—	18
1or 2 Digit Shield	36 x 36	—	—	—	36 x 36
3 Digit Shield	45 x 36	—	—	—	45 x 36
U.S. or State Route Sign					
Numeral	18	18	18	12	18
1 or 2 Digit Shield	36 x 36	36 x 36	36 x 36	24 x 24	36 x 36
3 Digit Shield	45 x 36	45 x 36	45 x 36	30 x 24	45 x 36
Alternate (Example: U.S. Alt. 56)					
Letters	15	12	12	10	12
Numeral	18	15	15	12	15
Cardinal Direction					
First Letter	18	15	12	10	15
Rest of Word	15	12	10	8	12
Name of Destination					
Upper-Case Letters	20	16	13.3	10.6	16
Lower-Case Letters	15	12	10	8	12
Distance Number	18	15	12	10	15
Distance Fraction	12	10	10	8	10
Distance Word	12	10	10	8	10
Action Message Word	10	10	10	8	10
B. Gore Signs					
Word	10	10	10	8	—
Numeral & Letter	12	12	12	10	—

Section 2E.16 Abbreviations

Guidance:

Abbreviations should be kept to a minimum; however, they are useful when complete destination messages produce excessively long signs. If used, abbreviations should be unmistakably recognized by road users (see Section 1A.14).

Periods should not be used unless a cardinal direction is abbreviated as part of a destination name.

Standard:

The words NORTH, SOUTH, EAST, and WEST shall not be abbreviated when used with route signs to indicate cardinal directions on guide signs.

Section 2E.17 Symbols

Standard:

Symbol designs shall be essentially like those shown in this Manual and in the "Standard Highway Signs" book (see Section 1A.11).

Table 2E-2. Minimum Letter and Numeral Sizes for Expressway Guide Signs According to Sign Type (Sheet 1 of 2)

Type of Sign	Minimum Size (mm)	Minimum Size (inches)
A. Pull-Through Signs		
Destination — Upper-Case Letters	330	13.3
Destination — Lower-Case Letters	250	10
Route Sign as Message		
Cardinal Direction	250	10
1- or 2-Digit Shield	900 x 900	36 x 36
3-Digit Shield	1125 x 900	45 x 36
B. Supplemental Guide Signs		
Exit Number Word	200	8
Exit Number Numeral and Letter	300	12
Place Name — Upper-Case Letters	265	10.6
Place Name — Lower-Case Letters	200	8
Action Message	200	8
C. Changeable Message Signs		
Characters	265*	10.6*
D. Interchange Sequence Signs		
Word — Upper-Case Letters	265	10.6
Word — Lower-Case Letters	200	8
Numeral	250	10
Fraction	200	8
E. Next X Exits Sign		
Place Name — Upper-Case Letters	265	10.6
Place Name — Lower-Case Letters	200	8
NEXT X EXITS	200	8
F. Distance Signs		
Word — Upper-Case Letters	200	8
Word — Lower-Case Letters	150	6
Numeral	200	8
G. General Services Signs		
Exit Number Word	200	8
Exit Number Numeral and Letter	300	12
Services	200	8
H. Rest Area and Scenic Area Signs		
Word	250	10
Distance Numeral	300	12
Distance Fraction	200	8
Distance Word	250	10
Action Message Word	250	10

Table 2E-2. Minimum Letter and Numeral Sizes for Expressway Guide Signs According to Sign Type *(Sheet 2 of 2)*

Type of Sign	Minimum Size (mm)	Minimum Size (inches)
I. Reference Location Signs		
Word	100	4
Numeral	250	10
J. Boundary and Orientation Signs		
Word — Upper-Case Letters	200	8
Word — Lower-Case Letters	150	6
K. Next Exit and Next Services Signs		
Word and Numeral	200	8
L. Exit Only Signs		
Word	300	12

*Changeable Message Signs may often require larger sizes than the minimum. A size of 450 mm (18 in) should be used where traffic speeds are greater than 90 km/h (55 mph), in areas of persistent inclement weather, or where complex driving tasks are involved.

Guidance:

A special effort should be made to balance legend components for maximum legibility of the symbol with the rest of the sign.

Option:

Educational plaques may be used below symbol signs where needed.

Section 2E.18 Arrows for Interchange Guide Signs

Standard:

On all Exit Direction signs, both overhead and ground mounted, arrows shall be upward slanting and shall be located on the side of the sign consistent with the direction of the exiting movement.

Downward pointing arrows shall be used only for overhead guide signs to prescribe lane assignment for traffic bound for a destination or route that can be reached only by being in the designated lane(s).

Option:

Downward pointing arrows may be tilted where it is desired to emphasize the separation of roadways.

Support:

Examples of arrows for use on guide signs are shown in Figure 2D-2. Detailed dimensions of arrows are provided in the "Standard Highway Signs" book (see Section 1A.11).

Section 2E.19 Diagrammatic Signs

Support:

Diagrammatic signs are guide signs that show a graphic view of the exit arrangement in relationship to the main highway. Use of such guide signs has been shown to be superior to conventional guide signs for some interchanges.

Standard:

Diagrammatic signs shall be designed in accordance with the following criteria:

A. The graphic legend shall be of a plan view showing the off-ramp arrangement (see Figure 2E-3).
B. No other symbols or route shields shall be used as a substitute for arrowheads.
C. They shall not be installed at the exit direction location (see Section 2E.33).
D. The EXIT ONLY panel shall not be used on diagrammatic signs at any major split.

Table 2E-3. Minimum Letter and Numeral Sizes for Freeway Guide Signs According to Interchange Classification

(sizes shown in millimeters)

Type of Sign	Type of Interchange (see Section 2E.29)				
	Major				
	Category a	Category b	Intermediate	Minor	Overhead
A. Advance Guide, Exit Direction, and Overhead Guide Signs					
Exit Plaque					
Word	250	250	250	250	250
Numeral & Letter	375	375	375	375	375
Interstate Route Sign					
Numeral	600/450	—	—	—	450
1- or 2-Digit Shield	1200 x 1200/ 900 x 900	—	—	—	900 x 900
3-Digit Shield	1500 x 1200/ 1125 x 900	—	—	—	1125 x 900
U.S. or State Route Sign					
Numeral	600/450	450	450	300	450
1- or 2-Digit Shield	1200 x 1200/ 900 x 900	900 x 900	900 x 900	600 x 600	900 x 900
3-Digit Shield	1500 x 1200/ 1125 x 900	1125 x 900	1125 x 900	750 x 600	1125 x 900
Alternate (Example: U.S. Alt. 56)					
Letters	375	375/300	300	250	300
Numeral	450	450/375	375	300	375
Cardinal Direction					
First Letter	450	375	375	250	300
Rest of Word	375	300	300	200	300
Name of Destination					
Upper-Case Letters	500	500	400	330	400
Lower-Case Letters	375	375	300	250	300
Distance Number	450	450/375	375	300	375
Distance Fraction	300	300/250	250	200	250
Distance Word	300	300/250	250	200	250
Action Message Word	300	300/250	250	200	250
B. Gore Signs					
Word	300	300	300	200	—
Numeral & Letter	375	375	375	250	—

Note: (/) Slanted bar signifies separation of desirable and minimum sizes.

Table 2E-3. Minimum Letter and Numeral Sizes for Freeway Guide Signs According to Interchange Classification
(sizes shown in inches)

Type of Sign	Type of Interchange (see Section 2E.29)				Overhead
	Major		Intermediate	Minor	
	Category a	Category b			
A. Advance Guide, Exit Direction, and Overhead Guide Signs					
Exit Plaque					
Word	10	10	10	10	10
Numeral & Letter	15	15	15	15	15
Interstate Route Sign					
Numeral	24/18	—	—	—	18
1- or 2-Digit Shield	48 x 48/ 36 x 36	—	—	—	36 x 36
3-Digit Shield	60 x 48/ 45 x 36	—	—	—	45 x 36
U.S. or State Route Sign					
Numeral	24/18	18	18	12	18
1- or 2-Digit Shield	48 x 48/ 36 x 36	36 x 36	36 x 36	24 x 24	36 x 36
3-Digit Shield	60 x 48/ 45 x 36	45 x 36	45 x 36	30 x 24	45 x 36
Alternate (Example: U.S. Alt. 56)					
Letters	15	15/12	12	10	12
Numeral	18	18/15	15	12	15
Cardinal Direction					
First Letter	18	15	15	10	15
Rest of Word	15	12	12	8	12
Name of Destination					
Upper-Case Letters	20	20	16	13.3	16
Lower-Case Letters	15	15	12	10	12
Distance Number	18	18/15	15	12	15
Distance Fraction	12	12/10	10	8	10
Distance Word	12	12/10	10	8	10
Action Message Word	12	12/10	10	8	10
B. Gore Signs					
Word	12	12	12	8	—
Numeral & Letter	15	15	15	10	—

Note: (/) Slanted bar signifies separation of desirable and minimum sizes.

Table 2E-4. Minimum Letter and Numeral Sizes for Freeway Guide Signs According to Sign Type (Sheet 1 of 2)

Type of Sign	Minimum Size (mm)	Minimum Size (inches)
A. Pull-Through Signs		
Destination — Upper-Case Letters	400	16
Destination — Lower-Case Letters	300	12
Route Sign as Message		
Cardinal Direction	300	12
1- or 2-Digit Shield	900 x 900	36 x 36
3-Digit Shield	1125 x 900	45 x 36
B. Supplemental Guide Signs		
Exit Number Word	250	10
Exit Number Numeral and Letter	375	15
Place Name — Upper-Case Letters	330	13.3
Place Name — Lower-Case Letters	250	10
Action Message	250	10
C. Changeable Message Signs		
Characters	265*	10.6*
D. Interchange Sequence Signs		
Word — Upper-Case Letters	330	13.3
Word — Lower-Case Letters	250	10
Numeral	330	13.3
Fraction	250	10
E. Next X Exits Sign		
Place Name — Upper-Case Letters	330	13.3
Place Name — Lower-Case Letters	250	10
NEXT X EXITS	250	10
F. Distance Signs		
Word — Upper-Case Letters	200	8
Word — Lower-Case Letters	150	6
Numeral	200	8
G. General Service Signs		
Exit Number Word	250	10
Exit Number Numeral and Letter	375	15
Services	250	10
H. Rest Area and Scenic Area Signs		
Word	300	12
Distance Numeral	375	15
Distance Fraction	250	10
Distance Word	300	12
Action Message Word	300	12

Table 2E-4. Minimum Letter and Numeral Sizes for Freeway Guide Signs According to Sign Type (Sheet 2 of 2)

Type of Sign	Minimum Size (mm)	Minimum Size (inches)
I. Reference Location Signs		
Word	100	4
Numeral	250	10
J. Boundary and Orientation Signs		
Word — Upper-Case Letters	200	8
Word — Lower-Case Letters	150	6
K. Next Exit and Next Services Signs		
Word and Numeral	200	8
L. Exit Only Signs		
Word	300	12
M. Diagrammatic Signs		
Lane Widths	125	5
Lane Line Segments	25 x 150	1 x 6
Gap Between Lane Lines	150	6
Stem Height (up to upper point of departure)	750	30
Arrowhead (standard “up” arrow)	200	8
Space Between Arrowhead and Route Shield	300	12

*Changeable Message Signs may often require larger sizes than the minimum. A size of 450 mm (18 in) should be used where traffic speeds are greater than 90 km/h (55 mph), in areas of persistent inclement weather, or where complex driving tasks are involved.

Guidance:

Diagrammatic signs should be designed in accordance with the following additional criteria:

A. The graphic should not depict deceleration lanes.
B. No more than one destination should be shown for each arrowhead, and no more than two destinations should be shown per sign.
C. A black on yellow EXIT ONLY panel should be used to supplement a lane drop graphic.
D. The shaft for the exit ramp movement should be shorter than, but not separated from, the through movement graphic. Where the movements are freeway splits rather than exits, the shafts should be equal in length.
E. Arrow shafts should contain lane lines where appropriate.
F. Route shields, cardinal directions, and destinations should be clearly related to the arrowhead, and the arrowhead should point toward the route shield for the off movement.
G. The cardinal direction should be placed adjacent to the route shield, and the destination should be placed below and justified with the route shield.

Diagrammatic signs should be used at the Advance Guide sign location(s) for the following:

A. Left exits (see Figure 2E-3).
B. Splits where the off-route movement is to the left (see Figure 2E-4).
C. Optional lane splits for non-overlapping routes (see Figure 2E-5).
D. Where a two-lane exit has an optional lane that carries the through route (see Figures 2E-6 and 2E-7). These interchanges create serious expectancy problems for drivers who are unfamiliar with the interchange.
E. Left exit interchange lane drop situations. In this situation, an EXIT ONLY (E11-1c) panel should be used without a down arrow for Advance Guide signs (see Figure 2E-8).

Figure 2E-3. Diagrammatic Sign for a Single-Lane Left Exit

* The upper half of a Left Exit plaque, which contains the word LEFT, may have a black legend and border on a yellow background.

Standard:

Diagrammatic signs have been shown to be inferior to conventional signs at cloverleaf interchanges and shall not be used at these locations.

Support:

Specific guidelines for more detailed design of diagrammatic signs are contained in the "Standard Highway Signs" book (see Section 1A.11).

Section 2E.20 Signing for Interchange Lane Drops

Standard:

Major guide signs for all lane drops at interchanges shall be mounted overhead. An EXIT ONLY panel shall be used for all interchange lane drops at which the through route is carried on the mainline.

Guidance:

The EXIT ONLY (down arrow) (E11-1) panel (see Figure 2E-9) should be used on all signing of lane drops on all Advance Guide signs for right exits (see Figure 2E-10). For lane drops on the left side, diagrammatic signing with the EXIT ONLY (E11-1c) panel (see Figure 2E-9) should be used without a down arrow for Advance Guide signs (see Figure 2E-8).

Standard:

The Exit Direction sign (see Figure 2E-20) and E11-1a panel (see Figure 2E-9) shall be of the format shown in Figures 2E-8 and 2E-10 for all lane drops. The standard slanted up arrow (left or right side) shall be included on the Exit Direction sign.

Option:

EXIT ONLY messages of either E11-1b or E11-1c formats may be used to retrofit existing signing to warn of a lane drop situation ahead.

Standard:

If used on an existing sign, the E11-1b panel (see Figure 2E-9) shall be placed on either side of a white down arrow. The E11-1c panel, if used on an existing nondiagrammatic sign, shall be placed between the lower destination message and the white down arrow.

Guidance:

Advance Guide signs for lane drops within 2 km or 1 mile of the interchange should not contain the distance message.

Wherever the dropped lane carries the through route, diagrammatic signs should be used without the EXIT ONLY panel.

Figure 2E-4. Diagrammatic Signs for Split with Dedicated Lanes

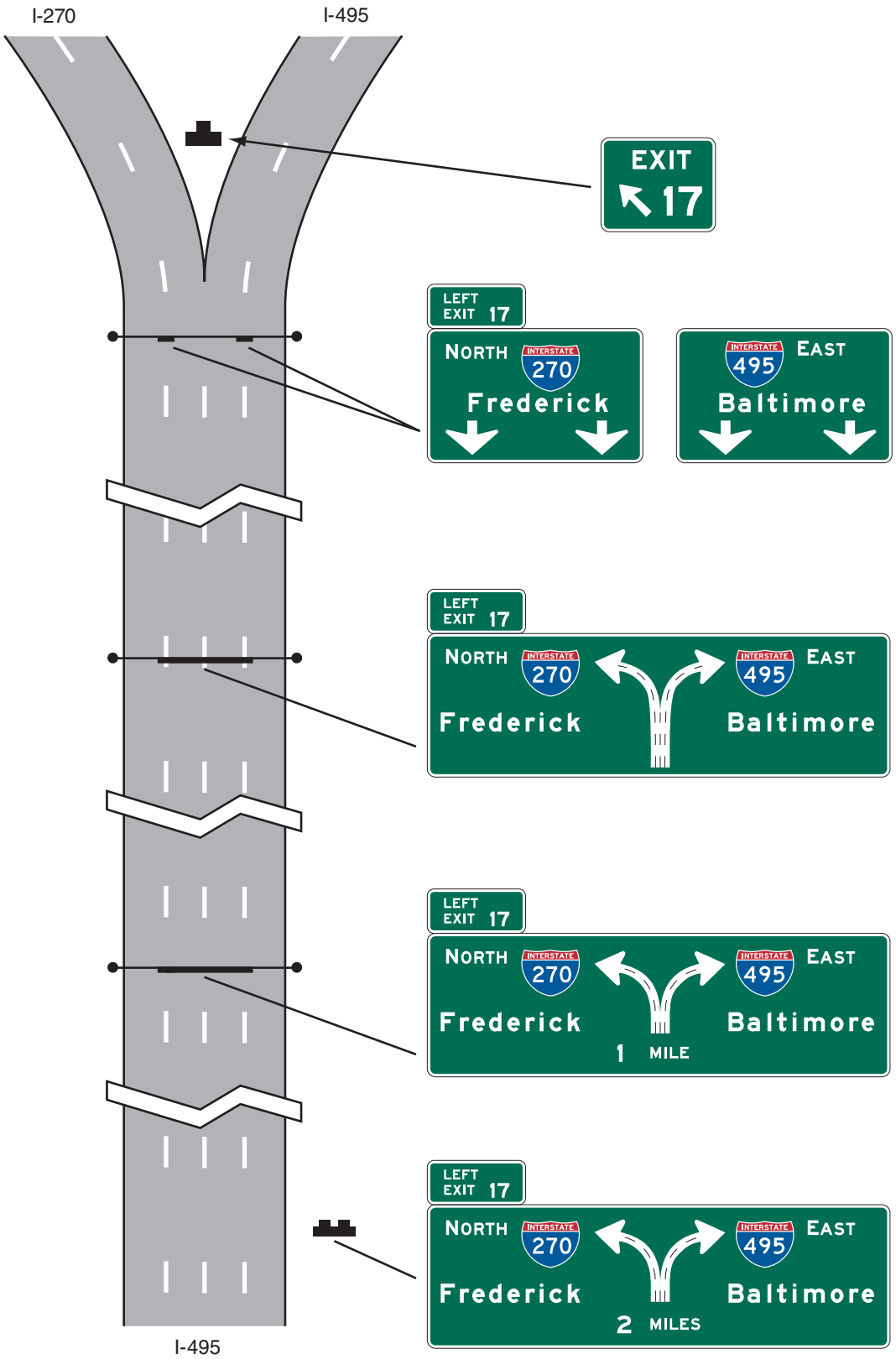


Figure 2E-5. Diagrammatic Signs for Split with Optional Lane

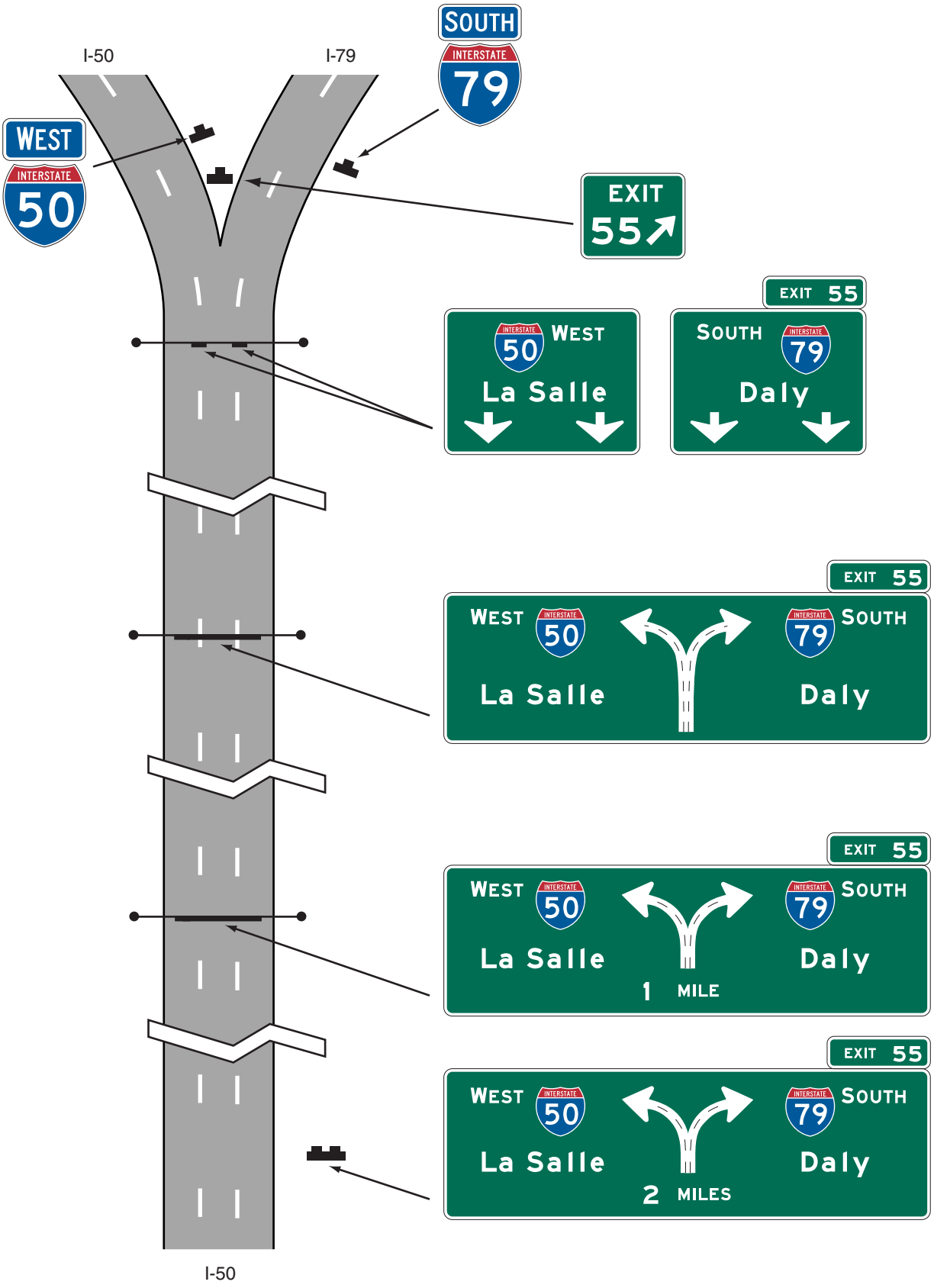


Figure 2E-6. Diagrammatic Signs for Two-Lane Exit with Optional Lane

Figure 2E-7. Diagrammatic Signs for Two-Lane Exit with Optional Lane

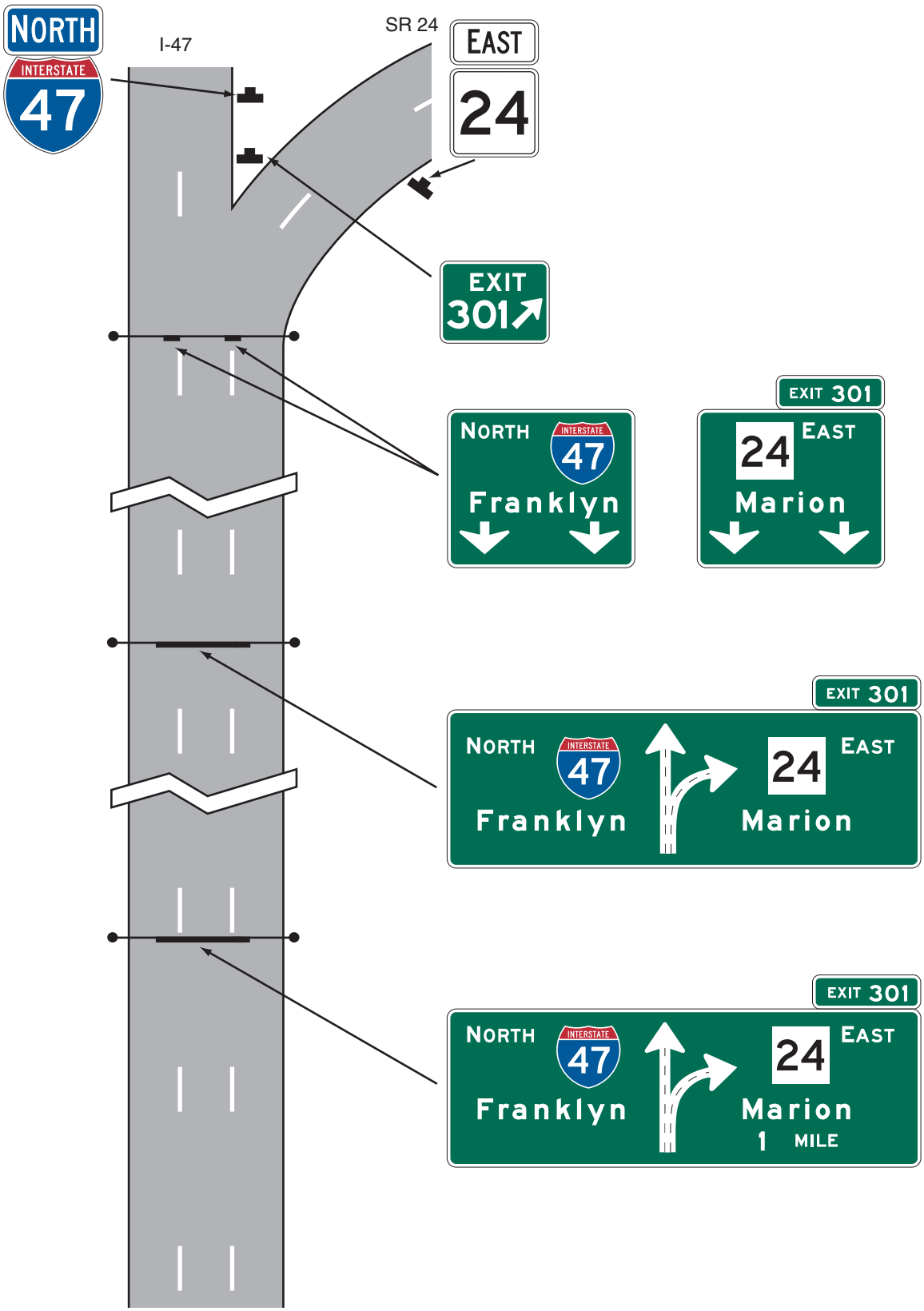


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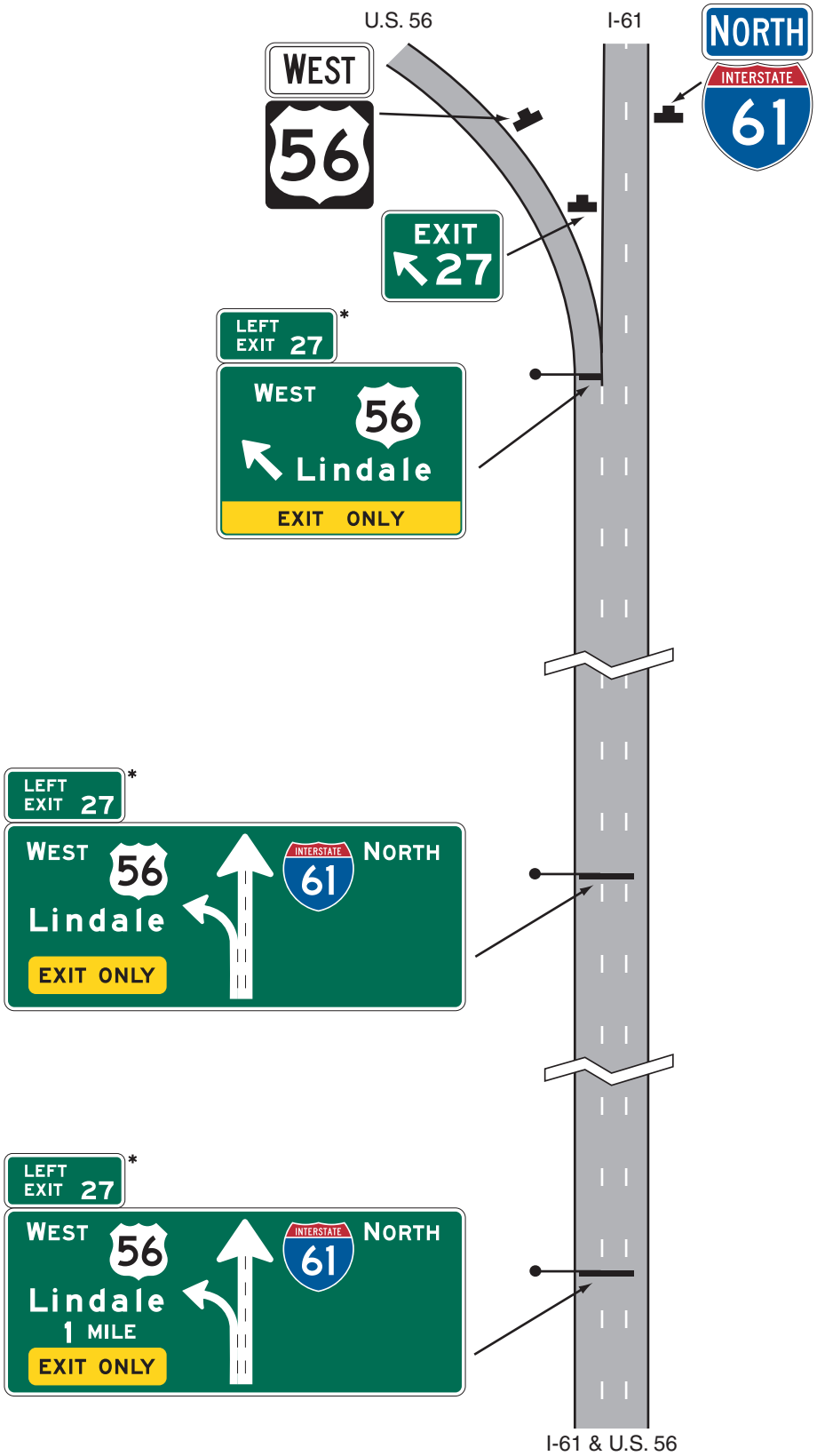
Figure 2E-8. EXIT ONLY on Left with Diagrammatic Sign for Left Lane Dropped at an Interchange



* The upper half of a Left Exit plaque, which contains the word LEFT, may have a black legend and border on a yellow background.

Figure 2E-9. EXIT ONLY Panels

E11-1

E11-1a

E11-1b

E11-1c

Section 2E.21 Changeable Message Signs

Standard:

Changeable message signs shall be capable of displaying several messages in a sequence. Such messages shall be changed manually, by remote control, or by automatic controls. Changeable message signs shall display pertinent traffic operational and guidance information only, not advertising.

Support:

Because technology for changeable message signs continues to advance, a specific standard for changeable message signs is not practical. Considerations that influence the selection of the best sign for a particular application include conspicuity, legibility, operation, and maintenance of the changeable message sign. This Section applies to signs for use on freeway and expressway mainlines. It is recognized that similar signs might be used on ramps and at ramp terminals where smaller letter heights and the number of messages might differ from the provisions of this Section.

Guidance:

To the extent practical, the design and application of changeable message signs should conform to the general principles of this Manual. Within the context of Section 2A.07, these practices should be followed for mainline freeway and expressway applications:

A. Changeable message signs should be capital letters and have a desirable letter size of 450 mm (18 in) or a minimum letter size of 265 mm (10.6 in). Signs should be limited to not more than 3 lines with not more than 20 characters per line.
B. No more than two displays should be used within any message cycle.
C. Each display should convey a single thought.
D. The entire message cycle should be readable at least twice by drivers traveling at the posted speed, the off-peak 85th-percentile speed, or the operating speed.

Standard:

Messages shall be centered within each line of legend. If more than one changeable message sign is visible to road users, then only one such sign shall display a sequential message at any given time.

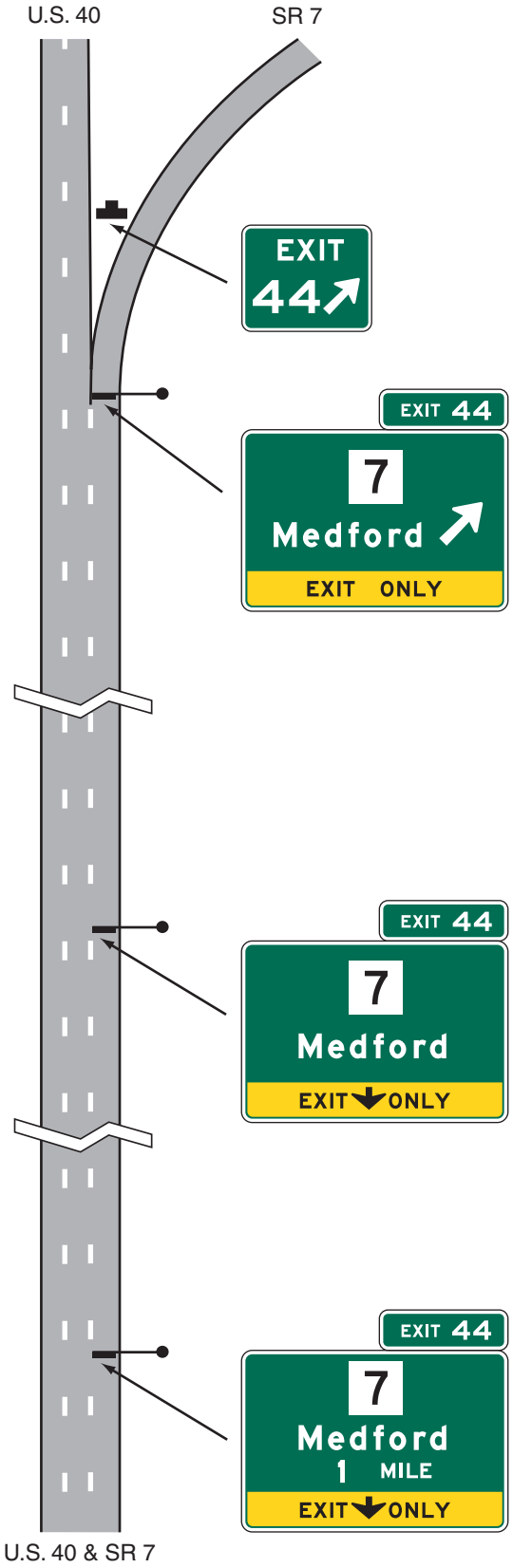
A three-line changeable message sign shall be limited to not more than two messages. Techniques of message display such as fading, exploding, dissolving, or moving messages shall not be used.

Section 2E.22 Overhead Sign Installations

Support:

Specifications for the design and construction of structural supports for highway signs have been standardized by the American Association of State Highway and Transportation Officials (AASHTO). Overcrossing structures can often serve for the support of overhead signs, and might in some cases be the only practical location that will provide adequate viewing distance. Use of these structures as sign supports will eliminate the need for additional sign supports along the roadside. Factors justifying the installation of overhead sign

Figure 2E-10. EXIT ONLY Panels for Right Lane Dropped at an Interchange



Section 2E.23 Lateral Offset

Standard:

The minimum lateral clearance outside the usable roadway shoulder for ground-mounted freeway and expressway signs or for overhead sign supports, either to the right or left side of the roadway, shall be 1.8 m (6 ft). This minimum clearance shall also apply outside of a barrier curb. If located within the clear zone, the signs shall be mounted on crashworthy supports or shielded by appropriate crashworthy barriers.

Guidance:

Where practical, a sign should not be less than 3 m (10 ft) from the edge of the nearest traffic lane. Large guide signs especially should be farther removed, preferably 9 m (30 ft) or more from the nearest traffic lane.

Where an expressway median is 3.7 m (12 ft) or less in width, consideration should be given to spanning both roadways without a center support.

Where overhead sign supports cannot be placed a reasonably safe distance away from the line of traffic or in an otherwise protected site, they should either be designed to minimize the impact forces, or be adequately shielded by a physical barrier or guardrail of suitable design.

Standard:

Butterfly-type sign supports and other overhead noncrashworthy sign supports shall not be installed in gores or other unprotected locations within the clear zone.

Option:

Lesser clearances, but not generally less than 1.8 m (6 ft), may be used on connecting roadways or ramps at interchanges.

Section 2E.24 Guide Sign Classification

Support:

Freeway and expressway guide signs are classified and treated in the following categories:

A. Route signs and Trailblazer Assemblies (see Section 2E.25);
B. At-Grade Intersection signs (see Section 2E.26);
C. Interchange signs (see Sections 2E.27 through 2E.36);
D. Interchange Sequence signs (see Section 2E.37);
E. Community Interchanges Identification signs (see Section 2E.38);
F. NEXT X EXITS signs (see Section 2E.39);
G. General Service signs (see Section 2E.51);
H. Rest and Scenic Area signs (see Section 2E.52);
I. Tourist Information and Welcome Center signs (see Section 2E.53);
J. Reference Location Signs (see Section 2E.54);
K. Miscellaneous guide signs (see Section 2E.55);
L. Radio Information signing (see Section 2E.56);
M. Carpool and Ridesharing signing (see Section 2E.57);
N. Weigh Station signing (see Section 2E.58);
O. Specific Service signs (see Chapter 2F); and
P. Recreational and Cultural Interest Area signs (see Chapter 2H).

Section 2E.25 Route Signs and Trailblazer Assemblies

Standard:

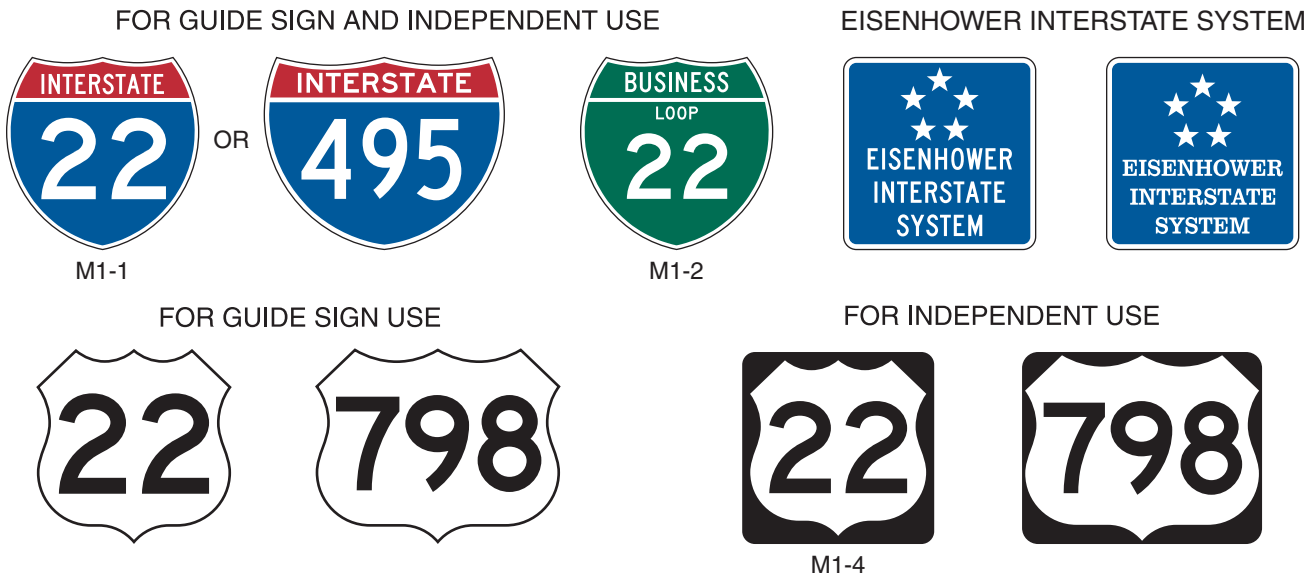
The official Route sign for the Interstate Highway System shall be the red, white, and blue retroreflective distinctive shield adopted by the American Association of State Highway and Transportation Officials (see Section 2D.11).

Guidance:

Route signs (see Figure 2E-11) should be incorporated as cut-out shields or other distinctive shapes on large directional guide signs. Where the Interstate shield is displayed in an assembly or on the face of a guide sign with U.S. or State Route signs, the Interstate numeral should be at least equal in size to the numerals on the other Route signs. The use of independent Route signs should be limited primarily to route confirmation assemblies.

Route signs and auxiliary signs showing junctions and turns should be used for guidance on approach roads, for route confirmation just beyond entrances and exits, and for reassurance along the freeway or expressway. When used along the freeway or expressway, the Route signs should be enlarged as shown in the "Standard Highway Signs" book (see Section 1A.11). When independently mounted Route signs are used in place of Pull-Through signs, they should be located just beyond the exit.

Figure 2E-11. Interstate and U.S. Route Signs



Option:

The standard Trailblazer Assembly (see Section 2D.32) may be used on roads leading to the freeway or expressway. Component parts of the Trailblazer Assembly may be included on a single sign panel. Independently mounted Route signs may be used instead of Pull-Through signs as confirmation information (see Section 2E.11). The commonly used name or trailblazer symbol for a toll facility may be displayed on nontoll sections of the Interstate Highway System at:

A. The last exit before entering a toll section of the Interstate Highway System;
B. The interchange or connection with a toll facility, whether or not the toll facility is a part of the Interstate Highway System; and
C. Other locations within a reasonable approach distance of toll facilities when the name or trailblazer symbol for the toll facility would provide better guidance to road users unfamiliar with the area than would place names and route numbers.

The toll facility name or symbol may be included as a part of the guide sign installations on intersecting highways and approach roads to indicate the interchange with a toll section of an Interstate route. Where needed for the proper direction of traffic, a trailblazer for a toll facility that is part of the Interstate Highway System may be displayed with the Interstate Trailblazer Assembly.

Section 2E.26 Signs for Intersections at Grade

Guidance:

If there are intersections at grade within the limits of an expressway, guide sign types specified in Chapter 2D should be used. However, such signs should be of a size compatible with the size of other signing on the expressway.

Option:

Advance Guide signs for intersections at grade may take the form of diagrammatic layouts depicting the geometrics of the intersection along with essential directional information.

Section 2E.27 Interchange Guide Signs

Standard:

The signs at interchanges and on their approaches shall include Advance Guide signs and Exit Direction signs. Consistent destination messages shall be displayed on these signs.

Guidance:

New destination information should not be introduced into the major sign sequence for one interchange, nor should destination information be dropped.

Reference should be made to Section 2E.10 and Sections 2E.30 through 2E.39 for a detailed description of the signs in the order that they should appear at the approach to and beyond each interchange. Guide signs placed in advance of an interchange deceleration lane should be spaced at least 245 m (800 ft) apart.

Supplemental guide signing should be used sparingly as provided in Section 2E.32.

Section 2E.28 Interchange Exit Numbering

Support:

Interchange exit numbering provides valuable orientation for the road user on a freeway or expressway. The feasibility of numbering interchanges or exits on an expressway will depend largely on the extent to which grade separations are provided. Where there is appreciable continuity of interchange facilities, interrupted only by an occasional intersection at grade, the numbering will be helpful to the expressway user.

Standard:

Interchange numbering shall be used in signing each freeway interchange exit. Interchange exit numbers shall be displayed with each Advance Guide sign, Exit Direction sign, and Gore sign. The exit number shall be displayed on a separate plaque at the top of the Advance Guide or Exit Direction sign. The standard exit number plaque shall include the word EXIT, the appropriate exit number, and the suffix letter (on multi-exit interchanges) separated from the exit number by a space in a single-line format on a plaque 750 mm (30 in) in height. Exit numbers shall not include the cardinal initials corresponding to the directions of the cross route. Minimum numeral and letter sizes are given in Tables 2E-1 through 2E-4. If used, the interchange numbering system for expressways shall conform to the provisions prescribed for freeways.

Option:

There are two approaches to interchange exit numbering that the State and local highway agencies may use: (1) reference location sign numbering or (2) consecutive numbering.

Support:

Reference location sign exit numbering is preferred over consecutive exit numbering for two reasons: (1) if new interchanges are added to a route, the highway agencies do not have to change the numbering sequence; and (2) reference location sign numbering assists road users in determining their destination distances and travel mileage.

Exit numbers may also be used with Supplemental Guide signs and Road User Service signs.

Guidance:

Exit number plaques should be located toward the top left edge of the sign for a left exit and toward the top right edge for right exits.

Because road users might not expect a left exit and might have difficulty in maneuvering to the left, the word LEFT should be added to the exit number plaque (see Figure 2E-3). Where a left exit is not numbered (no exit number plaque), a plaque with the word LEFT should be added to the top left edge of the sign.

Option:

The portion of the exit number plaque containing the word LEFT may have a black legend and border on a yellow background.

Support:

The general plan for numbering interchange exits is shown in Figures 2E-12 through 2E-14.

Example exit number plaque designs are shown in Figures 2E-3 and 2E-15. Figures 2E-1, 2E-20, 2E-23, 2E-27 through 2E-32, and 2E-42 illustrate the incorporation of exit number plaques on guide signs.

Standard:

Where a route originates within a State, the southernmost or westernmost terminus shall be the beginning point for numbering. If a loop, spur, or circumferential route crosses State boundaries, the sequence of numbering shall be coordinated by the States to provide continuous numbering.

For circumferential routes, the numbering of interchanges shall be in a clockwise direction. The numbering shall begin with the first interchange west of the south end of an imaginary north-south line bisecting the circumferential route, at a radial freeway or other Interstate route, or some other conspicuous landmark in the circumferential route near a south polar location (see Figure 2E-12). The interchange numbers on loop routes shall begin at the loop interchange nearest the south or west mainline junction and increase in magnitude toward the north or east mainline junction (see Figure 2E-13). Spur route interchanges shall be numbered in ascending order starting at the interchange where the spur leaves the mainline of the principal route (see Figure 2E-13).

Figure 2E-12. Example of Interchange Numbering for Mainline and Circumferential Routes

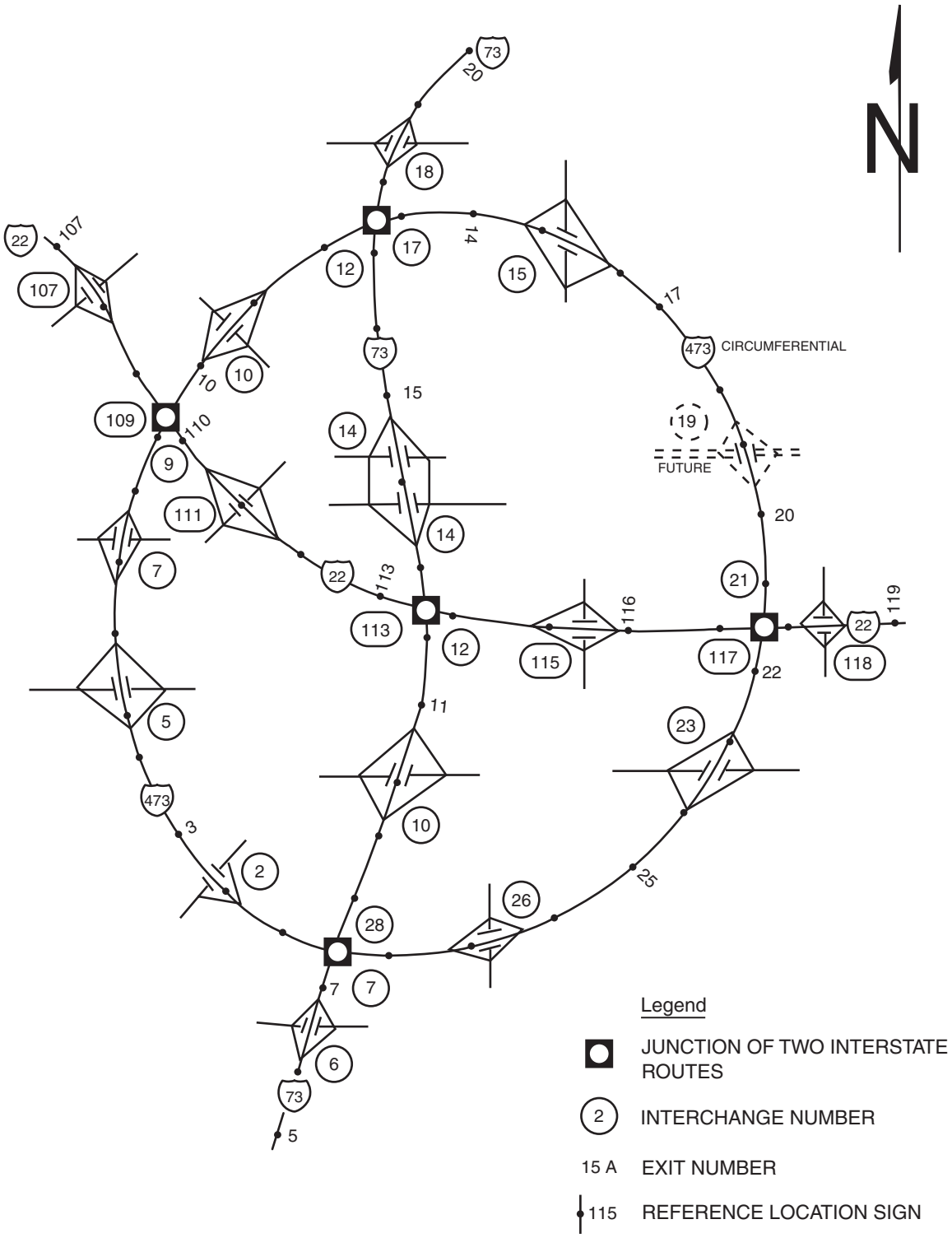
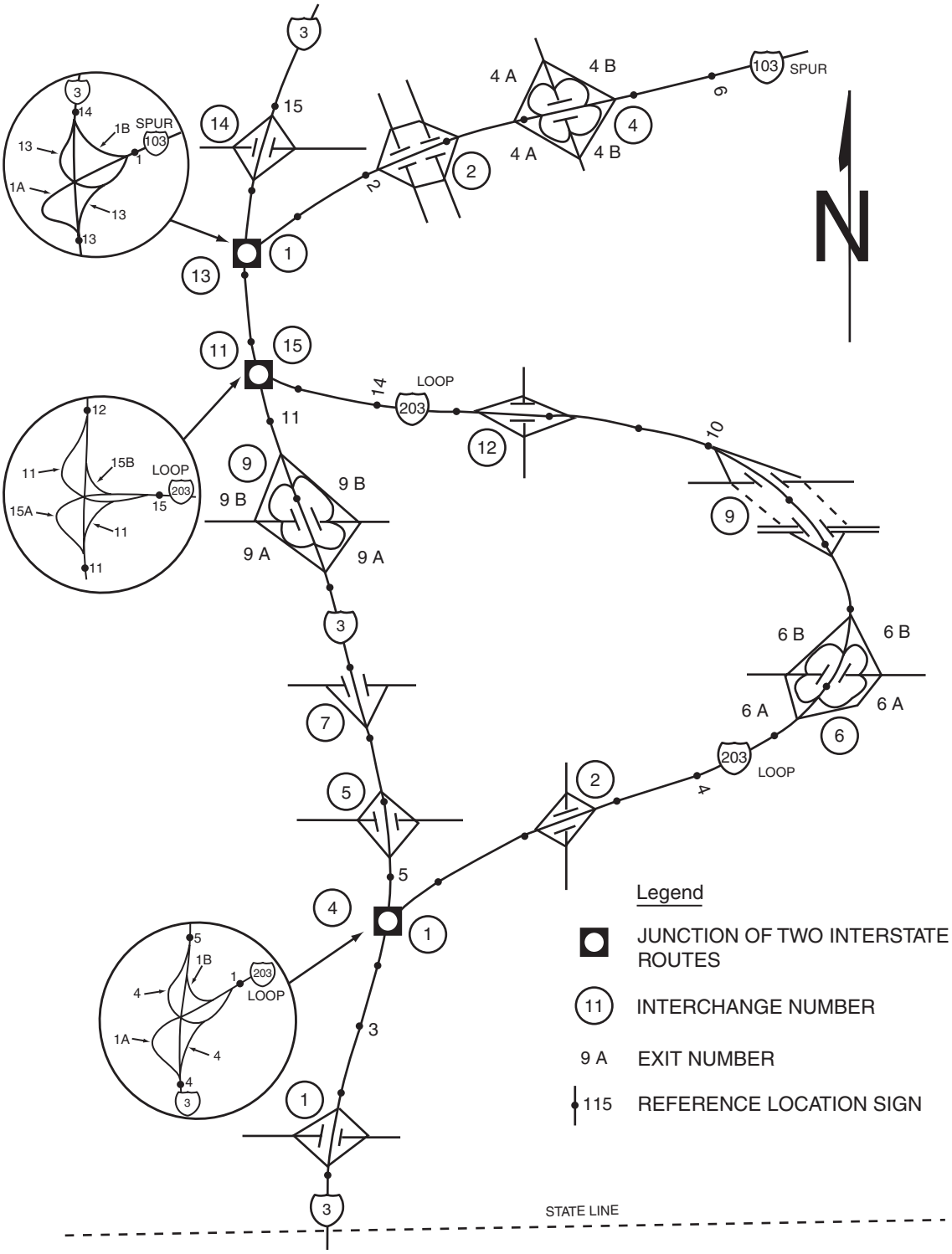


Figure 2E-13. Example of Interchange Numbering for Mainline, Loop, and Spur Routes



Where numbered routes overlap, continuity of interchange numbering shall be established for only one of the routes (see Figure 2E-14). If one of the routes is an Interstate, the Interstate route shall maintain continuity of interchange numbering.

Guidance:

The route chosen for continuity of interchange numbering should also have reference location sign continuity (see Figure 2E-14).

Section 2E.29 Interchange Classification

Support:

For signing purposes, interchanges are classified as major, intermediate, and minor. The minimum alphabet sizes contained in Tables 2E-1 and 2E-3 are based on this classification. Descriptions of these classifications are as follows:

A. Major interchanges are subdivided into two categories: (a) interchanges with other expressways or freeways, or (b) interchanges with high-volume multi-lane highways, principal urban arterials, or major rural routes where the volume of interchanging traffic is heavy or includes many road users unfamiliar with the area.
B. Intermediate interchanges are those with urban and rural routes not in the category of major or minor interchanges.
C. Minor interchanges include those where traffic is local and very light, such as interchanges with land service access roads. Where the sum of exit volumes is estimated to be lower than 100 vehicles per day in the design year, the interchange is classified as minor.

Section 2E.30 Advance Guide Signs

Support:

The Advance Guide sign gives notice well in advance of the exit point of the principal destinations served by the next interchange and the distance to that interchange (see Figure 2E-15).

Guidance:

For major and intermediate interchanges (see Section 2E.29), Advance Guide signs should be placed at 1 km or 0.5 miles and at 2 km or 1 mile in advance of the exit with a third Advance Guide sign placed at 4 km (2 mi) in advance of the exit if spacing permits. At minor interchanges, only one Advance Guide sign should be used. It should be located 1 to 2 km or 0.5 to 1 mile from the exit gore. If the sign is located less than 1 km or 0.5 miles from the exit, the distance shown should be to the nearest 400 m or 1/4 mile. Fractions of kilometers or decimals of kilometers should not be used. Fractions of a mile, rather than decimals, should be shown in all cases.

Where Advance Guide signs are provided for a left exit, diagrammatic signs should be used (see Figure 2E-3).

Standard:

When used, Advance Guide signs shall contain the distance message. The legend on the Advance Guide signs shall be the same as the legend on the Exit Direction sign, except that the last line shall read EXIT X km (EXIT X MILES). If the interchange has two or more exit roadways, the bottom line shall read EXITS X km (EXITS X MILES).

Option:

Where interchange exit numbers are used, the word EXIT may be omitted from the bottom line. Where the distance between interchanges is more than 2 km or 1 mile, but less than 4 km or 2 miles, the first Advance Guide sign may be closer than 4 km or 2 miles, but not placed so as to overlap the signing for the previous exit. Duplicate Advance Guide signs or Interchange Sequence Series signs may be placed in the median on the opposite side of the roadway and are not included in the minimum requirements of interchange signing.

Guidance:

Where there is less than 245 m (800 ft) between interchanges, Interchange Sequence Series signs should be used instead of Advance Guide signs for the affected interchanges.

Section 2E.31 Next Exit Supplemental Signs

Option:

Where the distance to the next interchange is unusually long, Next Exit supplemental signs may be installed to inform road users of the distance to the next interchange (see Figure 2E-16).

Guidance:

The Next Exit supplemental sign should not be used unless the distance between successive interchanges is more than 8 km (5 mi).

Figure 2E-14. Example of Interchange Numbering If Routes Overlap

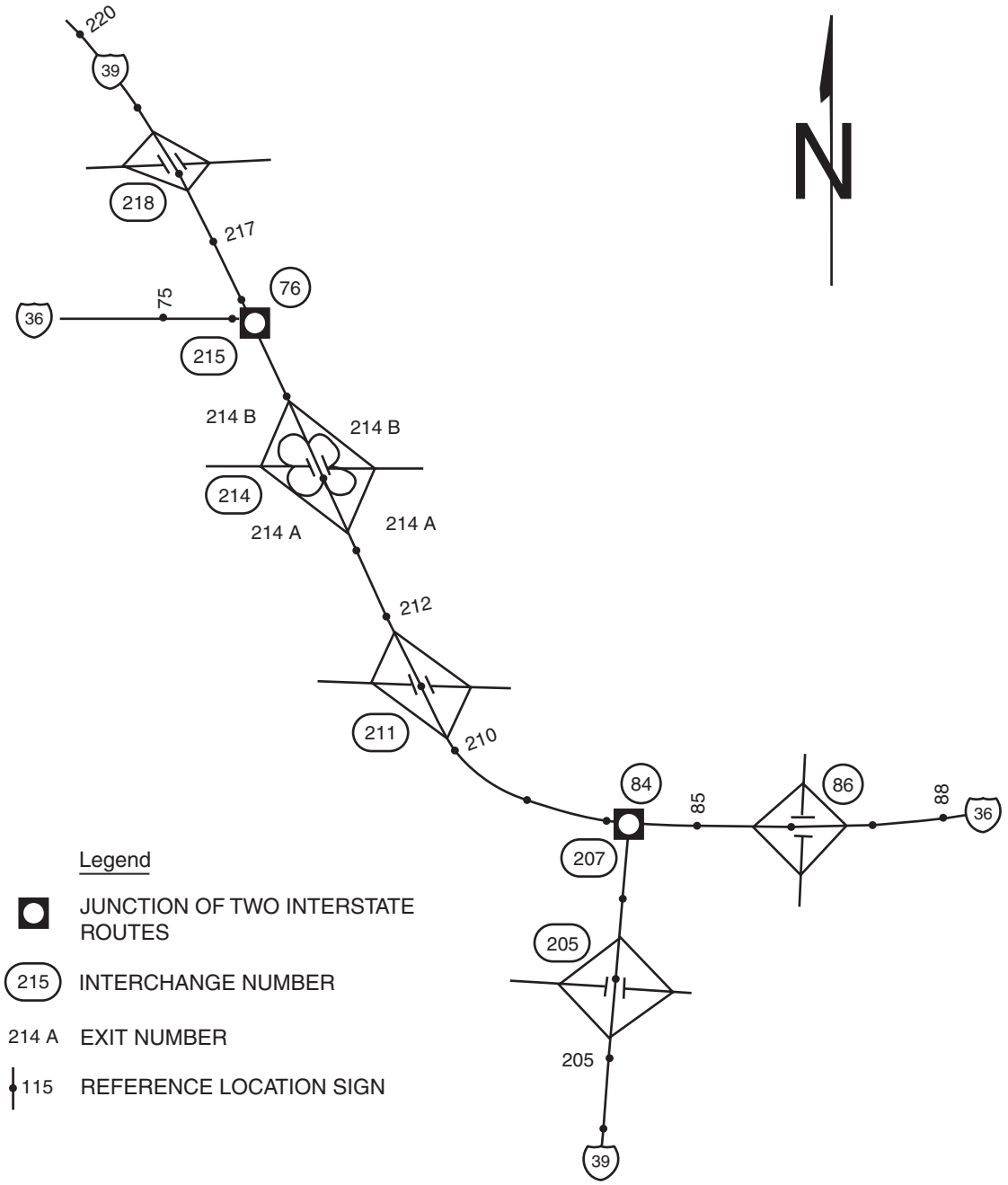


Figure 2E-15. Examples of Interchange Advance Guide Signs

E1-1

E1-1a

Note: Delete word EXIT(S) if exit number is used.

E1-2

E1-2a

E1-5
Exit Number Plaque

Figure 2E-16. Next Exit Supplemental Advance Guide Signs

E2-1

E2-1A

Standard:

The Next Exit supplemental sign shall carry the legend NEXT EXIT X km (X MILES). If the Next Exit supplemental sign is used, it shall be placed below the Advance Guide sign nearest the interchange. It shall be mounted so as to not adversely affect the breakaway feature of the sign support structure.

Option:

The legend for the Next Exit supplemental sign may be displayed in either one or two lines. The one-line message is the more desirable choice unless the message causes the sign to have a horizontal dimension greater than that of the Advance Guide sign.

Section 2E.32 Other Supplemental Guide Signs

Support:

Supplemental Guide signs can be used to provide information regarding destinations accessible from an interchange, other than places shown on the standard interchange signing. However, such Supplemental Guide signing can reduce the effectiveness of other more important guide signing because of the possibility of overloading the road user's capacity to receive visual messages and make appropriate decisions. "The AASHTO Guidelines for the Selection of Supplemental Guide Signs for Traffic Generators Adjacent to Freeways" is incorporated by reference in this section (see Page i for AASHTO's address).

Guidance:

No more than one Supplemental Guide sign should be used on each interchange approach.

A Supplemental Guide sign (see Figure 2E-17) should not list more than two destinations. Destination names should be followed by the interchange number (and suffix), or if interchanges are not numbered, by the legend NEXT RIGHT or SECOND RIGHT or both, as appropriate. The Supplemental Guide sign should be installed as an independent guide sign assembly.

Where two or more Advance Guide signs are used, the Supplemental Guide sign should be installed approximately midway between two of the Advance Guide signs. If only one Advance Guide sign is used, the Supplemental Guide sign should follow it by at least 245 m (800 feet). If the interchanges are numbered, the interchange number should be used for the action message.

States and other agencies should adopt an appropriate policy for installing supplemental signs using "The AASHTO Guidelines for the Selection of Supplemental Guide Signs for Traffic Generators Adjacent to Freeways." In developing policies for such signing, such items as population, amount of traffic generated, distance from the route, and the significance of the destination should be taken into account.

Standard:

Guide signs directing drivers to park and ride facilities shall be considered as Supplemental Guide signs (see Figures 2E-18 and 2E-19).

Figure 2E-17. Supplemental Guide Signs for Multi-exit Interchanges

Figure 2E-18. Supplemental Guide Sign for a Park and Ride Facility (Route without Exit Numbering)

Figure 2E-19. Supplemental Guide Sign for a Park and Ride Facility (Route with Exit Numbering)

Figure 2E-20. Interchange Exit Direction Sign

Section 2E.33 Exit Direction Signs

Support:

The Exit Direction sign repeats the route and destination information that was shown on the Advance Guide sign(s) for the next exit, and thereby assures road users of the destination served and indicates whether they exit to the right or the left for that destination.

Standard:

Exit Direction signs (see Figure 2E-20) shall be used at major and intermediate interchanges. Population figures or other similar information shall not be used on Exit Direction signs.

Guidance:

Exit Direction signs should be used at minor interchanges.

Ground-mounted Exit Direction signs should be installed at the beginning of the deceleration lane. If there is less than 90 m (300 ft) from the beginning of the deceleration lane to the theoretical gore (see Figure 3B-8), the Exit Direction sign should be installed overhead over the exiting lane in the vicinity of the theoretical gore.

Standard:

Where a through lane is being terminated (dropped) at an exit, the Exit Direction sign shall be placed overhead at the theoretical gore (see Figures 2E-8 and 2E-10).

The following provisions shall govern the design and application of the overhead Exit Direction sign:

A. The sign shall carry the exit number (if used), the route number, cardinal direction, and destination with an appropriate upward slanting arrow (see Figure 2E-20).
B. The message EXIT ONLY in black on a yellow panel shall be used on the overhead Exit Direction sign to advise road users of a lane drop situation. The sign shall conform to the provisions of Section 2E.20.
C. Diagrammatic signs shall not be employed at the exit direction location.

Guidance:

Exit number plaques should be located toward the left edge of the sign for a left exit and toward the right edge for right exits.

Option:

In some cases, principally in urban areas, where restricted sight distance because of structures or unusual alignment make it impossible to locate the Exit Direction sign without violating the required minimum spacing (see Section 2E.30) between major guide signs, Interchange Sequence signs (see Section 2E.37) may be substituted for an Advance Guide sign.

Guidance:

At multi-exit interchanges, the Exit Direction sign should be located directly over the exiting lane for the first exit. At the same location, and normally over the right through lane, an Advance Guide sign for the second exit should be located. Only for those conditions where the through movement is not evident should a confirmatory message (Pull-Through sign as shown in Figure 2E-2) be used over the left lane(s) to guide road users traveling through an interchange. In the interest of sign spreading, three signs on one structure should not be used. When the freeway or expressway is on an overpass, the Exit Direction sign should be installed on an overhead support over the exit lane in advance of the gore point.

Option:

If the second exit is beyond an underpass, the Exit Direction sign may be mounted on the face of the overhead structure.

Section 2E.34 Exit Gore Signs

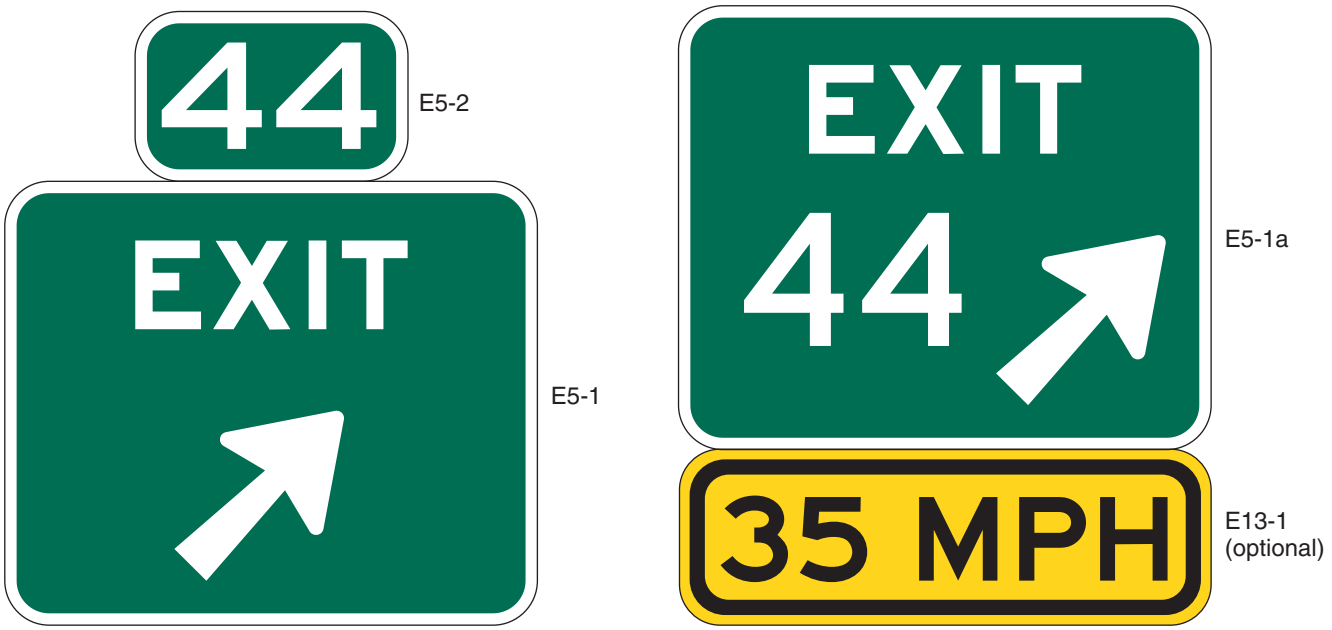
Support:

The Exit Gore sign in the gore indicates the exiting point or the place of departure from the main roadway. Consistent application of this sign at each exit is important.

Standard:

The gore shall be defined as the area located between the main roadway and the ramp just beyond where the ramp branches from the main roadway. The Exit Gore sign shall be located in the gore and shall carry the word EXIT or EXIT XX (if interchange numbering is used) and an appropriate upward slanting arrow (see Figure 2E-21). Breakaway or yielding supports shall be used.

Figure 2E-21. Exit Gore Signs



Guidance:

The arrow should be aligned to approximate the angle of departure. Each gore should be treated similarly, whether the interchange has one exit roadway or multiple exits.

Option:

Where extra emphasis of an especially low advisory ramp speed is needed, an E13-1 panel indicating the advisory speed may be mounted below the Exit Gore sign (see Figure 2E-21) to supplement, but not to replace, the exit or ramp advisory speed warning signs.

Section 2E.35 Post-Interchange Signs

Guidance:

If space between interchanges permits, as in rural areas, and where undue repetition of messages will not occur, a fixed sequence of signs should be displayed beginning 150 m (500 ft) beyond the end of the acceleration lane. At this point a Route sign assembly should be installed followed by a Speed Limit sign and a Distance sign, each at a spacing of 300 m (1,000 ft).

If space between interchanges does not permit placement of these three post-interchange signs without encroaching on or overlapping the Advance Guide signs necessary for the next interchange, or in rural areas where the interchanging traffic is primarily local, one or more of the post-interchange signs should be omitted.

Option:

Usually the Distance sign will be of less importance than the other two signs and may be omitted, especially if Interchange Sequence signs are used. If the sign for through traffic on an overhead assembly already contains the route sign, the post-interchange route sign assembly may also be omitted.

Section 2E.36 Distance Signs

Standard:

If used, the post-interchange Distance sign shall consist of a two- or three-line sign carrying the names of significant destination points and the distances to those points. The top line of the sign shall identify the next meaningful interchange with the name of the community near or through which the route passes, or if there is no community, the route number or name of the intersected highway (see Figure 2E-22).

Support:

The minimum sizes of the route shields identifying a significant destination point are prescribed in Tables 2E-1 through 2E-4.

Figure 2E-22. Post-Interchange Distance Sign

Option:

The text identification of a route may be shown instead of a route shield, such as "US XX", "State Route XX", or "County Route X".

Guidance:

If a second line is used, it should be reserved for communities of general interest that are located on or immediately adjacent to the route or for major traffic generators along the route.

Option:

The choice of names for the second line, if it is used, may be varied on successive Distance signs to give road users maximum information concerning communities served by the route.

Standard:

The third, or bottom line, shall contain the name and distance to a control city (if any) that has national significance for travelers using the route.

Guidance:

Distances to the same destinations should not be shown more frequently than at 8 km (5 mi) intervals. The distances displayed on these signs should be the actual distance to the destination points and not to the exit from the freeway or expressway.

Section 2E.37 Interchange Sequence Signs

Guidance:

If there is less than 245 m (800 ft) between interchanges, Interchange Sequence signs should be used instead of the Advance Guide signs for the affected interchanges. If used, Interchange Sequence signs should be used over the entire length of a route in an urban area. They should not be used on a single interchange basis.

Option:

If interchanges are closely spaced, particularly through large urban areas, so that guide signs cannot be adequately spaced, Interchange Sequence signs identifying the next two or three interchanges may be used.

Support:

Interchange Sequence signs are generally supplemental to Advance Guide signs. Signing of this type is illustrated in Figures 2E-23 and 2E-24, and is compatible with the sign spreading concept.

These signs are installed in a series and display the next two or three interchanges by name or route number with distances to the nearest 400 m or 1/4 mile.

Standard:

If used, the first sign in the series shall be located in advance of the first Advance Guide sign for the first interchange.

Where the exit direction is to the left, interchange names or route numbers shown on such signs shall be followed by the legend LEFT or LEFT EXIT in black letters on a yellow rectangular background.

Figure 2E-23. Signing of Closely Spaced Interchanges Using Interchange Sequence Signs

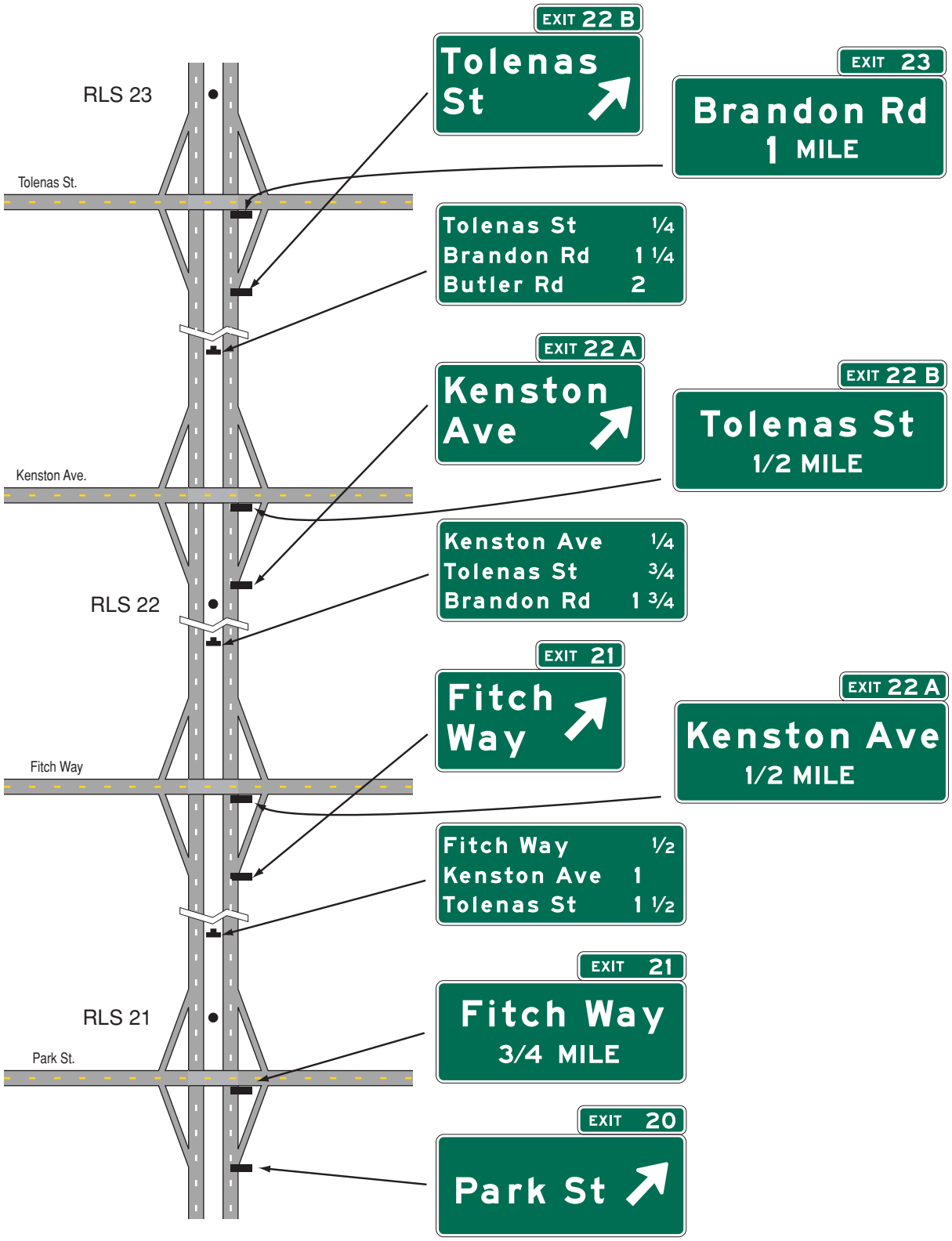


Figure 2E-24. Interchange Sequence Sign

Figure 2E-25. Community Interchanges Identification Sign

Figure 2E-26. NEXT EXITS Sign

Interchange Sequence signs shall not be substituted for Exit Direction signs.

Guidance:

Interchange Sequence signs should be located in the median. After the first of the series, Interchange Sequence signs should be placed approximately midway between interchanges.

Standard:

Interchange Sequence signs located in the median shall be installed at overhead sign height.

Option:

Interchange numbers may be shown to the left of the interchange name or route number.

Section 2E.38 Community Interchanges Identification Signs

Support:

For suburban or rural communities served by two or three interchanges, Community Interchanges Identification signs are useful (see Figure 2E-25).

Guidance:

In these cases, the name of the community followed by the word EXITS should be shown on the top line; the lines below should display the destination, road name or route number, and the corresponding distances to the nearest 400 m or 1/4 mile.

The sign should be located in advance of the first Advance Guide sign for the first interchange within the community.

Option:

If interchanges are not conveniently identifiable or if there are more than three interchanges to be identified, the NEXT X EXITS sign (see Section 2E.39) may be used.

Section 2E.39 NEXT X EXITS Sign

Support:

Many freeways or expressways pass through historical or recreational regions, or urban areas served by a succession of several interchanges.

Option:

Such regions or areas may be indicated by a NEXT X EXITS sign (see Figure 2E-26) located in advance of the Advance Guide sign or signs for the first interchange.

Guidance:

The sign legend should identify the region or area followed by the words NEXT X EXITS.

Section 2E.40 Signing by Type of Interchange

Support:

Road users need signs to help identify the location of the exit, as well as to obtain route, direction, and destination information for specific exit ramps. Figures 2E-27 through 2E-32 show examples of guide signs for common types of interchanges. The interchange layouts shown in most of the figures illustrate only the major guide signs for one direction of traffic on the through road and on the crossroad.

Standard:

Interchange guide signing shall be consistent for each type of interchange along a route.

Guidance:

The signing layout for all interchanges having only one exit ramp in the direction of travel should be similar, regardless of the interchange type (see Figures 2E-8, 2E-10, and Figures 2E-27 through 2E-32). For the sake of uniform application, the significant features of the signing plan for each of the more frequent kinds of interchanges (illustrated in Figures 2E-27 through 2E-32) should be followed as closely as possible. Even when unusual geometric features exist, variations in signing layout should be held to a minimum.

Section 2E.41 Freeway-to-Freeway Interchange

Support:

Freeway-to-freeway interchanges are major decision points where the effect of taking a wrong ramp cannot be easily corrected. Reversing direction on the connecting freeway or reentering to continue on the intended course is usually not possible. Figure 2E-27 shows examples of guide signs at a freeway-to-freeway interchange.

Figure 2E-27. Examples of Freeway-to-Freeway Interchange Guide Signs

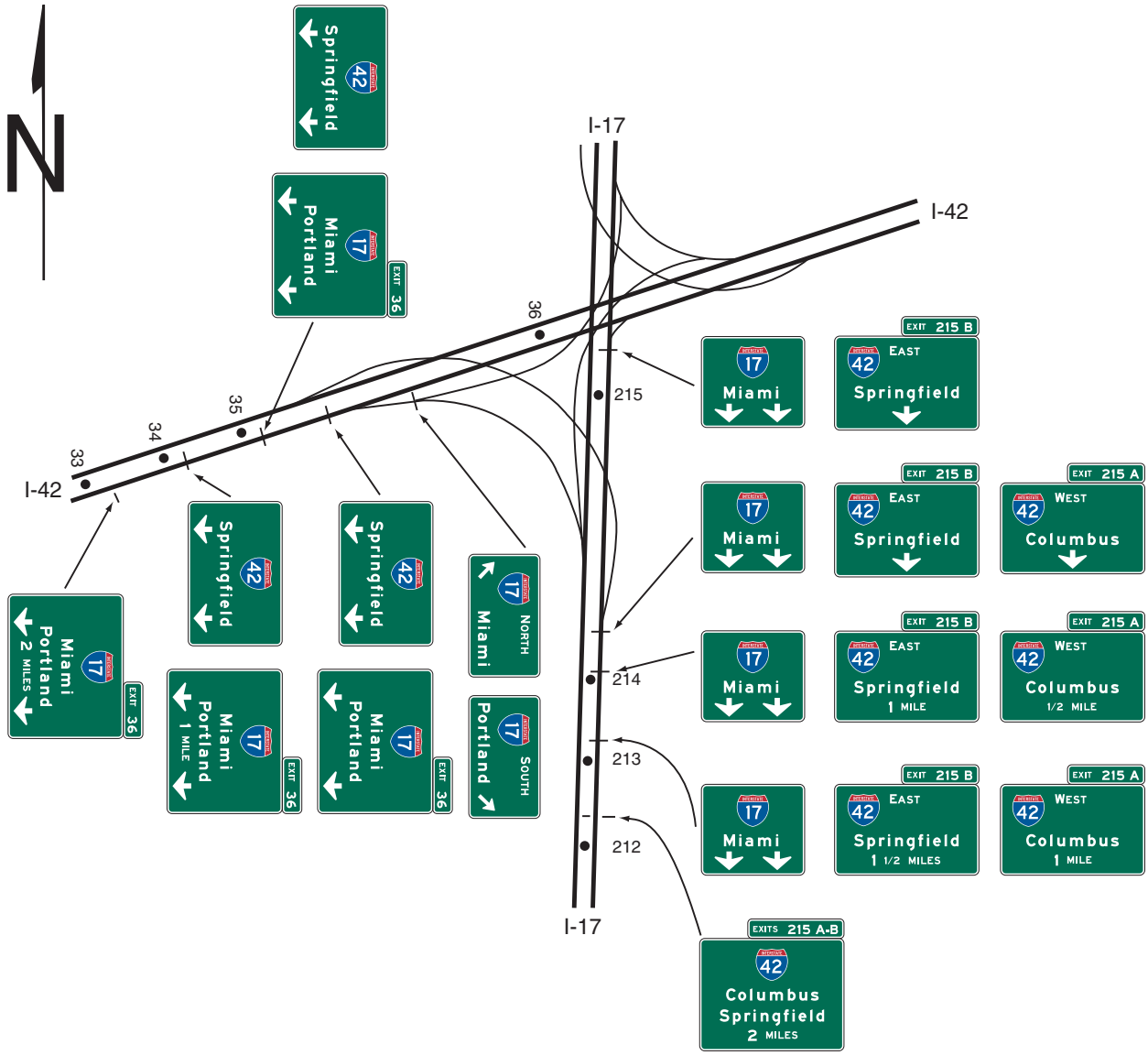
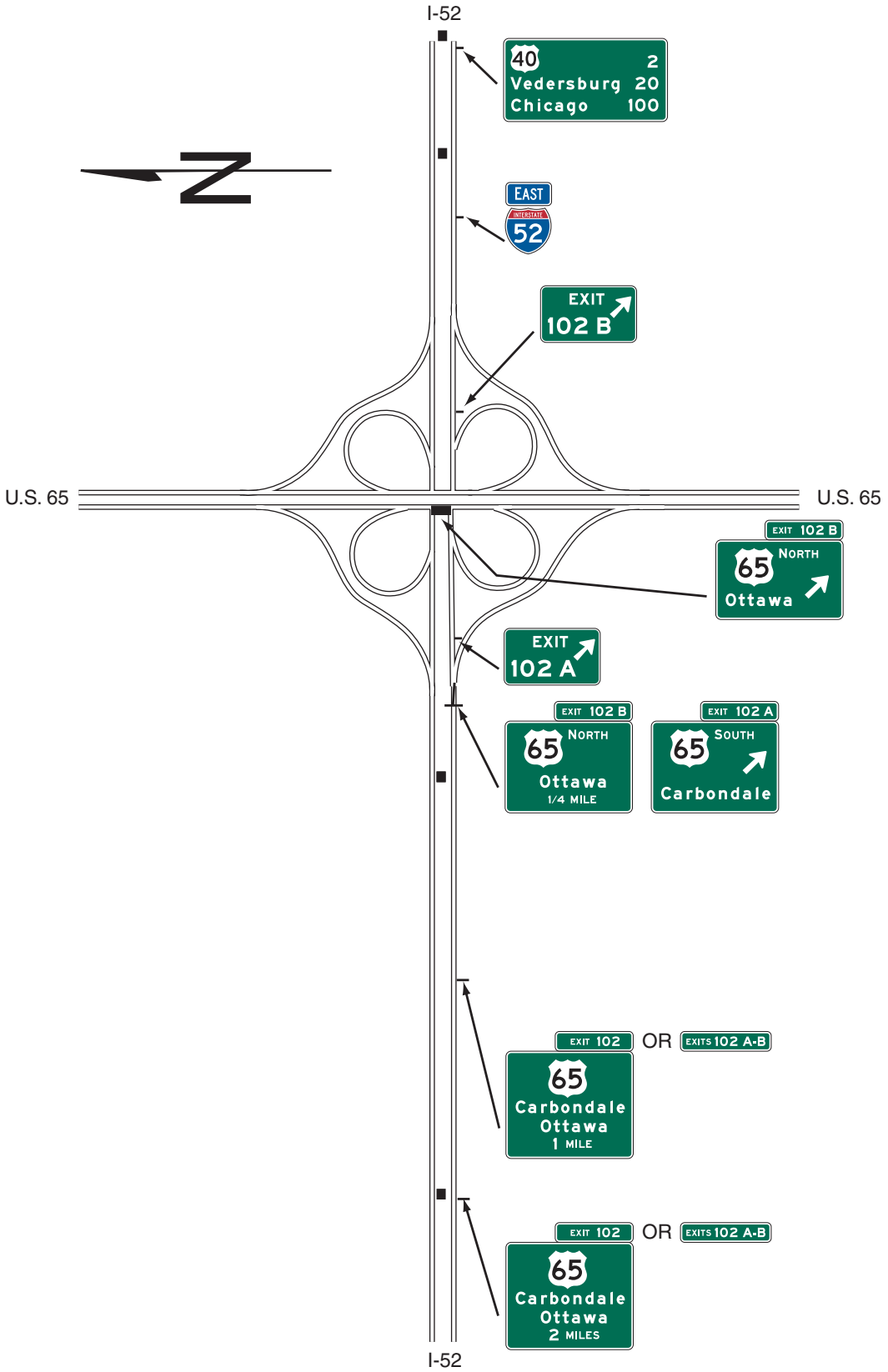


Figure 2E-28. Examples of Guide Signs for Full Cloverleaf Interchange

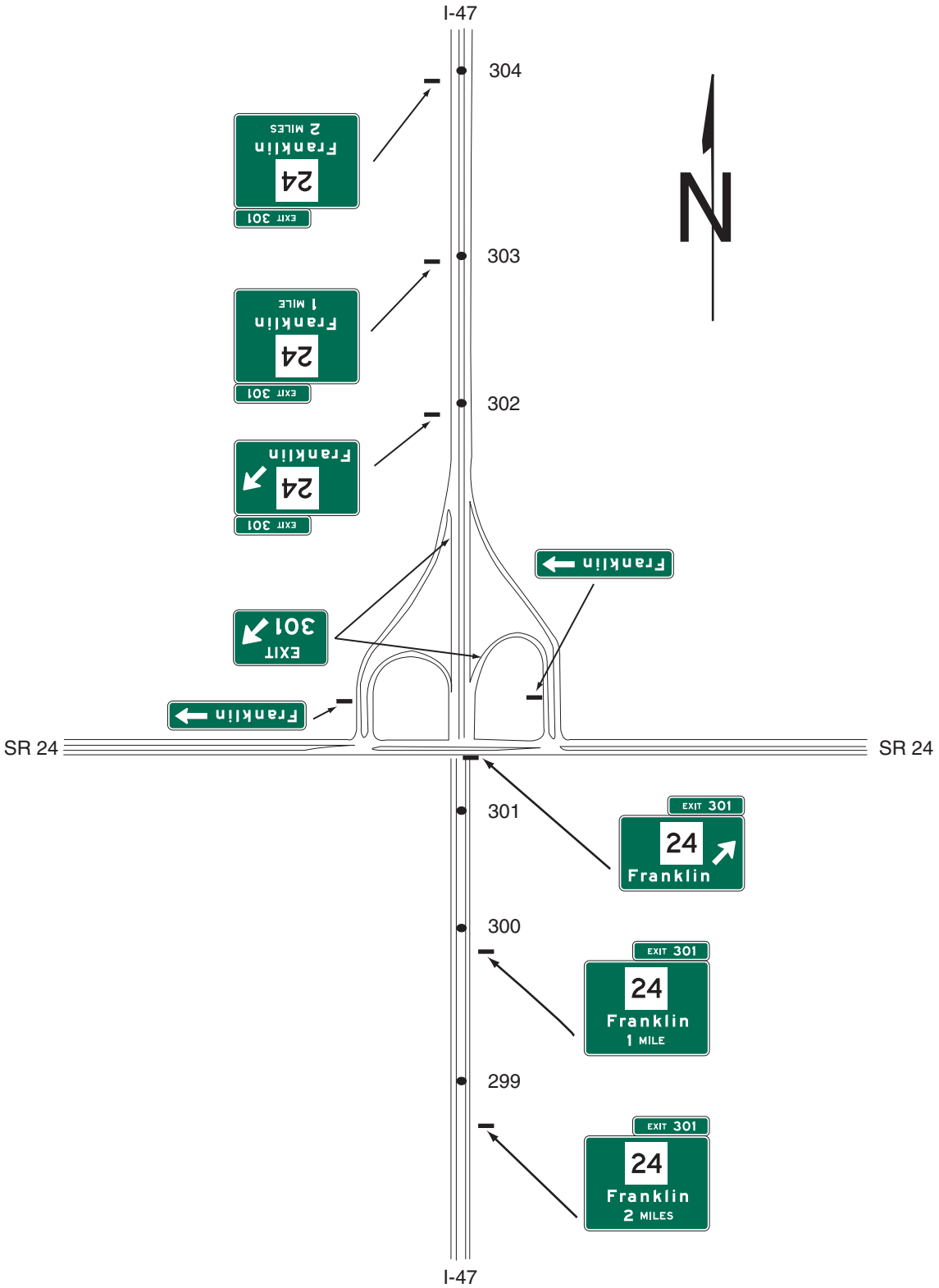


Note: See Figure 2E-38 for examples of multi-lane crossroad signing for cloverleaf interchanges

Figure 2E-29. Examples of Guide Signs for Full Cloverleaf Interchange With Collector-Distributor Roadways

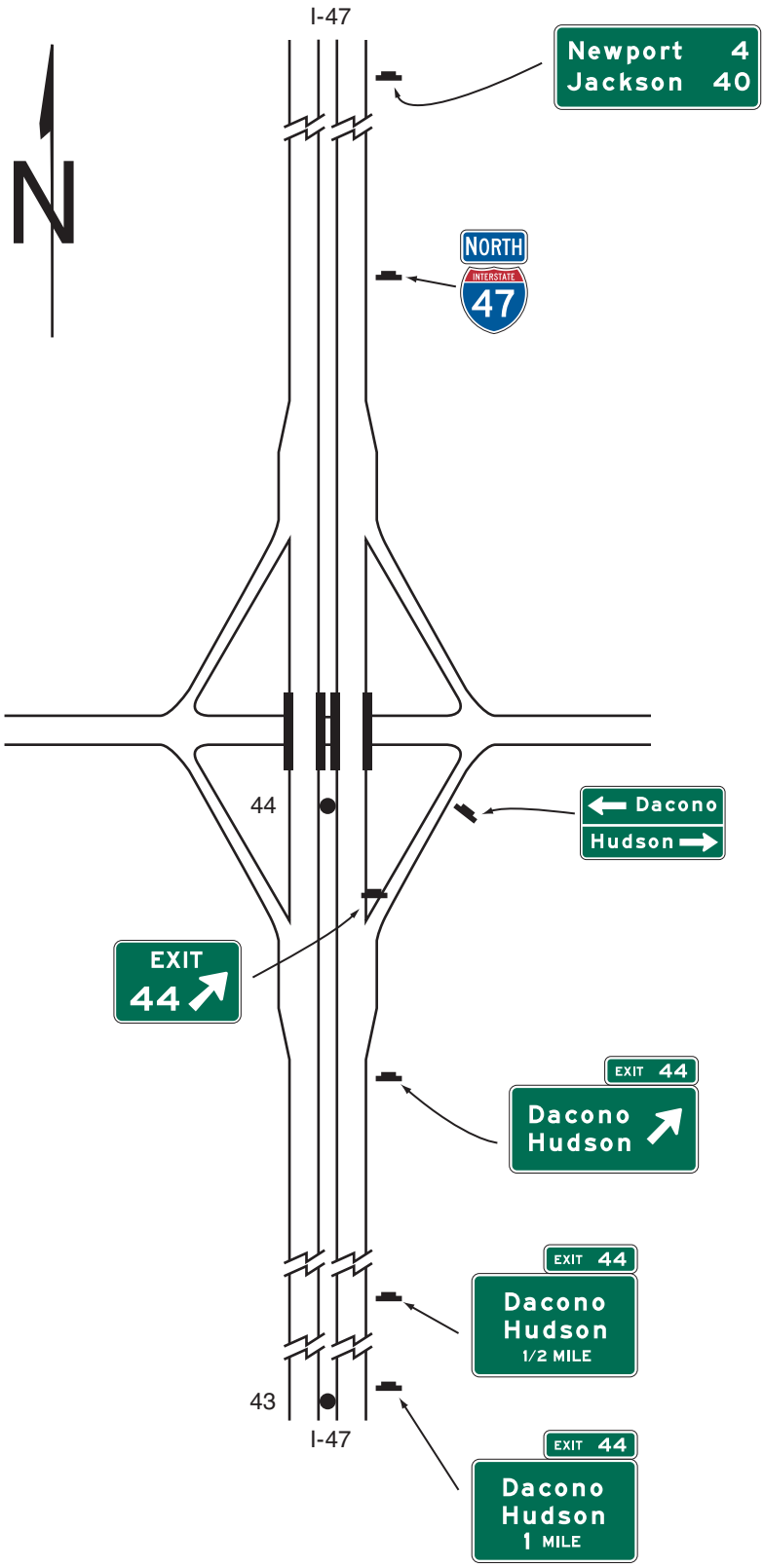
Note: See Figure 2E-38 for examples of multi-lane crossroad signing for cloverleaf interchanges

Figure 2E-30. Examples of Partial Cloverleaf Interchange Guide Signs



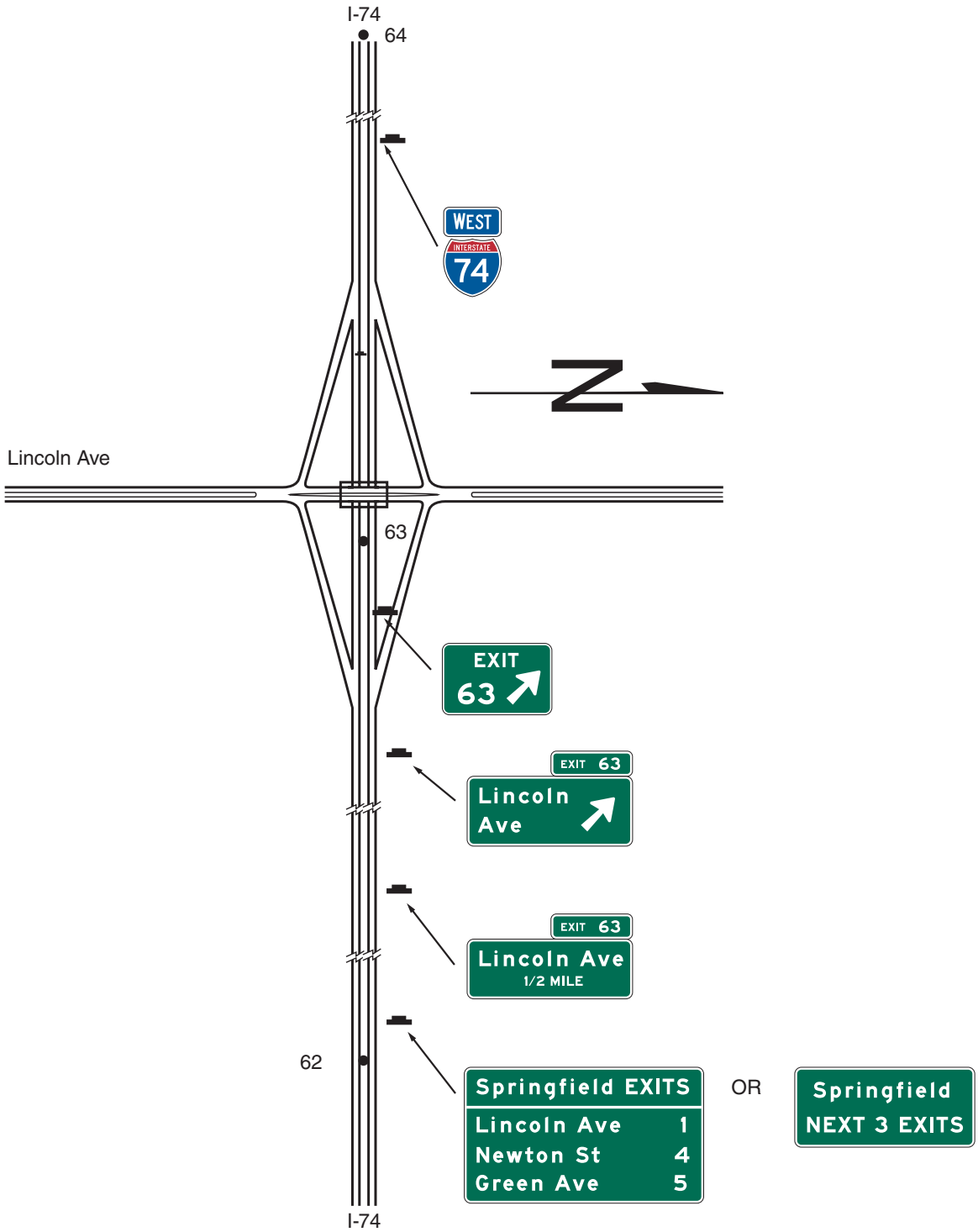
Note: See Figure 2E-37 for examples of multi-lane crossroad signing for partial cloverleaf interchanges

Figure 2E-31. Examples of Diamond Interchange Guide Signs



Note: See Figures 2E-34 and 2E-36 for examples of crossroad signing for one-lane approaches and examples of multi-lane crossroad signing for diamond interchanges

Figure 2E-32. Examples of Diamond Interchange Guide Signs in an Urban Area



Note: See Figures 2E-34 and 2E-36 for examples of crossroad signing for one-lane approaches and examples of multi-lane crossroad signing for diamond interchanges

Guidance:

The sign messages should contain only the route shield, cardinal direction, and the name of the next control city on the route. Arrows should point as indicated in Section 2D.08, unless a diagrammatic representation of the interchange layout requires otherwise.

At splits where the off-route movement is to the left or where there is an optional lane split, expectancy problems usually result, and diagrammatic signs should be used at the Advance Guide sign location. Diagrammatic signs (see Section 2E.19) also should be used at the Advance Guide sign locations for interchanges where two-lane exits with an optional lane carry the through route on the exiting lanes.

Standard:

Overhead signs shall be used at a distance of 2 km or 1 mile and at the theoretical gore of each connecting ramp. When diagrammatic signs are used, they shall conform to the provisions of Section 2E.19.

Option:

Overhead signs may also be used at the 1 km or 0.5 mile and 4 km or 2 mile points.

The arrow and/or the name of the control city may be omitted on signs that indicate the straight-ahead continuation of a route.

An Exit Speed sign may be used where an engineering study shows that it is necessary to display a speed reduction message for ramp signing (see Section 2C.36).

Section 2E.42 Cloverleaf Interchange

Support:

A cloverleaf interchange has two exits for each direction of travel. The exits are closely spaced and have common Advance Guide signs. Examples of guide signs for cloverleaf interchanges are shown in Figure 2E-28.

Guidance:

The Advance Guide signs should include two place names, one corresponding to each exit ramp, with the name of the place served by the first exit on the upper line.

Standard:

An Overhead Guide sign shall be placed at the theoretical gore point of the first exit ramp, with an upward slanting arrow on the exit direction sign for that exit and the message XX km (XX MILE) on the Advance Guide sign for the second exit, as shown in Figure 2E-28. The second exit shall be indicated by an overhead Exit Direction sign over the auxiliary lane. An Exit sign shall also be used at each gore (see Section 2E.34).

Interchanges with more than one exit from the main line shall be numbered as described in Section 2E.28 with an appropriate suffix.

Diagrammatic signs shall not be used for cloverleaf interchanges.

Guidance:

As shown in Figure 2E-28, the overhead Exit Direction sign for the second exit should be mounted on the structure if the mainline passes under the crossroad and the exit roadway is located beyond the structure.

Section 2E.43 Cloverleaf Interchange with Collector-Distributor Roadways

Support:

Examples of guide signs for full cloverleaf interchanges with collector-distributor roadways are shown in Figure 2E-29.

Guidance:

Signing on the collector-distributor roadways should be the same as the signing on the mainline of a cloverleaf interchange.

Standard:

Guide signs at exits from the collector-distributor roadways shall be overhead and located at the theoretical gore of the collector-distributor roadway and the exit ramp.

Option:

Exits from the collector-distributor roadways may be numbered with an appropriate suffix. The Advance Guide signs may include two place names and their corresponding exit numbers or may use the singular EXIT.

Section 2E.44 Partial Cloverleaf Interchange

Support:

Examples of guide signs for partial cloverleaf interchanges are shown in Figure 2E-30.

Guidance:

As shown in Figure 2E-30, the overhead Exit Direction sign should be placed on the structure if the mainline passes under the crossroad and the exit roadway is located beyond the structure.

Standard:

A ground-mounted Exit Gore sign shall also be installed in the ramp gore.

Section 2E.45 Diamond Interchange

Support:

Examples of guide signs for diamond interchanges are shown in Figure 2E-31.

Standard:

The singular message EXIT shall be used on the Advance Guide and Exit Direction signs. Exit numbers shall not include the cardinal initials corresponding to the direction of the cross route.

Support:

The typical diamond interchange ramp departs from the mainline roadway such that a speed reduction generally is not necessary in order for a driver to reasonably safely negotiate an exit maneuver from the mainline onto the ramp roadway.

Guidance:

When a speed reduction is not necessary, an exit speed sign should not be used.

Option:

An Exit Speed sign may be used where an engineering study shows that it is necessary to display a speed reduction message for ramp signing (see Section 2C.36).

Guidance:

The Exit Speed sign should be located along the deceleration lane or along the ramp such that it is visible to the driver far enough in advance so that a reasonably safe slowing and exiting maneuver can be made.

Option:

A Stop Ahead or Signal Ahead warning sign may be placed, where engineering judgment indicates a need, along the ramp in advance of the cross street, to give notice to the driver (see Section 2C.29).

Guidance:

When used on two-lane ramps, Stop Ahead or Signal Ahead signs should be used in pairs with one sign on each side of the ramp.

Section 2E.46 Diamond Interchange in Urban Area

Support:

Examples of guide signs for diamond interchanges in an urban area are shown in Figure 2E-32. This example includes the use of the Community Interchanges Identification sign (see Section 2E.38) which might be useful if two or more interchanges serve the same community.

In urban areas, street names are often shown as the principal message in destination signs.

Option:

If interchanges are too closely spaced to properly locate the Advance Guide signs, they may be placed closer to the exit, and the distance figures adjusted accordingly.

Section 2E.47 Closely Spaced Interchanges

Option:

When a series of interchanges is closely spaced, the advance guide sign for the next interchange may be mounted on an overhead structure located downstream from the gore of the preceding interchange.

Guidance:

Interchange Sequence signs should be used at closely spaced interchanges. When used, they should identify and show street names and distances for the next two or three exits as shown in Figure 2E-23.

Standard:

Advance Guide signs for closely spaced interchanges shall show information for only one interchange.

Section 2E.48 Minor Interchange

Option:

Less signing may be used for minor interchanges because such interchanges customarily serve low volumes of local traffic.

Support:

Examples of guide signs for minor interchanges are shown in Figure 2E-33.

Standard:

At least one Advance Guide sign and an Exit Gore sign shall be placed at a minor interchange.

Guidance:

An Exit Direction sign should also be used.

Section 2E.49 Signing of Approaches and Connecting Roadways

Support:

Because there are a number of different ramp configurations that are commonly used at interchanges with conventional roads, drivers on the conventional road cannot reliably predict whether they will be required to turn left or right in order to enter the correct ramp to access the freeway or expressway in the desired direction of travel. Consistently applied signing for conventional road approaches to freeway or expressway interchanges is highly desirable.

Guidance:

The signing of conventional roads with one lane of traffic approaching an interchange should consist of a sequence containing the following signs (see Figure 2E-34):

A. Junction Assembly
B. Destination sign
C. Directional Assembly or Entrance Direction sign for the first ramp
D. Advance Route Turn Assembly or Advance Entrance Direction sign with an advance turn arrow
E. Directional Assembly or Entrance Direction sign for the second ramp

Standard:

If used, the Entrance Direction sign shall consist of a white legend and border on a green background. It shall contain the freeway or expressway route shield(s), cardinal direction, and directional arrow(s).

Option:

The Entrance Direction sign may contain a destination(s) and/or an action message such as NEXT RIGHT.

At minor interchanges, the following sequence of signs may be used (see Figure 2E-35):

A. Junction Assembly
B. Directional Assembly for the first ramp
C. Directional Assembly for the second ramp

Guidance:

On multi-lane conventional roads approaching an interchange, the sign sequence should contain the following signs (see Figures 2E-36, 2E-37, and 2E-38):

A. Junction Assembly
B. Advance Entrance Direction sign(s) for both directions (if applicable) of travel on the freeway or expressway
C. Entrance Direction sign for first ramp
D. Advance Turn Assembly
E. Entrance Direction sign for the second ramp

Support:

Advance Entrance signs are used to direct road users to the appropriate lane(s).

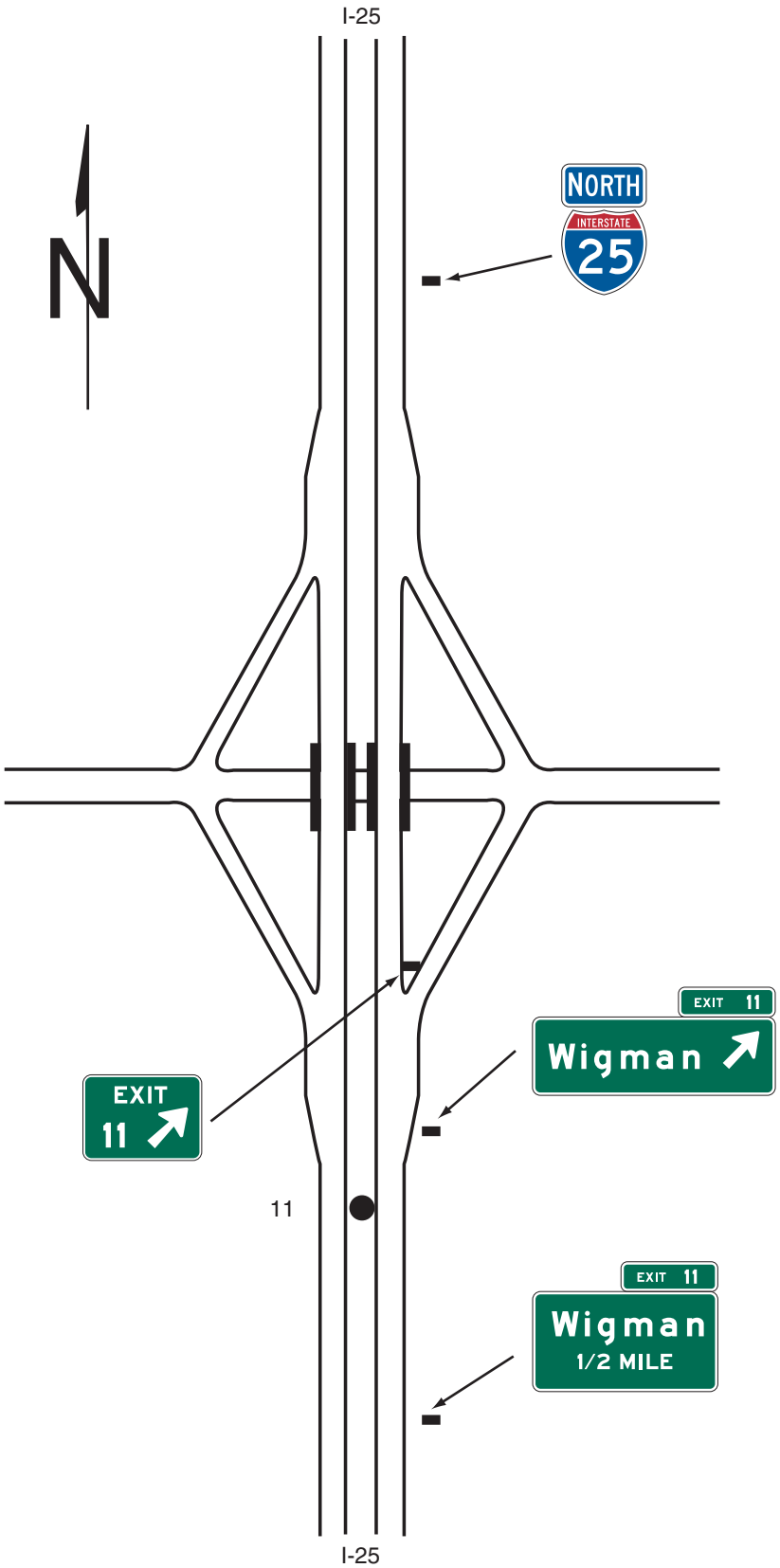
Standard:

The Advance Entrance sign shall consist of a white legend and border on a green background. It shall contain the freeway or expressway route shield(s) and cardinal direction(s).

Option:

The Advance Entrance sign may have destinations, directional arrows, and/or an action message such as LEFT LANE, NEXT LEFT, or SECOND RIGHT. Signs in this sequence may be mounted overhead to improve visibility.

Figure 2E-33. Examples of Minor Interchange Guide Signs



Note: See Figure 2E-35 for example of minor interchange crossroad signing

Figure 2E-34. Example of Crossroad Signing for One-Lane Approach

Figure 2E-35. Example of Minor Interchange Crossroad Signing

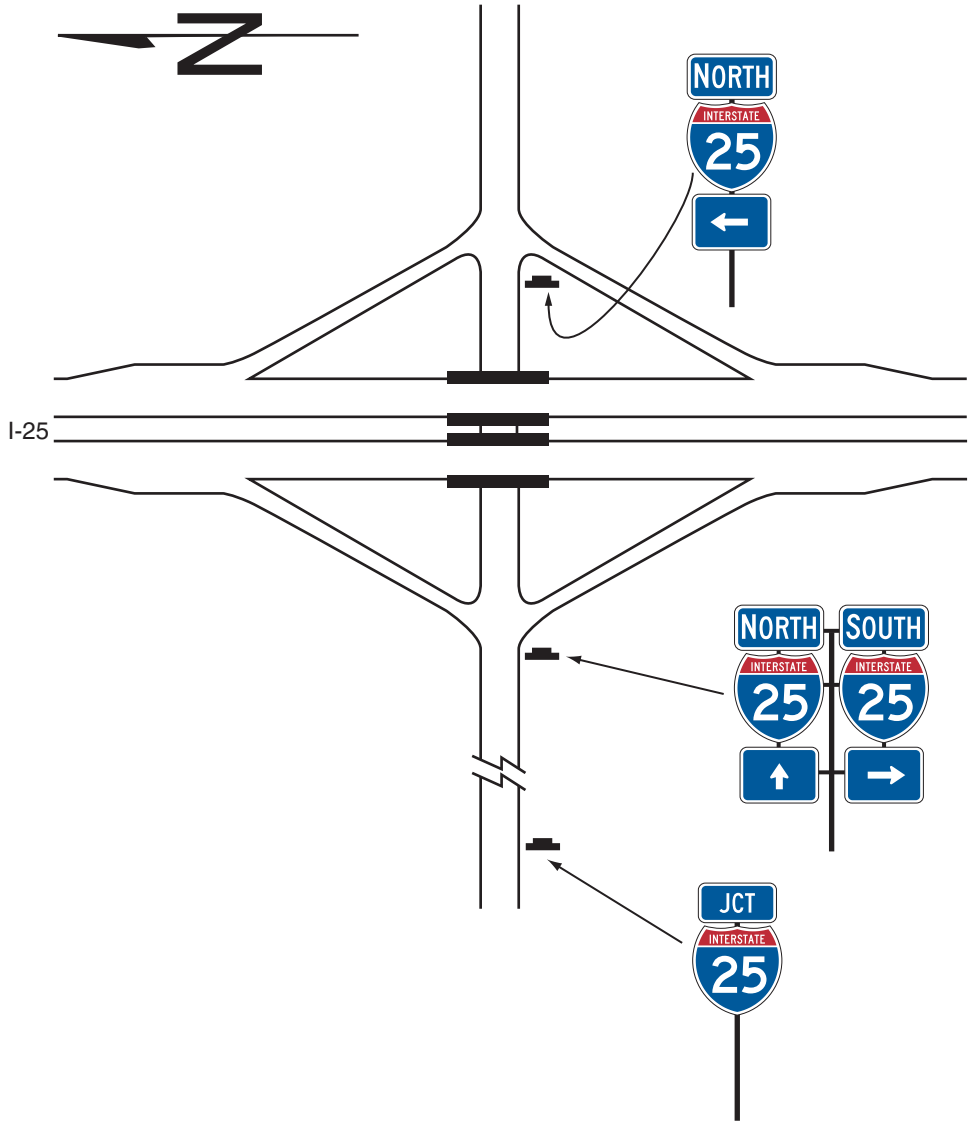


Figure 2E-36. Examples of Multi-lane Crossroad Signing for Diamond Interchange

Figure 2E-37. Examples of Multi-lane Crossroad Signing for Partial Cloverleaf Interchange

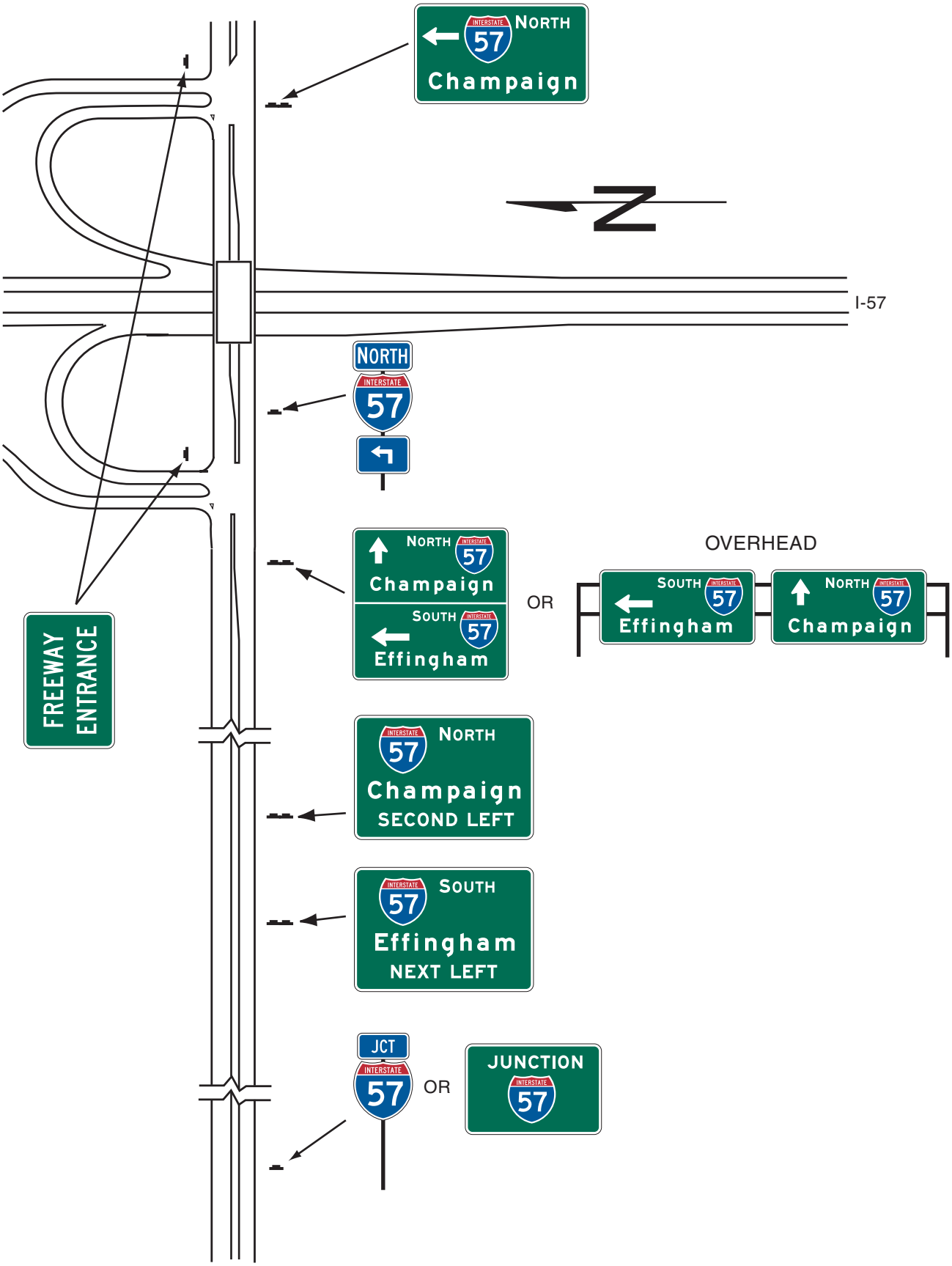
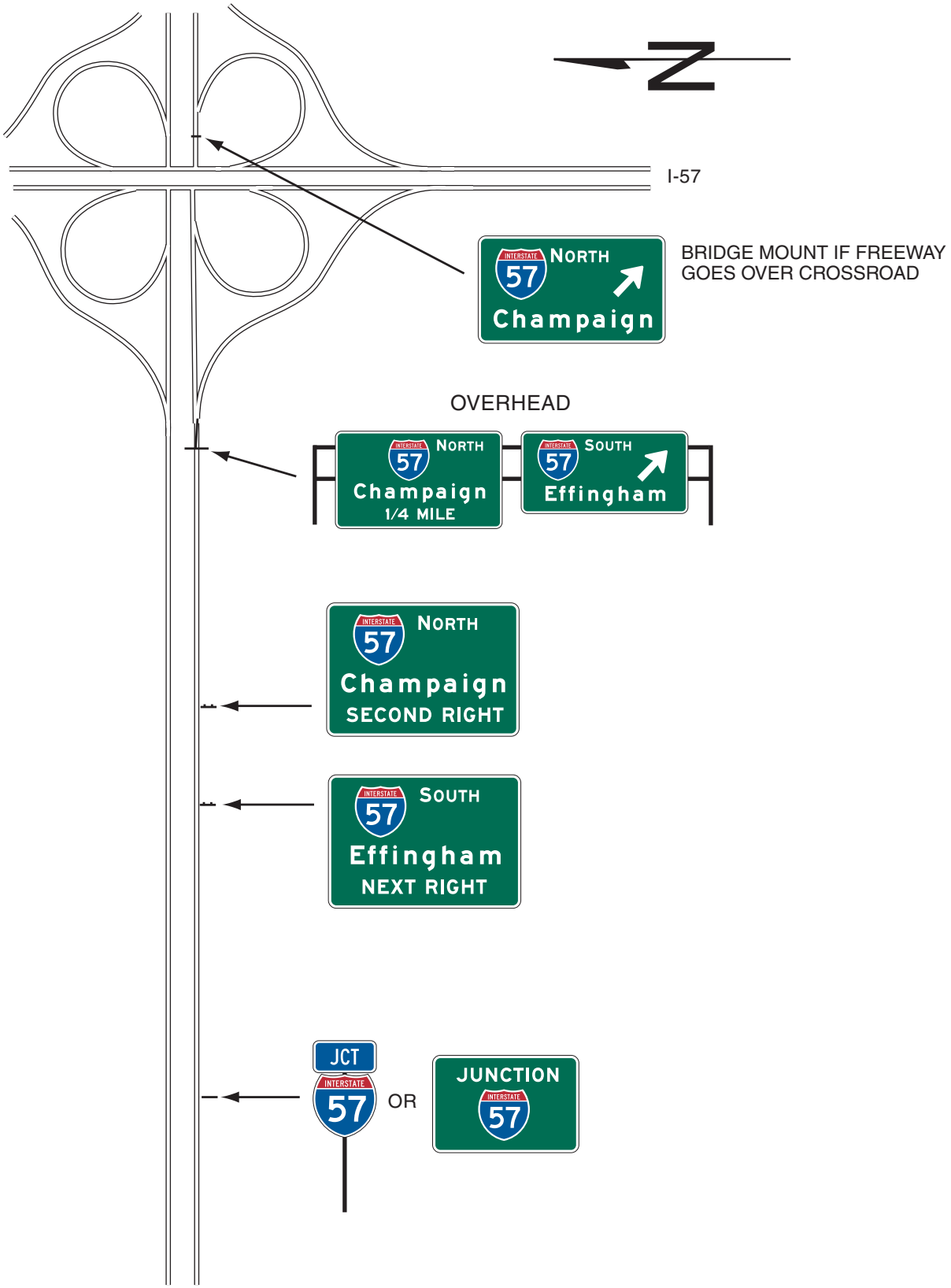


Figure 2E-38. Examples of Multi-lane Crossroad Signing for Cloverleaf Interchange



Section 2E.50 Wrong-Way Traffic Control at Interchange Ramps

Standard:

At interchange exit ramp terminals where the ramp intersects a crossroad in such a manner that wrong-way entry could inadvertently be made, the following signs shall be used (see Figure 2E-39):

A. At least one ONE WAY sign for each direction of travel on the crossroad shall be placed where the exit ramp intersects the crossroad.
B. At least one DO NOT ENTER sign shall be conspicuously placed near the end of the exit ramp in positions appropriate for full view of a road user starting to enter wrongly.
C. At least one WRONG WAY sign shall be placed on the exit ramp facing a road user traveling in the wrong direction.

Guidance:

In addition, the following pavement markings should be used (see Figure 2E-39):

A. On two-lane paved crossroads at interchanges, double solid yellow lines should be used as a centerline for an adequate distance on both sides approaching the ramp intersections.
B. Where crossroad channelization or ramp geometrics do not make wrong-way movements difficult, a lane-use arrow should be placed in each lane of an exit ramp near the crossroad terminal where it will be clearly visible to a potential wrong-way road user.

Option:

The following traffic control devices may be used to supplement the above signs and pavement markings:

A. Additional ONE WAY signs may be placed, especially on two-lane rural crossroads, appropriately in advance of the ramp intersection to supplement the required ONE WAY sign(s).
B. Additional WRONG WAY signs may be used.
C. Slender, elongated wrong-way arrow pavement markings (see Figure 3B-21) intended primarily to warn wrong-way road users that they are traveling in the wrong direction may be placed upstream from the ramp terminus (see Figure 2E-39) to indicate the correct direction of traffic flow. Wrong-way arrow pavement markings may also be placed on the exit ramp at appropriate locations near the crossroad junction to indicate wrong-way movement. The wrong-way arrow markings may consist of pavement markings or bidirectional red-and-white raised pavement markers or other units that show red to wrong-way road users and white to other road users (see Figure 3B-21).
D. Lane-use arrow pavement markings may be placed on the exit ramp and crossroad near their intersection to indicate the permissive direction of flow.
E. Guide signs may be used on entrance ramps near the crossroad to inform road users of the freeway or expressway entrance, as appropriate (see Figure 2E-37).

Guidance:

On interchange entrance ramps where the ramp merges with the through roadway and the design of the interchange does not clearly make evident the direction of traffic on the separate roadways or ramps, a ONE WAY sign visible to traffic on the entrance ramp and through roadway should be placed on each side of the through roadway near the entrance ramp merging point as illustrated in Figure 2E-40.

Option:

At locations where engineering judgment determines that a special need exists, other standard warning or prohibitive methods and devices may be used as a deterrent to the wrong-way movement.

Support:

Section 2B.35 contains further information on signing to avoid wrong-way movements at at-grade intersections on expressways.

Section 2E.51 General Service Signs

Support:

General Service signs (see Figure 2D-11) are generally not appropriate at major interchanges (see Section 2E.29 for definition) and in urban areas.

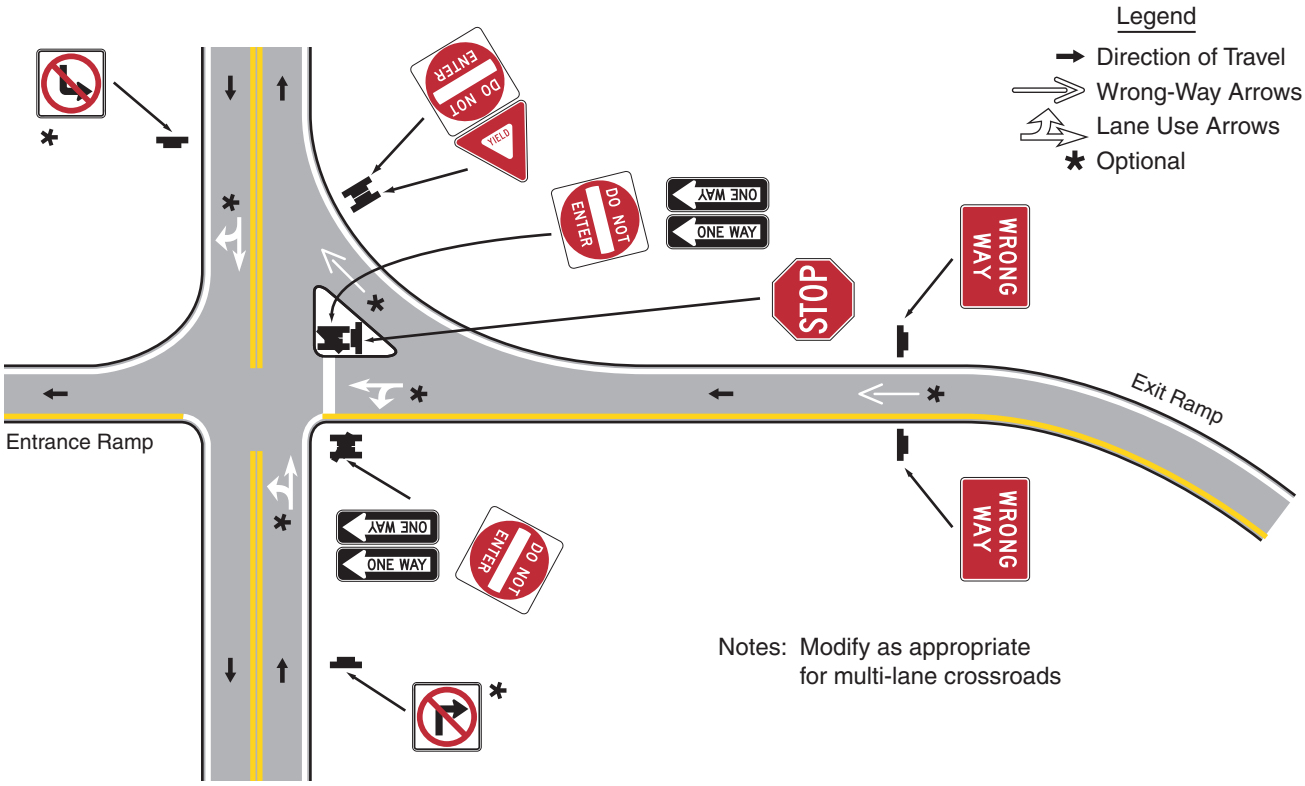
Option:

If interchanges are not numbered, an action message such as NEXT EXIT or SECOND RIGHT may be used (see Figure 2E-41).

Standard:

General Service signs shall have white letters, symbols, and borders on a blue background. Letter and numeral sizes shall conform to the minimum requirements of Tables 2E-1 through 2E-4. All approved

Figure 2E-39. Examples of Regulatory Signing and Pavement Markings at Exit Ramp Termination to Deter Wrong-Way Entry



symbols shall be permitted as alternatives to word messages, but symbols and word service messages shall not be intermixed. If the services are not visible from the ramp of a single-exit interchange, the service signing shall be repeated in smaller size at the intersection of the exit ramp and the crossroad. Such service signs shall use arrows to indicate the direction to the services.

Guidance:

Distance to services should be shown on General Service signs where distances are more than 2 km or 1 mile.

General Service signing should only be provided at locations where the road user can return to the freeway or expressway and continue in the same direction of travel.

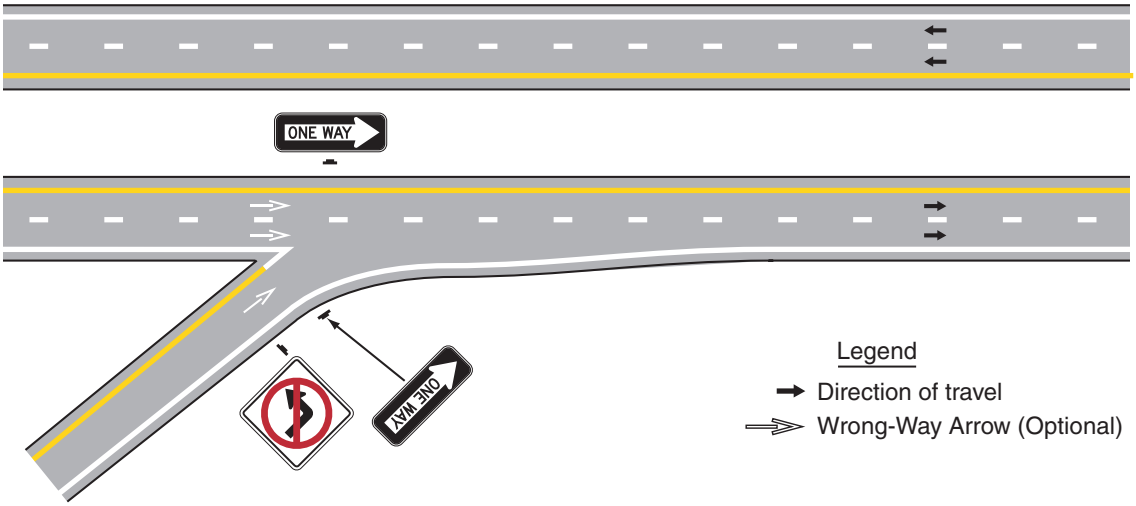
Only services that fulfill the needs of the road user should be shown on General Service signs. If State or local agencies elect to provide General Service signing, there should be a statewide policy for such signing and criteria for the availability of the various types of services. The criteria should consider the following:

A. Gas, Diesel, LP Gas, EV Charging, and/or other alternative fuels if all of the following are available:
   1. Vehicle services such as gas, oil, and water;
   2. Modern sanitary facilities and drinking water;
   3. Continuous operations at least 16 hours per day, 7 days per week; and
   4. Public telephone.

B. Food if all of the following are available:
   1. Licensing or approval, where required;
   2. Continuous operation to serve at least two meals per day, at least 6 days per week;
   3. Public telephone; and
   4. Modern sanitary facilities.

C. Lodging if all of the following are available:
   1. Licensing or approval, where required;
   2. Adequate sleeping accommodations;
   3. Public telephone; and
   4. Modern sanitary facilities.

Figure 2E-40. Examples of Regulatory Signing and Pavement Markings at Entrance Ramp Terminal Where Design Does Not Clearly Indicate the Direction of Flow



D. Public Telephone if continuous operation, 7 days per week is available.
E. Hospital if continuous emergency care capability, with a physician on duty 24 hours per day, 7 days per week is available. A physician on duty would include the following criteria and should be signed in accordance with the priority as follows:
   1. Physician on duty within the emergency department;
   2. Registered nurse on duty within the emergency department, with a physician in the hospital on call; or
   3. Registered nurse on duty within the emergency department, with a physician on call from office or home.
Rev. 1 F. 24-Hour Pharmacy if a pharmacy is open, with a State-licensed pharmacist present and on duty, 24 hours per day, 7 days per week and is located within 4.8 km (3 mi) of an interchange on the Federal-aid system.
G. Camping if all of the following are available:
   1. Licensing or approval, where required;
   2. Adequate parking accommodations; and
   3. Modern sanitary facilities and drinking water.

Standard:

For any service that is operated on a seasonal basis only, the General Service signs shall be removed or covered during periods when the service is not available.

The General Service signs shall be mounted in an effective location, between the Advance Guide sign and the Exit Direction sign, in advance of the exit leading to the available services.

Guidance:

The General Service sign should contain the interchange number, if any, as illustrated in Figure 2E-42.

Option:

If the distance to the next point where services are available is greater than 16 km (10 miles), a NEXT SERVICES XX km (XX MILES) (D9-17) sign (see Figure 2E-43), may be used as a separate sign panel installed below the Exit Direction sign.

Standard:

Signs for services shall conform to the format for General Service signs (see Section 2D.45) and as specified herein. Letter and numeral sizes shall be as shown in Tables 2E-1 through 2E-4. No more than six general road user services shall be displayed on one sign, which includes any appended sign panels. General Service signs shall carry the legends for one or more of the following services: Food, Gas,
Rev. 1 **Lodging, Camping, Phone, Hospital, 24-Hour Pharmacy, or Tourist Information.**

The qualified services available shall be shown at specific locations on the sign.

To provide flexibility for the future when the service might become available, the sign space normally reserved for a given service symbol or word shall be left blank when that service is not present.

Figure 2E-41. Examples of General Service Signs (without Exit Numbering)

D9-18e

D9-18

E2-2

Figure 2E-42. Examples of General Service Signs (with Exit Numbering)

D9-18a

OR

D9-18

E2-3

OR

D9-18a

D9-18

E2-3

Rev. 1

Figure 2E-43. Example of Next Services Sign

D9-17

Guidance:

The standard display of word messages should be FOOD and PHONE in that order on the top line, and GAS and LODGING on the second line. If used, HOSPITAL and CAMPING should be on separate lines (see Figure 2E-42).

Option:

Signing for DIESEL, LP-Gas, or other alternative fuel services may be substituted for any of the general services or appended to such signs. The International Symbol of Accessibility for the Handicapped (D9-6) sign may be used for facilities that qualify.

Guidance:

When symbols are used for the road user services, they should be displayed as follows:

A. Six services:
   1. Top row—GAS, FOOD, and LODGING
   2. Bottom row—PHONE, HOSPITAL, and CAMPING
B. Four services:
   1. Top row—GAS and FOOD
   2. Bottom row—LODGING and PHONE
C. Three services:
   1. Top row—GAS, FOOD, and LODGING

Option:

Substitutions of other services for any of the services shown above may be made by placing the substitution Rev. 1 in the lower right (four or six services) or extreme right (three services) portion of the sign panel. An action message or an interchange number may be used for symbol signs in the same manner as they are used for word message signs. The Diesel Fuel (D9-11) symbol or the LP-Gas (D9-15) symbol may be substituted for the Rev. 1 symbol representing fuel or appended to such assemblies. The Tourist Information (D9-10) symbol or the 24-Hour Pharmacy (D9-20 and D9-20a) symbol may be substituted on any of the above configurations.

Standard:

If more than three services become available at rural interchange areas where limited road user services were anticipated, any appended sign panel shall be removed and replaced with an independently mounted General Service sign as described in this Section.

Option:

A separate Telephone Service (D9-1) sign may be installed if telephone facilities are located adjacent to the route at places where public telephones would not normally be expected.

The Recreational Vehicle Sanitary Station (D9-12) sign may be used as needed to indicate the availability of facilities designed for dumping wastes from recreational vehicle holding tanks.

In some locations, signs may be used to indicate that services are not available.

A TRUCK PARKING (D9-16) sign may be used on a separate sign panel below the other general road user services to direct truck drivers to designated parking areas.

Section 2E.52 Rest and Scenic Area Signs

Guidance:

Signing for rest areas and scenic areas should conform to the provisions set forth in Sections 2D.42 and 2D.43. However, the signs should be suitably enlarged for freeway or expressway application. A roadside area that does not contain restroom facilities should be signed to indicate the major road user service that is provided. For example, an area with only parking should be signed with a PARKING AREA (D5-4) sign (see Figure 2E-44). An area with picnic tables and parking should be signed with a PICNIC AREA (D5-5c) sign or a Picnic Table Area (D5-5a) symbol sign.

Rest areas that have tourist information and welcome centers should be signed as discussed in Section 2E.53.

Scenic area signing should be consistent with that specified for rest areas. Standard messages should read SCENIC AREA (D6-1), SCENIC VIEW (D6-2), SCENIC OVERLOOK (D6-3), or the equivalent.

Figure 2E-44. Examples of Rest Area, Scenic Overlook, and Welcome Center Signs

D5-1

D5-1a

D5-1b

D5-2

D5-2a

D5-3

D5-4

D5-7

D5-7a

D5-8

D5-9

D5-9a

D5-10

D5-11

Standard:

All signs for rest and scenic areas shall have white letters, symbols, and borders on a blue background. Letter and numeral sizes shall conform to the minimum requirements of Tables 2E-1 through 2E-4. On the approach to rest areas, a REST AREA advance guide sign shall be placed 2 km or 1 mile and/or 4 km or 2 miles in advance of the rest area. At the rest area exit gore, there shall be a sign with a message REST AREA together with an arrow indicating the appropriate turn as shown in Figure 2E-44.

Option:

If the rest area has facilities for the physically impaired (see Section 2D.45), the International Symbol of Accessibility for the Handicapped (D9-6) sign may be placed with or beneath the REST AREA advance guide sign.

Between the REST AREA advance guide sign and the gore of the rest area exit, there may be a REST AREA (D5-1b) sign (see Figure 2E-44). The words NEXT RIGHT (E2-2) or an arrow may be included as part of the message.

To provide the road user with information on the location of succeeding rest areas, a NEXT REST AREA XX km (XX MILES) (D5-6) sign (see Figure 2E-44) may be installed independently or as a supplemental sign panel mounted below one of the REST AREA advance guide signs.

Section 2E.53 Tourist Information and Welcome Center Signs

Support:

Tourist information and welcome centers have been constructed within rest areas on freeways and expressways and are operated by either a State or a private organization. Others have been located within close proximity to these facilities and operated by civic clubs, chambers of commerce, or private enterprise.

Guidance:

An excessive number of supplemental panels should not be installed with Tourist Information or Welcome Center signs so as not to overload the road user.

Standard:

Tourist Information or Welcome Center signs (see Figure 2E-44) shall have a white legend and border on a blue background. Continuously staffed or unstaffed operation at least 8 hours per day, 7 days per week, shall be required.

If operated only on a seasonal basis, the Tourist Information or Welcome Center signs shall be removed or covered during the off seasons.

Guidance:

For freeway or expressway rest area locations that also serve as tourist information or welcome centers, the following signing criteria should be used:

A. The locations for tourist information and welcome center Advance Guide, Exit Direction, and Exit Gore signs should meet the General Service signing requirements described in Section 2E.51.
B. If the signing for the tourist information or welcome center is to be accomplished in conjunction with the initial signing for the rest areas, the message on the Advance Guide sign should be REST AREA, TOURIST INFO CENTER, XX km (XX MILES) or REST AREA, WELCOME CENTER XX km (XX MILES). On the Exit Direction sign the message should be REST AREA, TOURIST INFO CENTER with an upward sloping arrow (or NEXT RIGHT), or REST AREA, WELCOME CENTER with an upward sloping arrow (or NEXT RIGHT).
C. If the initial rest area Advance Guide and Exit Direction signing is in place, these signs should include, on supplemental sign panels, the legend TOURIST INFO CENTER or STATE NAME (optional), WELCOME CENTER.
D. The Gore sign should contain only the legend REST AREA with the arrow and should not be supplemented with any legend pertaining to the tourist information center or welcome center.

Option:

An alternative to the supplemental TOURIST INFO CENTER legend is the Information Symbol (D9-10) sign, which may be appended beneath the REST AREA advance guide sign. The name of the State or local jurisdiction may appear on tourist information/welcome center signs if the jurisdiction controls the operation of the tourist information or welcome center and the center meets the operating criteria set forth herein and is consistent with State policies. The State name may be used on the Advance Guide and the Exit Direction signs.

Guidance:

For tourist information centers located off the freeway or expressway facility, additional signing criteria should be as follows:

A. Each State should adopt a policy establishing the maximum distance that a tourist information center can be located from the interchange in order to be included on official signs.
B. The location of signing should be in accordance with requirements pertaining to General Service signing (see Section 2E.51).
C. Signing along the crossroad should be installed to guide the road user from the interchange to the tourist information center and back to the interchange.

Option:

As an alternative, the Information Symbol (D9-10) sign may be appended to the guide signs for the exit providing access to the tourist information center. As a second alternative, the Information Symbol sign may be combined with General Service signing.

Section 2E.54 Reference Location Signs and Enhanced Reference Location Signs (D10-4, D10-5)

Support:

Reference Location (D10-1 through D10-3) signs and Intermediate Reference Location (D10-1a through D10-3a) signs and their applications are described in Section 2D.46.

There are two types of enhanced reference location signs:

A. Enhanced Reference Location signs (D10-4), and
B. Intermediate Enhanced Reference Location signs (D10-5).

Standard:

Except as provided in the option below, Reference Location (D10-1 through D10-3) signs (see Section 2D.46) shall be placed on all expressway facilities that are located on a route where there is reference location sign continuity and on all freeway facilities to assist road users in estimating their progress, to provide a means for identifying the location of emergency incidents and traffic crashes, and to aid in highway maintenance and servicing.

Option:

Enhanced Reference Location (D10-4) signs (see Figure 2E-45), which enhance the reference location sign system by identifying the route, may be placed on freeways or expressways (instead of Reference Location signs) or on conventional roads.

To augment an enhanced reference location sign system, Intermediate Enhanced Reference Location (D10-5) signs (see Figure 2E-45), which show the tenth of a kilometer (mile) with a decimal point, may be installed along any section of a highway route or ramp at one tenth of a kilometer (mile) intervals, or at some other regular spacing.

Standard:

If enhanced reference location signs are used, they shall be vertical panels having blue or green backgrounds with white numerals, letters, and borders, except for the route shield, which shall be the standard color and shape. The top line shall consist of the cardinal direction for the roadway. The second line shall consist of the applicable route shield for the roadway. The third line shall identify the kilometer (mile) reference for the location and the bottom line of the Intermediate Enhanced Reference Location sign shall give the tenth of a kilometer (mile) reference for the location. The bottom line of the Intermediate Enhanced Reference Location sign shall contain a decimal point. The height of the legend on enhanced reference location signs shall be a minimum of 150 mm (6 in). The height of the route shield on enhanced reference location signs shall be a minimum of 300 mm (12 in).

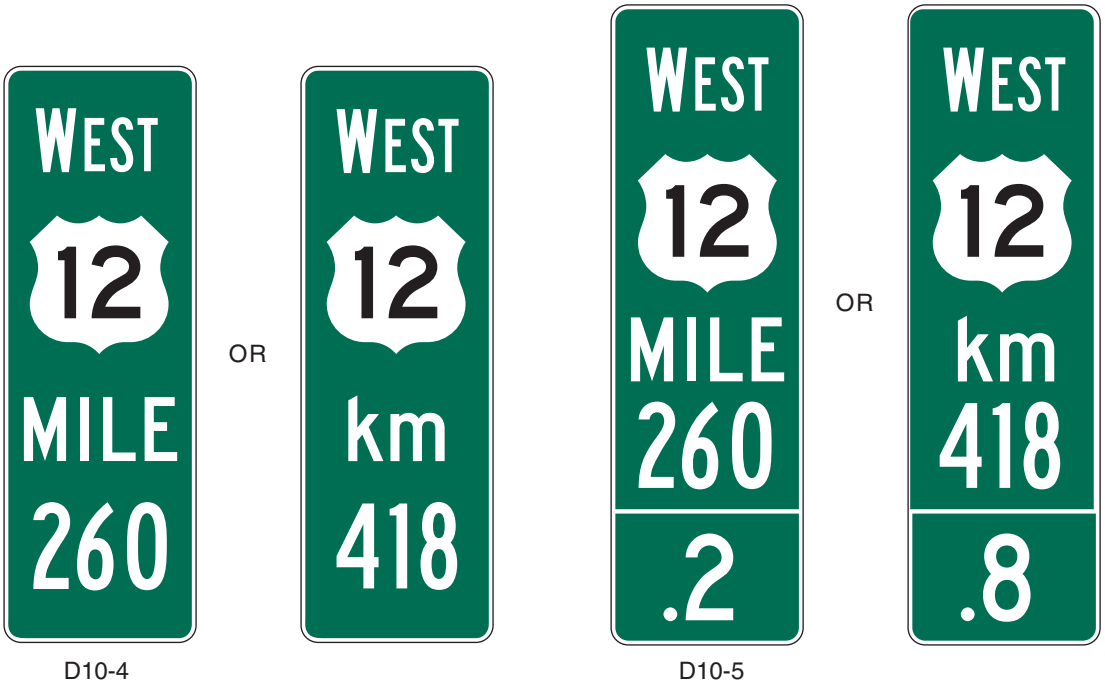
The background color shall be the same for all enhanced reference location signs within a jurisdiction.

The design details for enhanced reference location signs shall be as shown in the "Standard Highway Signs" book (see Section 1A.11).

Enhanced reference location signs shall have a minimum mounting height of 1.2 m (4 ft) to the bottom of the sign in accordance with the mounting height requirements of delineators (see Section 3D.04), and shall not be governed by the mounting height requirements prescribed in Section 2A.18.

The distance numbering shall be continuous for each route within any State, except where overlaps occur (see Section 2E.28). Where routes overlap, enhanced reference location sign continuity shall be established for only one of the routes. If one of the overlapping routes is an Interstate route, that route shall be selected for continuity of distance numbering.

Figure 2E-45. Enhanced Reference Location Signs



The distance measurement shall be made on the northbound and eastbound roadways. The enhanced reference location signs for southbound or westbound roadways shall be set at locations directly opposite the enhanced reference location signs for the northbound or eastbound roadways.

Guidance:

The route selected for continuity of distance numbering should also have continuity in interchange exit numbering (see Section 2E.28). On a route without enhanced reference location sign continuity, the first enhanced reference location sign beyond the overlap should indicate the total distance traveled on the route so that road users will have a means of correlating their travel distance between enhanced reference location signs with that shown on their odometer.

Standard:

Except as provided in the option below, enhanced reference location signs shall be installed on the right side of the roadway.

Option:

Where conditions limit or restrict the use of enhanced reference location signs on the right side of the roadway, they may be installed in the median. In urban areas, Intermediate Enhanced Reference Location signs may be installed on the right side of the roadway, in the median, or on ramps to replace or to supplement the reference location signs. Enhanced Reference Location signs may be installed back-to-back in median locations.

Section 2E.55 Miscellaneous Guide Signs

Support:

Miscellaneous Guide signs are used to point out geographical features, such as rivers and summits, and other jurisdictional boundaries (see Section 2D.48).

Option:

Miscellaneous Guide signs may be used if they do not interfere with signing for interchanges or other critical points.

Guidance:

Miscellaneous Guide signs should not be installed unless there are specific reasons for orienting the road users or identifying control points for activities that are clearly in the public interest. If Miscellaneous Guide signs are to be of value to the road user, they should be consistent with other freeway or expressway guide signs in design and legibility. On all such signs, the design should be simple and dignified, devoid of any tendency toward flamboyant advertising, and in general conformance with other freeway and expressway signing.

Section 2E.56 Radio Information Signing

Option:

Radio-Weather Information (D12-1) signs may be used in areas where difficult driving conditions commonly result from weather systems. Radio-Traffic Information signs may be used in conjunction with traffic management systems.

Standard:

Radio-Weather and Radio-Traffic Information signs shall have a white legend and border on a blue background. Only the numerical indication of the radio frequency shall be used to identify a station broadcasting travel-related weather or traffic information. No more than three frequencies shall be shown on each sign. Only radio stations whose signal will be of value to the road user and who agree to broadcast either of the two items below shall be identified on Radio-Weather and Radio-Traffic Information signs:

A. Periodic weather warnings at no more than 15-minute intervals during periods of adverse weather; or

B. Driving condition information (affecting the roadway being traveled) at a rate of at least once every 15 minutes, or when required, during periods of adverse traffic conditions, and when supplied by an official agency having jurisdiction.

If a station to be considered operates only on a seasonal basis, its signs shall be removed or covered during the off season.

Guidance:

The radio station should have a signal strength to adequately broadcast 110 km (70 mi) along the route. Signs should be spaced as needed for each direction of travel at distances determined by an engineering study. The stations to be included on the signs should be selected in cooperation with the association(s) representing major broadcasting stations in the area to provide: (1) maximum coverage to all road users on both AM and FM frequencies; and (2) consideration of 24 hours per day, 7 days per week broadcast capability.

Option:

In roadway rest area locations, a smaller sign using a greater number of radio frequencies, but of the same general design, may be used.

Standard:

Radio-Weather and Radio-Traffic Information signs installed in rest areas shall be positioned such that they are not visible from the main roadway.

Option:

A Channel 9 Monitored (D12-3) sign or cellular phone sign may be installed as needed.

Standard:

Only official public agencies or their designee shall be shown as the monitoring agency on the Channel 9 Monitored sign.

Support:

Section 2D.45 contains information about the use and application of TRAVEL INFO CALL 511 (D12-5) signs.

Section 2E.57 Carpool and Ridesharing Signing

Option:

In areas having carpool matching services, Carpool Information (D12-2) signs (see Figure 2D-12) may be provided adjacent to highways with preferential lanes or along any other highway.

Carpool Information signs may include Internet addresses or telephone numbers of more than four characters within the legend.

Guidance:

Because this is an information sign related to road user services, the Carpool Information sign should have a white legend and border on a blue background.

Standard:

If a local transit logo or carpool symbol is incorporated into the Carpool Information sign, the maximum vertical dimension of the logo or symbol shall not exceed 450 mm (18 in).

Section 2E.58 Weigh Station Signing

Standard:

Weigh Station signing on freeways and expressways shall be the same as that specified in Section 2D.44, except for lettering size and the advance posting distance for the Exit Direction sign, which shall be located a minimum of 450 m (1,500 ft) in advance of the gore.

Support:

Weigh Station sign layouts for freeway and expressway applications are shown in the "Standard Highway Signs" book (see Section 1A.11).

Section 2E.59 Preferential Only Lane Signs

Support:

Additional guidance and standards related to the designation, operational considerations, signing, pavement markings, and other considerations for preferential only lanes is provided in Sections 2B.26, 2B.27, 2B.28, 2C.52, 3B.22, and 3B.23.

Standard:

Ground-mounted advance guide signs shall be provided at least 800 m (0.5 mi) prior to the beginning or initial entry point to all types of preferential only lanes (including barrier-separated, buffer-separated, and concurrent flow). Ground-mounted guide signs shall be provided at the beginning or initial entry point and at intermediate access points to all types of preferential only lanes.

A combination of guide and regulatory signs shall be used in advance of all preferential only lanes. The advance guide signs for preferential only lanes shall be consistent with the requirements of Section 2E.30.

Reversible flow or express lanes that do not have any specific vehicle occupancy or designation restrictions shall be consistent with the requirements of Chapters 2B and 3B.

Overhead preferential only lane guide signs shall be used only as a supplement to ground-mounted preferential only lane guide signs unless an engineering study identifies that ground-mounted guide signs are not appropriate for a particular situation or location.

Either the HOV abbreviation or the diamond symbol shall appear in the legend of each preferential only lane sign at the designated entry and exit points for all types of HOV lanes (including barrier- and buffer-separated, concurrent flow, and direct access ramps) in order to alert motorists that there is a minimum allowable vehicle occupancy requirement for vehicles to use the HOV lanes and to inform them of the times during which these vehicle occupancy requirements are in effect.

Guidance:

Because consistency in signing and pavement markings for preferential only lanes within a State or metropolitan area plays a critical role in building public awareness, understanding, and acceptance, and makes enforcement more effective, an engineering study should be conducted to determine the appropriate combinations of overhead signs, ground-mounted signs, and pavement markings for a specific preferential only lane application.

Existing sign and bridge structures should be used to the extent practical for the installation of preferential only lane signs. Where possible, advance guide and guide signs that are provided for preferential only lanes should share sign structures spanning the preferential only lanes and the adjoining freeway facility.

The preferential only lane signing should be designed to avoid overloading the road user. Based on the importance of the sign, the following priority should be given: regulatory, advance regulatory, guide, then next exit supplemental signs.

Option:

Overhead advance guide signs and overhead guide signs may be used in advance of, at the beginning or initial entry point, and at designated intermediate access points to any type of preferential only lane. Advance guide signs may be installed and located approximately 1.6 km (1 mi) and 3.2 km (2 mi) in advance of the beginning or initial entry point to any type of preferential only lane.

Guidance:

Where conditions restrict the ability to provide more than one advance guide sign in advance of any type of preferential only lane, the advance guide sign that is installed should be placed at least 800 m (0.5 mi) in advance of the beginning or entry point to the preferential only lane.

Advance destination guide signs, identifying downstream exit locations, should be installed in advance of designated entry points and along the length of access restricted preferential only lanes (such as barrier- and buffer-separated). In addition to the routes that typically appear on advance destination guide signs, these signs

should also include destinations. These signs should be located based on the priority of the message, the available space, the existing signs on adjoining general purpose traffic lanes, roadway and traffic characteristics, the proximity to existing overhead signs, the ability to install overhead signs, and other unique local factors.

Option:

Advance guide signs may be provided for preferential only lanes with unrestricted access, such as concurrent flow preferential only lanes.

Guidance:

The use of guide signs for preferential only lanes at freeway interchanges should conform to the regulatory and guide sign requirements established in this Manual.

Option:

Changeable message signs may be used to supplement static signs where travel conditions change or where multiple types of operational strategies (such as variable occupancy requirements, vehicle types, or pricing policies) are used and varied throughout the day or week to manage the use of, control of, or access to preferential only lanes.

Standard:

When changeable message signs (see Section 2A.07) are used as regulatory or guide signs for preferential only lanes, they shall be the required sign size and shall display the required letter height and legend format that corresponds to the type of roadway facility and design speed.

Ground-mounted and overhead advance guide signs, guide signs, and exit signs applicable to HOV lanes and direct access ramps to HOV lanes shall contain the HOV diamond symbol in the upper left corner of the sign as shown in Figures 2E-46 through 2E-52. The diamond symbol shall not be used with lanes designated for bus or taxi traffic.

Option:

Agencies may select from either the HOV abbreviation or the diamond symbol to reference the HOV lane designation.

Guidance:

Where lateral clearance is limited, such as when a ground-mounted Preferential Only Lane sign is installed on a median barrier, the edges of the sign should not project beyond the outer edges of the barrier.

Option:

Where lateral clearance is limited, Preferential Only Lane (R3-10, R3-11, and R3-12 series) signs that are 1800 mm (72 in) or less in width may be skewed up to 45 degrees in order to fit within the barrier width or may be mounted at a height of 4.3 m (14 ft) or more above the roadway.

Guidance:

Where lateral clearance is limited, Preferential Only Lane signs that are wider than 1800 mm (72 in) should be mounted at a height of at least 4.3 m (14 ft) above the roadway.

Standard:

For barrier-separated preferential only lanes, overhead advance guide and overhead guide signs shall be provided in advance of and at the beginning or initial entry point to the preferential only lanes (see Figure 2E-46 for HOV lanes). Overhead guide signs shall also be used at all intermediate entry points to barrier-separated preferential only lanes (see Figure 2E-47 for HOV lanes).

For barrier-separated preferential only lanes, ground-mounted advance exit and ground-mounted exit signs shall be installed prior to and at the intermediate exit points of the preferential only lanes (see Figure 2E-47 for HOV lanes). Ground-mounted guide signs shall be mounted in the median or on median barriers that separate two directions of traffic.

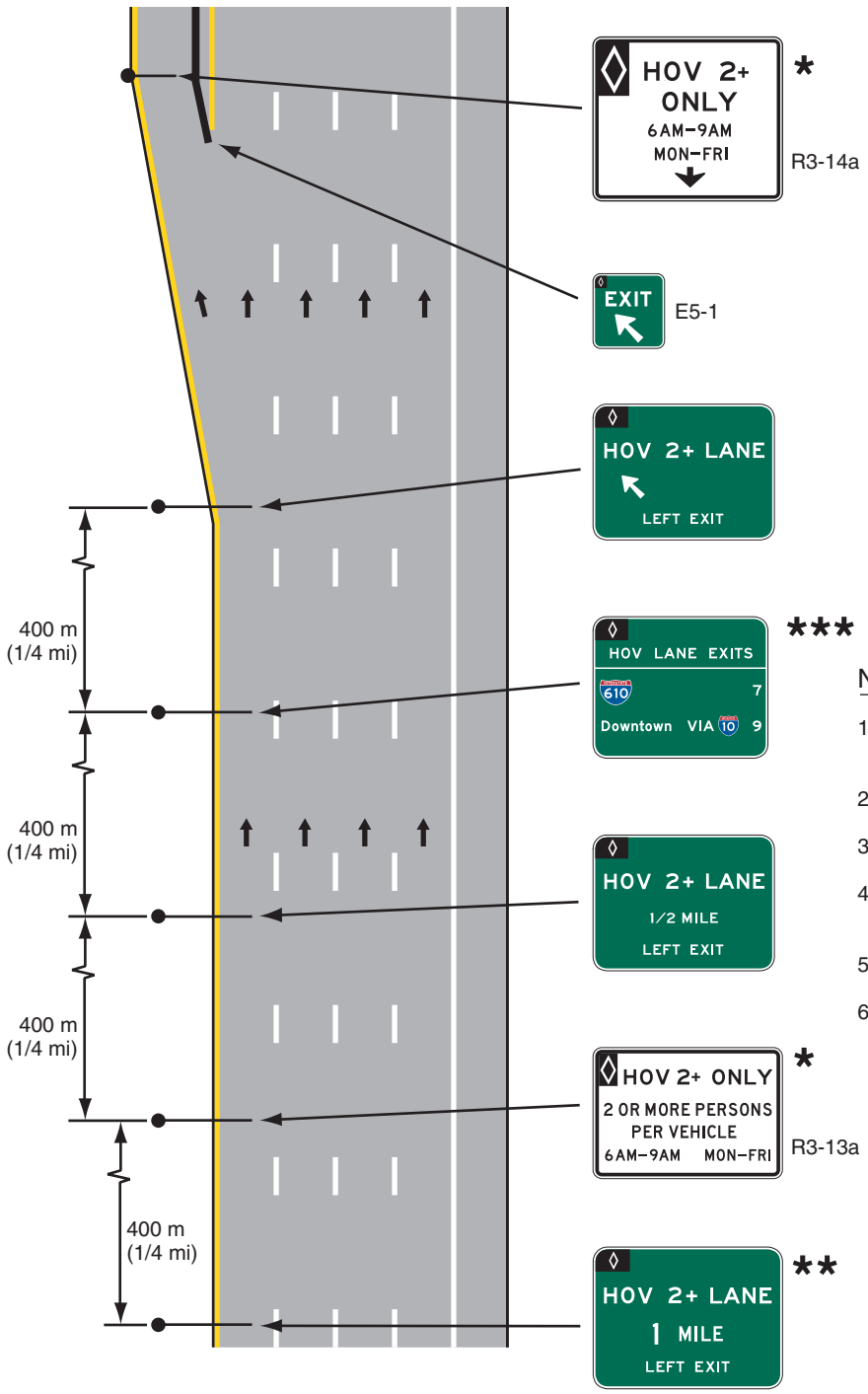
Option:

For barrier-separated preferential only lanes, an advance destination guide sign may be used in the vicinity of designated intermediate entry and exit points.

Guidance:

For barrier-separated preferential only lanes where conditions restrict the ability to provide more than one advance guide sign prior to the entrance to the preferential only lane, the sign should be placed approximately 800 m (0.5 mi) in advance of the exit. In these situations, the installation of the corresponding regulatory and next exit supplemental signs should be located based on the priority of the message and the available space.

Figure 2E-46. Example of Signing for the Entrance to Barrier-Separated HOV Lanes



Legend

→ Direction of travel

NOTES:

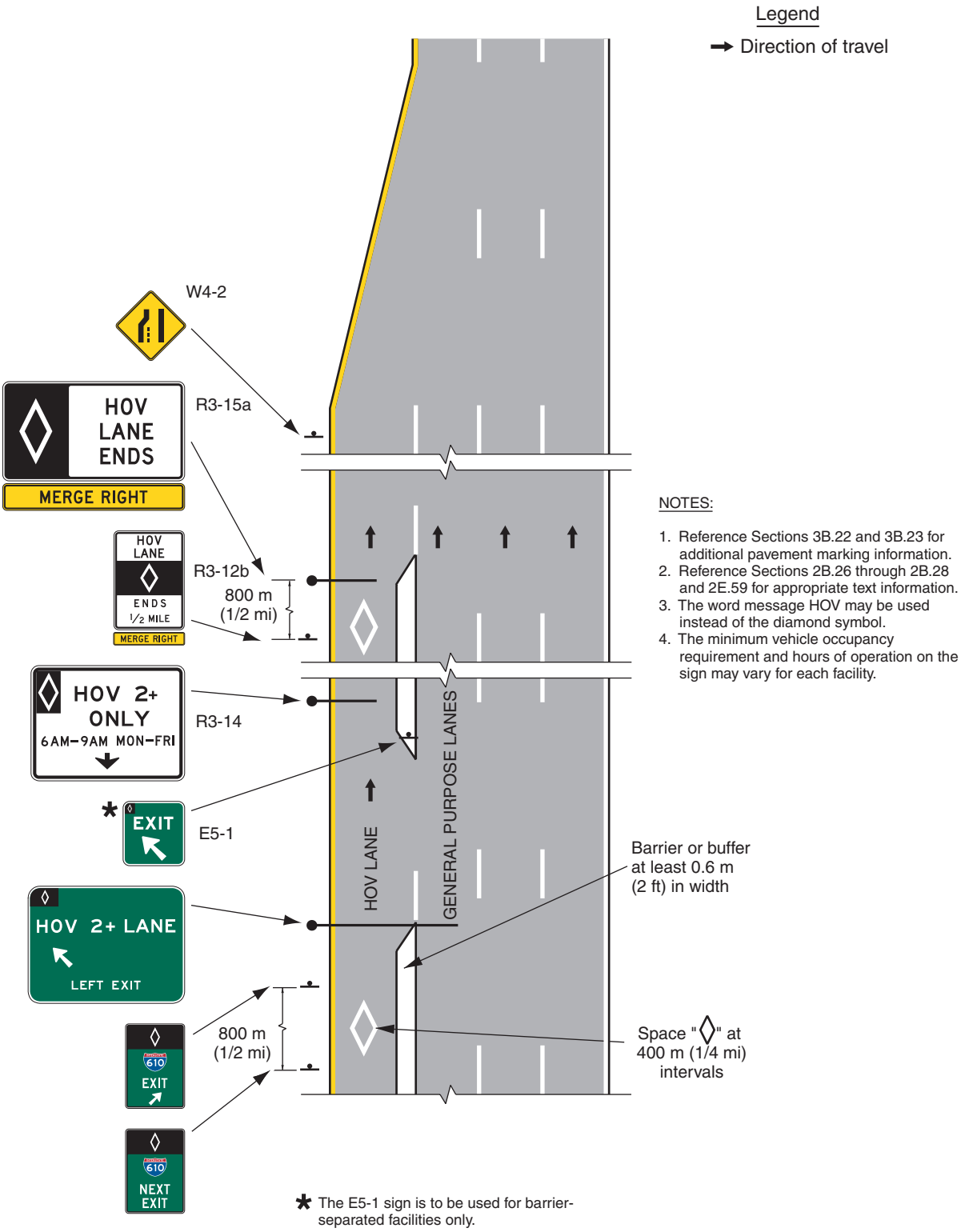
1. For right-side exits to access HOV lane, the same signing scheme would be used with adjustments made to sign messaging.
2. Exit ramp is for illustrative purposes only. Use locally applied geometric criteria.
3. The word message HOV may be used instead of the diamond symbol.
4. The minimum vehicle occupancy requirement and hours of operation on the sign may vary for each facility.
5. Reference Sections 3B.22 and 3B.23 for additional pavement marking information.
6. Reference Sections 2B.26 through 2B.28 and 2E.59 for appropriate text information.

* Potential location of a Changeable Message Sign (CMS) for reversible or contraflow operations.

** 1.6 km (1 mi) and 3.2 km (2 mi) signs are optional

*** For access restricted facilities. Destinations may be augmented to accompany routes on Interchange Sequence signs (see Figure 2E-24).

Figure 2E-47. Example of Signing for the Intermediate Entry to and Exit from Barrier- or Buffer-Separated HOV Lanes



Standard:

For buffer-separated preferential only lanes (painted buffer of 0.6 m (2 ft) or more) where access is restricted to designated entry points, ground-mounted guide signs shall be mounted in the median or on median barriers separating two directions of traffic. Ground-mounted advance exit and ground-mounted exit signs shall be installed prior to and at the intermediate exit points of buffer-separated preferential only lanes (see Figure 2E-47 for HOV lanes).

Option:

For buffer-separated preferential only lanes, an advance destination guide sign may be used in the vicinity of designated intermediate entry and exit points.

Guidance:

For buffer-separated HOV lanes, guide and regulatory signs should be provided to alert HOV lane users and non-users of the minimum allowable vehicle occupancy requirement and the locations of the designated entry and exit points.

Standard:

For concurrent flow preferential only lanes, including those where a preferential only lane is added to the roadway (see Figure 2E-48 for HOV lanes) and those where a general purpose lane transitions into a preferential only lane on the roadway (see Figure 2E-49 for HOV lanes), an overhead regulatory (R3-14 or R3-14a) sign shall be used.

For concurrent flow HOV lanes on the left side of the roadway with unrestricted access, advance guide and guide signs shall only be used on direct access ramps, such as HOV lane only ramps or ramps to park & ride lots (see Figures 2E-50 and 2E-51 for HOV lanes).

For direct access ramps to HOV lanes, advance guide signs shall be provided along the adjoining surface streets to direct traffic into a transit facility (such as a park & ride lot or a transit station or terminal) that ultimately leads to HOV lanes (see Figure 2E-50 for HOV lanes).

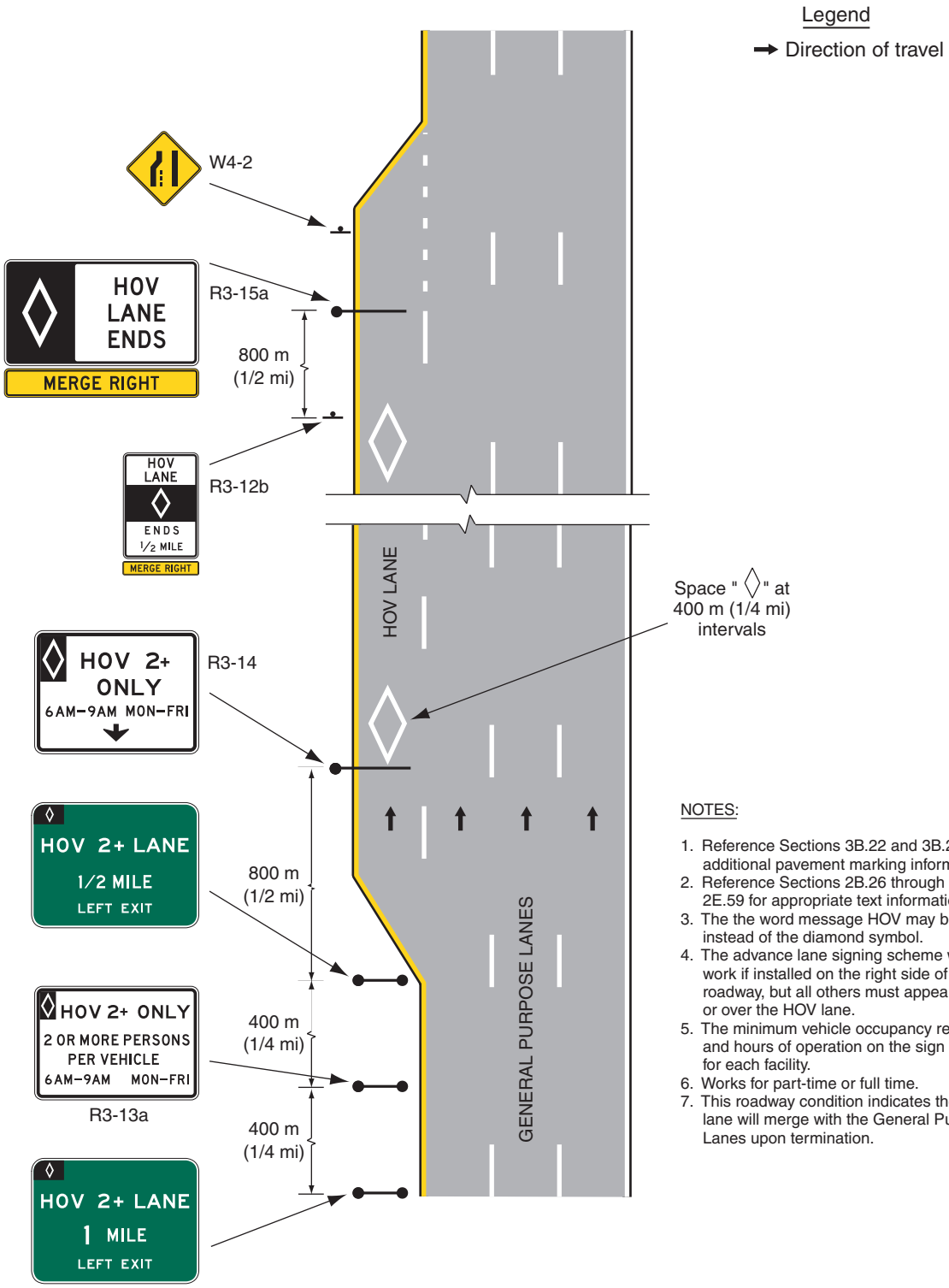
Because direct access ramps for preferential only lanes at interchanges connecting two freeways are typically left side exits and typically have design speeds similar to the preferential only lane, overhead advance guide signs and overhead guide signs shall be provided in advance of and at the entry point to each preferential only lane ramp (see Figure 2E-52 for HOV lanes).

Support:

Figures 2E-50 through 2E-52 provide examples of recommended uses and layouts of signs for HOV lanes for direct access ramps, park & ride lots, access from surface streets, and exclusive preferential only lane ramps at interchanges that directly connect two freeway facilities. Direct access ramps to preferential only lanes sometimes form a three or four-legged intersection that is controlled by either static signs or traffic control signals.

The use of advance guide and guide signs for direct access ramps for preferential only lanes at interchanges connecting two freeways is similar to a connecting ramp between two freeway facilities.

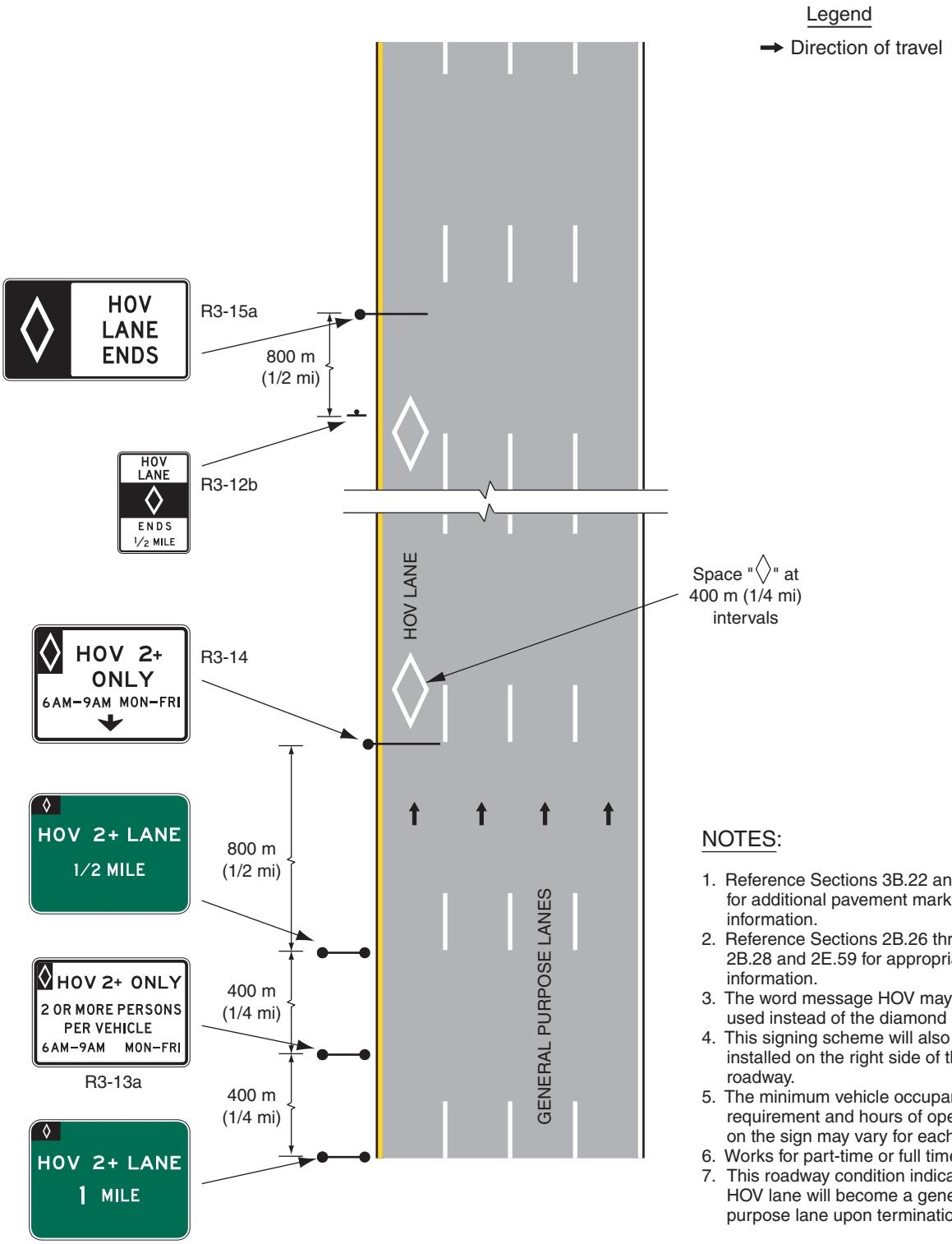
Figure 2E-48. Example of Signing for the Entrance to and Exit from an Added HOV Lane



NOTES:

1. Reference Sections 3B.22 and 3B.23 for additional pavement marking information.
2. Reference Sections 2B.26 through 2B.28 and 2E.59 for appropriate text information.
3. The the word message HOV may be used instead of the diamond symbol.
4. The advance lane signing scheme will also work if installed on the right side of the roadway, but all others must appear adjacent or over the HOV lane.
5. The minimum vehicle occupancy requirement and hours of operation on the sign may vary for each facility.
6. Works for part-time or full time.
7. This roadway condition indicates the HOV lane will merge with the General Purpose Lanes upon termination.

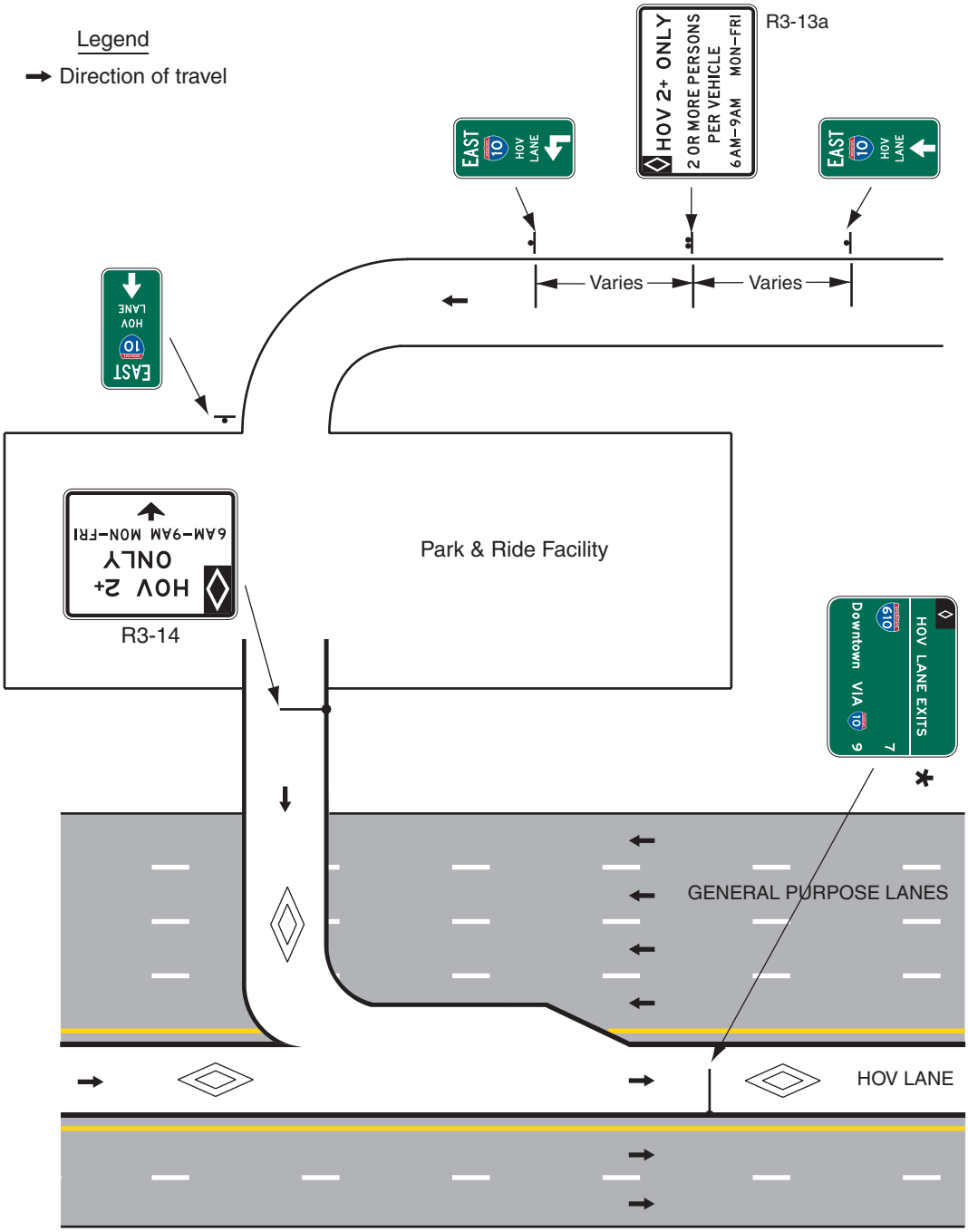
Figure 2E-49. Example of Signing for the Entrance to and Exit from a General Purpose Lane that Becomes an HOV Lane



NOTES:

1. Reference Sections 3B.22 and 3B.23 for additional pavement marking information.
2. Reference Sections 2B.26 through 2B.28 and 2E.59 for appropriate text information.
3. The word message HOV may be used instead of the diamond symbol.
4. This signing scheme will also work if installed on the right side of the roadway.
5. The minimum vehicle occupancy requirement and hours of operation on the sign may vary for each facility.
6. Works for part-time or full time.
7. This roadway condition indicates the HOV lane will become a general purpose lane upon termination.

Figure 2E-50. Example of Signing for a Direct Access Ramp to an HOV Lane from a Park & Ride Facility

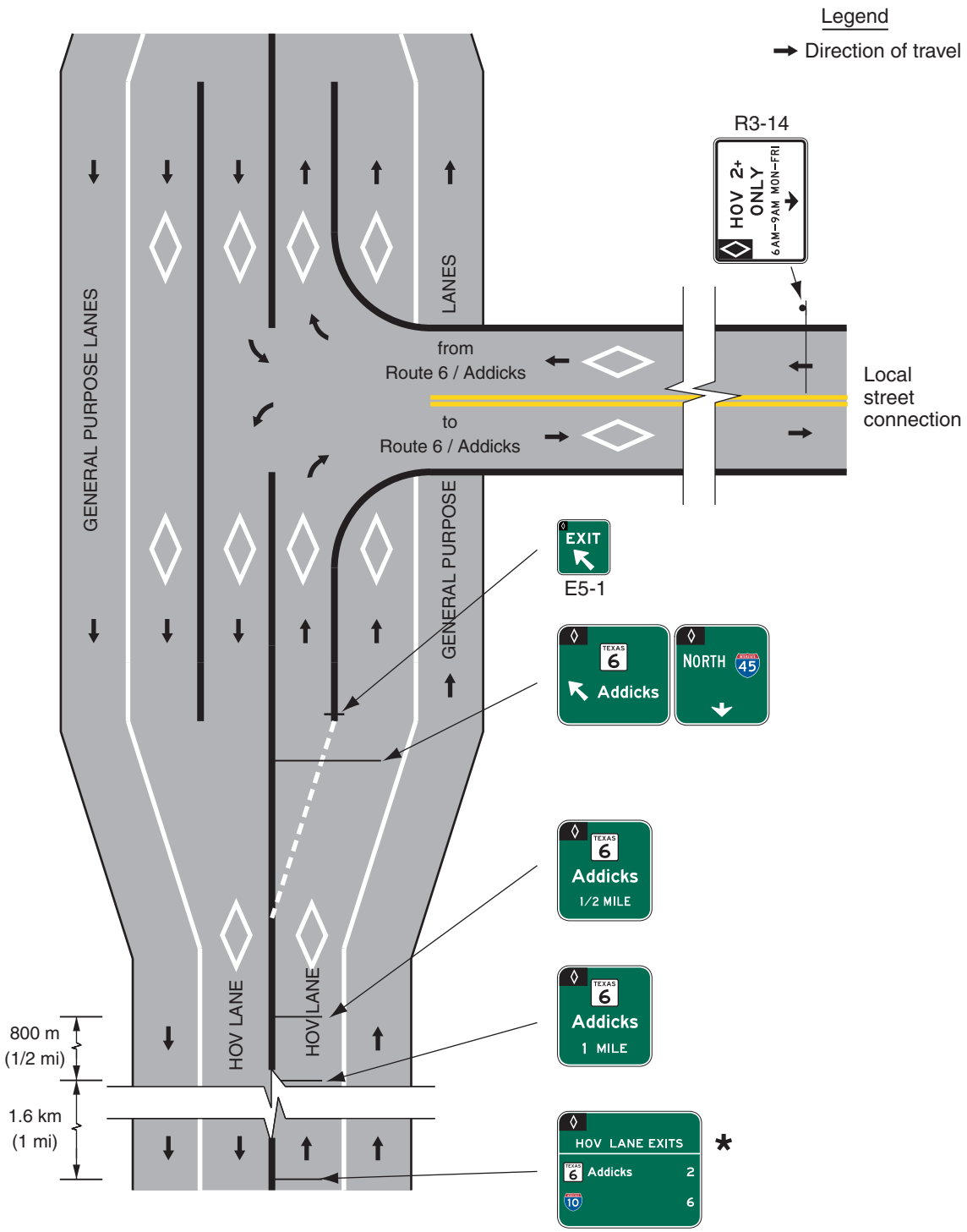


NOTES:

1. Reference Sections 3B.22 and 3B.23 for additional pavement marking information.
2. Reference Sections 2B.26 through 2B.28 and 2E.59 for appropriate text information.
3. Additional advisory and warning signs are required.
4. Direction of HOV traffic is inbound.
5. Sign locations are approximate.
6. The word message HOV may be used instead of the diamond symbol.
7. The minimum vehicle occupancy requirement on the sign may vary for each facility.
8. Overhead HOV signs should supplement ground-mounted HOV signs.
9. Additional signs may be required to direct drivers from the surrounding streets into the park & ride lot and HOV lane.
10. Additional signs are required on the adjoining surface streets to inform non-HOVs that they should not enter the HOV facility.

* For access restricted facilities. Destinations may be augmented to accompany routes on Interchange Sequence signs (see Figure 2E-24).

Figure 2E-51. Example of Signing for a Direct Access Ramp to an HOV Lane from a Local Street

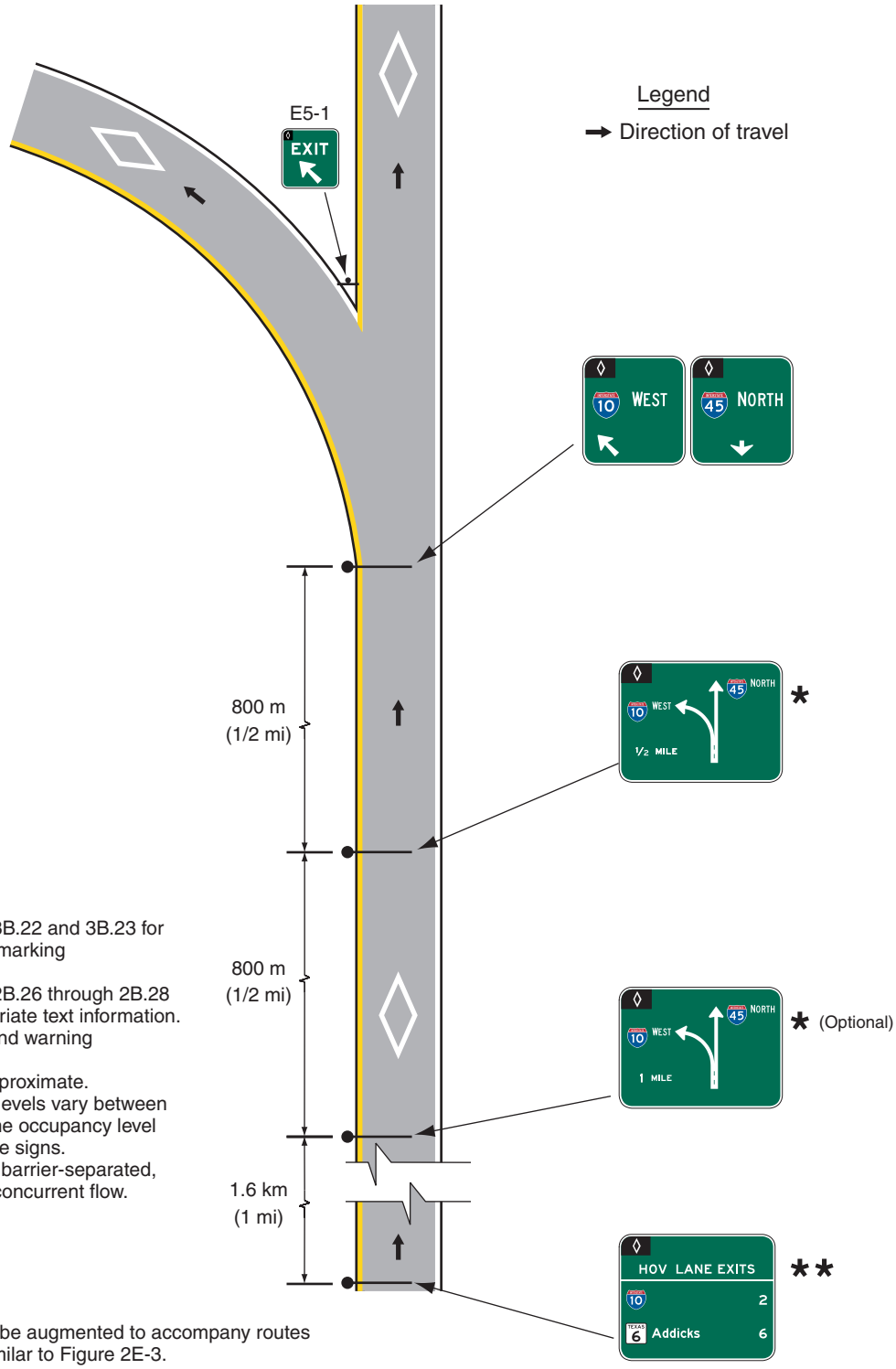


NOTES:

1. Reference Sections 3B.22 and 3B.23 for additional pavement marking information.
2. Reference Sections 2B.26 through 2B.28 and 2E.59 for appropriate text information.
3. Additional advisory and warning signs are required.
4. Sign locations are approximate.
5. HOV facility could be barrier-separated, buffer-separated, or concurrent flow.

* For access restricted facilities. Destinations may be augmented to accompany routes on Interchange Sequence signs (see Figure 2E-24).

Figure 2E-52. Example of Signing for a Direct Access Ramp between HOV Lanes on Separate Freeways



NOTES:

1. Reference Sections 3B.22 and 3B.23 for additional pavement marking information.
2. Reference Sections 2B.26 through 2B.28 and 2E.59 for appropriate text information.
3. Additional advisory and warning signs are required.
4. Sign locations are approximate.
5. If vehicle occupancy levels vary between HOV facilities, then the occupancy level can be added to guide signs.
6. HOV facility could be barrier-separated, buffer-separated, or concurrent flow.

* Destinations may be augmented to accompany routes on guide signs similar to Figure 2E-3.

** For access restricted facilities. Destinations may be augmented to accompany routes on Interchange Sequence signs (see Figure 2E-24).

CHAPTER 2F. SPECIFIC SERVICE SIGNS

Section 2F.01 Eligibility

Standard:

Specific Service signs shall be defined as guide signs that provide road users with business identification and directional information for services and for eligible attractions.

Guidance:

The use of Specific Service signs should be limited to areas primarily rural in character or to areas where adequate sign spacing can be maintained.

Option:

Where an engineering study determines a need, Specific Service signs may be used on any class of highways.

Guidance:

Specific Service signs should not be installed at an interchange where the road user cannot conveniently reenter the freeway or expressway and continue in the same direction of travel.

Standard:

Eligible service facilities shall comply with laws concerning the provisions of public accommodations without regard to race, religion, color, age, sex, or national origin, and laws concerning the licensing and approval of service facilities.

The attraction services shall include only facilities which have the primary purpose of providing amusement, historical, cultural, or leisure activities to the public.

Distances to eligible 24-hour pharmacies shall not exceed 4.8 km (3 mi) in any direction of an interchange on the Federal-aid system. Rev. 1

Guidance:

Except as noted in the Option below, distances to eligible services other than pharmacies should not exceed 4.8 km (3 mi) in any direction. Rev. 1

Option:

If, within the 4.8 km (3 mi) limit, facilities for the services being considered other than pharmacies are not available or choose not to participate in the program, the limit of eligibility may be extended in 4.8 km (3 mi) increments until one or more facilities for the services being considered chooses to participate, or until 25 km (15 mi) is reached, whichever comes first. Rev. 1

Guidance:

If State or local agencies elect to provide Specific Service signing, there should be a statewide policy for such signing and criteria for the availability of the various types of services. The criteria should consider the following:

A. To qualify for a GAS logo panel, a business should have:
   1. Vehicle services including gas and/or alternative fuels, oil, and water;
   2. Modern sanitary facilities and drinking water;
   3. Continuous operation at least 16 hours per day, 7 days per week for freeways and expressways, and continuous operation at least 12 hours per day, 7 days per week for conventional roads; and
   4. Public telephone.

B. To qualify for a FOOD logo panel, a business should have:
   1. Licensing or approval, where required;
   2. Continuous operations to serve at least two meals per day, at least 6 days per week;
   3. Public telephone; and
   4. Modern sanitary facilities.

C. To qualify for a LODGING logo panel, a business should have:
   1. Licensing or approval, where required;
   2. Adequate sleeping accommodations;
   3. Public telephone; and
   4. Modern sanitary facilities.

D. To qualify for a CAMPING logo panel, a business should have:
   1. Licensing or approval, where required;
   2. Adequate parking accommodations; and
   3. Modern sanitary facilities and drinking water.

E. To qualify for an ATTRACTION logo panel, a facility should have:
   1. Regional significance; and
   2. Adequate parking accommodations.

Standard:

If State or local agencies elect to provide Specific Service signing for pharmacies, both of the following criteria shall be met for a pharmacy to qualify for signing:

Rev. 1

A. The pharmacy shall be continuously operated 24 hours per day, 7 days per week, and shall have a State-licensed pharmacist present and on duty at all times; and

B. The pharmacy shall be located within 4.8 km (3 mi) of an interchange on the Federal-aid system.

Section 2F.02 Application

Standard:

The number of Specific Service signs along an approach to an interchange or intersection, regardless of the number of service types displayed, shall be limited to a maximum of four. In the direction of traffic,
Rev. 1 **successive Specific Service signs shall be for 24-hour pharmacy, attraction, camping, lodging, food, and gas services, in that order.**

A Specific Service sign shall display the word message GAS, FOOD, LODGING, CAMPING,
Rev. 1 **ATTRACTION, or 24-HOUR PHARMACY, an appropriate directional legend such as the word message EXIT XX, NEXT RIGHT, SECOND RIGHT, or directional arrows, and the related logo sign panels. No more than three types of services shall be represented on any sign or sign assembly. If three types of services are shown on one sign, then the logo panels shall be limited to two for each service (for a total of six logo panels). The legend and logo panels applicable to a service type shall be displayed such that the road user will not associate them with another service type on the same sign. No service type shall appear on more than one sign. The signs shall have a blue background, a white border, and white legends of upper-case letters, numbers, and arrows.**

Guidance:

The Specific Service signs should be located to take advantage of natural terrain, to have the least impact on the scenic environment, and to avoid visual conflict with other signs within the highway right-of-way.

Rev. 1 Option:

General Service signs (see Sections 2D.45 and 2E.51) may be used in conjunction with Specific Service signs for eligible types of services that are not represented by a Specific Service sign.

Support:

Examples of Specific Service signs are shown in Figure 2F-1. Examples of sign locations are shown in Figure 2F-2.

Section 2F.03 Logos and Logo Panels

Standard:

A logo shall be either an identification symbol/trademark or a word message. Each logo shall be placed on a separate logo panel which shall be attached to the Specific Service sign. Symbols or trademarks used alone for a logo shall be reproduced in the colors and general shape consistent with customary use, and any integral legend shall be in proportionate size. A logo that resembles an official traffic control device shall not be used.

Guidance:

A word message logo, not using a symbol or trademark, should have a blue background with white legend and border.

Option:

Where business identification symbols or trademarks are used alone for a logo, the border may be omitted from the logo panel.

A portion at the bottom of a GAS logo panel may be used to display the legends for alternative fuels (see Section 2E.51) available at the facility. A portion at the bottom of a FOOD logo panel may be used to display the word CLOSED and the day of the week when the facility is closed.

Section 2F.04 Number and Size of Logos and Signs

Guidance:

Sign sizes should be determined by the amount and height of legend and the number and size of logo panels attached to the sign. All logo panels on a sign should be the same size.

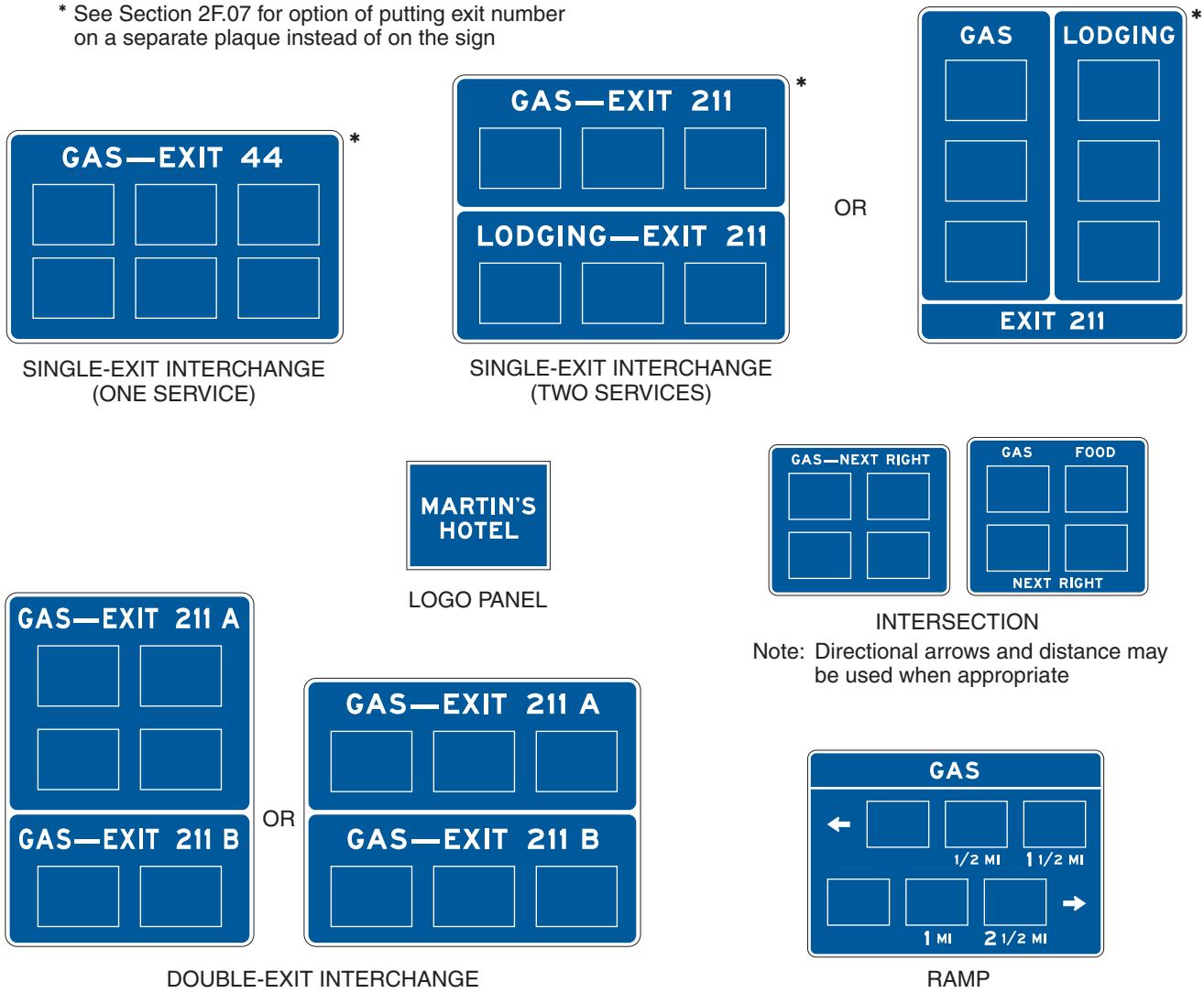
Standard:

Each Specific Service sign or sign assembly shall be limited to no more than six logo panels. There shall be no more than four logo panels for one of the two service types on the same sign or sign assembly.

Support:

Section 2F.08 contains information regarding Specific Service signs for double-exit interchanges.

Figure 2F-1. Examples of Specific Service Signs



Standard:

Each logo panel attached to a Specific Service sign shall have a rectangular shape with a width longer than the height. A logo panel on signs for freeways and expressways shall not exceed 1500 mm (60 in) in width and 900 mm (36 in) in height. A logo panel on signs for conventional roads and ramps shall not exceed 750 mm (30 in) in width and 450 mm (18 in) in height. The vertical and horizontal spacing between logo panels shall not exceed 200 mm (8 in) and 300 mm (12 in), respectively.

Support:

Sections 2A.15, 2E.14, and 2E.15 contain information regarding borders, interline spacing, and edge spacing.

Section 2F.05 Size of Lettering

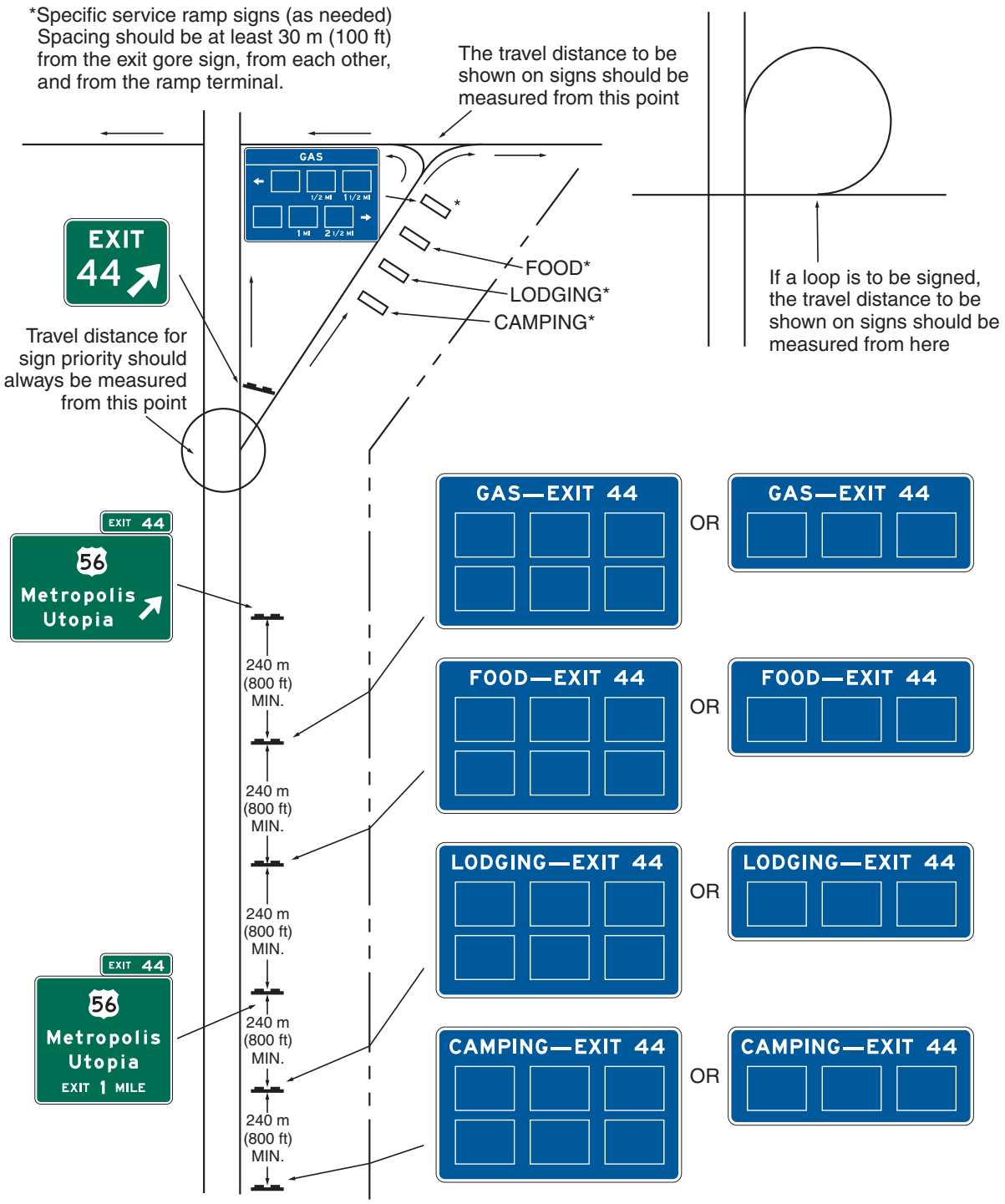
Standard:

All letters and numerals on Specific Service signs, except on the logo panels, shall be a minimum height of 250 mm (10 in) for signs on freeways and expressways, and 150 mm (6 in) for signs on conventional roads and ramps.

Guidance:

Any legend on a symbol/trademark should be proportional to the size of the symbol/trademark.

Figure 2F-2. Examples of Specific Service Sign Locations



Section 2F.06 Signs at Interchanges

Standard:

The Specific Service signs shall be installed between the previous interchange and at least 245 m (800 ft) in advance of the Exit Direction sign at the interchange from which the services are available (see Figure 2F-2).

Guidance:

There should be at least a 245 m (800 ft) spacing between the Specific Service signs, except for Specific Service ramp signs. However, excessive spacing is not desirable. Specific Service ramp signs should be spaced at least 30 m (100 ft) from the exit gore sign, from each other, and from the ramp terminal.

Section 2F.07 Single-Exit Interchanges

Standard:

At single-exit interchanges, the name of the service type followed by the exit number shall be displayed on one line above the logo panels. At unnumbered interchanges, the directional legend NEXT RIGHT (LEFT) shall be used.

At single-exit interchanges, Specific Service ramp signs shall be installed along the ramp or at the ramp terminal for facilities that have logo panels displayed along the main roadway if the facilities are not readily visible from the ramp terminal. Directions to the service facilities shall be indicated by arrows on the ramp signs. Logo panels on Specific Service ramp signs shall be duplicates of those displayed on the Specific Service signs located in advance of the interchange, but shall be reduced in size.

Guidance:

Specific Service ramp signs should include distances to the service facilities.

Option:

An exit number plaque (see Section 2E.28) may be used instead of the exit number on the signs located in advance of an interchange.

The reduced size logo panels and signs also may be installed along the crossroad.

Section 2F.08 Double-Exit Interchanges

Guidance:

At double-exit interchanges, the Specific Service signs should consist of two sections, one for each exit (see Figure 2F-1).

Standard:

At a double-exit interchange, the top section shall display the logo panels for the first exit and the bottom section shall display the logo panels for the second exit. The name of the service type and the exit number shall be displayed above the logo panels in each section. At unnumbered interchanges, the word message NEXT RIGHT (LEFT) and SECOND RIGHT (LEFT) shall be used in place of the exit number. The number of logo panels on the sign (total of both sections) or the sign assembly shall be limited to six.

Option:

At a double-exit interchange where there are four logo panels to be displayed for one of the exits and one or two logo panels to be displayed for the other exit, the logo panels may be arranged in three rows with two logo panels per row.

At a double-exit interchange, where a service is to be signed for only one exit, one section of the Specific Service sign may be omitted, or a single exit interchange sign may be used. Signs on ramps and crossroads as described in Section 2F.07 may be used at a double-exit interchange.

Section 2F.09 Signs at Intersections

Standard:

Where both tourist-oriented information (see Chapter 2G) and specific service information would be needed at the same intersection, the design of the tourist-oriented directional signs shall be used, and the needed specific service information shall be incorporated.

Guidance:

If Specific Service signs are used on conventional roads or at intersections on expressways, they should be installed between the previous interchange or intersection and at least 90 m (300 ft) in advance of the intersection from which the services are available.

The spacing between signs should be determined on the basis of an engineering study.

Logo panels should not be displayed for a type of service for which a qualified facility is readily visible.

Standard:

If Specific Service signs are used on conventional roads or at intersections on expressways, the name of each type of service shall be displayed above its logo panel(s), together with an appropriate legend such as NEXT RIGHT (LEFT) or a directional arrow on the same line.

Option:

If Specific Service signs are used on conventional roads or at intersections on expressways, the NEXT RIGHT (LEFT) or other applicable directional legend or action message may be displayed below instead of above the logo panels.

Signs similar to Specific Service ramp signs as described in Section 2F.07 may be provided on the crossroad.

Section 2F.10 Signing Policy

Guidance:

Each highway agency that elects to use Specific Service signs should establish a signing policy that includes, as a minimum, the guidelines of Section 2F.01 and at least the following criteria:

A. Selection of eligible businesses;
B. Distances to eligible services;
C. The use of logo panels, legends, and signs conforming with this Manual and State design requirements;
D. Removal or covering of logo panels during off seasons for business that operate on a seasonal basis;
E. The circumstances, if any, under which Specific Service signs may be used in nonrural areas; and
F. Determination of the costs to businesses for initial permits, installations, annual maintenance, and removal of logo panels.

CHAPTER 2G. TOURIST-ORIENTED DIRECTIONAL SIGNS

Section 2G.01 Purpose and Application

Support:

Tourist-oriented directional signs are guide signs with one or more panels that display the business identification of and directional information for business, service, and activity facilities.

Standard:

A facility shall be eligible for tourist-oriented directional signs only if it derives its major portion of income or visitors during the normal business season from road users not residing in the area of the facility.

Option:

Tourist-oriented directional signs may include businesses involved with seasonal agricultural products.

Standard:

When used, tourist-oriented directional signs shall be used only on rural conventional roads and shall not be used on conventional roads in urban areas nor at interchanges on freeways or expressways.

Where both tourist-oriented directional signs and Specific Service signs (see Chapter 2F) would be needed at the same intersection, the tourist-oriented directional signs shall incorporate the needed information from, and be used in place of, the Specific Service signs.

Guidance:

Each State that elects to use tourist-oriented directional signs should have a State policy for use as indicated in Section 2G.07.

Option:

Tourist-oriented directional signs may be used in conjunction with General Service signs (see Section 2D.45).

Section 2G.02 Design

Standard:

Tourist-oriented directional signs shall have one or more panels for the purpose of displaying the business identification of and directional information for eligible facilities. Each panel shall be rectangular in shape and shall have a white legend and border on a blue background.

The content of the legend on each panel shall be limited to the business identification and directional information for not more than one eligible business, service, or activity facility. The legends shall not include promotional advertising.

Guidance:

Each panel should have a maximum of two lines of legend including not more than one symbol, a separate directional arrow, and the distance to the facility shown beneath the arrow. Arrows pointing to the left or up should be at the extreme left of the sign. Arrows pointing to the right should be at the extreme right of the sign. Symbols, when used, should be to the left of the word legend or logo.

Option:

The tourist-oriented directional sign may have the word message TOURIST ACTIVITIES at the top of the sign.

Standard:

The TOURIST ACTIVITIES word message shall be a white legend and border on a blue background. If used, it shall be placed above and in addition to the panels.

Option:

The General Service sign symbols (see Section 2D.45) and the symbols for recreational and cultural interest area signs (see Chapter 2H) may be used.

Logos for specific businesses, services, and activities may also be used. Based on engineering judgment, the hours of operation may be added on the panels.

Standard:

When used, symbols and logos shall be an appropriate size (see Section 2G.04). Logos resembling official traffic control devices shall not be permitted.

Support:

Examples of tourist-oriented directional signs are shown in Figures 2G-1 and 2G-2.

Section 2G.03 Style and Size of Lettering

Guidance:

All letters and numbers on tourist-oriented directional signs, except on the logos, should be upper-case and at least 150 mm (6 in) in height. Any legend on a logo should be proportional to the size of the logo.

Standard:

Design standards for upper-case letters, lower-case letters, numerals, and spacing shall be as provided in the "Standard Highway Signs" book (see Section 1A.11).

Section 2G.04 Arrangement and Size of Signs

Standard:

The size of a tourist-oriented directional sign shall be limited to a maximum height of 1.8 m (6 ft). However, additional height shall be allowed to accommodate the addition of the optional TOURIST ACTIVITIES message discussed in Section 2G.02 and the directional word messages discussed in Section 2G.05.

Guidance:

The number of intersection approach signs (one sign for tourist-oriented destinations to the left, one for destinations to the right, and one for destinations straight ahead) installed in advance of an intersection should not exceed three. The number of panels installed on each sign should not exceed four. The panels for right-turn, left-turn, and straight-ahead destinations should be on separate signs. The left-turn destination sign should be located farthest from the intersection, then the right-turn destination sign, with the straight-ahead destination sign located closest to the intersection (see Figure 2G-2). Signs for facilities in the straight-ahead direction should be considered only when there are signs for facilities in either the left or right direction.

When it is appropriate to combine the left-turn and right-turn destination panels on a single sign, the left-turn destination panels should be above the right-turn destination panels (see Figure 2G-1). When there are multiple destinations in the same direction, they should be in order based on their distance from the intersection. Except as noted in the Option, a straight-ahead panel should not be combined with a sign displaying left- and/or right-turn facilities.

The panels should not exceed the size necessary to accommodate two lines of legend without crowding. Symbols and logos on a panel should not exceed the height of two lines of word legends. All panels and other parts of the sign should be the same width, which should not exceed 1.8 m (6 ft).

Option:

At intersection approaches where three or fewer facilities are shown, the left-turn, right-turn, and straight-ahead destination panels may be combined on the same sign.

Section 2G.05 Advance Signs

Guidance:

Advance signs should be limited to those situations where sight distance, intersection vehicle maneuvers, or other vehicle operating characteristics require advance notification of the services.

The design of the advance sign should be identical to the design of the intersection approach sign. However, the directional arrows and distances to the facilities should be omitted. The directional word messages NEXT RIGHT, NEXT LEFT, or AHEAD should be placed on the sign above the business identification panels. The directional word messages should have the same letter height as the other word messages on the panels (see Figures 2G-1 and 2G-2).

Standard:

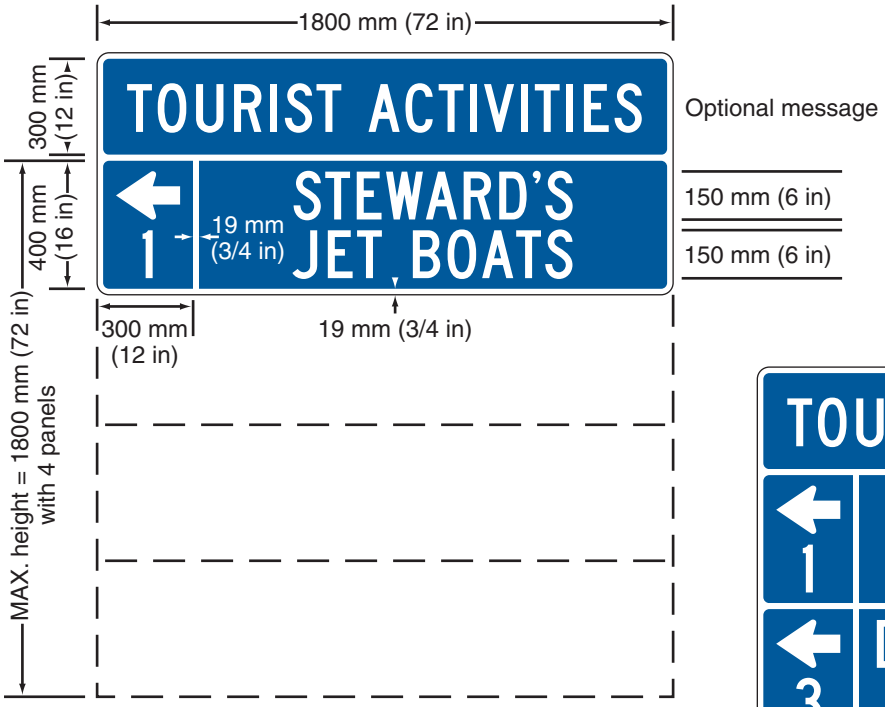
The directional word messages shall be a white legend and border on a blue background.

Option:

The legend RIGHT 1 km or RIGHT 1/2 MILE or LEFT 1 km or LEFT 1/2 MILE may be used on advance signs when there are intervening minor roads.

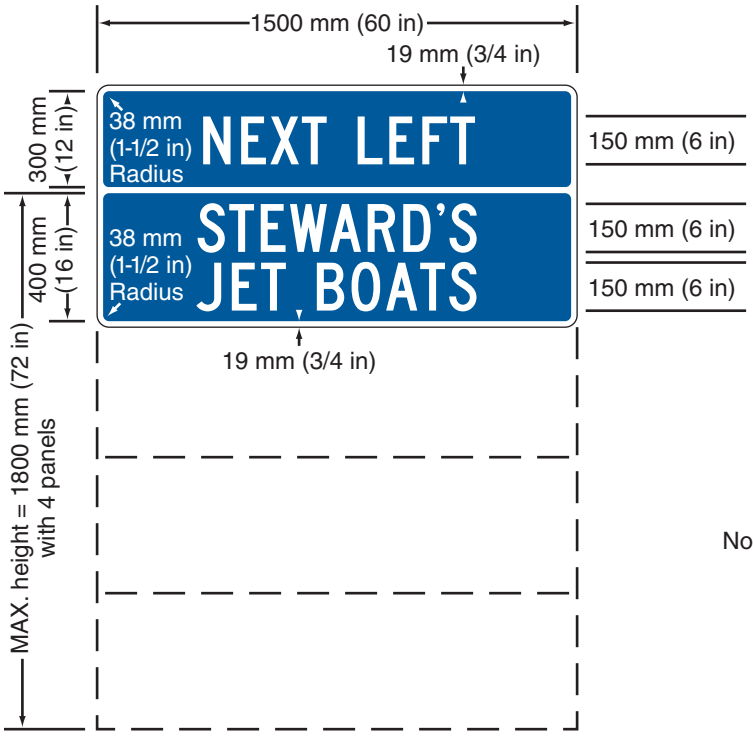
The height required to add the directional word messages recommended for the advance sign may be added to the maximum sign height of 1.8 m (6 ft).

Figure 2G-1. Examples of Tourist-Oriented Directional Signs



INTERSECTION APPROACH SIGN

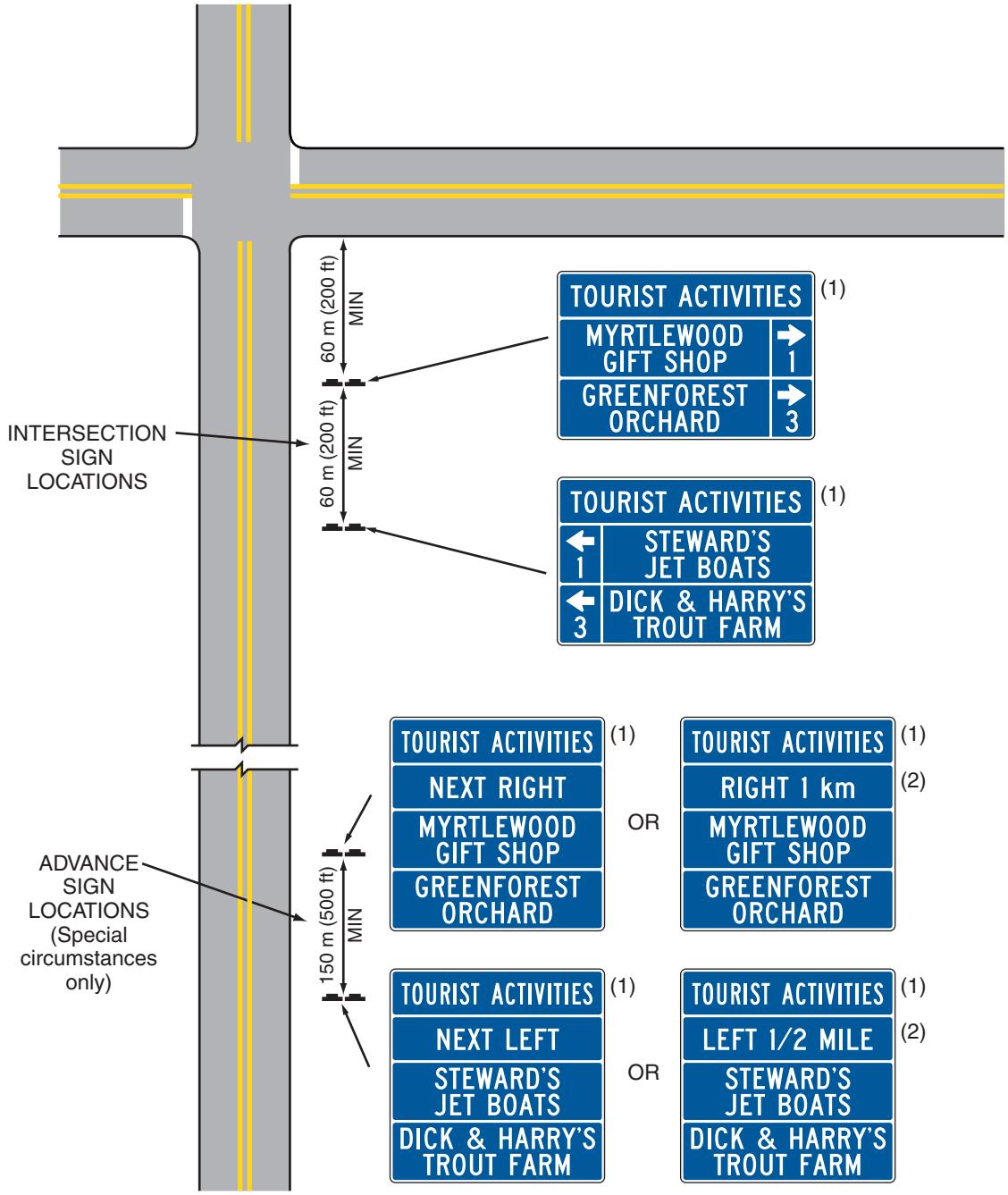
COMBINED SIGN



ADVANCE SIGN

Note: Series of lettering depends upon length of legend. Maximum length of business name per line is 1600 mm (64 in). Reflectorized white legend on reflectorized blue background.

Figure 2G-2. Examples of Intersection Approach Signs and Advance Signs for Tourist-Oriented Directional Signs



(1) Optional Message
(2) Use if there is an intervening road

Section 2G.06 Sign Locations

Guidance:

If used, the intersection approach signs should be located at least 60 m (200 ft) in advance of the intersection. Signs should be spaced at least 60 m (200 ft) apart and at least 60 m (200 ft) from other traffic control devices.

If used, advance signs should be located approximately 1 km or 0.5 miles from the intersection with 150 m (500 ft) between these signs. In the direction of travel, the order of advance sign placement should be to show the facilities to the left first, then facilities to the right, and last, the facilities straight ahead.

Position, height, and lateral clearance of signs should be governed by Chapter 2A except as permitted in this Section.

Option:

Tourist-oriented directional signs may be placed further from the edge of the road than other traffic control signs.

Standard:

The location of other traffic control devices shall take precedence over the location of tourist-oriented directional signs.

Section 2G.07 State Policy

Standard:

To be eligible for tourist-oriented directional signing, facilities shall comply with applicable State and Federal laws concerning the provisions of public accommodations without regard to race, religion, color, age, sex, or national origin, and with laws concerning the licensing and approval of service facilities. Each State that elects to use tourist-oriented directional signs shall adopt a policy that complies with these provisions.

Guidance:

The State policy should include:

A. A definition of tourist-oriented business, service, and activity facilities.
B. Eligibility criteria for signs for facilities.
C. Provision for incorporating Specific Service signs into the tourist-oriented directional signs as required.
D. Provision for covering signs during off seasons for facilities operated on a seasonal basis.
E. Provisions for signs to facilities that are not located on the crossroad when such facilities are eligible for signs.
F. A definition of the immediate area. The major portion of income or visitors to the facility should come from road users not residing in the immediate area of the facility.
G. Maximum distances to eligible facilities. The maximum distance should be 8 km (5 mi).
H. Provision for information centers (plazas) when the number of eligible sign applicants exceeds the maximum permissible number of sign panel installations.
I. Provision for limiting the number of signs when there are more applicants than the maximum number of signs permitted.
J. Criteria for use at intersections on expressways.
K. Provisions for controlling or excluding those businesses which have illegal signs as defined by the Highway Beautification Act of 1965 (23 U.S.C. 131).
L. Provisions for States to charge fees to cover the cost of signs through a permit system.
M. A definition of the conditions under which the time of operation is shown.
N. Provisions for determining if advance signs will be permitted, and the circumstances under which they will be installed.

CHAPTER 2H. RECREATIONAL AND CULTURAL INTEREST AREA SIGNS

Section 2H.01 Scope

Support:

Recreational or cultural interest areas are attractions or traffic generators that are open to the general public for the purpose of play, amusement, or relaxation. Recreational attractions include such facilities as parks, campgrounds, gaming facilities, and ski areas, while examples of cultural attractions include museums, art galleries, and historical buildings or sites.

The purpose of recreation and cultural interest area signs is to guide road users to a general area and then to specific facilities or activities within the area.

Option:

Recreational and cultural interest area signs that depict significant traffic generators may be used on freeways and expressways where there is direct access to these areas as discussed in Section 2H.09.

Recreational and cultural interest area signs may be used off the road network, as appropriate.

Section 2H.02 Application of Recreational and Cultural Interest Area Signs

Support:

Standards for signing recreational or cultural interest areas are subdivided into two different types of signs: (1) symbol signs and (2) destination guide signs.

Guidance:

When highway agencies decide to provide recreational and cultural interest area signing, these agencies should have a policy for such signing. The policy should establish signing criteria for the eligibility of the various types of services, accommodations, and facilities. These signs should not be used where they might be confused with other traffic control signs.

Option:

Recreational and cultural interest area signs may be used on any road to direct persons to facilities, structures, and places, and to identify various services available to the general public. These signs may also be used in recreational or cultural interest areas for signing nonvehicular events and amenities such as trails, structures, and facilities.

Section 2H.03 Regulatory and Warning Signs

Standard:

All regulatory and warning signs installed on public roads and streets within recreational and cultural interest areas shall conform to the requirements of Chapters 2A, 2B, and 2C.

Section 2H.04 General Design Requirements for Recreational and Cultural Interest Area Symbol Signs

Standard:

Recreational and cultural interest area symbol signs shall be square or rectangular in shape and shall have a white symbol or message and white border on a brown background. The symbols shall be grouped into the following usage and series categories (see the "Standard Highway Signs" book for design details):

A. General Information (RG Series)
B. Motorist Services (RM Series)
C. Accommodation Services (RA Series)
D. Land Recreation (RL series)
E. Water Recreation (RW Series), and
F. Winter Recreation (RS Series)

Support:

Table 2H-1 contains a listing of the symbols within each series category. Drawings for these symbols are found in the "Standard Highway Signs" book (see Section 1A.11).

Option:

Mirror images of symbols may be used where the reverse image will better convey the message.

Table 2H-1. Category Chart for Symbols

General Information	
Automobile	RG-010
Bear Viewing Area	RG-020
Dam	RG-030
Deer Viewing Area	RG-040
Drinking Water	RG-050
Environmental Study Area	RG-060
Falling Rocks *	RG-070
Firearms	RG-080
Fish Hatchery	RG-090
Information	RG-100
Leashed Pets *	RG-110
Lighthouse	RG-120
Litter Container	RG-130
Lookout Tower	RG-140
Ped Xing *	RG-150
Point of Interest	RG-160
Ranger Station	RG-170
Smoking *	RG-180
Truck	RG-190
Tunnel	RG-200
Dog	RG-240
Seaplane	RG-260

Motorist Services	
Camping (Tent)	RM-010
Camping (Trailer)	RM-020
Ferry	RM-030
First Aid	RM-040
Food	RM-050
Gas	RM-060
Grocery Store	RM-070
Handicapped	RM-080
Lodging	RM-090
Mechanic	RM-100
Post Office	RM-110
Picnic Area	RM-120
Picnic Shelter	RM-130
Rest Room	RM-140
Telephone	RM-150
Trailer Sanitary Station	RM-160
Viewing Area	RM-170
Motor Home	RM-200
Group Camping	RM-210
Group Picnicking	RM-220
24-Hour Pharmacy	RM-230

Accommodation Services	
Airport	RA-010
Bus Stop	RA-020
Campfire	RA-030
Elevator *	RA-040
Kennel	RA-050
Laundry	RA-060
Locker *	RA-070
Parking	RA-080
Rest Room (Men) *	RA-090
Rest Room (Women) *	RA-100
Shelter (Sleeping) *	RA-110
Shelter (Trail) *	RA-120
Showers *	RA-130
Family Rest Room *	RA-150
Helicopter	RA-160

Land Recreation	
Amphitheater	RL-010
Climbing	RL-020
Climbing (Rock)	RL-030
Hunting	RL-040
Playground	RL-050
Rock Collecting	RL-060
Spelunking	RL-070
Stable	RL-080
Trail (Bicycle)	RL-090
Trail (Hiking)	RL-100
Trail (Horse)	RL-110
Trail (Interpretive, Auto)	RL-120
Trail (Interpretive, Ped.)	RL-130
Trail/Road (4 WD Veh.)	RL-140
Trail (Trail Bike)	RL-150
Tramway	RL-160
All-Terrain Vehicle	RL-170
Archer	RL-190
Hang Glider	RL-210

Water Recreation	
Boat Tours	RW-010
Canoeing	RW-020
Diving	RW-030
Diving (Scuba)	RW-040
Fishing	RW-050
Marine Recreation Area	RW-060
Motorboating	RW-070
Ramp (Launch)	RW-080
Rowboating	RW-090
Sailboating	RW-100
Skiing (water)	RW-110
Surfing	RW-120
Swimming	RW-130
Wading	RW-140
Fishing Pier	RW-160
Hand Launch	RW-170
Kayak	RW-190
Wind Surf	RW-210

Winter Recreation	
Skating (ice)	RS-010
Ski Jumping	RS-020
Skiing (Bobbing)	RS-030
Skiing (Cross Country)	RS-040
Skiing (Downhill)	RS-050
Sledding	RS-060
Snowmobiling	RS-070
Snowshoeing	RS-080
Winter Recreation Area	RS-090
Chairlift	RS-100

Rev. 1

* For Non-Road Use

Section 2H.05 Symbol Sign Sizes

Guidance:

Recreational and cultural interest area symbol signs should be 600 x 600 mm (24 x 24 in). Where greater visibility or emphasis is needed, larger sizes should be used. Symbol sign enlargements should be in 150 mm (6 in) increments.

Recreational and cultural interest area symbol signs should be 750 x 750 mm (30 x 30 in) when used on freeways or expressways.

Option:

A smaller size of 450 x 450 mm (18 x 18 in) may be used on low-speed, low-volume roadways and on nonroad applications.

Section 2H.06 Use of Educational Plaques

Guidance:

Educational plaques should accompany all initial installations of recreational and cultural interest area symbol signs. The educational plaque should remain in place for at least 3 years after the initial installation. If used, the educational plaque should be the same width as the symbol sign.

Option:

Symbol signs that are readily recognizable by the public may be installed without educational plaques.

Support:

Figure 2H-1 illustrates some examples of the use of educational plaques.

Section 2H.07 Use of Prohibitive Slash

Standard:

The red diagonal slash, if used on a recreational and cultural interest area sign, shall be placed from the upper left corner to the lower right corner of the sign face (see Figure 2H-1). Requirements for retroreflection of the red slash shall be the same as those requirements for legends, symbols, and borders.

Option:

Where it is necessary to indicate a restriction within a recreational or cultural interest area, a red diagonal slash may be used to indicate that the activity is prohibited.

Support:

Figure 2H-1 illustrates some examples of the use of prohibitive slashes.

Section 2H.08 Placement of Recreational and Cultural Interest Area Symbol Signs

Standard:

If used, recreational and cultural interest area symbol signs shall be placed in accordance with the general requirements contained in Chapter 2A. The symbol(s) shall be placed in the uppermost part of the sign assembly and the directional information shall be placed below the symbol(s).

Where the name of the recreational or cultural interest area facility or activity is shown on a general directional guide sign and a symbol is used, the symbol shall be placed below the name (see Figure 2H-2).

Recreational and cultural interest area symbols installed for nonroad use shall be placed in accordance with the general sign position requirements of the authority having jurisdiction.

Support:

Figure 2H-3 illustrates typical height and lateral mounting positions. Figure 2H-4 illustrates some examples of the placement of symbol signs within a recreational or cultural interest area. Figure 2H-5 illustrates some of the symbols that can be used.

Guidance:

The number of symbols used in a single sign assembly should not exceed four.

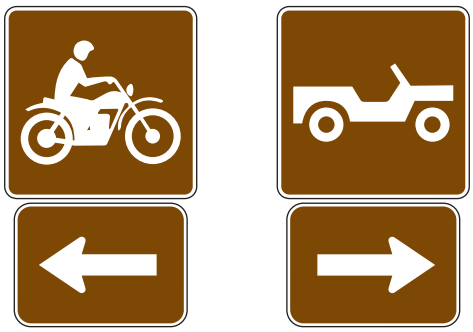
Option:

Symbols for recreational or cultural interest areas may be used as legend components for a directional sign assembly. The symbols may be used singularly, or in groups of two, three, or four on a single sign assembly (see Figures 2H-1, 2H-3, and 2H-4). Smaller-size secondary symbols (see Figure 2H-1) may be placed beneath the primary symbols, where needed.

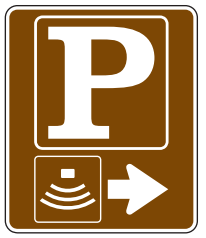
Figure 2H-1. Examples of Use of Educational Plaques, Prohibitory Slashes, and Arrows

a) Directional sign with arrow

b) Directional signs with arrow



c) Directional signs with arrows



d) Directional sign with secondary symbol

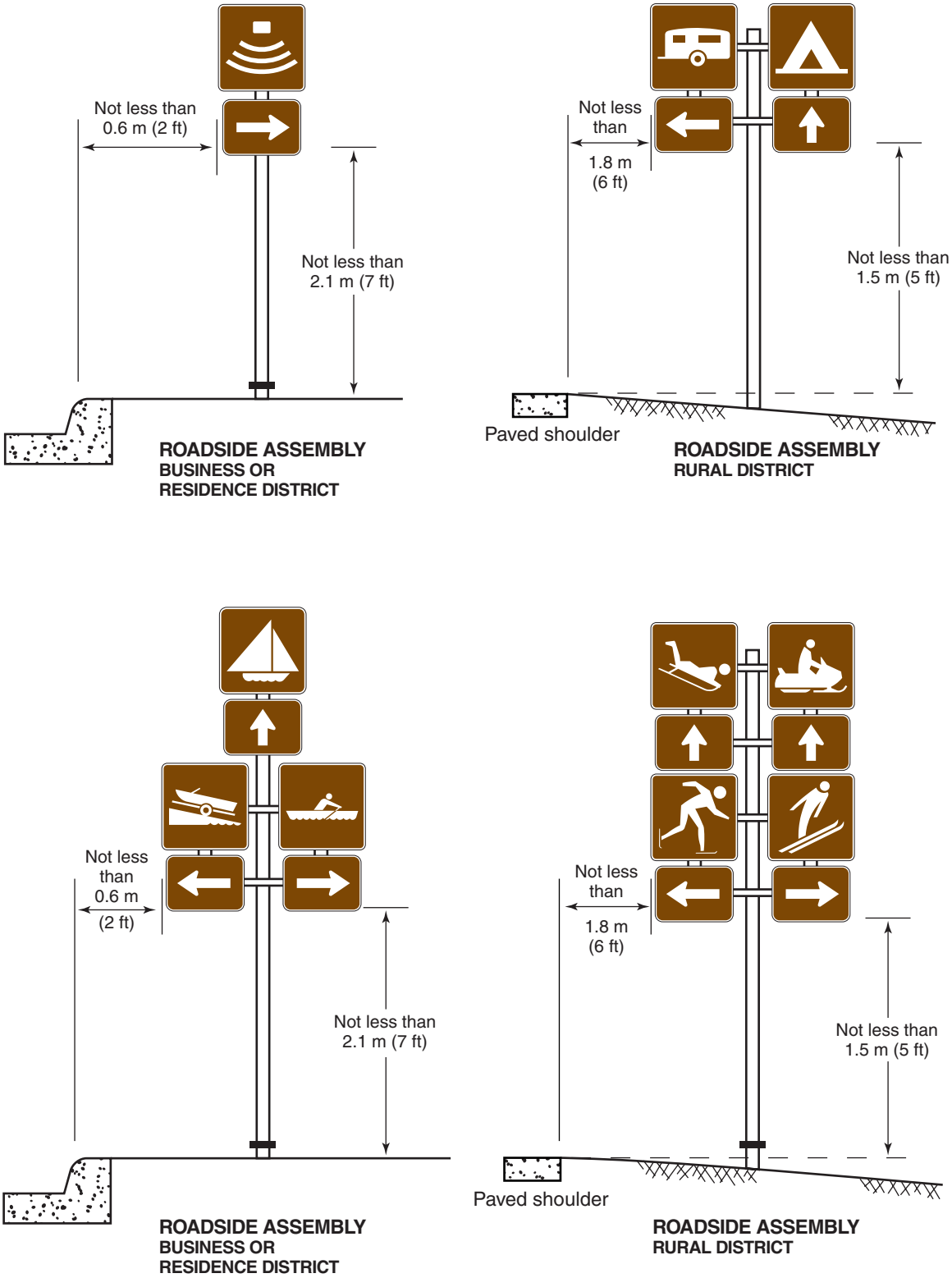
e) Management symbols with prohibitive slashes and educational plaques

f) Directional sign with educational plaque and arrow

Figure 2H-2. Examples of General Directional Guide Signs for Conventional Roads

*Optional shape

Figure 2H-3. Height and Lateral Position of Signs Located Within Recreational and Cultural Interest Areas



Note:
See Section 2A.19 for reduced lateral offset distances that may be used in areas where lateral offsets are limited, and in urban areas where sidewalk width is limited or where existing poles are close to the curb.

Figure 2H-4. Examples of Symbol Signing Layout

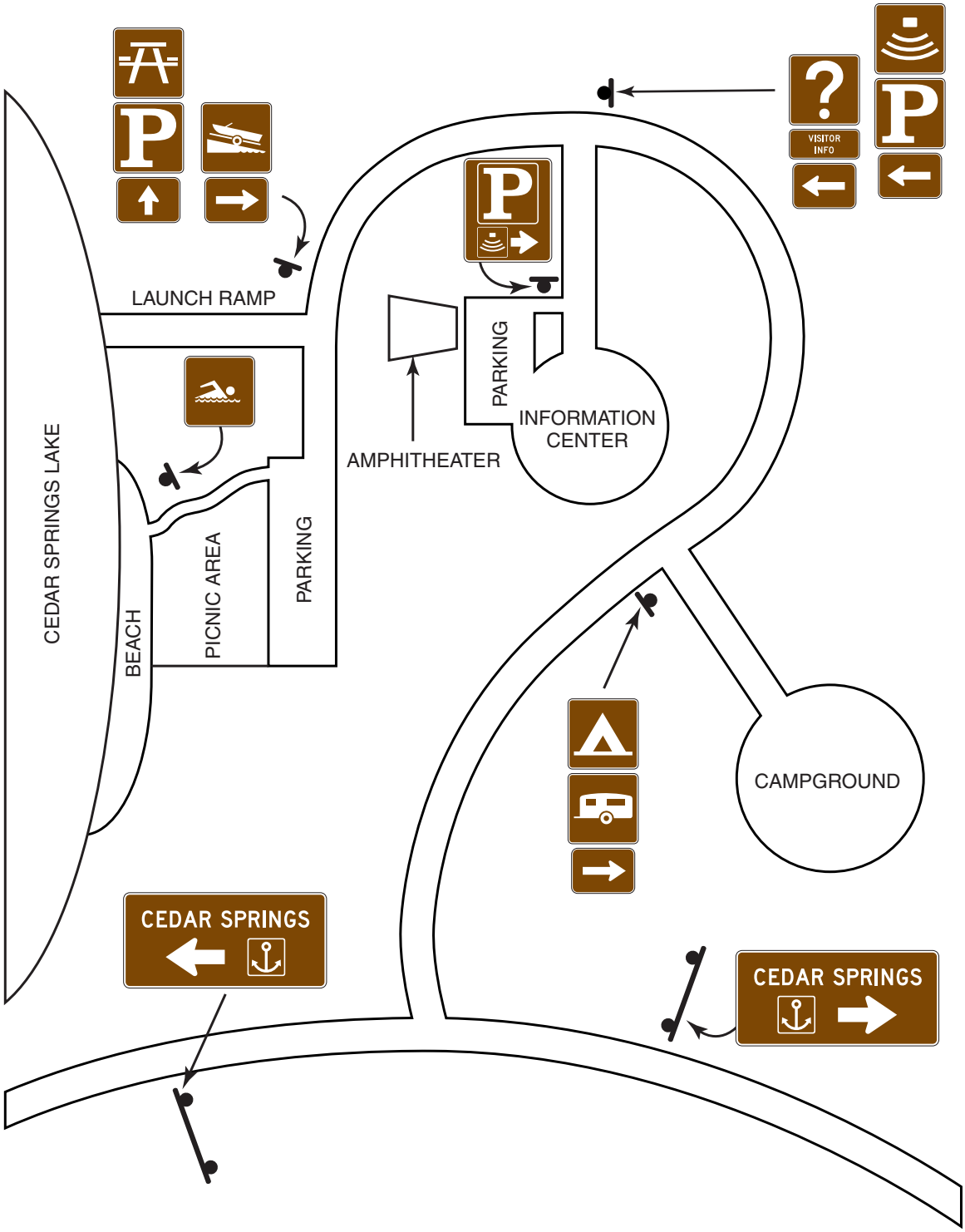


Figure 2H-5. Recreational and Cultural Interest Area Symbol Signs
(Sheet 1 of 5)

RG-010
Automobile

RG-020
Bear Viewing Area

RG-030
Dam

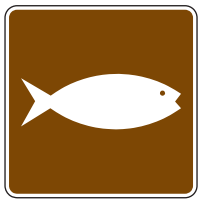
RG-040
Deer Viewing Area

RG-050
Drinking Water

RG-060
Environmental
Study Area

RG-070
Falling Rocks

RG-080
Firearms


RG-090
Fish Hatchery

RG-100
Information

RG-110
Leashed Pets

RG-120
Lighthouse

RG-130
Litter Container

RG-140
Lookout Tower

RG-150
Ped Xing

RG-160
Point of Interest

RG-170
Ranger Station

RG-180
Smoking

RG-190
Truck

RG-200
Tunnel

RG-240
Dog

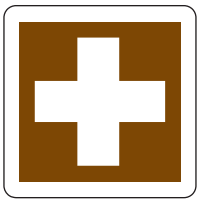
RG-260
Seaplane

RM-010
Camping (Tent)

RM-020
Camping (Trailer)

RM-030
Ferry

Figure 2H-5. Recreational and Cultural Interest Area Symbol Signs
(Sheet 2 of 5)


RM-040
First Aid

RM-050
Food

RM-060
Gas

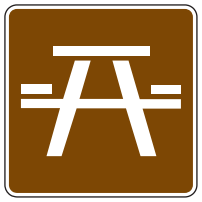
RM-070
Grocery Store

RM-080
Handicapped

RM-090
Lodging

RM-100
Mechanic

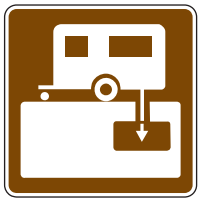
RM-110
Post Office

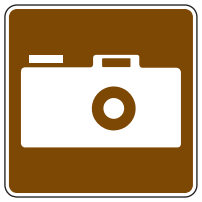

RM-120
Picnic Area

RM-130
Picnic Shelter

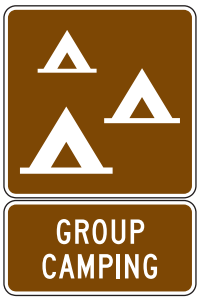
RM-140
Rest Room

RM-150
Telephone

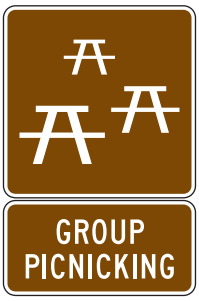

RM-160
Trailer
Sanitary Station


RM-170
Viewing Area

RM-200
Motor Home



RM-210
Group Camping



RM-220
Group Picnicking

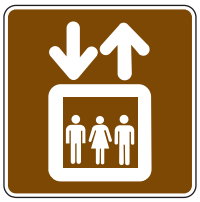
RM-230
24-Hour Pharmacy

RA-010
Airport

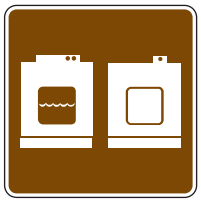
RA-020
Bus Stop

RA-030
Campfire

Rev. 1 (new RM-230 sign)


RA-040
Elevator

RA-050
Kennel


RA-060
Laundry

RA-070
Locker

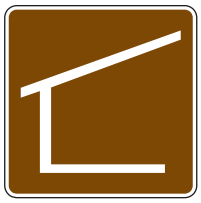
RA-080
Parking

Figure 2H-5. Recreational and Cultural Interest Area Symbol Signs
(Sheet 3 of 5)

RA-090
Rest Room (Men)

RA-100
Rest Room (Women)

RA-110
Shelter (Sleeping)


RA-120
Shelter (Trail)

RA-130
Showers

RA-150
Family Rest Room

RA-160
Helicopter

RL-010
Amphitheater

RL-020
Climbing

RL-030
Climbing (Rock)

RL-040
Hunting

RL-050
Playground

RL-060
Rock Collecting

RL-070
Spelunking

RL-080
Stable

RL-090
Trail
(Bicycle)

RL-100
Trail
(Hiking)

RL-110
Trail
(Horse)

RL-120
Trail
(Interpretive, Auto)

RL-130
Trail
(Interpretive, Ped.)

RL-140
Trail/Road
(4 WD Veh.)

RL-150
Trail
(Trail Bike)

RL-160
Tramway

RL-170
All-Terrain Vehicle

RL-190
Archer

Figure 2H-5. Recreational and Cultural Interest Area Symbol Signs
(Sheet 4 of 5)

RL-210
Hang Glider

RW-010
Boat Tours

RW-020
Canoeing

RW-030
Diving

RW-040
Diving (Scuba)

RW-050
Fishing

RW-060
Marine Recreation
Area

RW-070
Motorboating

RW-080
Ramp (Launch)

RW-090
Rowboating

RW-100
Sailboating

RW-110
Skiing (Water)

RW-120
Surfing

RW-130
Swimming

RW-140
Wading

RW-160
Fishing Pier

RW-170
Hand Launch

RW-190
Kayak

RW-210
Wind Surf

RS-010
Skating (Ice)

RS-020
Ski Jumping

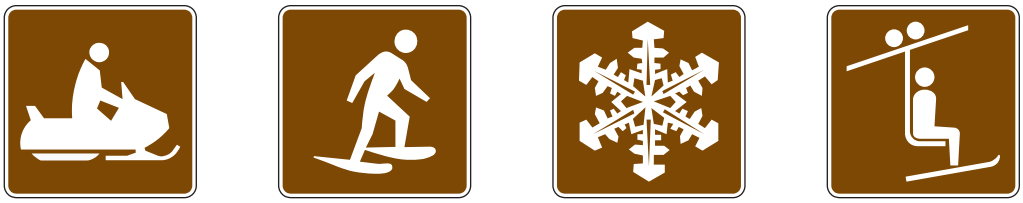
RS-030
Skiing
(Bobbing)

RS-040
Skiing
(Cross Country)

RS-050
Skiing
(Downhill)

RS-060
Sledding

Figure 2H-5. Recreational and Cultural Interest Area Symbol Signs
(Sheet 5 of 5)



RS-070 Snowmobiling | RS-080 Snowshoeing | RS-090 Winter Recreation Area | RS-100 Chairlift

Section 2H.09 Destination Guide Signs

Guidance:

When recreational or cultural interest area destinations are shown on supplemental guide signs, the sign should be rectangular or trapezoidal in shape. The order of preference for use of shapes and colors should be as follows: (1) rectangular with a white legend and border on a green background; (2) rectangular with a white legend and border on a brown background; or (3) trapezoidal with a white legend and border on a brown background.

Standard:

Whenever the trapezoidal shape is used, the color combination shall be a white legend and border on a brown background.

Option:

White-on-brown destination guide signs may be posted at the first point where an access or crossroad intersects a highway where recreational or cultural interest areas are a significant destination along conventional roads, expressways, or freeways. White-on-brown supplemental guide signs may be used along conventional roads, expressways, or freeways to direct road users to recreational or cultural interest areas. Where access or crossroads lead exclusively to the recreational or cultural interest area, the advance guide sign and the exit direction sign may be white-on-brown.

Standard:

Linear parkway-type highways that primarily function as arterial connectors, even if they also provide access to recreational or cultural interest areas, shall not qualify for the use of white-on-brown destination guide signs. Directional guide signs used on these highways shall conform to Chapter 2D.

All gore signs shall have a white legend and border on a green background. The background color of the interchange exit number panel shall match the background color of the guide sign. Design characteristics of conventional road, expressway, or freeway guide signs shall conform to Chapter 2D or 2E except as specified in this Section for color combination.

The advance guide sign and the Exit Direction sign shall retain the white-on- green color combination where the crossroad leads to a destination other than a recreational or cultural interest area.

Support:

Figure 2H-2 illustrates destination guide signs commonly used for identifying recreational or cultural interest areas or facilities.

CHAPTER 2I. EMERGENCY MANAGEMENT SIGNING

Section 2I.01 Emergency Management

Guidance:

Contingency planning for an emergency evacuation should be considered by all State and local jurisdictions and should consider the use of all applicable roadways.

In the event of a disaster where highways that cannot be used will be closed, a successful contingency plan should account for the following elements: a controlled operation of certain designated highways, the establishment of traffic operations for the expediting of essential traffic, and the provision of emergency centers for civilian aid.

Section 2I.02 Design of Emergency Management Signs

Standard:

Emergency Management signs shall be used to guide and control highway traffic during an emergency.

Emergency Management signs shall not permanently displace any of the standard signs that are normally applicable.

Advance planning for transportation operations' emergencies shall be the responsibility of State and local authorities. The Federal Government shall provide guidance to the States as necessitated by changing circumstances.

The sizes for Emergency Management signs shall be as shown in Table 2I-1.

Guidance:

As conditions permit, the Emergency Management signs should be replaced or augmented by standard signs.

The background of Emergency Management signs should be retroreflective.

Because Emergency Management signs might be needed in large numbers for temporary use during an emergency, consideration should be given to their fabrication from any light and economical material that can serve through the emergency period.

Option:

Any Emergency Management sign may be accompanied by a standard triangular plaque for marking areas contaminated by biological and chemical warfare agents and radioactive fallout.

Section 2I.03 EVACUATION ROUTE Sign (EM-1)

Standard:

The EVACUATION ROUTE (EM-1) sign (see Figure 2I-1) shall be a rectangular sign with a blue circular symbol with a directional arrow and the legend EVACUATION ROUTE. The diameter of the circular symbol shall be 25 mm (1 in) smaller than the width of the sign.

Option:

An approved Emergency Management symbol may appear near the bottom of the sign with a diameter of 87 mm (3.5 in).

Standard:

The legend and arrow of the EVACUATION ROUTE sign shall be white on a blue circular background. The corners of the sign outside of the circle shall be white. The entire sign shall be retroreflective. The arrow designs shall include a straight, vertical arrow pointing upward, a straight horizontal arrow pointing to the left or right, or a bent arrow pointing to the left or right for advance warning of a turn.

If used, the EVACUATION ROUTE sign, with the appropriate arrow, shall be installed 45 to 90 m (150 to 300 ft) in advance of, and at, any turn in an approved evacuation route. The sign shall also be installed elsewhere for straight-ahead confirmation where needed.

If used in urban areas, the EVACUATION ROUTE sign shall be mounted at the right-hand side of the roadway, not less than 2.1 m (7 ft) above the top of the curb, and at least 0.3 m (1 ft) back from the face of the curb. If used in rural areas, it shall be not less than 2.1 m (7 ft) above the pavement and 1.8 to 3 m (6 to 10 ft) to the right side of the roadway edge.

EVACUATION ROUTE signs shall not be placed where they will conflict with other signs. Where conflict in placement would occur between the EVACUATION ROUTE sign and a standard regulatory sign, the regulatory sign shall take precedence.

Table 2I-1. Emergency Management Sign Sizes

Sign	MUTCD Code	Section	Conventional Road	Expressway	Freeway	Minimum	Oversized
Evacuation Route	EM-1	2I.03	600 x 600 (24 x 24)	—	—	450 x 450 (18 x 18)	—
Area Closed	EM-2	2I.04	750 x 600 (30 x 24)	—	—	—	—
Traffic Control Point	EM-3	2I.05	750 x 600 (30 x 24)	—	—	—	—
Maintain Top Safe Speed	EM-4	2I.06	600 x 750 (24 x 30)	—	—	—	—
Permit Required	EM-5	2I.07	600 x 750 (24 x 30)	—	—	—	—
Emergency Aid Center	EM-6a to EM-6d	2I.08	750 x 600 (30 x 24)	—	—	—	—
Directional Shelter	EM-7a to EM-7d	2I.09	750 x 600 (30 x 24)	—	—	—	—

Notes:

1. Larger sizes may be used when appropriate.
2. Dimensions are shown in millimeters followed by inches in parentheses and are shown as width x height.

Option:

The legend on the EVACUATION ROUTE sign may be modified to describe the type of evacuation route, such as HURRICANE.

In case of conflict with guide or warning signs, the Emergency Management sign may take precedence.

Guidance:

Placement of EVACUATION ROUTE signs should be made under the supervision of the officials having jurisdiction over the placement of other traffic signs. Coordination with Emergency Management authorities and agreement between contiguous political entities should occur to assure continuity of routes.

Option:

The arrow may be a separate panel attached to the face of the sign.

Section 2I.04 AREA CLOSED Sign (EM-2)

Standard:

The AREA CLOSED (EM-2) sign (see Figure 2I-1) shall be used to close a roadway in order to prohibit traffic from entering the area. It shall be installed on the shoulder as near as practical to the right edge of the roadway, or preferably, on a portable mounting or barricade partly or entirely in the roadway.

Guidance:

For best visibility, particularly at night, the sign height should not exceed 1.2 m (4 ft) from the pavement to the bottom of the sign. Unless adequate advance warning signs are used, it should not be placed to create a complete and unavoidable blocked route. Where feasible, the sign should be located at an intersection that provides a detour route.

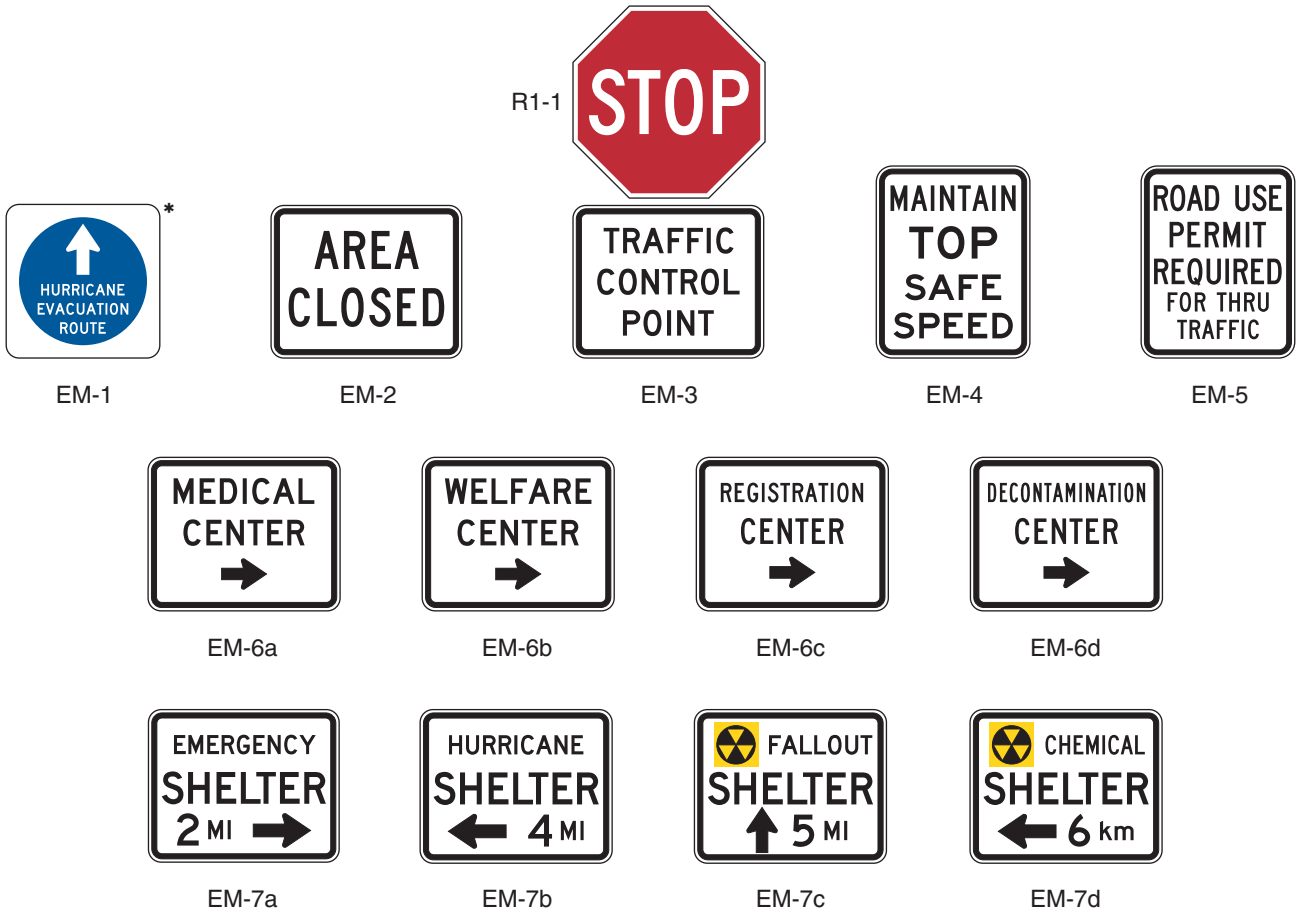
Section 2I.05 TRAFFIC CONTROL POINT Sign (EM-3)

Standard:

The TRAFFIC CONTROL POINT (EM-3) sign (see Figure 2I-1) shall be used to designate a location where an official traffic control point has been set up to impose such controls as are necessary to limit congestion, expedite emergency traffic, exclude unauthorized vehicles, or protect the public.

The sign shall be installed in the same manner as the AREA CLOSED sign (see Section 2I.04), and at the point where traffic must stop to be checked.

Figure 2I-1. Emergency Management Signs



* HURRICANE is an example of one type of evacuation route. Legends for other types may also be used, or this line of text may be omitted.

The standard STOP (R1-1) sign shall be used in conjunction with the TRAFFIC CONTROL POINT sign. The TRAFFIC CONTROL POINT sign shall consist of a black legend and border on a retroreflectorized white background.

Guidance:

The TRAFFIC CONTROL POINT sign should be mounted directly below the STOP sign.

Section 2I.06 MAINTAIN TOP SAFE SPEED Sign (EM-4)

Option:

The MAINTAIN TOP SAFE SPEED (EM-4) sign (see Figure 2I-1) may be used on highways where conditions are such that it is prudent to evacuate or traverse an area as quickly as possible.

Where an existing Speed Limit (R2-1) sign is in a suitable location, the MAINTAIN TOP SAFE SPEED sign may conveniently be mounted directly over the face of the speed limit sign that it supersedes.

Support:

Since any speed zoning would be impractical under such emergency conditions, no minimum speed limit can be prescribed by the MAINTAIN TOP SAFE SPEED sign in numerical terms. Where traffic is supervised by a traffic control point, official instructions will usually be given verbally, and the sign will serve as an occasional reminder of the urgent need for maintaining the proper reasonably safe speed.

Guidance:

The sign should be installed as needed, in the same manner as other standard speed signs.

Standard:

If used in rural areas, the MAINTAIN TOP SAFE SPEED sign shall be mounted on the right side of the road with its lower edge not less than 1.5 m (5 ft) above the pavement, 1.8 to 3 m (6 to 10 ft) from the roadway edge. If used in urban areas, the height shall be not less than 2.1 m (7 ft), and the nearest edge of the sign shall be not less than 0.3 m (1 ft) back from the face of the curb.

Section 2I.07 ROAD (AREA) USE PERMIT REQUIRED FOR THRU TRAFFIC Sign (EM-5)

Support:

The intent of the ROAD (AREA) USE PERMIT REQUIRED FOR THRU TRAFFIC (EM-5) sign (see Figure 2I-1) is to notify road users of the presence of the traffic control point so that those who do not have priority permits issued by designated authorities can take another route, or turn back, without making a needless trip and without adding to the screening load at the post. Local traffic, without permits, can proceed as far as the traffic control post.

Standard:

If used, the ROAD (AREA) USE PERMIT REQUIRED FOR THRU TRAFFIC (EM-5) sign shall be used at an intersection that is an entrance to a route on which a traffic control point is located.

If used, the sign shall be installed in a manner similar to that of the MAINTAIN TOP SAFE SPEED sign (see Section 2I.06).

Section 2I.08 Emergency Aid Center Signs (EM-6 Series)

Standard:

In the event of emergency, State and local authorities shall establish various centers for civilian relief, communication, medical service, and similar purposes. To guide the public to such centers a series of directional signs shall be used.

Emergency Aid Center (EM-6 series) signs (see Figure 2I-1) shall carry the designation of the center and an arrow indicating the direction to the center. They shall be installed as needed, at intersections and elsewhere, on the right side of the roadway, at a height in urban areas of at least 2.1 m (7 ft), and not less than 0.3 m (1 ft) back from the face of the curb, and in rural areas at a height of 1.5 m (5 ft), 1.8 to 3 m (6 to 10 ft) from the roadway edge.

Emergency Aid Center signs shall carry one of the following legends, as appropriate, or others designating similar emergency facilities:

A. MEDICAL CENTER (EM-6a)
B. WELFARE CENTER (EM-6b)
C. REGISTRATION CENTER (EM-6c)
D. DECONTAMINATION CENTER (EM-6d)

The Emergency Aid Center sign shall be a horizontal rectangle. The identifying word and the word CENTER, the directional arrow, and the border shall be black on a white background.

Section 2I.09 Shelter Directional Signs (EM-7 Series)

Standard:

Shelter Directional (EM-7 Series) signs (see Figure 2I-1) shall be used to direct the public to selected shelters that have been licensed and marked for emergency use.

The installation of Shelter Directional signs shall conform to established highway signing standards. Where used, the signs shall not be installed in competition with other necessary highway guide, warning, and regulatory signs.

The Shelter Directional sign shall be a horizontal rectangle. The identifying word and the word SHELTER, the directional arrow, the distance to the shelter, and the border shall be black on a white background.

Option:

The distance to the shelter may be omitted from the sign when appropriate.

Shelter Directional signs may carry one of the following legends, or others designating similar emergency facilities:

A. EMERGENCY (EM-7a)
B. HURRICANE (EM-7b)

C. FALLOUT (EM-7c)
D. CHEMICAL (EM-7d)

If appropriate, the name of the facility may be used.

The Shelter Directional signs may be installed on the Interstate Highway System or any other major highway system when it has been determined that a need exists for such signs as part of a State or local shelter plan.

The Shelter Directional signs may be used to identify different routes to a shelter to provide for rapid movement of large numbers of persons.

Guidance:

The Shelter Directional sign should be used sparingly and only in conjunction with approved plans of State and local authorities.

As a general rule, the Shelter Directional sign should not be posted more than 8 km (5 mi) from a shelter.

Manual on Uniform Traffic Control Devices

for Streets and Highways

2003 EDITION

Part 3
Markings

U.S. Department of Transportation
Federal Highway Administration

PART 3. MARKINGS

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CHAPTER 3A. GENERAL

Section 3A.01 Functions and Limitations

Support:

Markings on highways have important functions in providing guidance and information for the road user. Major marking types include pavement and curb markings, object markers, delineators, colored pavements, barricades, channelizing devices and islands. In some cases, markings are used to supplement other traffic control devices such as signs, signals and other markings. In other instances, markings are used alone to effectively convey regulations, guidance, or warnings in ways not obtainable by the use of other devices.

Markings have limitations. Visibility of the markings can be limited by snow, debris, and water on or adjacent to the markings. Marking durability is affected by material characteristics, traffic volumes, weather, and location. However, under most highway conditions, markings provide important information while allowing minimal diversion of attention from the roadway.

Pavement markings can enhance roadway delineation with the addition of audible and tactile features such as bars, differential surface profiles, raised pavement markers, or other devices intended to alert the road user that a delineation on the roadway is being traversed.

The general functions of longitudinal lines are:

A. A double line indicates maximum or special restrictions,
B. A solid line discourages or prohibits crossing (depending on the specific application),
C. A broken line indicates a permissive condition, and
D. A dotted line provides guidance.

Section 3A.02 Standardization of Application

Standard:

Each standard marking shall be used only to convey the meaning prescribed for that marking in this Manual. When used for applications not described herein, markings shall conform in all respects to the principles and standards set forth herein.

Guidance:

Before any new highway, paved detour, or temporary route is opened to traffic, all necessary markings should be in place.

Standard:

Markings that are no longer applicable for roadway conditions or restrictions and that might cause confusion for the road user shall be removed or obliterated to be unidentifiable as a marking as soon as practical. Markings that must be visible at night shall be retroreflective unless ambient illumination assures that the markings are adequately visible. All markings on Interstate highways shall be retroreflective.

Option:

Markings may be temporarily masked with tape until they can be removed or obliterated.

Section 3A.03 Materials

Support:

Pavement and curb markings are commonly placed by using paints or thermoplastics; however, other suitable marking materials, including raised pavement markers and colored pavements, are also used. Delineators, object markers, barricades, and channelizing devices are visibly placed in a vertical position similar to signs above the roadway.

Guidance:

The materials used for markings should provide the specified color throughout their useful life.

Consideration should be given to selecting pavement marking materials that will minimize tripping or loss of traction for pedestrians and bicyclists.

Object markers and delineators should not present a vertical or horizontal clearance obstacle for pedestrians.

Section 3A.04 Colors

Standard:

Markings shall be yellow, white, red, or blue. The colors for markings shall conform to the standard highway colors. Black in conjunction with one of the above colors shall be a usable color.

When used, white markings for longitudinal lines shall delineate:

A. The separation of traffic flows in the same direction.
B. The right edge of the roadway.

When used, yellow markings for longitudinal lines shall delineate:

A. The separation of traffic traveling in opposite directions.
B. The left edge of the roadways of divided and one-way highways and ramps.
C. The separation of two-way left turn lanes and reversible lanes from other lanes.

When used, red raised pavement markers shall delineate roadways that shall not be entered or used.

When used, blue markings shall supplement white markings for parking spaces for persons with disabilities. When used, blue raised pavement markers shall indicate locations of fire hydrants along a roadway.

Option:

Black may be used in combination with the above colors where a light-colored pavement does not provide sufficient contrast with the markings.

Support:

When used in combination with other colors, black is not considered a marking color, but only a contrast-enhancing system for the markings.

Section 3A.05 Widths and Patterns of Longitudinal Pavement Markings

Standard:

The widths and patterns of longitudinal lines shall be as follows:

A. A normal line is 100 to 150 mm (4 to 6 in) wide.
B. A wide line is at least twice the width of a normal line. The width of the line indicates the degree of emphasis.
C. A double line consists of two parallel lines separated by a discernible space.
D. A broken line consists of normal line segments separated by gaps.
E. A dotted line shall consist of noticeably shorter line segments separated by shorter gaps than used for a broken line. The width of a dotted line shall be at least the same as the width of the line it extends.

Guidance:

Broken lines should consist of 3 m (10 ft) line segments and 9 m (30 ft) gaps, or dimensions in a similar ratio of line segments to gaps as appropriate for traffic speeds and need for delineation.

Option:

A dotted line for line extensions may consist of 0.6 m (2 ft) line segments and 0.6 m (2 ft) to 1.8 m (6 ft) gaps. A dotted line for lane drop/add markings may consist of 0.9 m (3 ft) line segments and 2.7 m (9 ft) gaps.

CHAPTER 3B. PAVEMENT AND CURB MARKINGS

Section 3B.01 Yellow Centerline Pavement Markings and Warrants

Standard:

Centerline pavement markings, when used, shall be the pavement markings used to delineate the separation of traffic lanes that have opposite directions of travel on a roadway and shall be yellow.

Option:

Centerline pavement markings may be placed at a location that is not the geometric center of the roadway.

On roadways without continuous centerline pavement markings, short sections may be marked with centerline pavement markings to control the position of traffic at specific locations, such as around curves, over hills, on approaches to highway-railroad grade crossings, at highway-railroad grade crossings, and at bridges.

Standard:

The centerline markings on two-lane, two-way roadways shall be one of the following as shown in Figure 3B-1:

A. Two-direction passing zone markings consisting of a normal broken yellow line where crossing the centerline markings for passing with care is permitted for traffic traveling in either direction;
B. One-direction no-passing zone markings consisting of a normal broken yellow line and a normal solid yellow line where crossing the centerline markings for passing with care is permitted for the traffic traveling adjacent to the broken line, but is prohibited for traffic traveling adjacent to the solid line; and
C. Two-direction no-passing zone markings consisting of two normal solid yellow lines where crossing the centerline markings for passing is prohibited for traffic traveling in either direction.

The centerline markings on undivided two-way roadways with four or more lanes for moving motor vehicle traffic always available shall be the two-direction no-passing zone markings consisting of two normal solid yellow lines as shown in Figure 3B-2.

Guidance:

On two-way roadways with three through lanes for moving motor vehicle traffic, two lanes should be designated for traffic in one direction by using one- or two-direction no-passing zone markings as shown in Figure 3B-3.

Standard:

Centerline markings shall be placed on all paved urban arterials and collectors that have a traveled way of 6.1 m (20 ft) or more in width and an ADT of 6,000 vehicles per day or greater. Centerline markings shall also be placed on all paved two-way streets or highways that have three or more lanes for moving motor vehicle traffic.

Guidance:

Centerline markings should be placed on paved urban arterials and collectors that have a traveled way of 6.1 m (20 ft) or more in width and an ADT of 4,000 vehicles per day or greater. Centerline markings should also be placed on all rural arterials and collectors that have a traveled way of 5.5 m (18 ft) or more in width and an ADT of 3,000 vehicles per day or greater. Centerline markings should also be placed on other traveled ways where an engineering study indicates such a need.

Engineering judgment should be used in determining whether to place centerline markings on traveled ways that are less than 4.9 m (16 ft) wide because of the potential for traffic encroaching on the pavement edges, traffic being affected by parked vehicles, and traffic encroaching into the opposing traffic lane.

Option:

Centerline markings may be placed on other paved two-way traveled ways that are 4.9 m (16 ft) or more in width.

If a traffic count is not available, the ADTs described in this Section may be estimates that are based on engineering judgment.

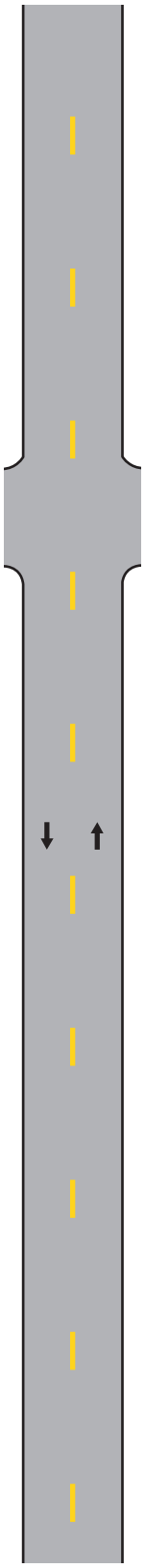
Section 3B.02 No-Passing Zone Pavement Markings and Warrants

Standard:

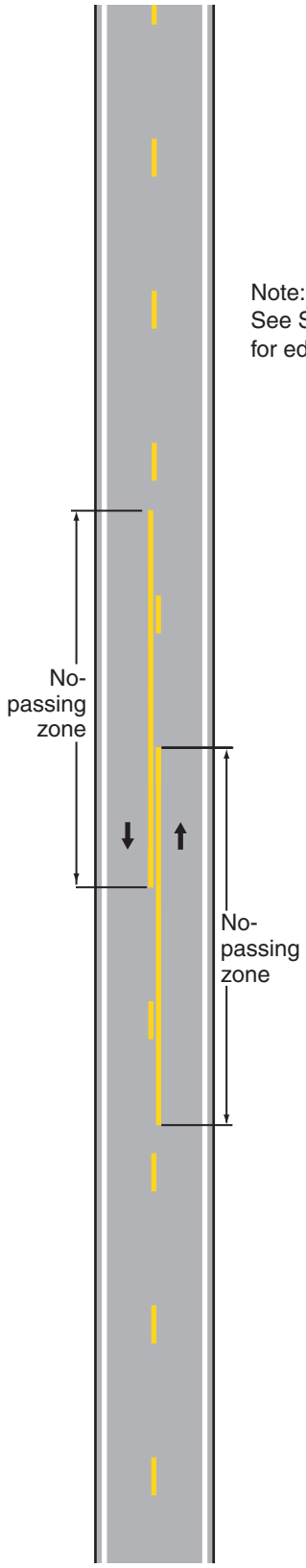
No-passing zones shall be marked by either the one direction no-passing zone pavement markings or the two-direction no-passing zone pavement markings described previously and shown in Figures 3B-1 and 3B-3.

Figure 3B-1. Examples of Two-Lane, Two-Way Marking Applications

a - Typical two-lane, two-way marking with passing permitted in both directions



b - Typical two-lane, two-way marking with no passing zones



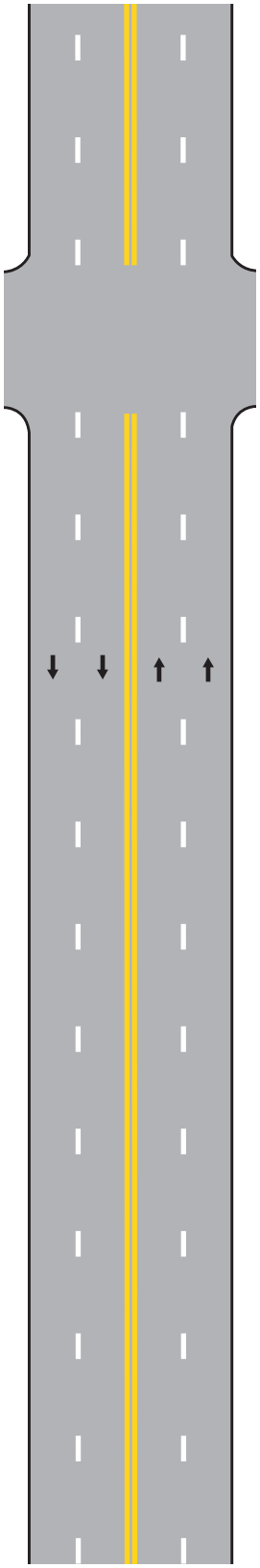
Legend

→ Direction of travel

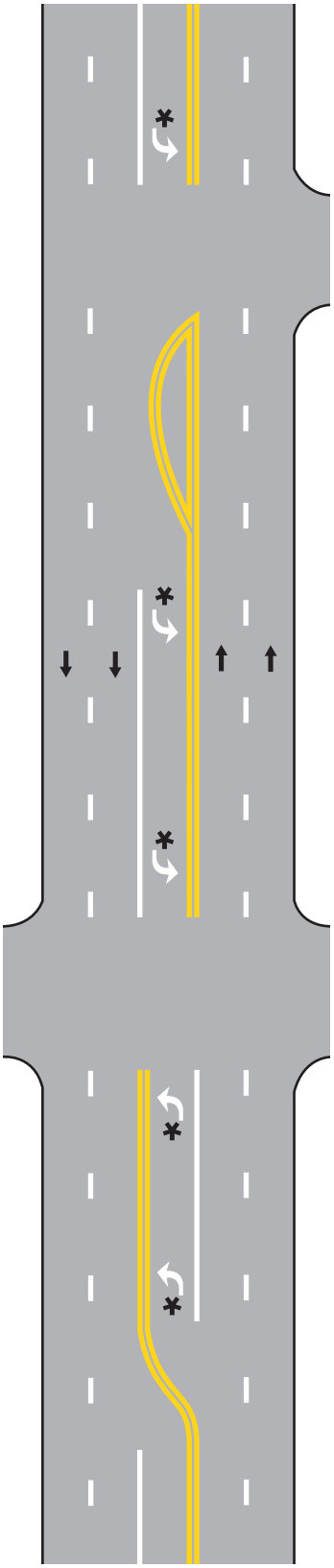
Note:
See Section 3B.07
for edge line warrants.

Figure 3B-2. Examples of Four-or-More Lane, Two-Way Marking Applications

a - Typical multi-lane, two-way marking



b - Typical multi-lane, two-way marking with single lane left turn channelization



Legend

* Optional

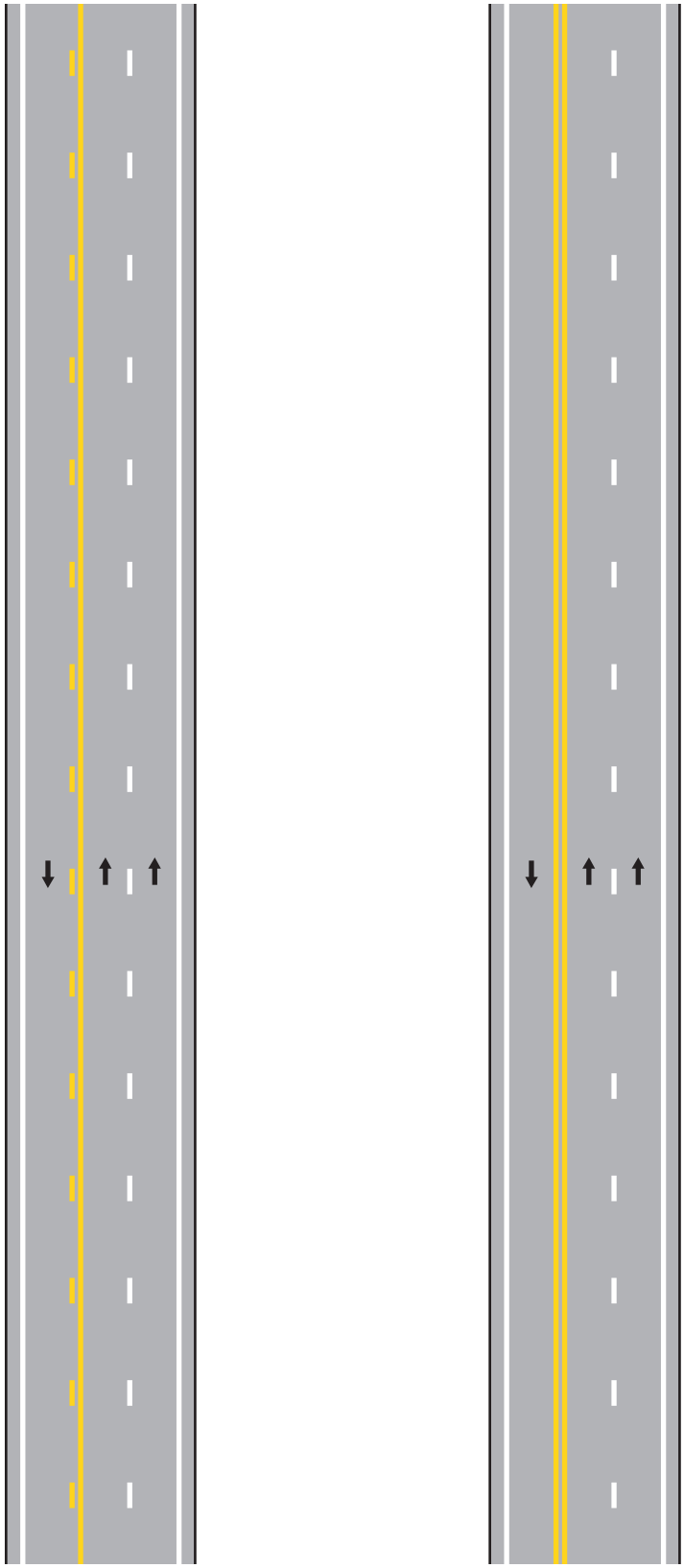
→ Direction of travel

Note:
See Section 3B.07
for edge line warrants.

Figure 3B-3. Examples of Three-Lane, Two-Way Marking Applications

a - Typical three-lane, two-way marking with passing permitted in single-lane direction

b - Typical three-lane, two-way marking with passing prohibited in single-lane direction



Legend

→ Direction of travel

When centerline markings are used, no-passing zone markings shall be used on two-way roadways at lane reduction transitions (see Section 3B.09) and on approaches to obstructions that must be passed on the right (see Section 3B.10).

Guidance:

Where the distance between successive no-passing zones is less than 120 m (400 ft), no-passing markings should connect the zones.

Standard:

Where centerline markings are used, no-passing zone markings shall be used on approaches to highway-rail grade crossings in conformance with Section 8B.20.

Option:

In addition to pavement markings, no-passing zone signs (see Sections 2B.29, 2B.30, and 2C.35) may be used to emphasize the existence and extent of a no-passing zone.

Support:

Section 11-307 of the "Uniform Vehicle Code (UVC) Revised" contains further information regarding no-passing zones. The "UVC" can be obtained from the National Committee on Uniform Traffic Laws and Ordinances at the address shown on Page i.

Standard:

On two-way, two- or three-lane roadways where centerline markings are installed, no-passing zones shall be established at vertical and horizontal curves and other locations where an engineering study indicates that passing must be prohibited because of inadequate sight distances or other special conditions.

On three-lane roadways where the direction of travel in the center lane transitions from one direction to the other, a no-passing buffer zone shall be provided in the center lane as shown in Figure 3B-4. A lane transition shall be provided at each end of the buffer zone.

The buffer zone shall be a median island that is at least 15 m (50 ft) in length.

Guidance:

For three-lane roadways having a posted or statutory speed limit of 70 km/h (45 mph) or greater, the lane transition taper length should be computed by the formula $L = 0.62\ WS$ for speeds in km/h ($L = WS$ for speeds in mph). For roadways where the posted or statutory speed limit is less than 70 km/h (45 mph), the formula $L = WS^2/155$ for speeds in km/h ($L = WS^2/60$ for speeds in mph) should be used to compute taper length. Under both formulas, L equals the taper length in meters (feet), W equals the width of the center lane or offset distance in meters (feet), and S equals the 85th-percentile speed or the posted or statutory speed limit, whichever is higher.

Standard:

The minimum lane transition taper length shall be 30 m (100 ft) in urban areas and 60 m (200 ft) in rural areas.

On roadways with centerline markings, no-passing zone markings shall be used at horizontal or vertical curves where the passing sight distance is less than the minimum necessary for reasonably safe passing at the 85th-percentile speed or the posted or statutory speed limit as shown in Table 3B-1. The passing sight distance on a vertical curve is the distance at which an object 1.07 m (3.5 ft) above the pavement surface can be seen from a point 1.07 m (3.5 ft) above the pavement (see Figure 3B-5). Similarly, the passing sight distance on a horizontal curve is the distance measured along the centerline (or right-hand lane line of a three-lane roadway) between two points 1.07 m (3.5 ft) above the pavement on a line tangent to the embankment or other obstruction that cuts off the view on the inside of the curve (see Figure 3B-5).

Support:

The beginning of a no-passing zone at point "a" in Figure 3B-5 is that point where the sight distance first becomes less than that specified in Table 3B-1. The end of the no-passing zone at point "b" in Figure 3B-5 is that point at which the sight distance again becomes greater than the minimum specified.

Section 3B.03 Other Yellow Longitudinal Pavement Markings

Standard:

If reversible lanes are used, the lane line pavement markings on each side of reversible lanes shall consist of a normal double broken yellow line to delineate the edge of a lane in which the direction of travel is reversed from time to time, such that each of these markings serve as the centerline markings of the roadway during some period (see Figure 3B-6).

Figure 3B-4. Example of Three-Lane, Two-Way Marking for Changing Direction of the Center Lane

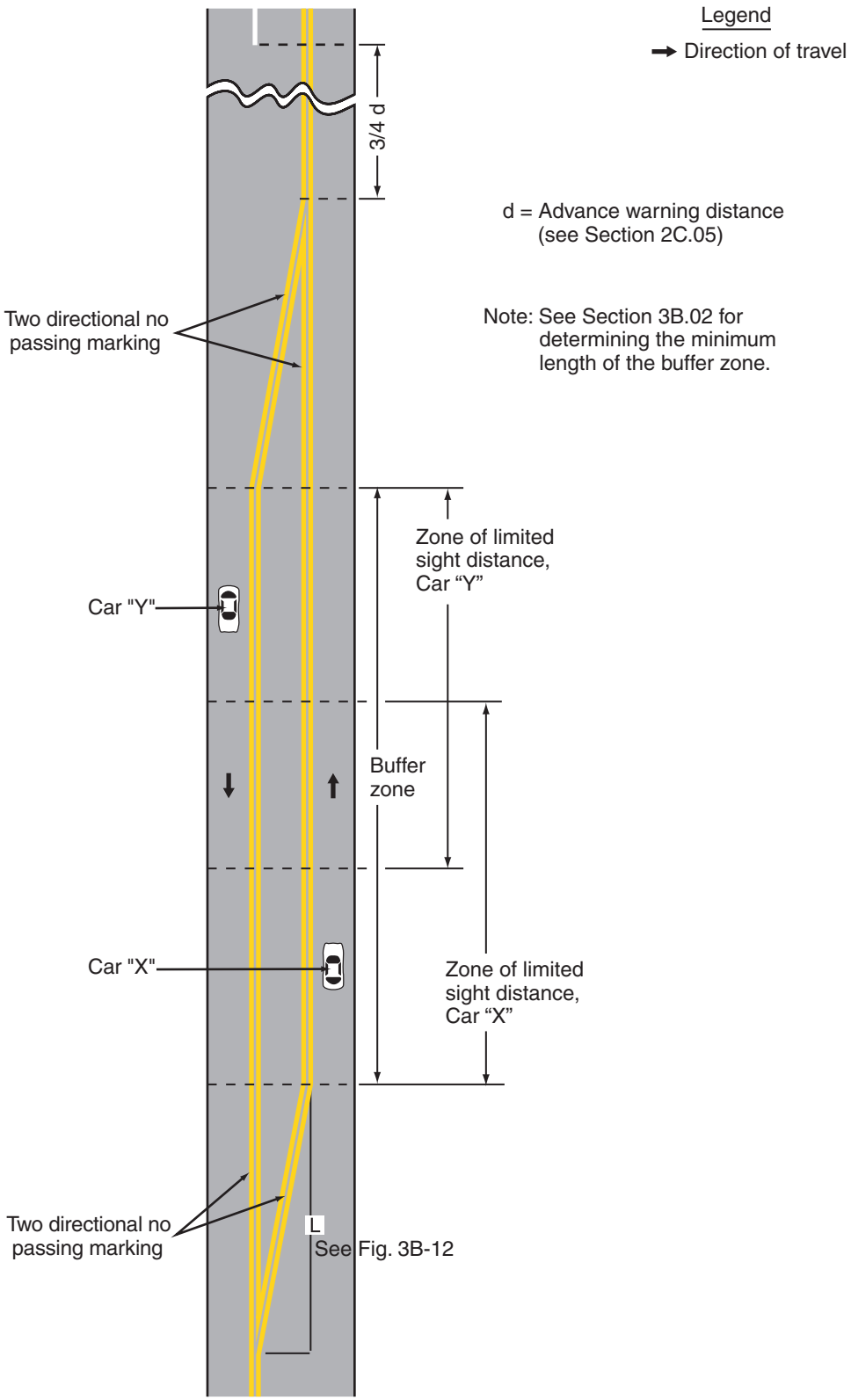


Table 3B-1. Minimum Passing Sight Distances

85th-Percentile or Posted or Statutory Speed Limit (km/h)	Minimum Passing Sight Distance (meters)
40	140
50	160
60	180
70	210
80	245
90	280
100	320
110	355
120	395

85th-Percentile or Posted or Statutory Speed Limit (mph)	Minimum Passing Sight Distance (feet)
25	450
30	500
35	550
40	600
45	700
50	800
55	900
60	1,000
65	1,100
70	1,200

Signs (see Section 2B.25), lane-use control signals (see Chapter 4J), or both shall be used to supplement reversible lane pavement markings.

If a two-way left-turn lane that is never operated as a reversible lane is used, the lane line pavement markings on each side of the two-way left-turn lane shall consist of a normal broken yellow line and a normal solid yellow line to delineate the edges of a lane that can be used by traffic in either direction as part of a left-turn maneuver. These markings shall be placed with the broken line toward the two-way left-turn lane and the solid line toward the adjacent traffic lane as shown in Figure 3B-7.

Option:

Pavement marking arrows may be used in conjunction with the two-way left-turn lane markings as shown in Figure 3B-7.

Guidance:

Signs should be used in conjunction with the two-way left turn markings (see Section 2B.24).

Standard:

If a continuous median island formed by pavement markings separating travel in opposite directions is used, two sets of double solid yellow lines shall be used to form the island as shown in Figures 3B-2 and 3B-4. Other markings in the median island area shall also be yellow, except crosswalk markings which shall be white (see Section 3B.17).

Section 3B.04 White Lane Line Pavement Markings and Warrants

Standard:

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

Support:

Examples of lane line markings are shown in Figures 3B-2, 3B-3, 3B-7 through 3B-13, 3B-22, 3B-24, and 3B-26.

Standard:

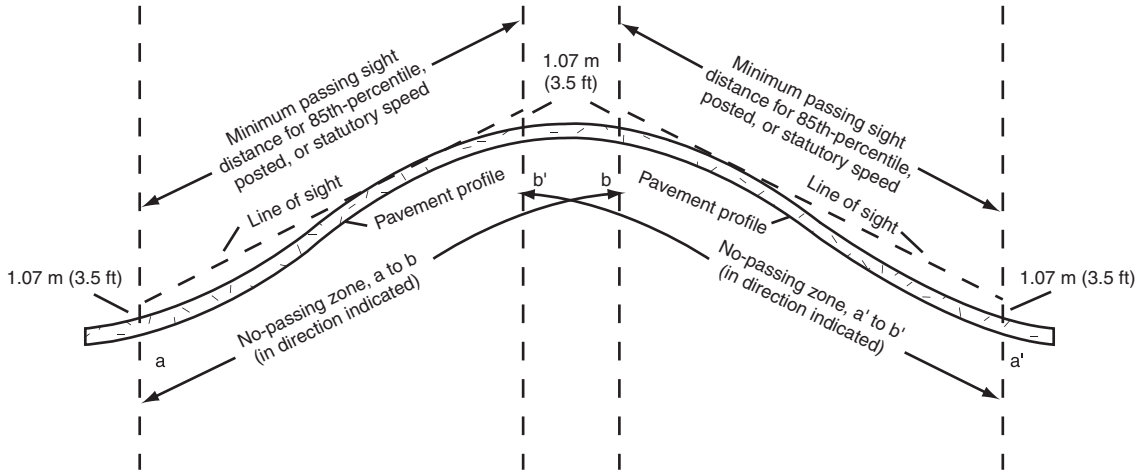
Where crossing the lane line markings with care is permitted, the lane line markings shall consist of a normal broken white line.

Figure 3B-5. Method of Locating and Determining the Limits of No-Passing Zones at Curves

Legend

→ Direction of travel

a- No-passing zone at VERTICAL CURVE.



a, a' Begin no-passing zone

Sight distance becomes less than minimum measured between points 1.07 m (3.5 ft) above pavement

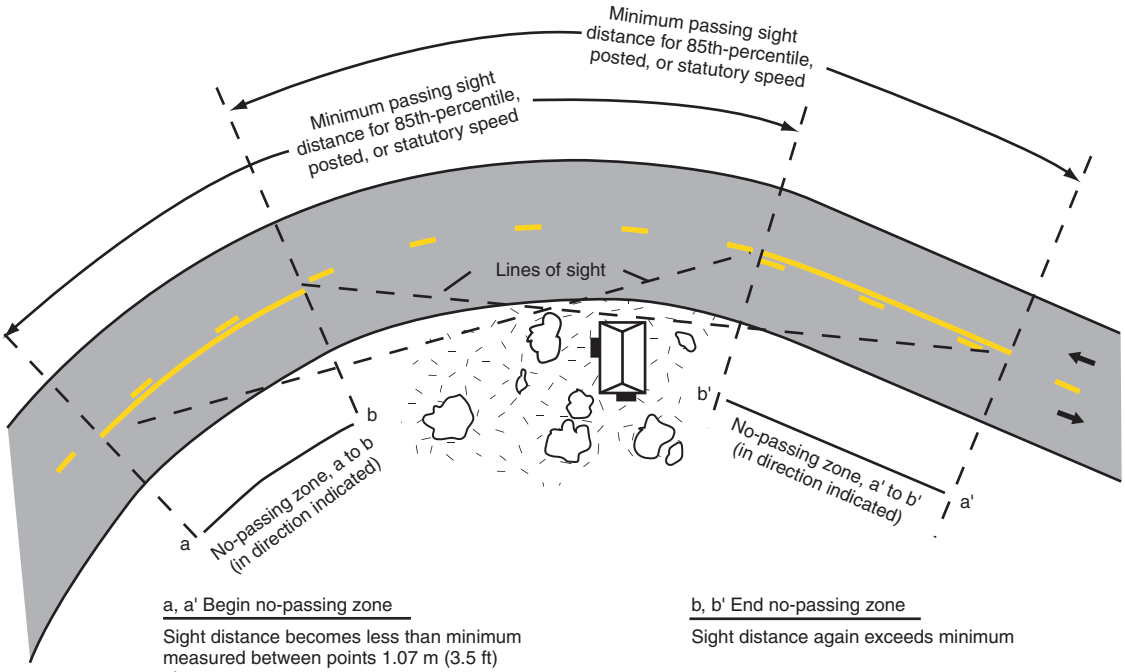
b, b' End no-passing zone

Sight distance again exceeds minimum

Profile View

Note: No-passing zones in opposite directions may or may not overlap, depending on alignment

b- No-passing zone at HORIZONTAL CURVE.



a, a' Begin no-passing zone

Sight distance becomes less than minimum measured between points 1.07 m (3.5 ft) above pavement

b, b' End no-passing zone

Sight distance again exceeds minimum

Plan View

Note: No-passing zones in opposite directions may or may not overlap, depending on alignment

Not to scale

Figure 3B-6. Example of Reversible Lane Marking Application

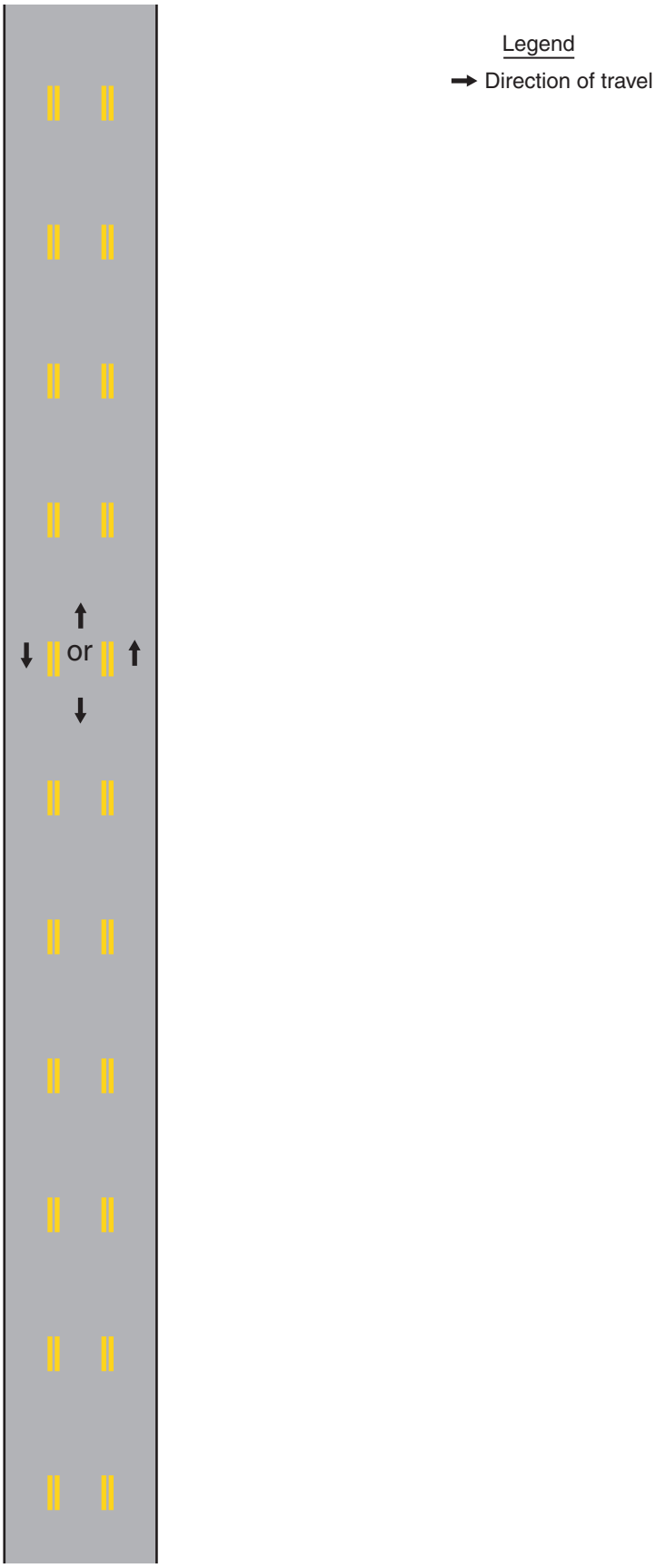
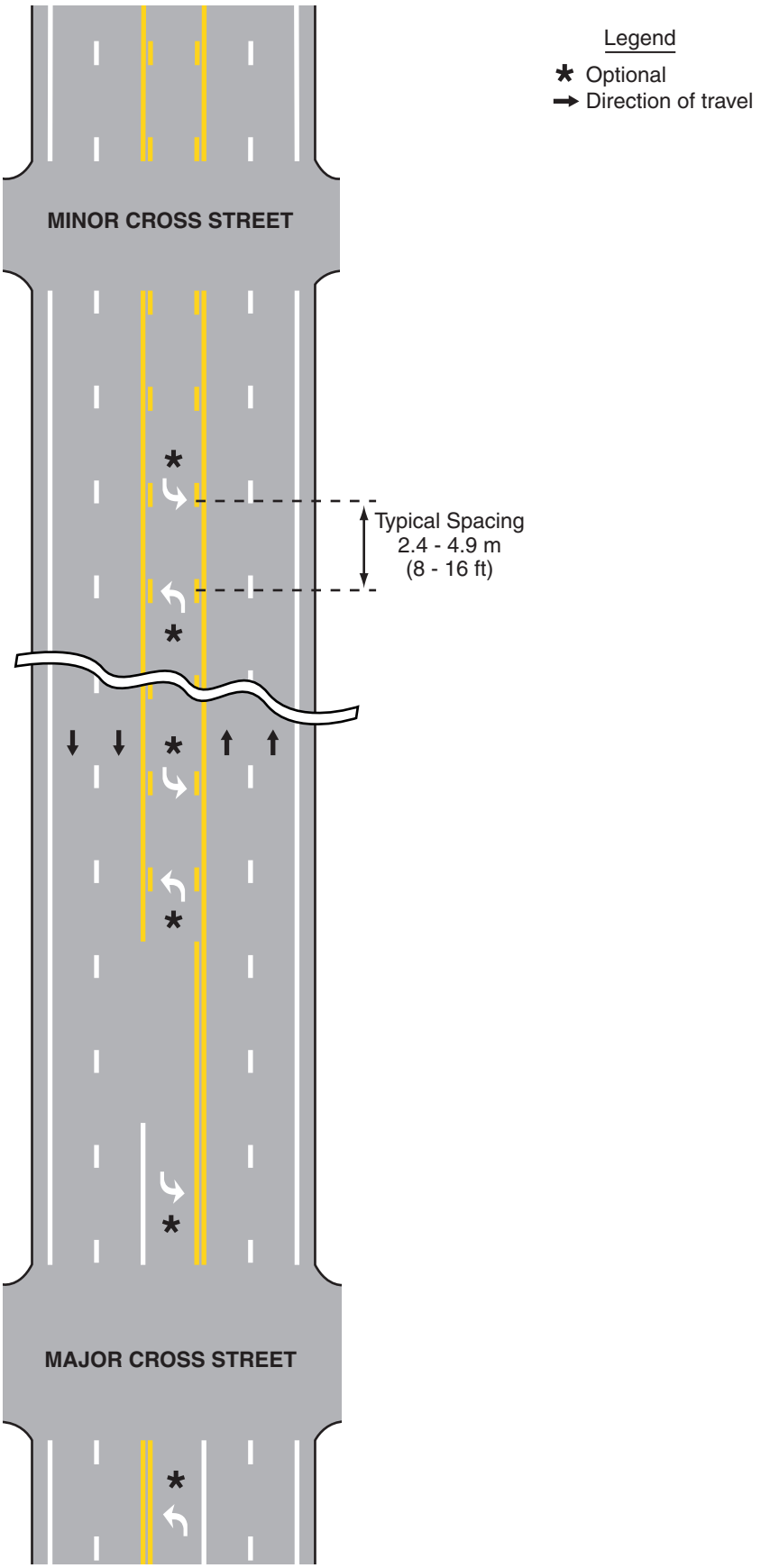


Figure 3B-7. Example of Two-Way Left-Turn Lane Marking Applications



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

Option:

Solid white lane line markings may be used to separate through traffic lanes from auxiliary lanes, such as uphill truck lanes, left- or right-turn lanes, and preferential lanes. They may also be used to separate traffic lanes approaching an intersection.

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

Standard:

Where crossing the lane line markings is prohibited, the lane line markings shall consist of two normal solid white lines.

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

Guidance:

Lane line markings should be used on all roadways with two or more adjacent traffic lanes that have the same direction of travel. Lane line markings should also be used at congested locations where the roadway will accommodate more traffic lanes with lane line markings than without the markings.

Section 3B.05 Other White Longitudinal Pavement Markings

Standard:

A channelizing line shall be a wide or double solid white line.

Option:

Channelizing lines may be used to form channelizing islands where traffic traveling in the same direction is permitted on both sides of the island.

Standard:

Other pavement markings in the channelizing island area shall be white.

Support:

Examples of channelizing line applications are shown in Figures 3B-8, 3B-9, and 3B-13.

Channelizing lines at exit ramps as shown in Figure 3B-8 define the neutral area, direct exiting traffic at the proper angle for smooth divergence from the main lanes into the ramp, and reduce the probability of colliding with objects adjacent to the roadway.

Channelizing lines at entrance ramps as shown in Figure 3B-9 promote reasonably safe and efficient merging with the through traffic.

Standard:

For exit ramps, channelizing lines shall be placed along the sides of the neutral area adjacent to the through traffic lane and the ramp lane. With a parallel deceleration lane, a lane line shall be extended from the beginning of the channelizing line upstream for a distance of one-half the length of the full-width deceleration lane as shown in Figure 3B-8.

Option:

White chevron markings may be placed in the neutral area for special emphasis as shown in Figure 3B-8.

Guidance:

For entrance ramps, a channelizing line should be placed along the side of the neutral area adjacent to the ramp lane.

For entrance ramps with a parallel acceleration lane, a lane line should be extended from the end of the channelizing line for a distance of one-half the length of the full-width acceleration lane as shown in Figure 3B-9.

Option:

For entrance ramps with a tapered acceleration lane, lane line markings may be placed to extend the channelizing line, but not beyond a point where the tapered lane meets the near side of the through traffic lane as shown in Figure 3B-9.

Lane drop markings as shown in Figure 3B-10 may be used in advance of lane drops at exit ramps to distinguish a lane drop from a normal exit ramp or from an auxiliary lane. The lane drop marking may consist of a wide, white dotted line with line segments 0.9 m (3 ft) in length separated by 2.7 m (9 ft) gaps.

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

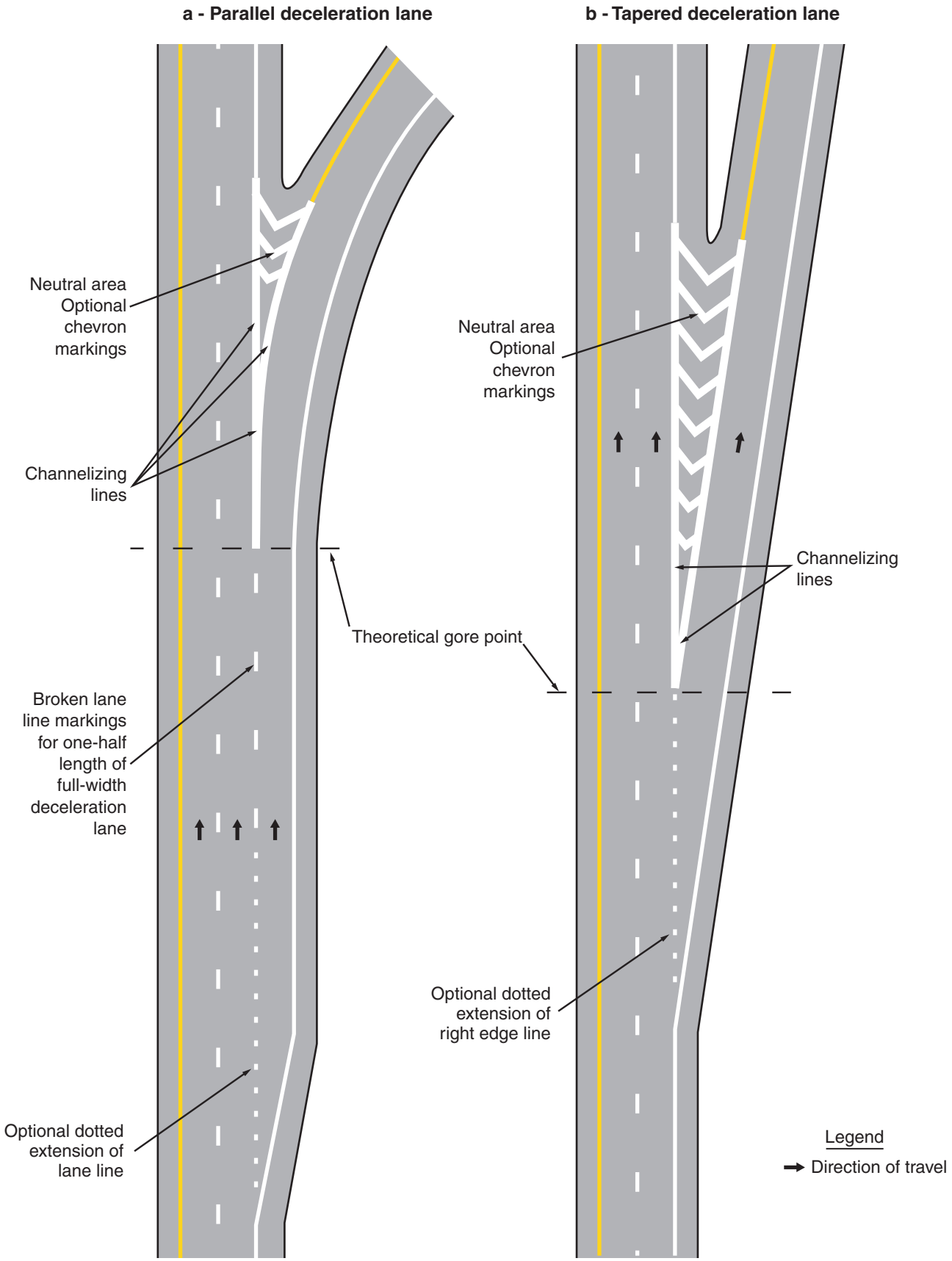


Figure 3B-8. Examples of Channelizing Line Applications for Exit Ramp Markings *(Sheet 2 of 2)*

c - Auxiliary lane, such as at cloverleaf interchange

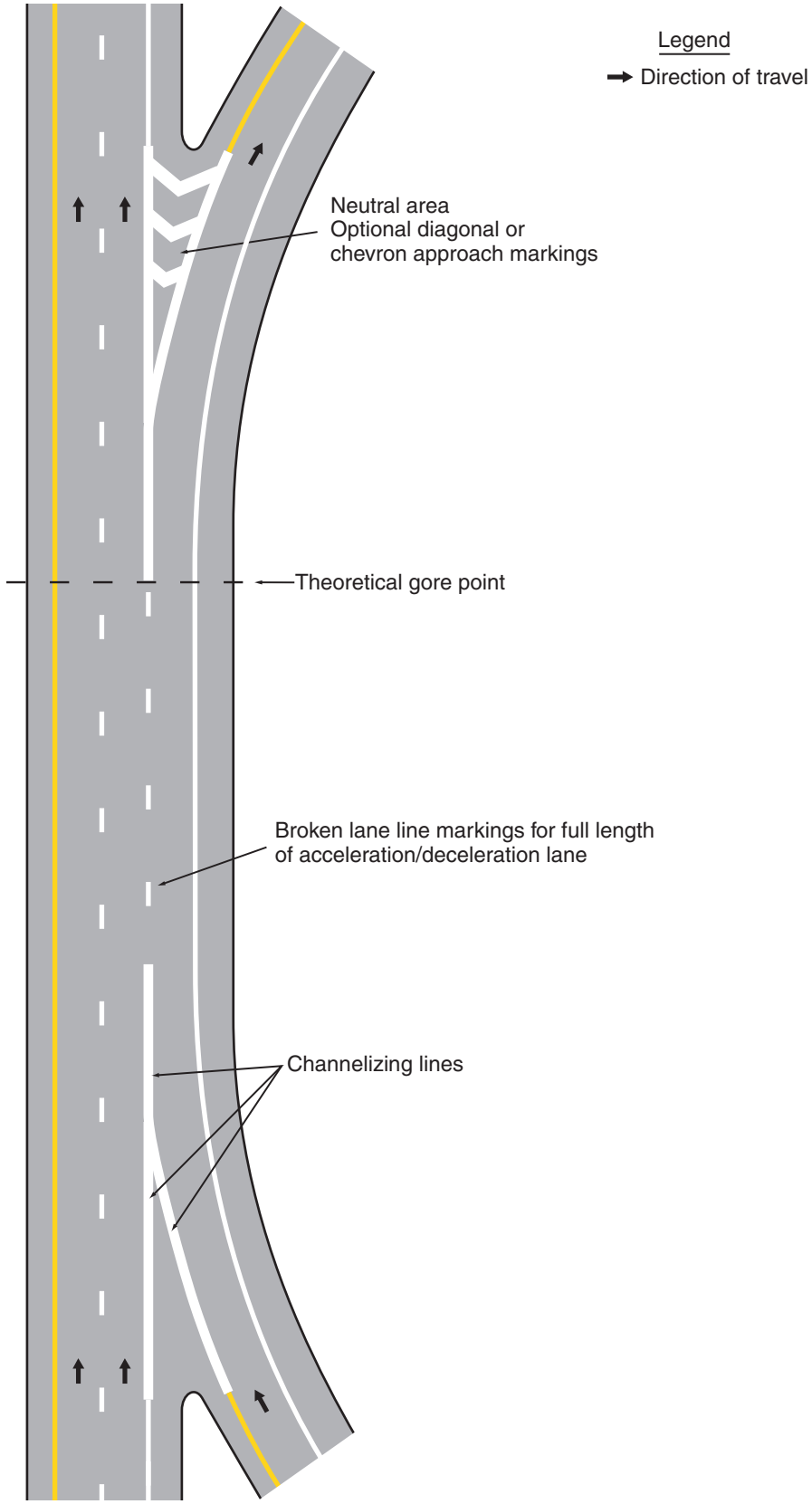


Figure 3B-9. Examples of Channelizing Line Applications for Entrance Ramp Markings

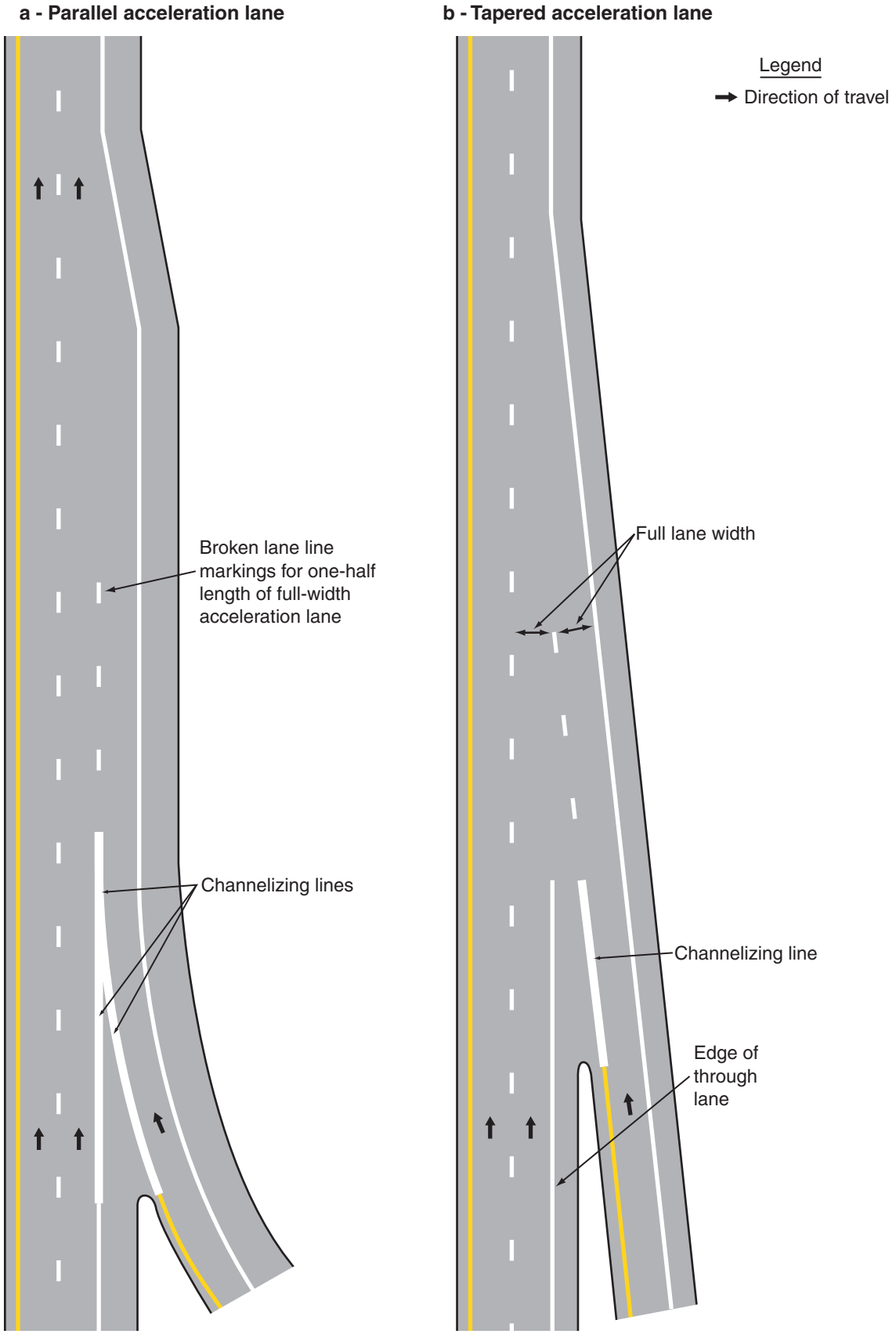
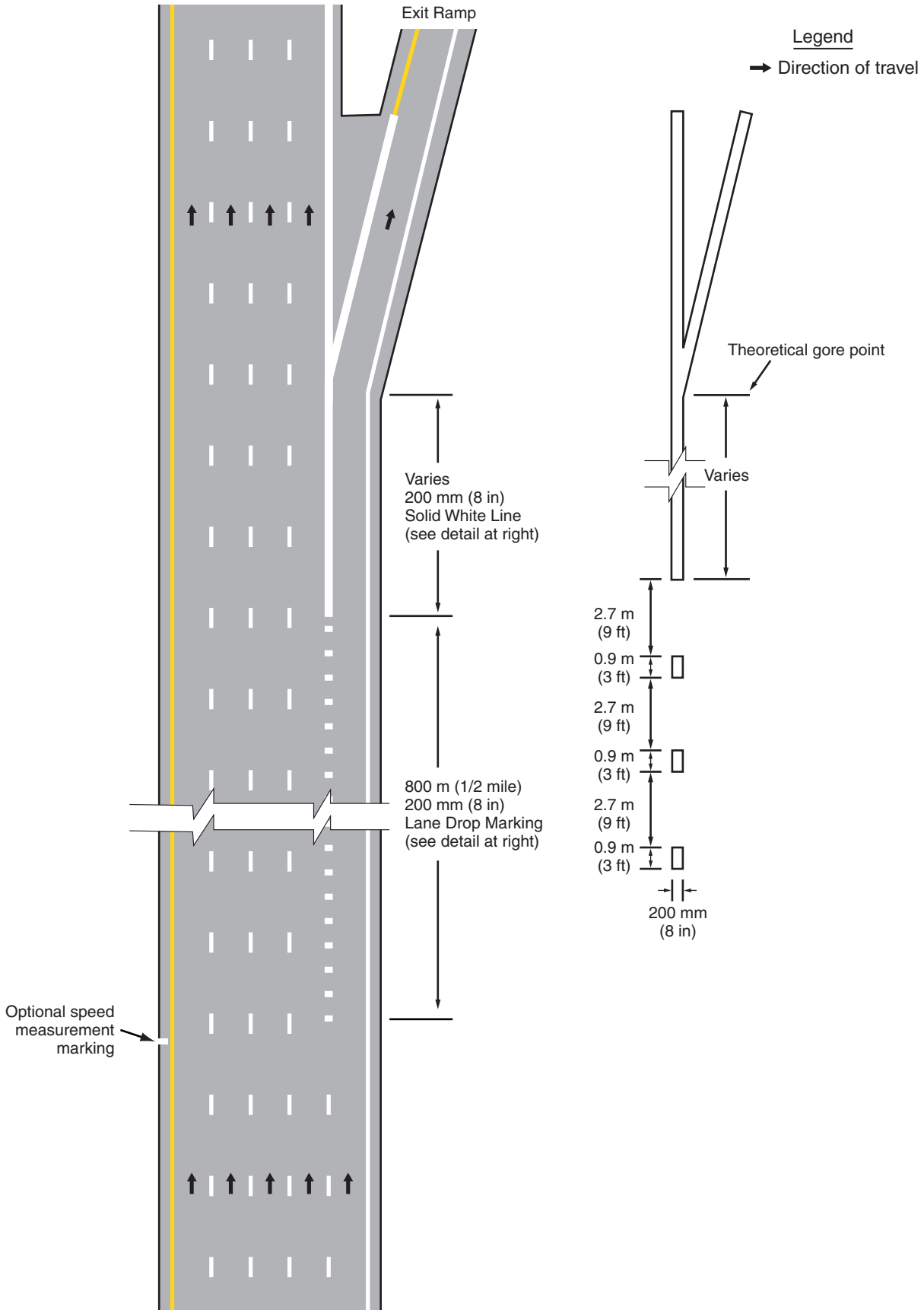


Figure 3B-10. Example of Lane Drop Markings at Exit Ramps



Guidance:

If used, lane drop markings should begin 800 m (0.5 mi) in advance of the theoretical gore point.

Option:

Where lane changes might cause conflicts, a wide solid white channelizing line may extend upstream from the theoretical gore point.

Section 3B.06 Edge Line Pavement Markings

Standard:

If used, edge line pavement markings shall delineate the right or left edges of a roadway.

Except for dotted edge line extensions (see Section 3B.08), edge line markings shall not be continued through intersections or major driveways.

If used on the roadways of divided highways or one-way streets, or on any ramp in the direction of travel, left edge line pavement markings shall consist of a normal solid yellow line to delineate the left edge of a roadway or to indicate driving or passing restrictions left of these markings.

If used, the right edge line pavement markings shall consist of a normal solid white line to delineate the right edge of the roadway.

Guidance:

Edge line markings should not be broken for minor driveways.

Support:

Edge line markings have unique value as visual references to guide road users during adverse weather and visibility conditions.

Option:

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

Section 3B.07 Warrants for Use of Edge Lines

Standard:

Edge line markings shall be placed on paved streets or highways with the following characteristics:

A. Freeways;
B. Expressways; and
C. Rural arterials with a traveled way of 6.1 m (20 ft) or more in width and an ADT of 6,000 vehicles per day or greater.

Guidance:

Edge line markings should be placed on paved streets or highways with the following characteristics:

A. Rural arterials and collectors with a traveled way of 6.1 m (20 ft) or more in width and an ADT of 3,000 vehicles per day or greater.
B. At other paved streets and highways where an engineering study indicates a need for edge line markings.

Edge line markings should not be placed where an engineering study or engineering judgment indicates that providing them is likely to decrease safety.

Option:

Edge line markings may be placed on streets and highways with or without centerline markings.

Edge line markings may be excluded, based on engineering judgment, for reasons such as if the traveled way edges are delineated by curbs, parking, bicycle lanes, or other markings.

Edge line markings may be used where edge delineation is desirable to minimize unnecessary driving on paved shoulders or on refuge areas that have lesser structural pavement strength than the adjacent roadway.

Section 3B.08 Extensions Through Intersections or Interchanges

Standard:

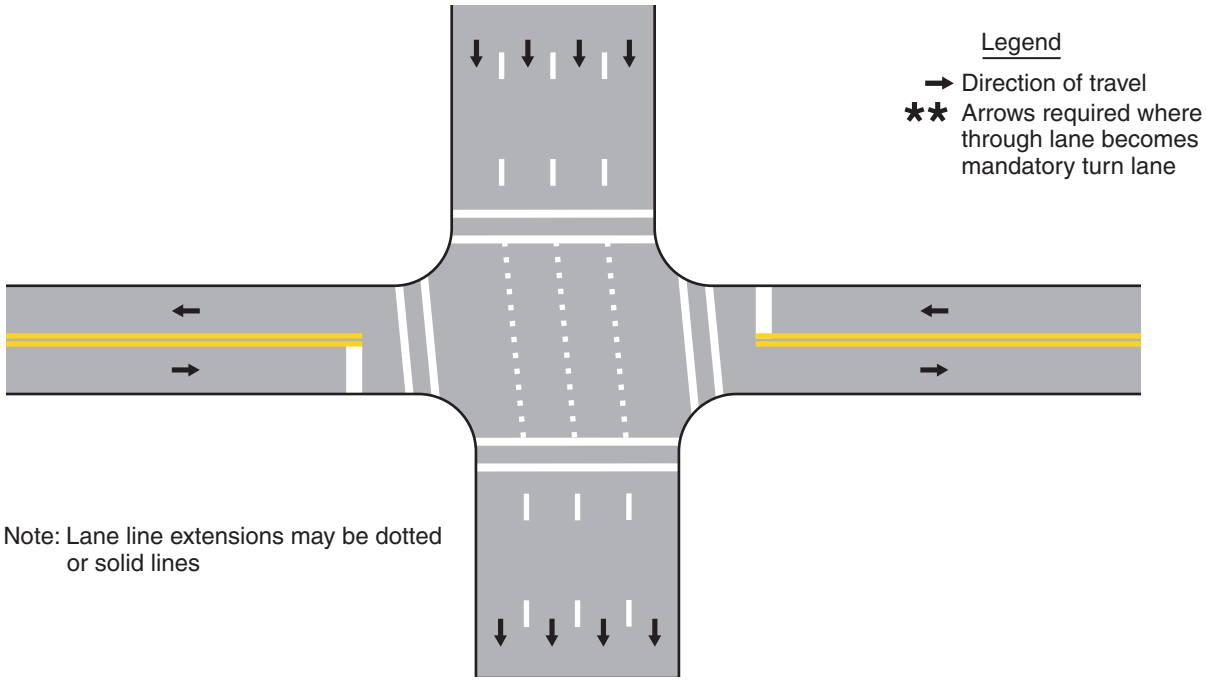
Pavement markings extended into or continued through an intersection or interchange area shall be the same color and at least the same width as the line markings they extend (see Figure 3B-11).

Option:

A normal line may be used to extend a wide line through an intersection.

Figure 3B-11. Examples of Extensions through Intersections (Sheet 1 of 2)

a - Typical pavement markings with offset lane lines continued through the intersection and optional crosswalk lines and stop lines



b - Typical pavement markings with optional double-turn lane lines, lane-use turn arrows, crosswalk lines, and stop lines

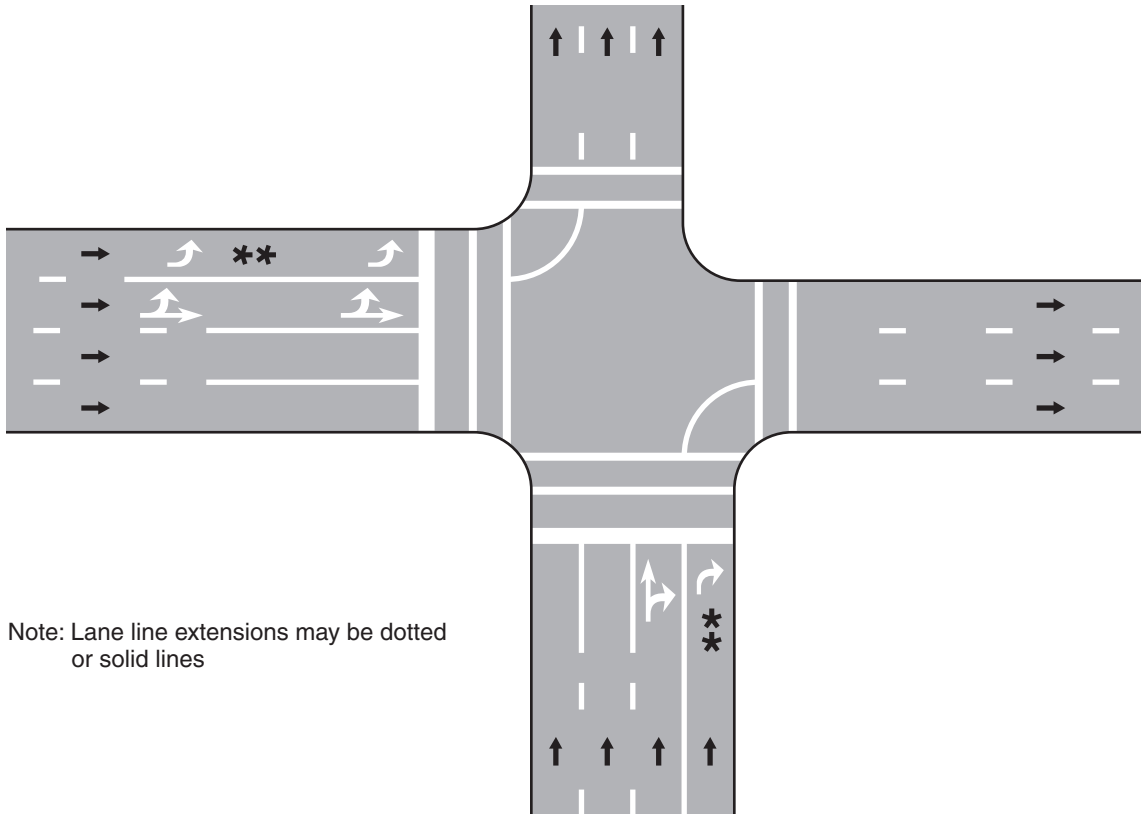
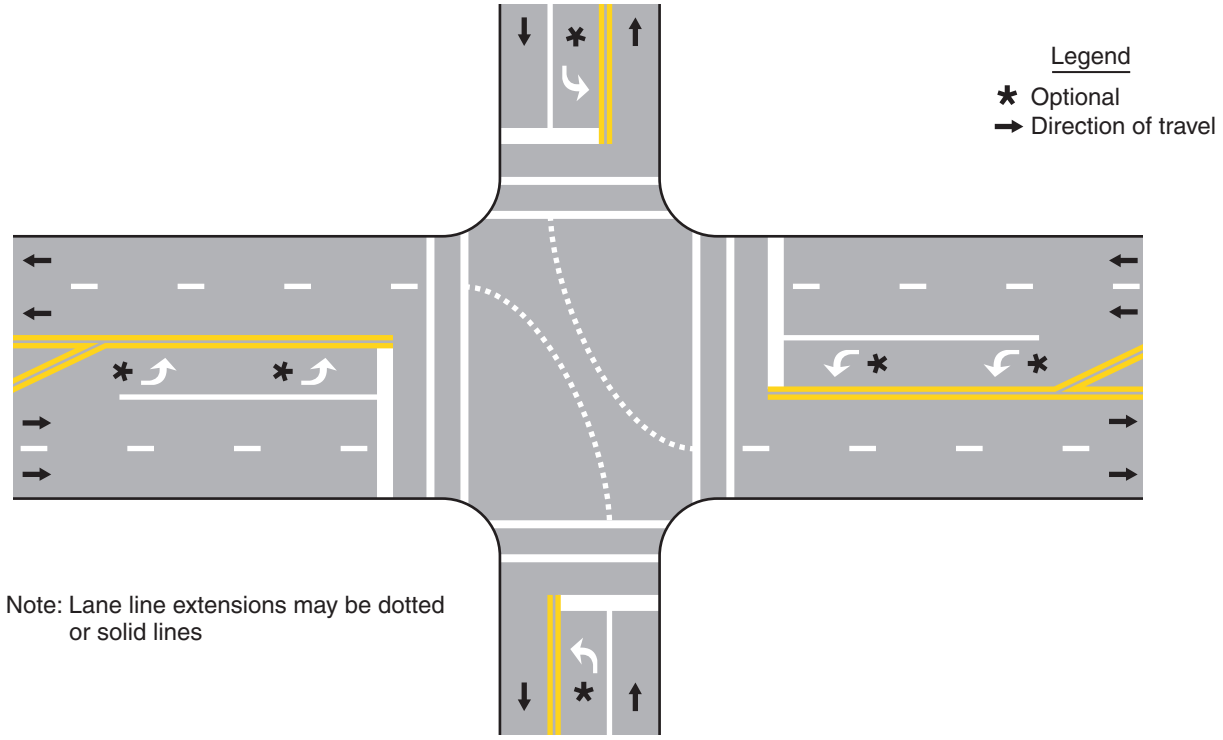
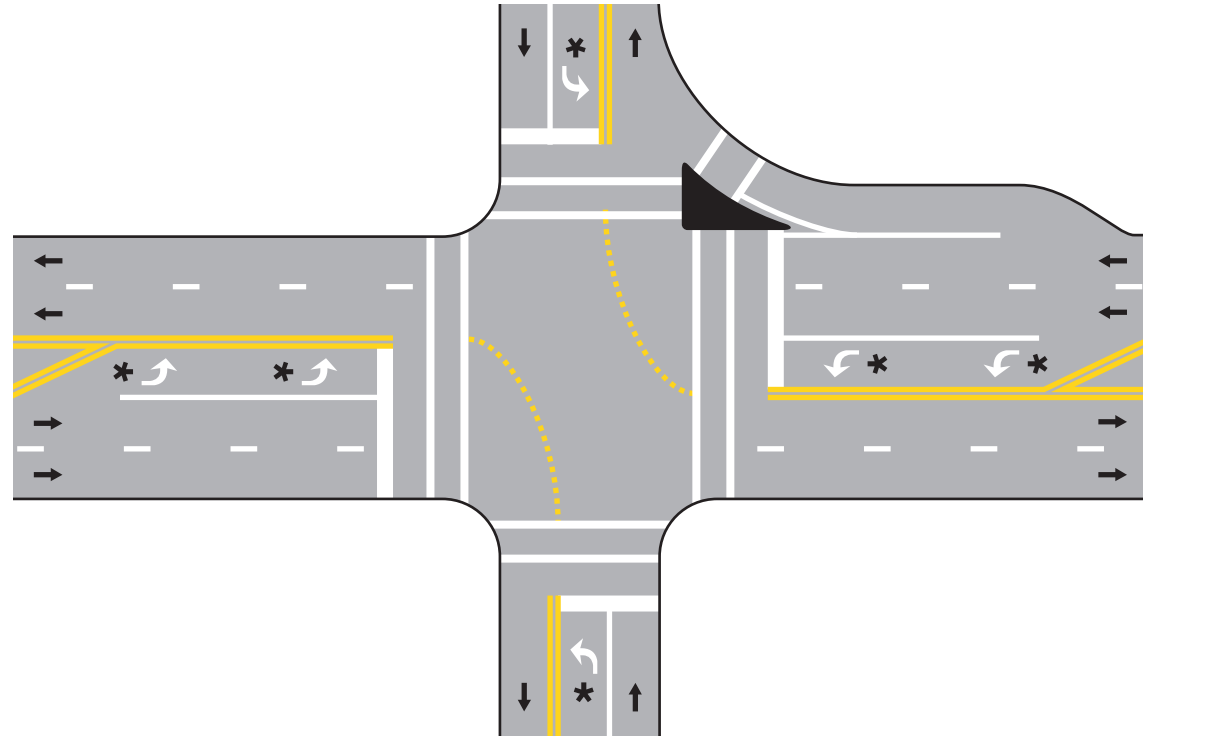


Figure 3B-11. Examples of Extensions through Intersections (Sheet 2 of 2)

c - Typical dotted line markings to extend longitudinal lane line markings



d - Typical dotted line markings to extend longitudinal centerline markings



Guidance:

Where highway design or reduced visibility conditions make it desirable to provide control or to guide vehicles through an intersection or interchange, such as at offset, skewed, complex, or multilegged intersections, on curved roadways, or where multiple turn lanes are used, dotted line markings should be used to extend longitudinal line markings through an intersection or interchange area.

Option:

Dotted edge line extensions may be placed through intersections or major driveways.

Guidance:

Where greater restriction is required, solid lane lines or channelizing lines should be extended into or continued through intersections or major driveways. However, edge lines should not be extended into or continued through intersections or major driveways as solid lines.

A single line of equal width to one of the lines of the double line should be used to extend a double line through an intersection.

To the extent possible, pavement marking extensions through intersections should be designed in a manner that minimizes potential confusion for drivers in adjacent or opposing lanes.

Section 3B.09 Lane Reduction Transition Markings

Standard:

Where pavement markings are used, lane reduction transition markings shall be used to guide traffic through transition areas where the number of through lanes is reduced, as shown in Figure 3B-12. On two-way roadways, no-passing zone markings shall be used to prohibit passing in the direction of the convergence, and shall continue through the transition area.

Guidance:

For roadways having a posted or statutory speed limit of 70 km/h (45 mph) or greater, the transition taper length for a lane reduction should be computed by the formula $L = 0.62\ WS$ for speeds in km/h ($L = WS$ for speeds in mph). For roadways where the posted or statutory speed limit is less than 70 km/h (45 mph), the formula $L = WS^2/155$ for speeds in km/h ($L = WS^2/60$ for speeds in mph) should be used to compute taper length. Under both formulas, L equals the taper length in meters (feet), W equals the width of the offset distance in meters (feet), and S equals the 85th-percentile speed or the posted or statutory speed limit, whichever is higher.

Where observed speeds exceed posted or statutory speed limits, longer tapers should be used.

Option:

On new construction, where no posted or statutory speed limit is established, the design speed may be used in the transition taper length formula.

Guidance:

Lane line markings should be discontinued one-quarter of the distance between the Lane Ends sign (see Section 2C.33) and the point where the transition taper begins.

Edge line markings should be installed from the location of the warning sign to beyond the beginning of the narrower roadway.

Support:

Pavement markings at lane reduction transitions supplement the standard signs.

Section 3B.10 Approach Markings for Obstructions

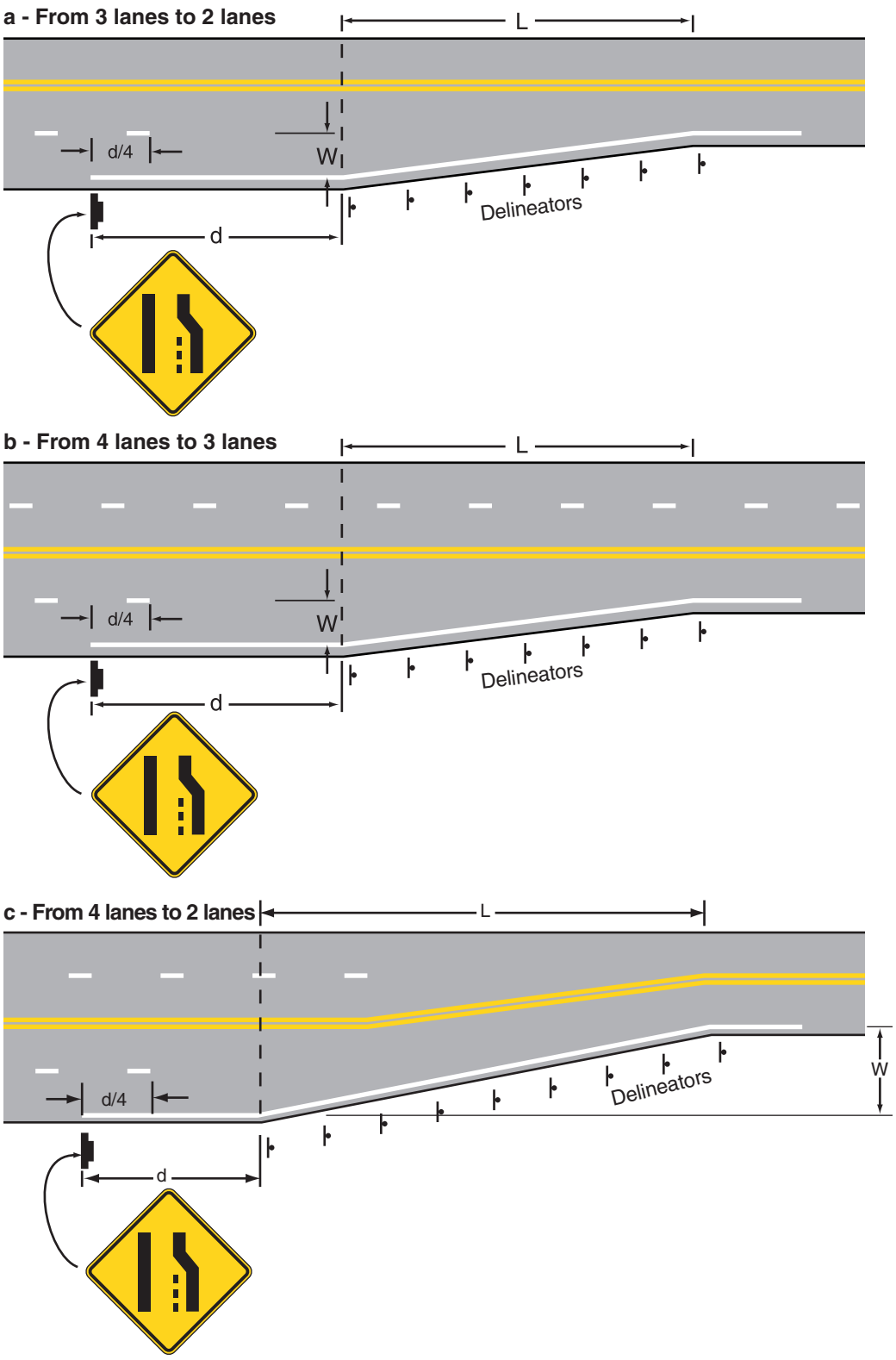
Standard:

Pavement markings shall be used to guide traffic away from fixed obstructions within a paved roadway. Approach markings for bridge supports, refuge islands, median islands, and raised channelization islands shall consist of a tapered line or lines extending from the centerline or the lane line to a point 0.3 to 0.6 m (1 to 2 ft) to the right side, or to both sides, of the approach end of the obstruction (see Figure 3B-13).

Guidance:

For roadways having a posted or statutory speed limit of 70 km/h (45 mph) or greater, the taper length of the tapered line markings should be computed by the formula $L = 0.62\ WS$ for speeds in km/h ($L = WS$ for speeds in mph). For roadways where the posted or statutory speed limit is less than 70 km/h (45 mph), the formula $L = WS^2/155$ for speeds in km/h ($L = WS^2/60$ for speeds in mph) should be used to compute taper length.

Figure 3B-12. Examples of Lane Reduction Markings



L = Length in meters (feet)
S = Posted, 85th-percentile, or statutory speed in km/h (mph)
W = Offset in meters (feet)
d = Advance warning distance (see Section 2C.05)

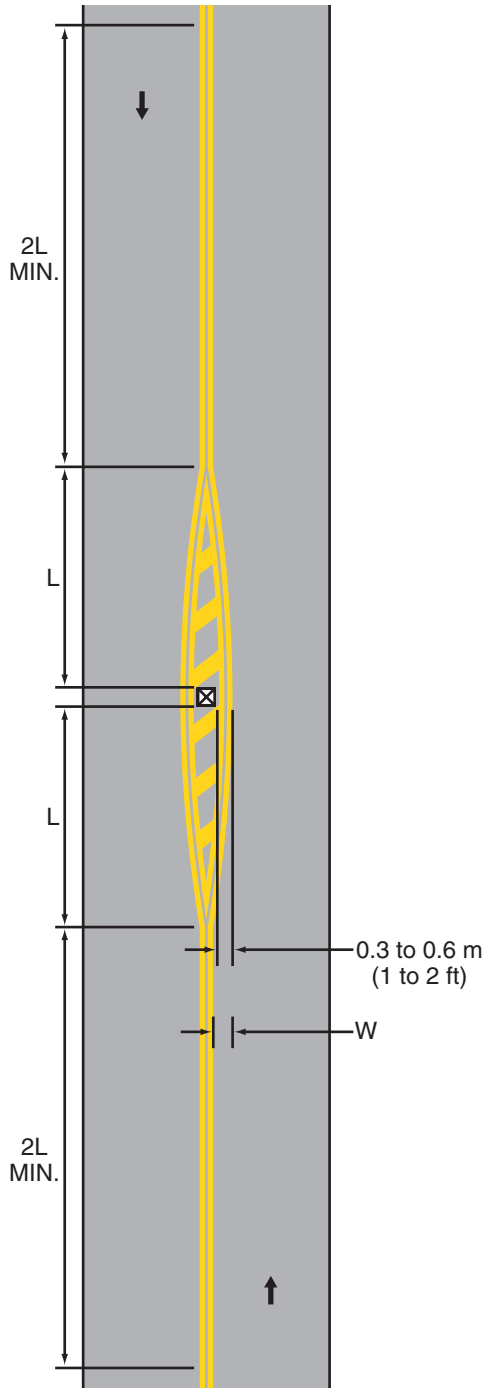
See Section 3D.04 for delineator spacing.

For speeds 70 km/h (45 mph) or more:
$L = 0.62\ WS \quad (L=WS)$

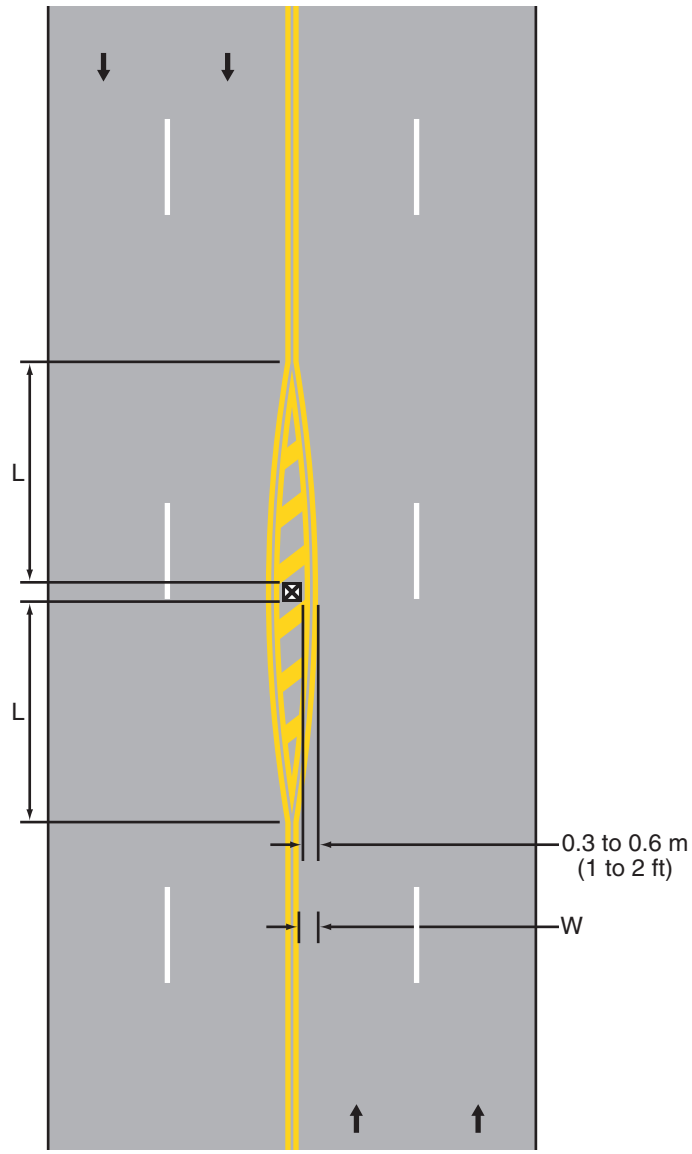
For speeds less than 70 km/h (45 mph):
$L = \frac{WS^2}{155} \quad \left(L = \frac{WS^2}{60}\right)$

Figure 3B-13. Examples of Markings for Obstructions in the Roadway
(Sheet 1 of 2)

a - Center of two-lane road



b - Center of four-lane road



For speeds 70 km/h (45 mph) or more L=0.62 WS (L=WS)
For speeds less than 70 km/h (45 mph) $L = WS^2/155$ ($L=WS^2/60$)
S = Posted, 85th-percentile, or statutory speed in km/h (mph)
W = Offset distance in meters (ft)

Minimum length of : L = 30 m (100 ft) in urban areas
L = 60 m (200 ft) in rural areas

Length "L" should be extended as required by sight distance conditions

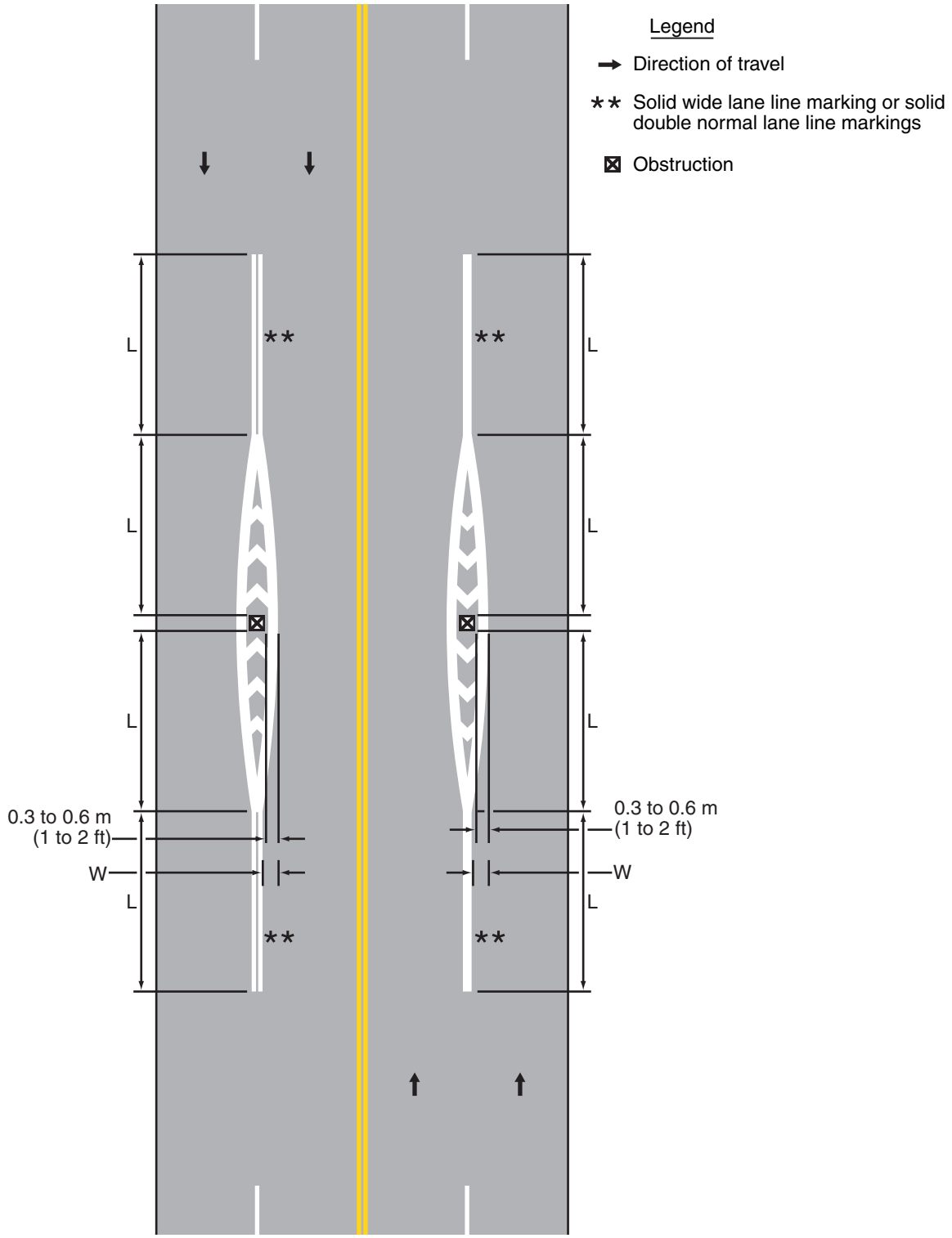
Legend

➡ Direction of travel

⊠ Obstruction

Figure 3B-13. Examples of Markings for Obstructions in the Roadway
(Sheet 2 of 2)

c - Traffic passing both sides of obstruction



For speeds 70 km/h (45 mph) or more L=0.62 WS (L=WS)
For speeds less than 70 km/h (45 mph) $L = WS^2/155$ ($L=WS^2/60$)
S = Posted, 85th-percentile, or statutory speed in km/h (mph)
W = Offset distance in meters (ft)

Minimum length of : L = 30 m (100 ft) in urban areas
L = 60 m (200 ft) in rural areas

Length "L" should be extended as required by sight distance conditions

Under both formulas, L equals the taper length in meters (feet), W equals the width of the offset distance in meters (feet), and S equals the 85th-percentile speed or the posted or statutory speed limit, whichever is higher.

Standard:

The minimum taper length shall be 30 m (100 ft) in urban areas and 60 m (200 ft) in rural areas.

Support:

Examples of approach markings for obstructions in the roadway are shown in Figure 3B-13.

Option:

Where observed speeds exceed posted or statutory speed limits, longer tapers may be used.

Standard:

If traffic is required to pass only to the right of the obstruction, the markings shall consist of a two-direction no-passing zone marking at least twice the length of the diagonal portion as determined by the appropriate taper formula (see Figure 3B-13).

Option:

If traffic is required to pass only to the right of the obstruction, yellow diagonal approach markings may be placed in the neutral area between the no-passing zone markings as shown in Figure 3B-13. Other markings, such as yellow delineators, raised pavement markers, and white crosswalk pavement markings, may also be placed in the neutral area.

Standard:

If traffic can pass either to the right or left of the obstruction, the markings shall consist of two channelizing lines diverging from the lane line, one to each side of the obstruction. In advance of the point of divergence, a solid wide white line or solid double normal white line shall be extended in place of the broken lane line for a distance equal to the length of the diverging lines (see Figure 3B-13).

Option:

If traffic can pass either to the right or left of the obstruction, additional white markings may be placed in the neutral area between the channelizing lines as shown in Figure 3B-13.

Section 3B.11 Raised Pavement Markers

Standard:

A raised pavement marker shall be a device with a height of at least 10 mm (0.4 in) mounted on or in a road surface that is intended to be used as a positioning guide or to supplement or substitute for pavement markings or to mark the position of a fire hydrant.

The color of raised pavement markers under both daylight and nighttime conditions shall conform to the color of the marking for which they serve as a positioning guide, or for which they supplement or substitute.

Option:

Blue raised pavement markers may be used to mark the positions of fire hydrants.

Support:

Retroreflective and internally illuminated raised pavement markers are available in monodirectional and bidirectional configurations. The bidirectional marker is capable of displaying the applicable color for each direction of travel.

Guidance:

Nonretroreflective raised pavement markers should not be used alone, without supplemental retroreflective or internally illuminated markers, as a substitute for other types of pavement markings.

Directional configurations should be used to maximize correct information and to minimize confusing information provided to the road user. Directional configurations also should be used to avoid confusion resulting from visibility of markers that do not apply to the road user.

The spacing of raised pavement markers used to supplement or substitute for other types of longitudinal markings should correspond with the pattern of broken lines for which the markers supplement or substitute.

Standard:

The value of N for the spacing of raised pavement markers for a broken or dotted line shall equal the length of one line segment plus one gap. 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 Sections 3B.13 and 3B.14).

Support:

Figures 9-20 through 9-22 in the "Traffic Control Devices Handbook" (see Section 1A.11) contain additional information regarding the spacing of raised pavement markers on longitudinal markings.

Section 3B.12 Raised Pavement Markers as Vehicle Positioning Guides with Other Longitudinal Markings

Option:

Raised pavement markers may be used as positioning guides with longitudinal line markings without necessarily conveying information to the road user about passing or lane-use restrictions. In such applications, markers may be positioned between the two lines of a one-way or two-way no-passing zone marking or positioned in line with or immediately adjacent to single solid or broken centerline or lane line markings.

Support:

A typical spacing for such applications is 2N, where N equals the length of one line segment plus one gap (see Section 3B.11).

Option:

Where it is desired to alert the road user to changes in the travel path, such as on sharp curves or on transitions that reduce the number of lanes or that shift traffic laterally, the spacing may be reduced to N or less.

On freeways and expressways, a spacing of 3N may be used for relatively straight and level roadway segments where engineering judgment indicates that such spacing will provide adequate delineation under wet night conditions.

Section 3B.13 Raised Pavement Markers Supplementing Other Markings

Guidance:

The use of raised pavement markers for supplementing longitudinal line markings should conform to the following:

A. Lateral Positioning
   1. When supplementing double line markings, pairs of raised pavement markers placed laterally in line with or immediately outside of the two lines should be used.
   2. When supplementing wide line markings, pairs of raised pavement markers placed laterally adjacent to each other should be used.

B. Longitudinal Spacing
   1. When supplementing solid line markings, raised pavement markers at a spacing no greater than N (see Section 3B.11) should be used, except when supplementing left edge line markings, a spacing of no greater than N/2 should be used. Raised markers should not supplement right edge line markings.
   2. When supplementing broken line markings, a spacing no greater than 3N should be used. However, when supplementing broken line markings identifying reversible lanes, a spacing of no greater than N should be used.
   3. When supplementing dotted line markings, a spacing appropriate for the application should be used.
   4. When supplementing longitudinal line markings through at-grade intersections, one raised pavement marker for each short line segment should be used.
   5. When supplementing edge line extensions through freeway interchanges, a spacing of no greater than N should be used.

Option:

Raised pavement markers also may be used to supplement other markings for channelizing islands or approaches to obstructions.

Section 3B.14 Raised Pavement Markers Substituting for Pavement Markings

Option:

Retroreflective or internally illuminated raised pavement markers, or nonretroreflective raised pavement markers supplemented by retroreflective or internally illuminated markers, may be substituted for markings of other types.

Guidance:

If used, the pattern and color of the raised pavement markers should simulate the pattern and color of the markings for which they substitute.

The normal spacing of raised pavement markers, when substituting for other markings, should be determined in terms of the standard length of the broken line segment.

Option:

The side of a raised pavement marker that is visible to traffic proceeding in the wrong direction may be red.

Standard:

If raised pavement markers are used to substitute for broken line markings, a group of three to five markers equally spaced at a distance no greater than N/8 (see Section 3B.11) shall be used. If N is other than 12 m (40 ft), the markers shall be equally spaced over the line segment length (at 1/2 points for 3 markers, at 1/3 points for 4 markers, and at 1/4 points for 5 markers). At least one retroreflective or internally illuminated marker per group shall be used or a retroreflective or internally illuminated marker shall be installed midway in each gap between successive groups of nonretroreflective markers.

When raised pavement markers substitute for solid lane line markings, 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.

Guidance:

Raised pavement markers should not substitute for right edge line markings.

Standard:

When raised pavement markers substitute for dotted lines, they shall be spaced at no greater than N/4, with not less than one raised pavement marker per dotted line. At least one raised marker every N shall be retroreflective or internally illuminated.

Option:

When substituting for wide lines, raised pavement markers may be placed laterally adjacent to each other to simulate the width of the line.

Section 3B.15 Transverse Markings

Standard:

Transverse markings, which include shoulder markings, word and symbol markings, stop lines, yield lines, crosswalk lines, speed measurement markings, speed hump markings, parking space markings, and others, shall be white unless otherwise specified herein.

Guidance:

Because of the low approach angle at which pavement markings are viewed, transverse lines should be proportioned to provide visibility equal to that of longitudinal lines.

Standard:

Pavement marking letters, numerals, and symbols shall be installed in accordance with the Pavement Markings chapter of the "Standard Highway Signs" book (see Section 1A.11).

Section 3B.16 Stop and Yield Lines

Standard:

If used, stop lines shall consist of solid white lines extending across approach lanes to indicate the point at which the stop is intended or required to be made.

If used, yield lines (see Figure 3B-14) shall consist of a row of solid white isosceles triangles pointing toward approaching vehicles extending across approach lanes to indicate the point at which the yield is intended or required to be made.

Guidance:

Stop lines should be 300 to 600 mm (12 to 24 in) wide.

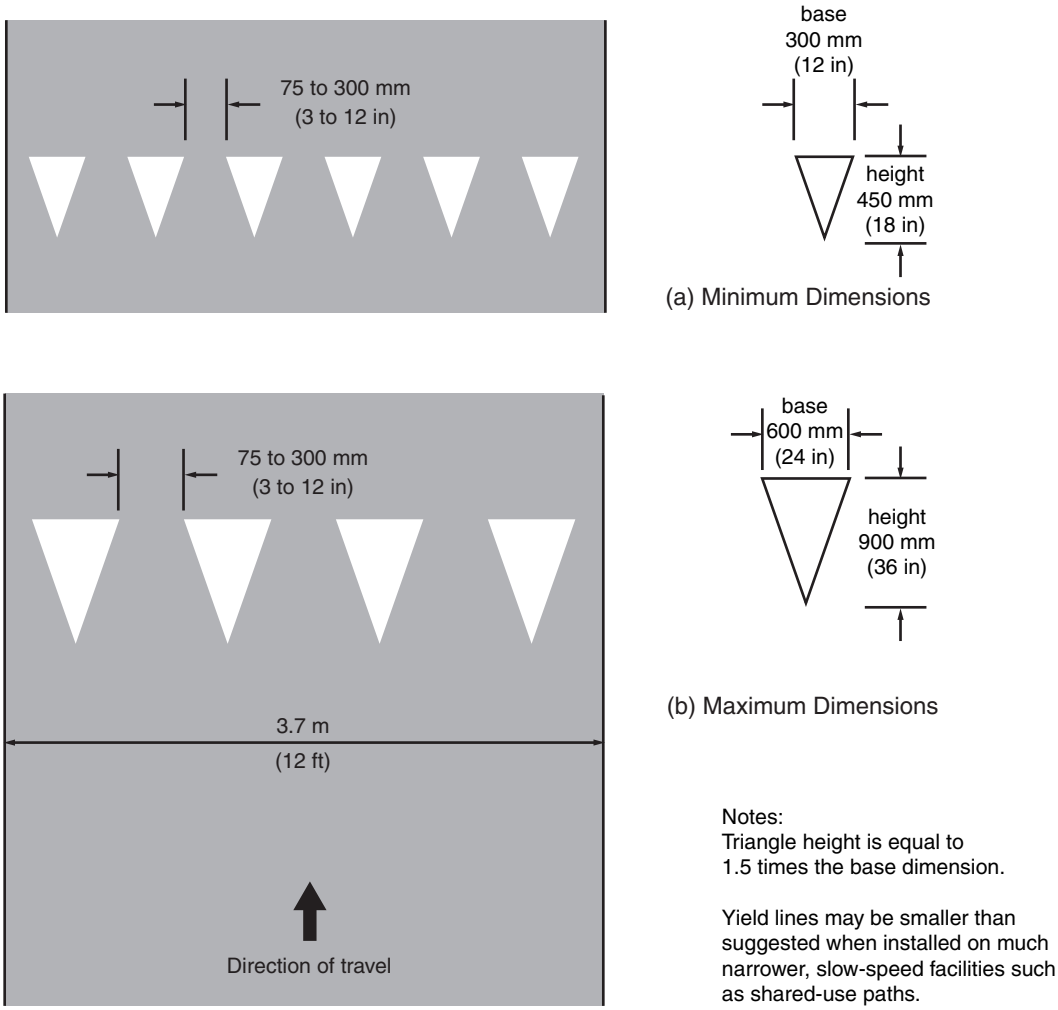
Stop lines should be used to indicate the point behind which vehicles are required to stop, in compliance with a STOP (R1-1) sign, traffic control signal, or some other traffic control device, except YIELD signs.

The individual triangles comprising the yield line should have a base of 300 to 600 mm (12 to 24 in) wide and a height equal to 1.5 times the base. The space between the triangles should be 75 to 300 mm (3 to 12 in).

Option:

Yield lines may be used to indicate the point behind which vehicles are required to yield in compliance with a YIELD (R1-2) sign or a Yield Here to Pedestrians (R1-5 or R1-5a) sign.

Figure 3B-14. Examples of Yield Line Layouts



Notes:
Triangle height is equal to 1.5 times the base dimension.

Yield lines may be smaller than suggested when installed on much narrower, slow-speed facilities such as shared-use paths.

Guidance:

If used, stop and yield lines should be placed a minimum of 1.2 m (4 ft) in advance of the nearest crosswalk line at controlled intersections, except for yield lines at roundabout intersections as provided for in Section 3B.24 and at midblock crosswalks. In the absence of a marked crosswalk, the stop line or yield line should be placed at the desired stopping or yielding point, but should be placed no more than 9 m (30 ft) nor less than 1.2 m (4 ft) from the nearest edge of the intersecting traveled way. Stop lines should be placed to allow sufficient sight distance to all other approaches to an intersection.

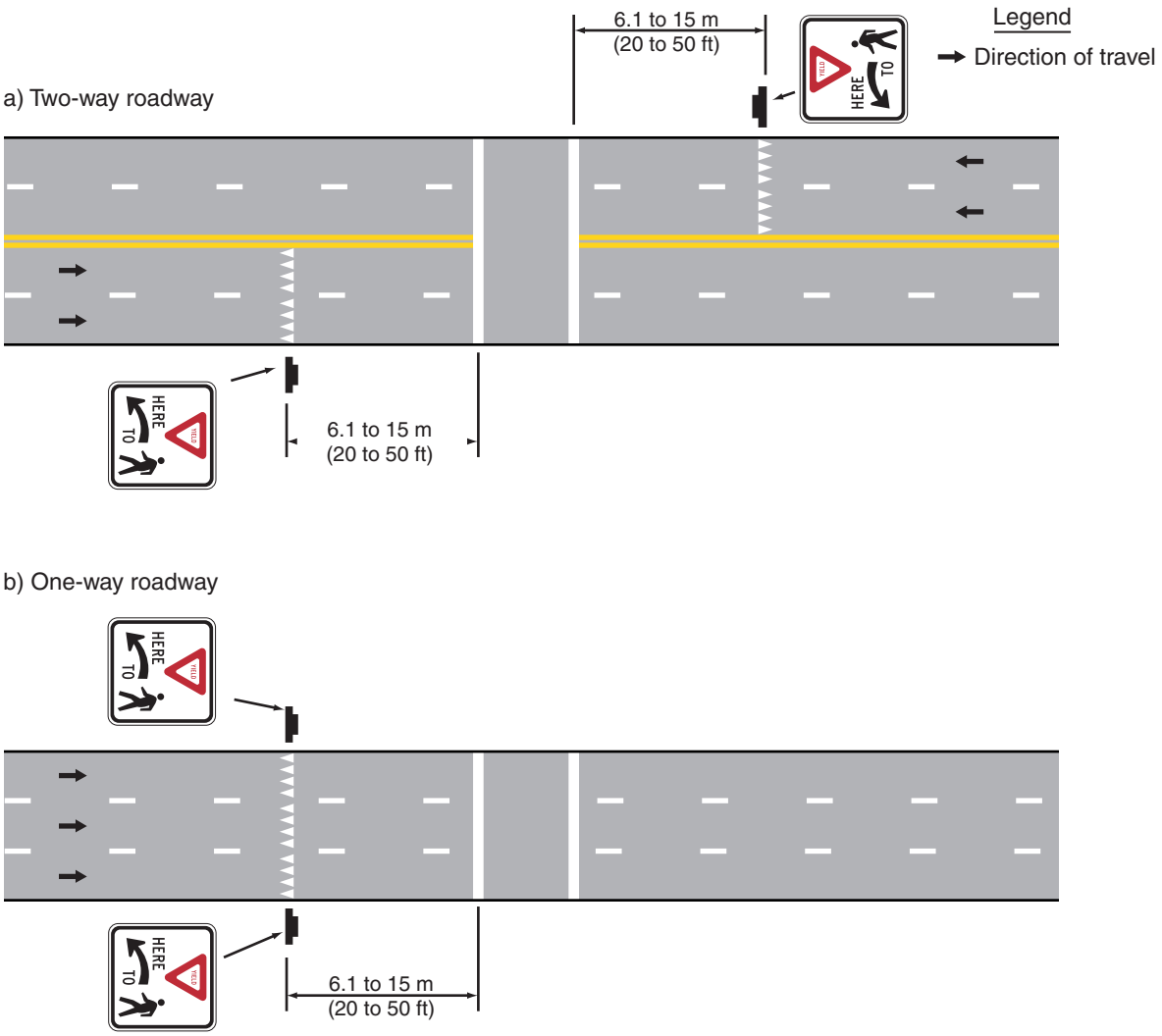
If used at an unsignalized midblock crosswalk, yield lines should be placed adjacent to the Yield Here to Pedestrians sign located 6.1 to 15 m (20 to 50 ft) in advance of the nearest crosswalk line, and parking should be prohibited in the area between the yield line and the crosswalk (see Figure 3B-15).

Stop lines at midblock signalized locations should be placed at least 12 m (40 ft) in advance of the nearest signal indication (see Section 4D.15).

Support:

Drivers who yield too close to crosswalks on multi-lane approaches place pedestrians at risk by blocking other drivers' views of pedestrians.

Figure 3B-15. Examples of Yield Lines at Unsignalized Midblock Crosswalks



Section 3B.17 Crosswalk Markings

Support:

Crosswalk markings provide guidance for pedestrians who are crossing roadways by defining and delineating paths on approaches to and within signalized intersections, and on approaches to other intersections where traffic stops.

Crosswalk markings also serve to alert road users of a pedestrian crossing point across roadways not controlled by highway traffic signals or STOP signs.

At nonintersection locations, crosswalk markings legally establish the crosswalk.

Standard:

When crosswalk lines are used, they shall consist of solid white lines that mark the crosswalk. They shall be not less than 150 mm (6 in) nor greater than 600 mm (24 in) in width.

Guidance:

If transverse lines are used to mark a crosswalk, the gap between the lines should not be less than 1.8 m (6 ft). If diagonal or longitudinal lines are used without transverse lines to mark a crosswalk, the crosswalk should be not less than 1.8 m (6 ft) wide.

Crosswalk lines, if used on both sides of the crosswalk, should extend across the full width of pavement or to the edge of the intersecting crosswalk to discourage diagonal walking between crosswalks (see Figures 3B-15 and 3B-16).

Crosswalks should be marked at all intersections where there is substantial conflict between vehicular and pedestrian movements.

Marked crosswalks also should be provided at other appropriate points of pedestrian concentration, such as at loading islands, midblock pedestrian crossings, or where pedestrians could not otherwise recognize the proper place to cross.

Crosswalk lines should not be used indiscriminately. An engineering study should be performed before they are installed at locations away from highway traffic signals or STOP signs.

Because nonintersection pedestrian crossings are generally unexpected by the road user, warning signs (see Section 2C.41) should be installed and adequate visibility should be provided by parking prohibitions.

Support:

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

Option:

For added visibility, the area of the crosswalk may be marked with white diagonal lines at a 45-degree angle to the line of the crosswalk or with white longitudinal lines parallel to traffic flow as shown in Figure 3B-16.

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

Guidance:

If used, the diagonal or longitudinal lines should be 300 to 600 mm (12 to 24 in) wide and spaced 300 to 1500 mm (12 to 60 in) apart. The marking design should avoid the wheel paths, and the spacing should not exceed 2.5 times the line width.

Option:

When an exclusive pedestrian phase that permits diagonal crossing is provided at a traffic control signal, a marking as shown in Figure 3B-17 may be used for the crosswalk.

Section 3B.18 Parking Space Markings

Support:

Marking of parking space boundaries encourages more orderly and efficient use of parking spaces where parking turnover is substantial. Parking space markings tend to prevent encroachment into fire hydrant zones, bus stops, loading zones, approaches to intersections, curb ramps, and clearance spaces for islands and other zones where parking is restricted. Examples of parking space markings are shown in Figure 3B-18.

Standard:

Parking space markings shall be white.

Option:

Blue lines may supplement white parking space markings of each parking space designated for use only by persons with disabilities.

Support:

Additional parking space markings for the purpose of designating spaces for use only by persons with disabilities are discussed in Section 3B.19 and illustrated in Figure 3B-19.

Section 3B.19 Pavement Word and Symbol Markings

Support:

Word and symbol markings on the pavement are used for the purpose of guiding, warning, or regulating traffic. Symbol messages are preferable to word messages. Examples of standard word and arrow pavement markings are shown in Figures 3B-20 and 3B-21.

Standard:

Word and symbol markings shall be white, except as otherwise noted in this Section.

Guidance:

Letters and numerals should be 1.8 m (6 ft) or more in height.

Figure 3B-16. Examples of Crosswalk Markings

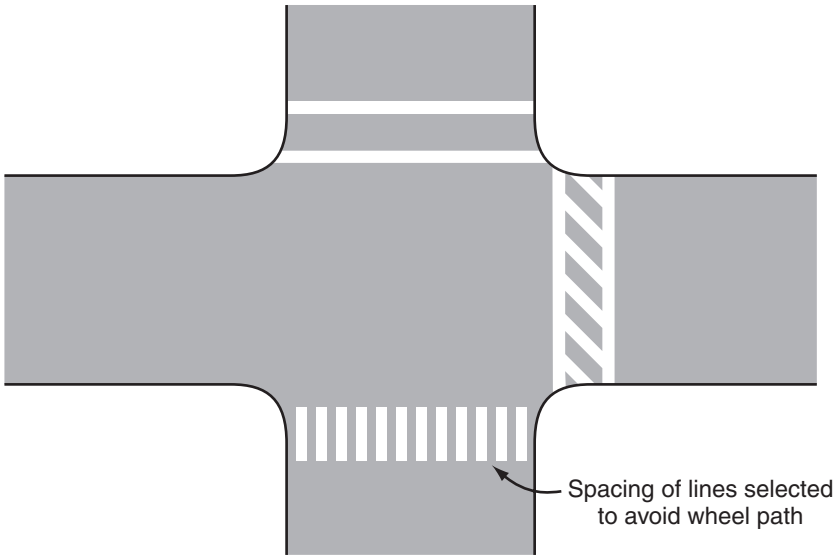


Figure 3B-17. Example of Crosswalk Markings for Exclusive Pedestrian Phase That Permits Diagonal Crossing

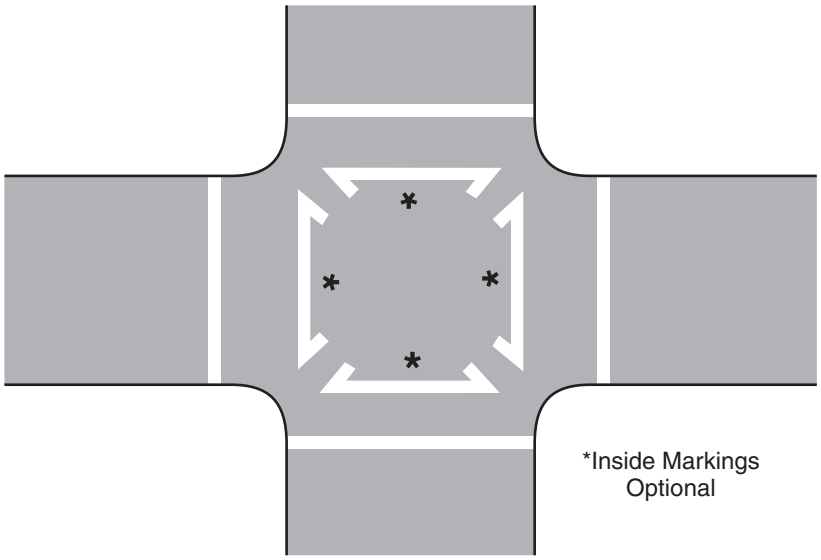


Figure 3B-18. Examples of Parking Space Markings

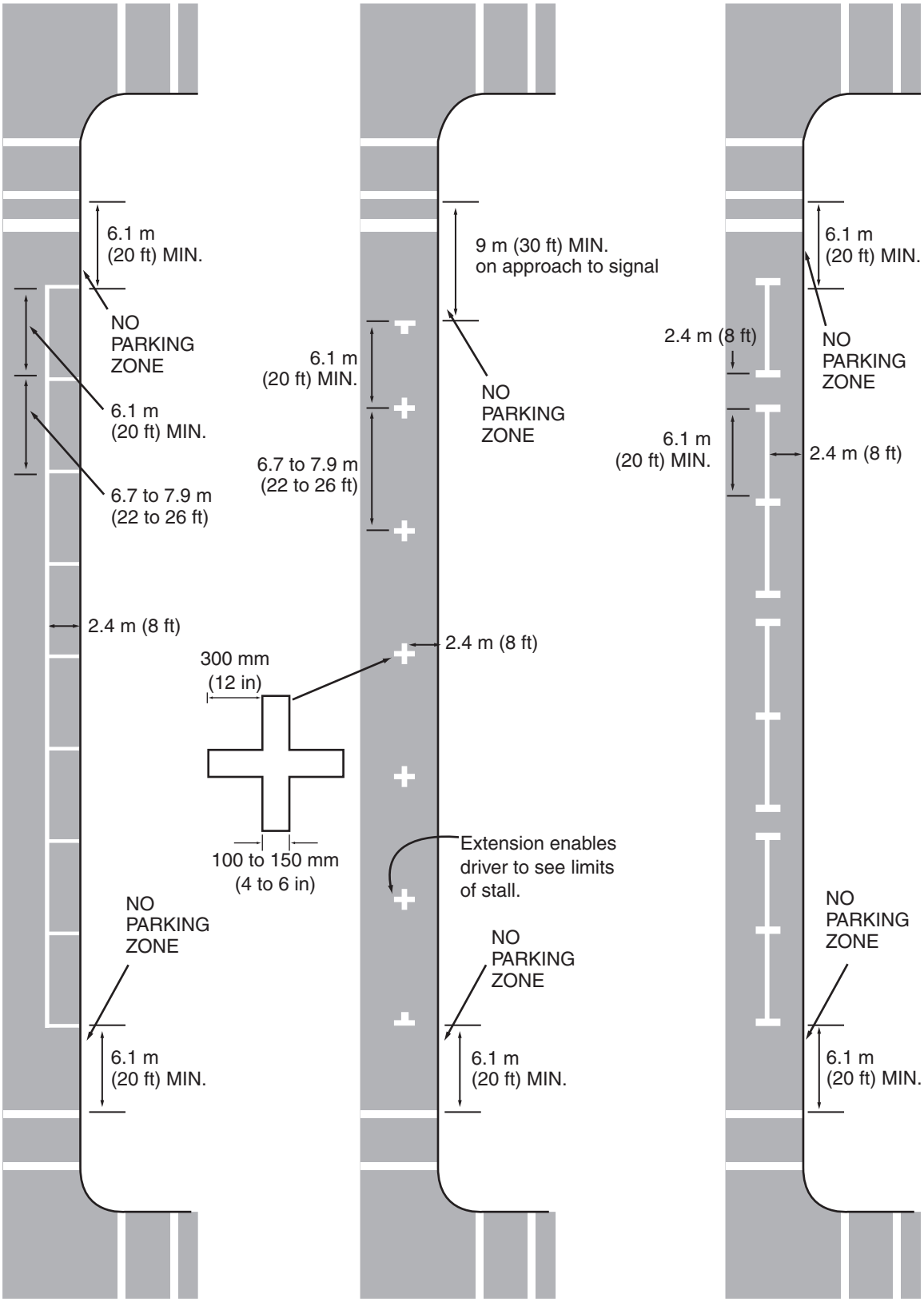


Figure 3B-19. International Symbol of Accessibility Parking Space Marking with Blue Background and White Border Options

Height of symbol:
Minimum = 700 mm (28 in)
Special = 1025 mm (41 in)

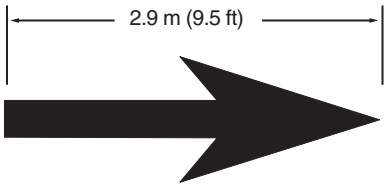
Width of symbol:
Minimum = 600 mm (24 in)
Special = 900 mm (36 in)

** Stroke width:
Minimum = 75 mm (3 in)
Special = 100 mm (4 in)

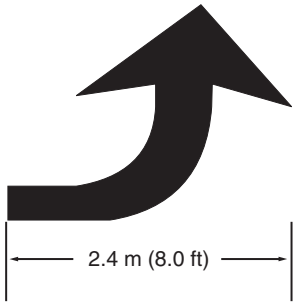
Figure 3B-20. Example of Elongated Letters for Word Pavement Markings

Figure 3B-21. Examples of Standard Arrows for Pavement Markings

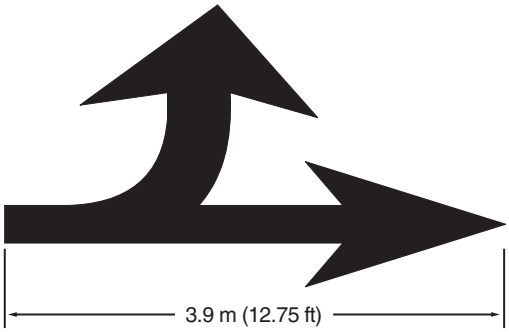
a - Through Lane-Use Arrow



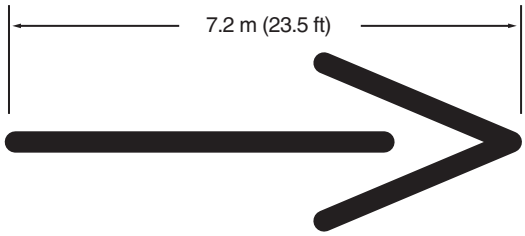
b - Turn Lane-Use Arrow



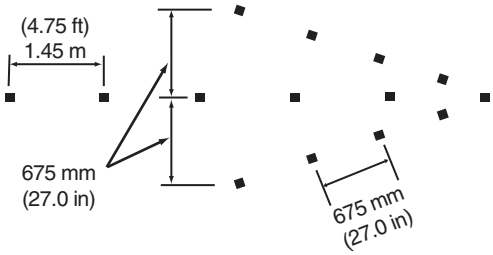
c - Turn and Through Lane-Use Arrow



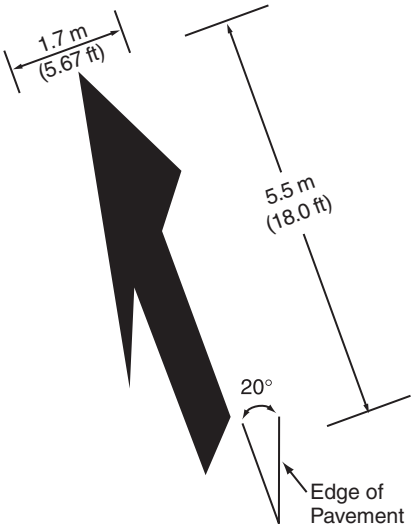
d - Wrong-Way Arrow



e - Wrong-Way Arrow Using Retroreflective Raised Pavement Markers



f - Lane-Reduction Arrow



Typical sizes for normal installation; sizes may be reduced approximately one-third for low-speed urban conditions; larger sizes may be needed for freeways, above average speeds, and other critical locations. A narrow elongated arrow design is optional. For proper proportion, see the Pavement Markings chapter of the “Standard Highway Signs” book (see Section 1A.11).

Word and symbol markings should not exceed three lines of information.

If a pavement marking word message consists of more than one line of information, it should read in the direction of travel. The first word of the message should be nearest to the road user.

Except for the two opposing arrows of a two-way left-turn lane marking (see Figure 3B-7), the longitudinal space between word or symbol message markings, including arrow markings, should be at least four times the height of the characters for low-speed roads, but not more than ten times the height of the characters under any conditions.

The number of different word and symbol markings used should be minimized to provide effective guidance and avoid misunderstanding.

Except as noted in the Option, pavement word and symbol markings should be no more than one lane in width.

Option:

The SCHOOL word marking may extend to the width of two approach lanes (see Section 7C.06).

Guidance:

When the SCHOOL word marking is extended to the width of two approach lanes, the characters should be 3 m (10 ft) or more in height (see Section 7C.06).

Pavement word and symbol markings should be proportionally scaled to fit within the width of the facility upon which they are applied.

Option:

On narrow, low-speed shared-use paths, the pavement words and symbols may be smaller than suggested, but to the relative scale.

The International Symbol of Accessibility parking space markings may be placed in each parking space designated for use by persons with disabilities. A blue background with white border may supplement the wheelchair symbol as shown in Figure 3B-19.

Standard:

Where through traffic lanes approaching an intersection become mandatory turn lanes, lane-use arrow markings (see Figure 3B-21) shall be used and shall be accompanied by standard signs.

Lane use, lane reduction, and wrong-way arrow markings shall be designed as shown in Figure 3B-21.

Guidance:

Where through lanes become mandatory turn lanes, signs or markings should be repeated as necessary to prevent entrapment and to help the road user select the appropriate lane in advance of reaching a queue of waiting vehicles.

Option:

Lane-use arrow markings (see Figure 3B-21) may be used to convey either guidance or mandatory messages.

The ONLY word marking (see Figure 3B-20) may be used to supplement lane-use arrow markings (see Figure 3B-22).

In situations where a lane reduction transition occurs, the lane reduction arrow markings shown in Figure 3B-21 may be used.

Guidance:

Where crossroad channelization or ramp geometrics do not make wrong-way movements difficult, a lane-use arrow should be placed in each lane of an exit ramp near the crossroad terminal where it will be clearly visible to a potential wrong-way road user (see Figure 3B-23).

Option:

The wrong-way arrow markings shown in Figure 3B-21 may be placed near the downstream terminus of a ramp as shown in Figures 3B-23 and 3B-24 to indicate the correct direction of traffic flow and to discourage drivers from traveling in the wrong direction.

A yield-ahead triangle symbol or YIELD AHEAD word pavement marking may be used on approaches to intersections where the approaching traffic will encounter a YIELD sign at the intersection (see Figure 3B-25).

Support:

Lane-use arrow markings are often used to provide guidance in turn bays (see Figure 3B-22), where turns may or may not be mandatory, and in two-way left-turn lanes (see Figure 3B-7).

Figure 3B-22. Examples of Lane Use Control Word and Symbol Markings

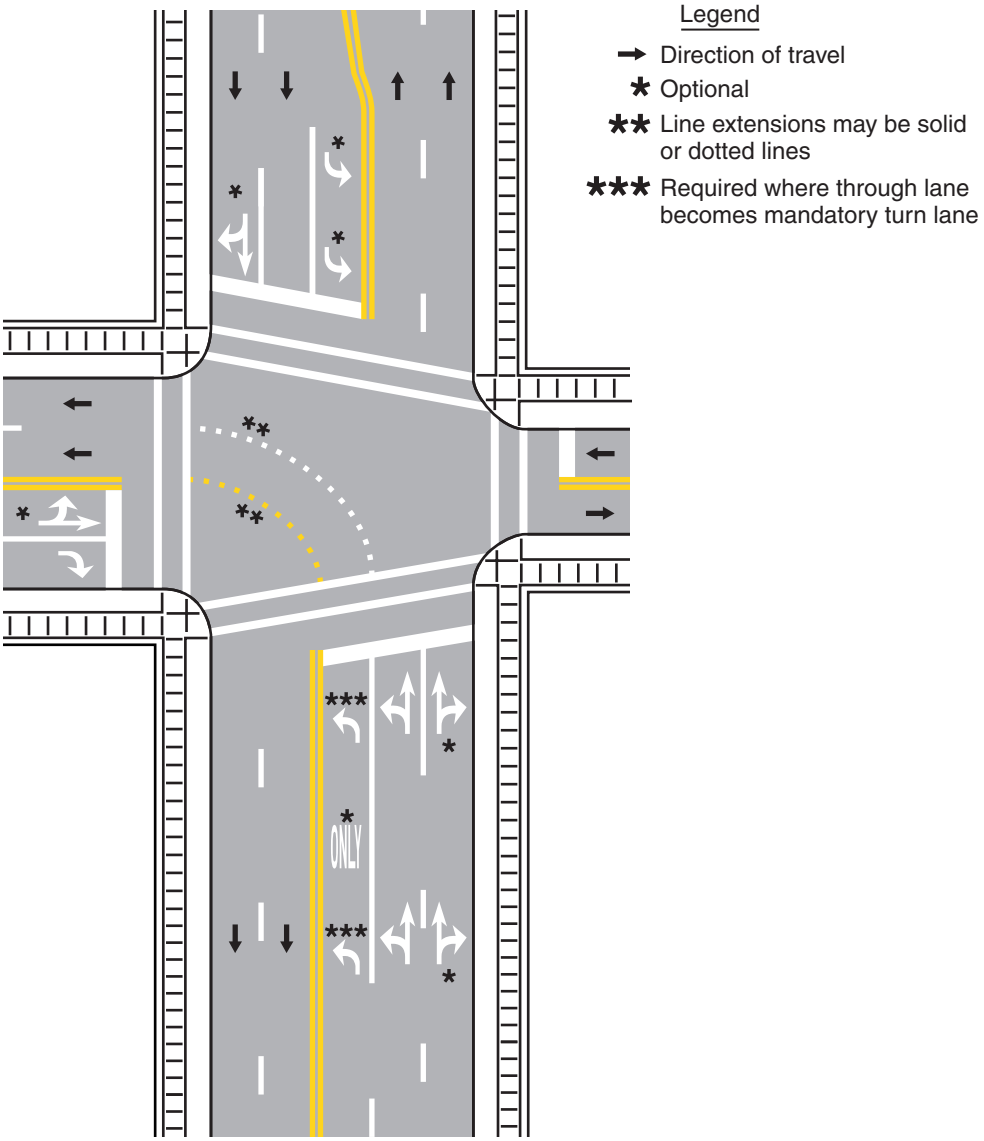


Figure 3B-23. Examples of Arrow Markings at Exit Ramp Terminals

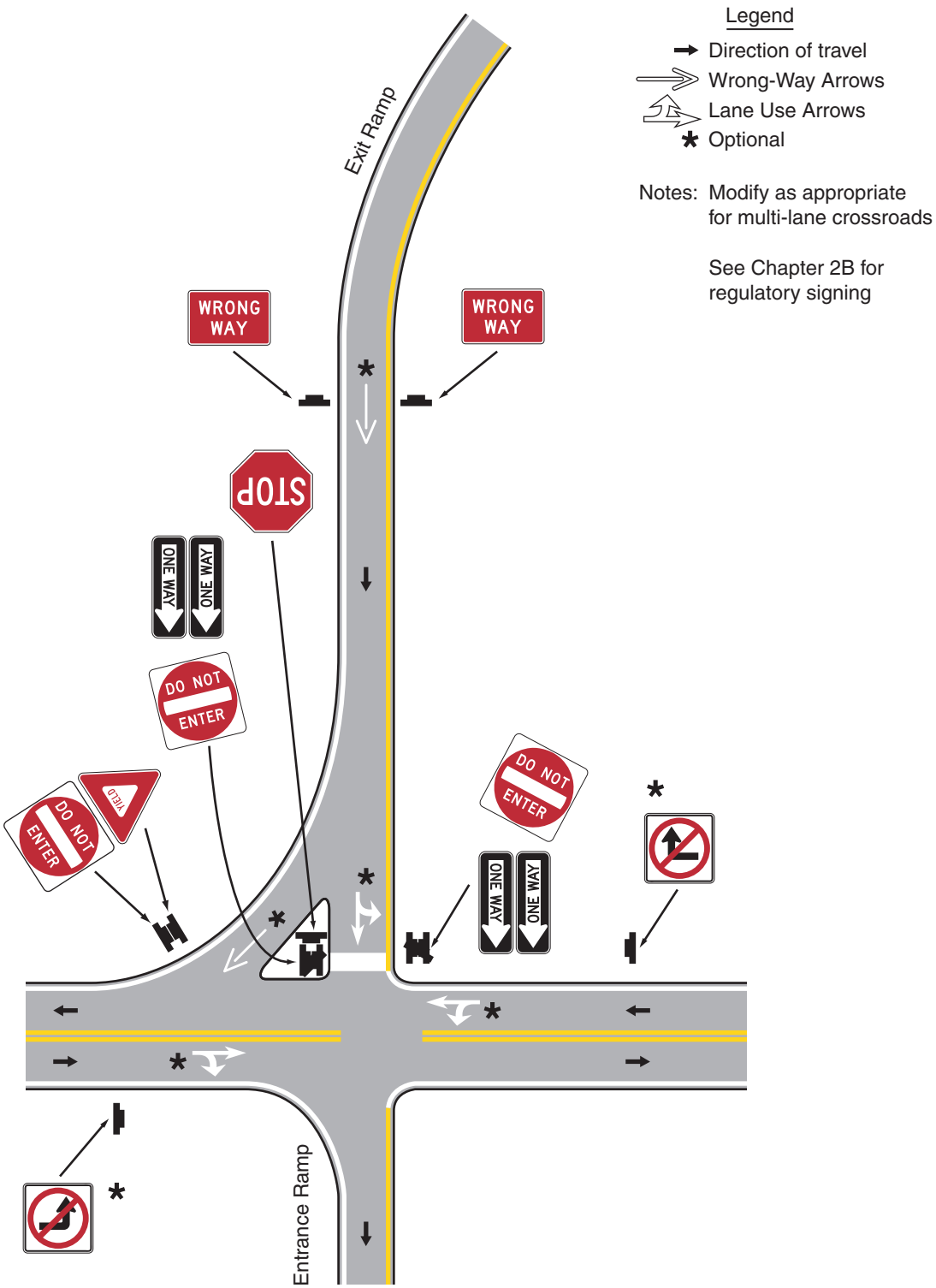


Figure 3B-24. Examples of Arrow Markings at Entrance Ramp Terminals

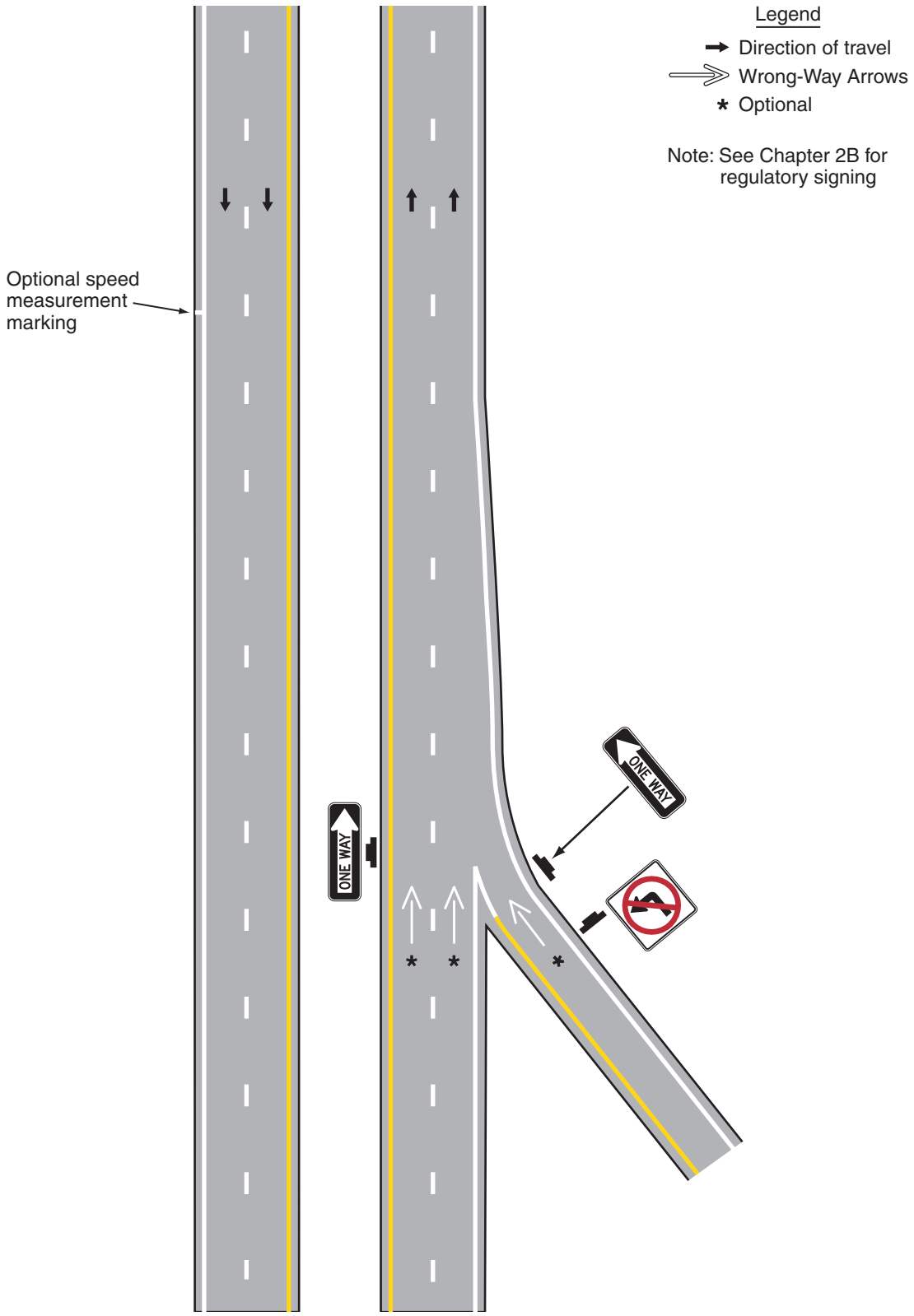
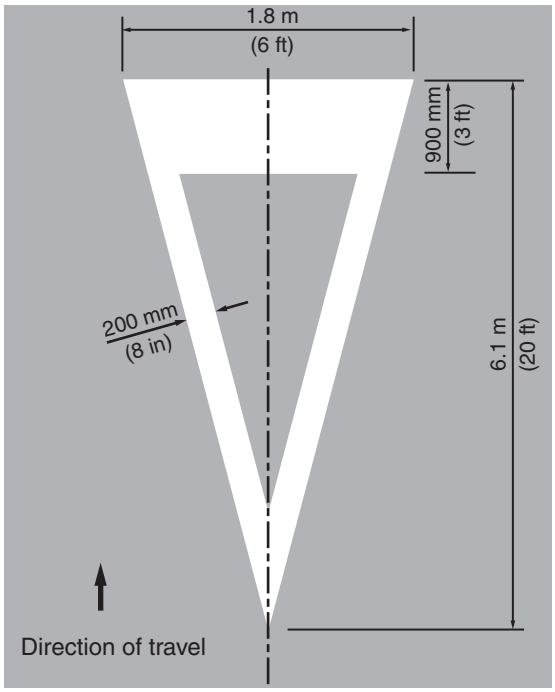
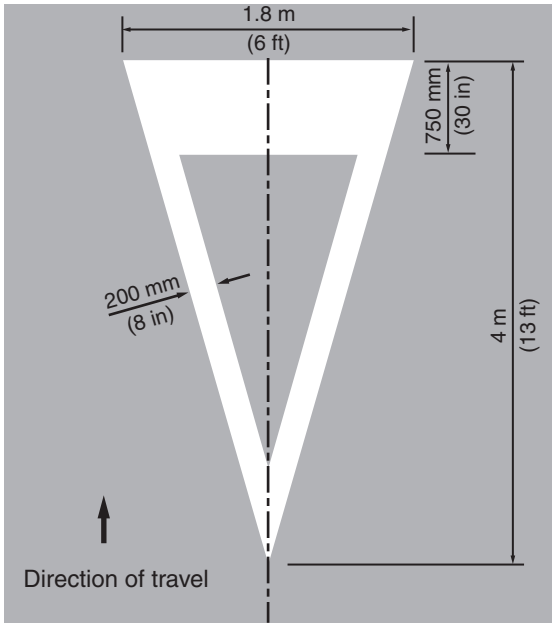


Figure 3B-25. Yield Ahead Triangle Symbols

a - Posted or Statutory Speed Limit 70 km/h (45 mph) or greater



b - Posted or Statutory Speed Limit less than 70 km/h (45 mph)



Option:

Word and symbol markings may include, but are not limited to, the following. Other words or symbols may also be used under certain conditions.

A. Regulatory:
   1. STOP
   2. RIGHT (LEFT) TURN ONLY
   3. 40 km/h (25 MPH)
   4. Arrow Symbols

B. Warning:
   1. STOP AHEAD
   2. YIELD AHEAD
   3. YIELD AHEAD Triangle Symbol
   4. SCHOOL XING
   5. SIGNAL AHEAD
   6. PED XING
   7. SCHOOL
   8. R X R
   9. BUMP
   10. HUMP

C. Guide:
   1. US 40
   2. STATE 135
   3. ROUTE 40

Standard:

Except at the ends of aisles in parking lots, the word STOP shall not be used on the pavement unless accompanied by a stop line (see Section 3B.16) and STOP sign (see Section 2B.04). At the ends of aisles in parking lots, the word STOP shall not be used on the pavement unless accompanied by a stop line.

The word STOP shall not be placed on the pavement in advance of a stop line, unless every vehicle is required to stop at all times.

The yield-ahead triangle symbol or YIELD AHEAD word pavement marking shall not be used unless a YIELD sign (see Section 2B.08) is in place at the intersection. The yield-ahead symbol marking shall be as shown in Figure 3B-25.

Section 3B.20 Speed Measurement Markings

Support:

A speed measurement marking is a transverse marking placed on the roadway to assist the enforcement of speed regulations.

Standard:

Speed measurement markings, if used, shall be white, and shall not be greater than 600 mm (24 in) in width.

Option:

Speed measurement markings may extend 600 mm (24 in) on either side of the centerline or 600 mm (24 in) on either side of edge line markings at 400 m (0.25 mi) intervals over a 1.6 km (1 mi) length of roadway. When paved shoulders of sufficient width are available, the speed measurements markings may be placed entirely on these shoulders. Advisory signs may be used in conjunction with these markings (see Figure 3B-10).

Section 3B.21 Curb Markings

Support:

Curb markings are most often used to indicate parking regulations or to delineate the curb.

Standard:

Signs shall be used with curb markings in those areas where curb markings are frequently obliterated by snow and ice accumulation unless the no parking zone is controlled by statute or local ordinance.

Where curbs are marked, the colors shall conform to the general principles of markings (see Section 3A.04).

Guidance:

Except as noted in the Option, when curb markings are used without signs to convey parking regulations, a legible word marking regarding the regulation (such as "No Parking" or "No Standing") should be placed on the curb.

Option:

Curb markings without word markings or signs may be used to convey a general prohibition by statute of parking within a specified distance of a STOP sign, driveway, fire hydrant, or crosswalk.

Guidance:

Retroreflective solid yellow markings should be placed on the noses of raised medians and curbs of islands that are located in the line of traffic flow where the curb serves to channel traffic to the right of the obstruction.

Retroreflective solid white markings should be used when traffic may pass on either side of the island.

Option:

Local highway agencies may prescribe special colors for curb markings to supplement standard signs for parking regulation.

Support:

Since yellow and white curb markings are frequently used for curb delineation and visibility, it is advisable to establish parking regulations through the installation of standard signs (see Sections 2B.39 through 2B.41).

Where the curbs of the islands become parallel to the direction of traffic flow, it is not necessary to mark the curbs unless an engineering study indicates the need for this type of delineation.

Curbs at openings in a continuous median island need not be marked unless an engineering study indicates the need for this type of marking.

Section 3B.22 Preferential Lane Word and Symbol Markings

Standard:

When a lane is assigned full or part time to a particular class or classes of vehicles, preferential lane markings shall be used.

Signs or signals shall be used with preferential lane word or symbol markings.

All preferential lane word and symbol markings shall be white.

All preferential lane word and symbol markings shall be positioned laterally in the center of the preferred-use lane.

Support:

Preferential lanes identify a wide variety of special uses, including, but not limited to, high-occupancy vehicle (HOV) lanes, bicycle lanes, bus only lanes, taxi only lanes, and light rail transit only.

Standard:

Where a preferential lane use is established, the preferential lane shall be marked with one or more of the following symbol or word markings for the preferential lane use specified:

A. HOV lane—the preferential lane use marking for high-occupancy vehicle lanes shall consist of white lines formed in a diamond shape symbol or the word message HOV. The diamond shall be at least 0.75 m (2.5 ft) wide and 3.7 m (12 ft) in length. The lines shall be at least 150 mm (6 in) in width.

B. Bicycle lane—the preferential lane use marking for a bicycle lane shall consist of a bicycle symbol or the word marking BIKE LANE (see Chapter 9C and Figures 9C-1 and 9C-3 through 9C-6).

C. Bus only lane—the preferential lane use marking for a bus only lane shall consist of the word marking BUS ONLY.

D. Taxi only lane—the preferential lane use marking for a taxi only lane shall consist of the word marking TAXI ONLY.

E. Light rail transit lane—the preferential lane use marking for a light rail transit lane shall consist of the letter T.

F. Other preferential lane use markings shall be identified in accordance with Section 3B.23.

If two or more preferential lane uses are permitted in a single lane, the symbol or word marking for each preferential lane use shall be installed.

Guidance:

Engineering judgment should determine the need for supplemental devices such as tubular markers, traffic cones, or flashing lights.

Support:

The spacing of the markings is an engineering judgment that is based on the prevailing speed, block lengths, distance from intersections, and other factors that affect clear communication to the road user. Markings spaced as close as 24 m (80 ft) apart might be appropriate on City streets, while markings spaced 300 m (1,000 ft) might be appropriate for freeways.

Option:

The vehicle occupancy requirements established for a high-occupancy vehicle lane may be included in sequence after the diamond symbol or HOV word message.

Section 3B.23 Preferential Lane Longitudinal Markings for Motor Vehicles

Standard:

Preferential lane longitudinal markings for motor vehicles shall be marked with the appropriate word or symbol pavement markings in accordance with Section 3B.22.

Support:

Preferential lanes can take many forms depending on the level of usage and the design of the facility. They might be physically separated from the other travel lanes by a barrier, median, or painted neutral area, or they might be concurrent with other travel lanes and be separated only by longitudinal pavement markings. Further, physically separated preferential lanes might operate in the same direction or be reversible.

Option:

Preferential lanes may be operated either full-time (24 hours per day on all days), for extended periods of the day, or part-time (restricted usage during specific hours on specified days).

Standard:

The following four items are presented in tabular form in Table 3B-2:

A. Physically separated, nonreversible preferential lane—the longitudinal pavement markings for preferential lanes that are physically separated from the other travel lanes by a barrier, median, or painted neutral area shall consist of a single normal solid yellow line at the left edge of the travel lane(s), a single normal solid white line at the right edge of the travel lane(s), and if there are two or more preferential lanes, the preferential travel lanes shall be separated with a normal broken white line (see Figure 3B-26a).

B. Physically separated, reversible preferential lane—the longitudinal pavement markings for reversible preferential lanes that are physically separated from the other travel lanes by a barrier, median, or painted neutral area shall consist of a single normal solid white line at both edges of the travel lane(s), and if there are two or more preferential lanes, the preferential travel lanes shall be separated with a normal broken white line (see Figure 3B-26a).

C. Concurrent flow (left side) preferential lane—the longitudinal pavement markings for a full-time or part-time preferential lane on the left side of the other traveled lanes shall consist of a single normal solid yellow line at the left edge of the preferential travel lane(s) and one of the following at the right edge of the preferential travel lane(s):

1. A double solid wide white line where crossing is prohibited (see Figure 3B-26b).
2. A single solid wide white line where crossing is discouraged (see Figure 3B-26c).
3. A single broken wide white line where crossing is permitted (see Figure 3B-26d).

If there are two or more preferential lanes, the preferential travel lanes shall be separated with a normal broken white line.

D. Concurrent flow (right side) preferential lane—the longitudinal pavement markings for a full-time or part-time preferential lane on the right of the other travel lanes shall consist of a single normal solid white line at the right edge of the preferential travel lane(s) if warranted and one of the following at the left edge of the preferential travel lane(s):

1. A double solid wide white line where crossing is prohibited (see Figure 3B-26b).
2. A single solid wide white line where crossing is discouraged (see Figure 3B-26c).
3. A single broken wide white line where crossing is permitted (see Figure 3B-26d).
4. A single dotted normal white line where crossing is permitted for any vehicle to perform a right turn maneuver (see Figure 3B-26e).

If there are two or more preferential lanes, the preferential travel lanes shall be separated with a normal broken white line.

Table 3B-2. Standard Edge Line Lane Markings for Preferential Lanes

Type of Preferential Lane	Left Edge Line	Right Edge Line
Physically Separated, Nonreversible	A single normal solid yellow line	A single normal solid white line
Physically Separated, Reversible	A single normal solid white line	A single normal solid white line
Concurrent Flow— Left Side	A single normal solid yellow line	A double solid wide white line where crossing is prohibited (see Figure 3B-26b) A single solid wide white line where crossing is discouraged (see Figure 3B-26c) A single broken wide white line where crossing is permitted (see Figure 3B-26d)
Concurrent Flow— Right Side	A double solid wide white line where crossing is prohibited (see Figure 3B-26e) A single solid wide white line where crossing is discouraged (see Figure 3B-26e) A single broken wide white line where crossing is permitted (see Figure 3B-26e) A single dotted normal white line where crossing is permitted for any vehicle to perform a right-turn maneuver (see Figure 3B-26e)	A single normal solid white line

Notes: If there are two or more preferential lanes, they shall be separated with a normal broken white line.
The standard lane markings listed in this table are provided in a tabular format for reference.
This information is also described in the second Standard in Section 3B.23.

Figure 3B-26. Examples of Markings for Preferential Lanes
(Sheet 1 of 2)

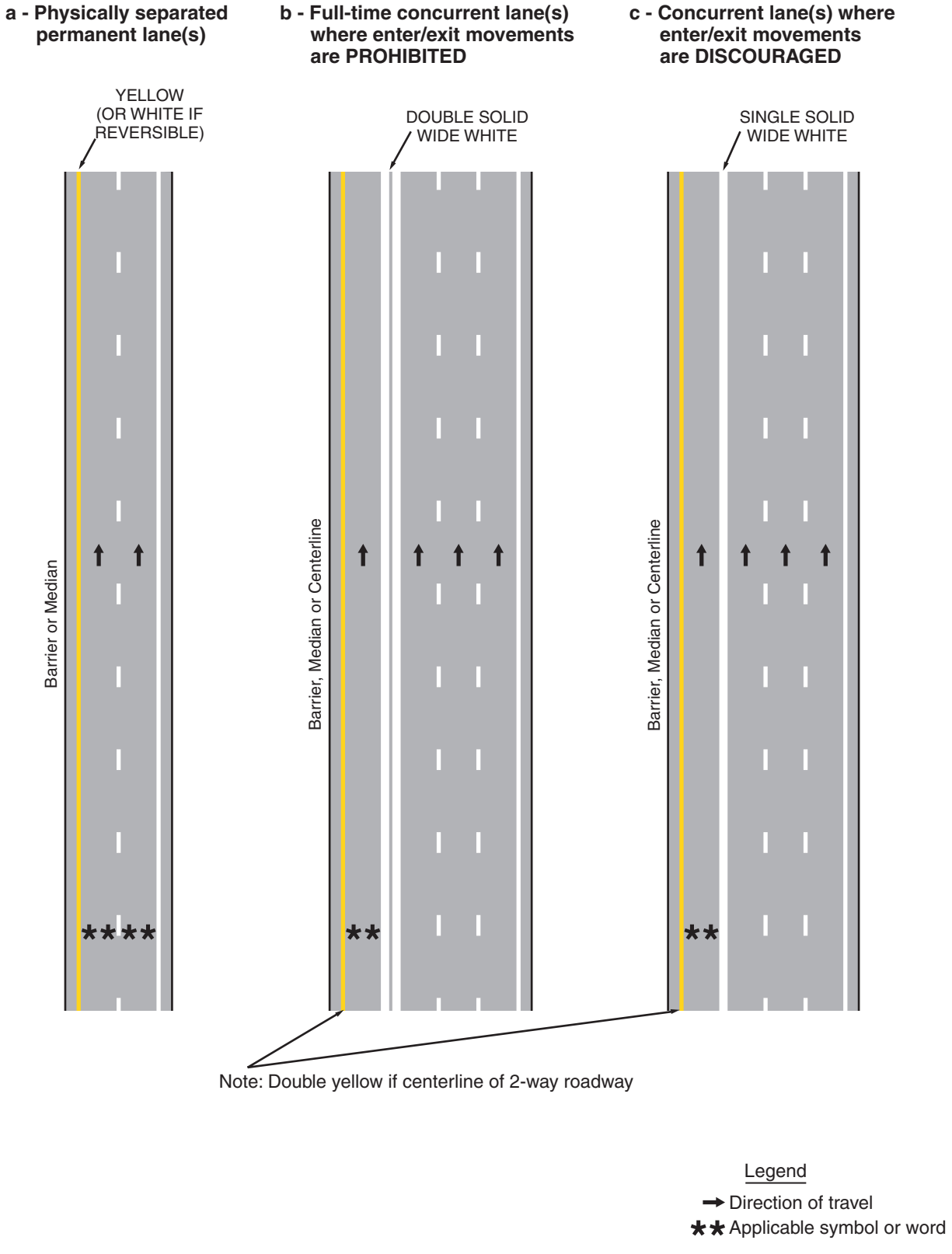
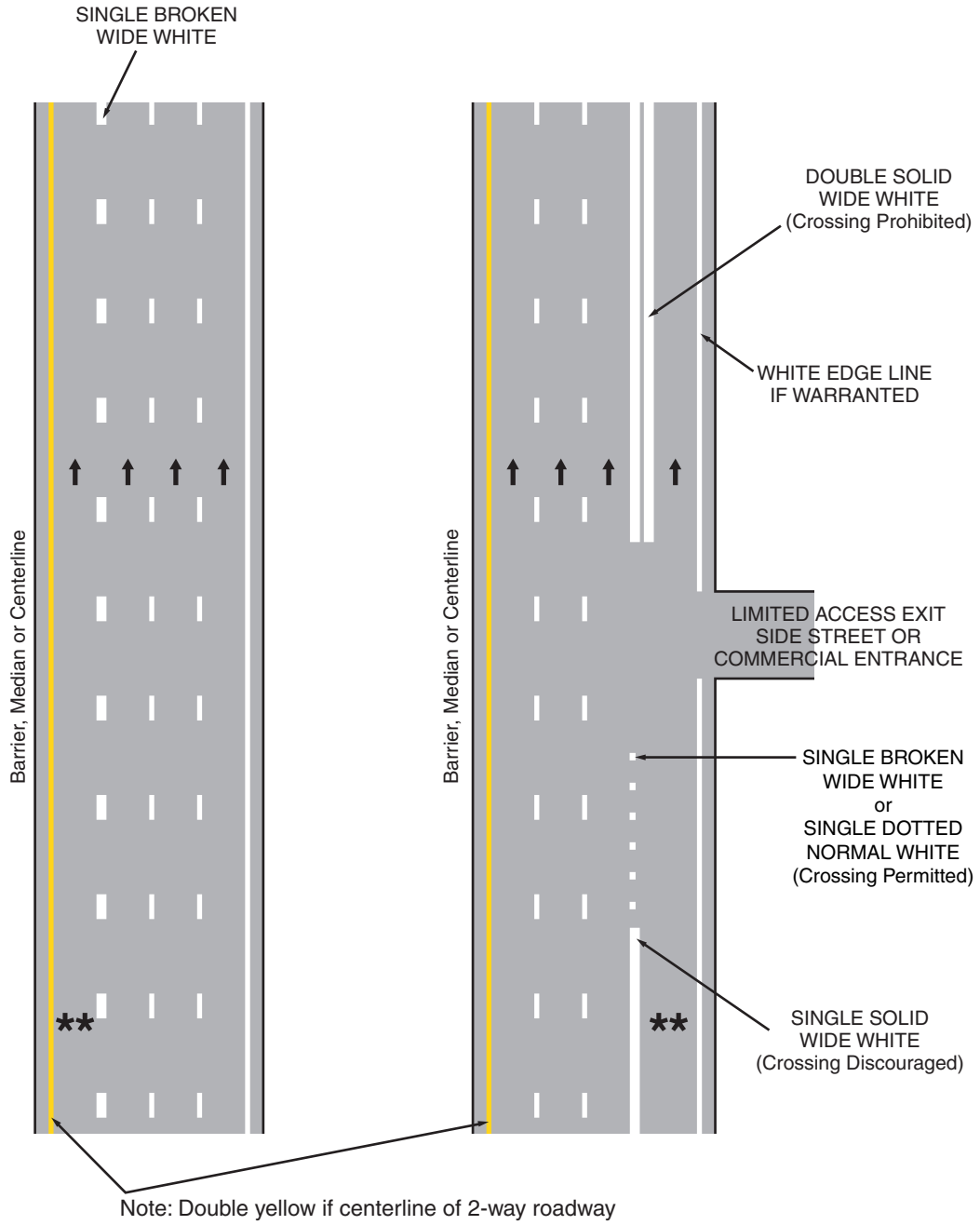


Figure 3B-26. Examples of Markings for Preferential Lanes
(Sheet 2 of 2)

d - Full-time concurrent lane(s) where enter/exit movements are PERMITTED

e - Right Side Concurrent Lane(s)



Legend

→ Direction of travel

** Applicable symbol or word

Guidance:

When concurrent flow preferential lanes and other travel lanes are separated by more than 1.2 m (4 ft), chevron markings should be placed in the neutral area. The chevron spacing should be 30 m (100 ft) or greater.

Option:

For full-time or part-time concurrent flow preferential lanes, the spacing or skip pattern of the single broken wide white line may be reduced. The width of the single broken wide white line may be increased.

Section 3B.24 Markings for Roundabout Intersections

Support:

Roundabout intersections are distinctive circular roadways that have the following three critical characteristics:

A. A requirement to yield at entry which gives a vehicle on the circular roadway the right-of-way;
B. A deflection of the approaching vehicle around the central island; and
C. A flare or widening of the approach to allow for proper operation as needed.

Examples of markings for roundabout intersections are shown in Figures 3B-27 and 3B-28.

Option:

A yellow edge line may be placed around the inner (left) edge of the circular roadway.

Guidance:

A white line should be used on the outer (right) side of the circular roadway as follows: a solid line along the splitter island and a dotted line across the lane(s) entering the roundabout intersection.

Edge line extensions should not be placed across the exits from the circular roadway.

Where crosswalk markings are used, these markings should be located a minimum of 7.6 m (25 ft) upstream from the yield line, or, if none, from the dotted white line.

Option:

Lane lines may be used on the circular roadway if there is more than one lane.

A yield line (see Section 3B.16) may be used to indicate the point behind which vehicles are required to yield at the entrance to a roundabout intersection.

Standard:

Bicycle lane markings shall not be provided on the circular roadway of a roundabout intersection.

Section 3B.25 Markings for Other Circular Intersections

Support:

Other circular intersections include but are not limited to rotaries, traffic circles, and residential traffic calming designs.

Option:

The markings shown in Figures 3B-27 and 3B-28 may be used at other circular intersections when engineering judgment indicates that their presence will benefit drivers or pedestrians.

Section 3B.26 Speed Hump Markings

Standard:

If used, speed hump markings shall be a series of white markings placed on a speed hump to identify its location.

Option:

Speed humps, except those used for crosswalks, may be marked in accordance with Figure 3B-29. The markings shown in Figure 3B-30 may be used where the speed hump also functions as a crosswalk or speed table.

Section 3B.27 Advance Speed Hump Markings

Standard:

If used, advance speed hump markings shall be a special white marking placed in advance of speed humps or other engineered vertical roadway deflections such as dips.

Figure 3B-27. Examples of Markings for Roundabout Intersections with One-Lane Approaches

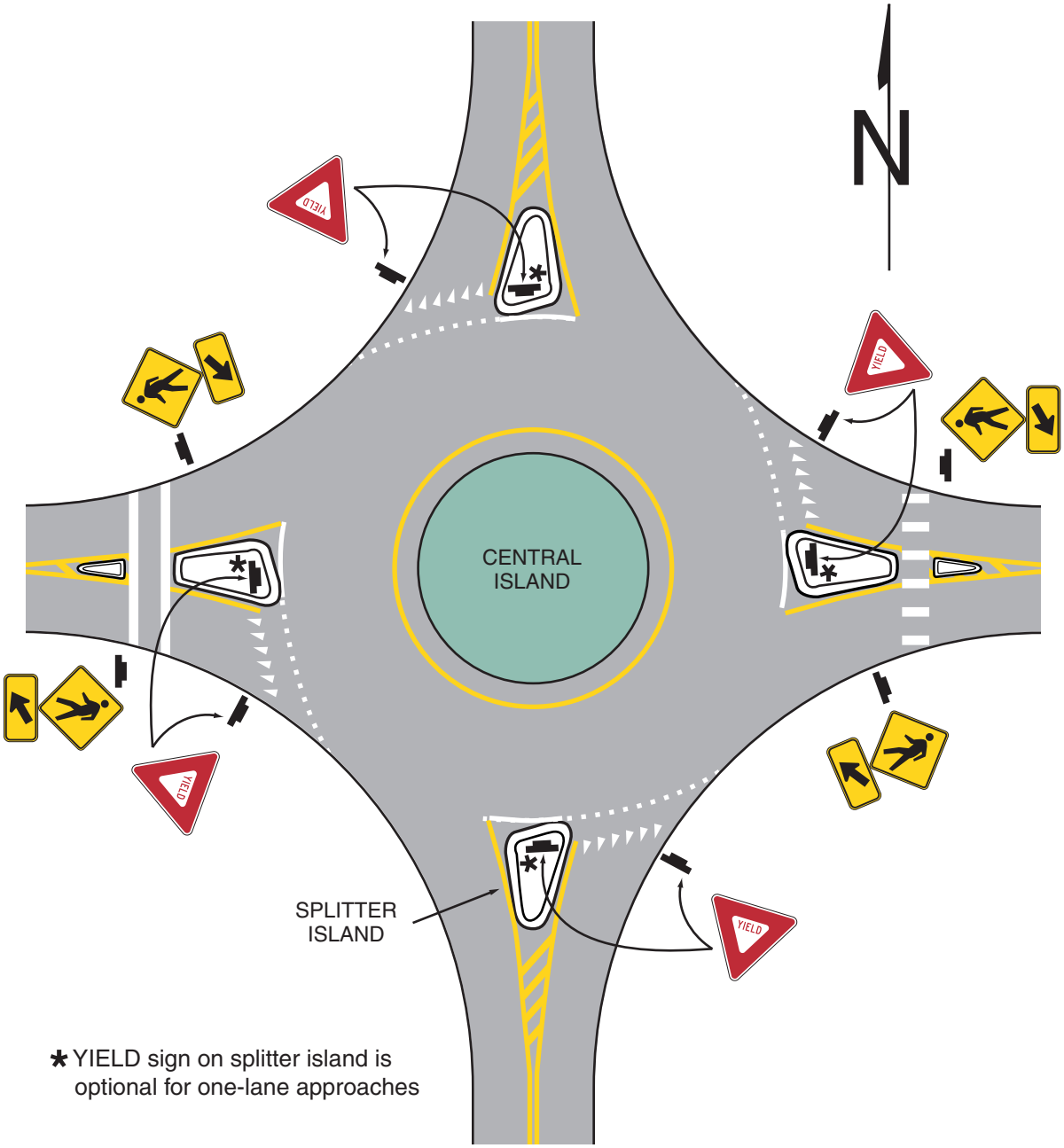


Figure 3B-28. Examples of Markings for Roundabout Intersections with Two-Lane Approaches

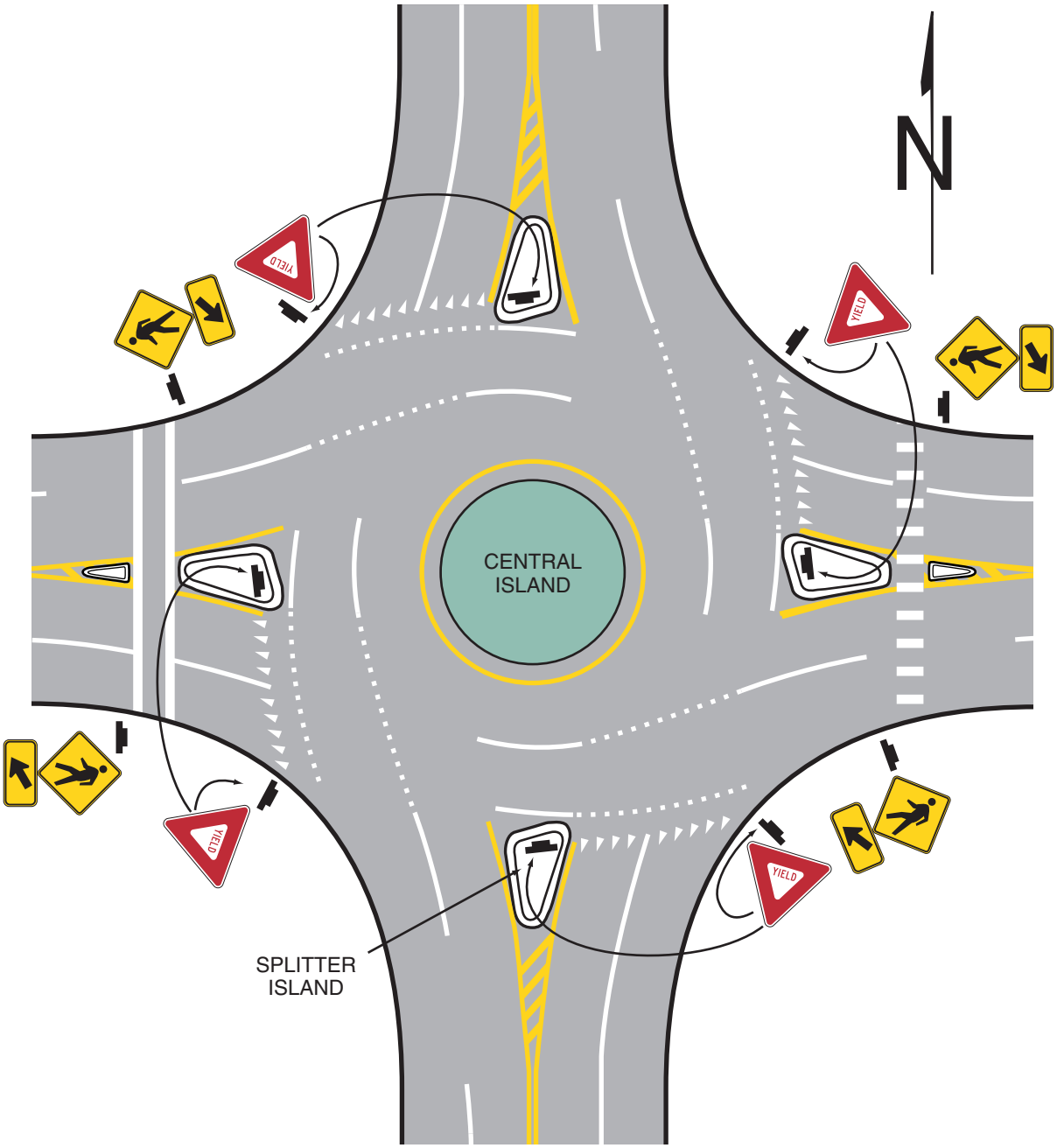
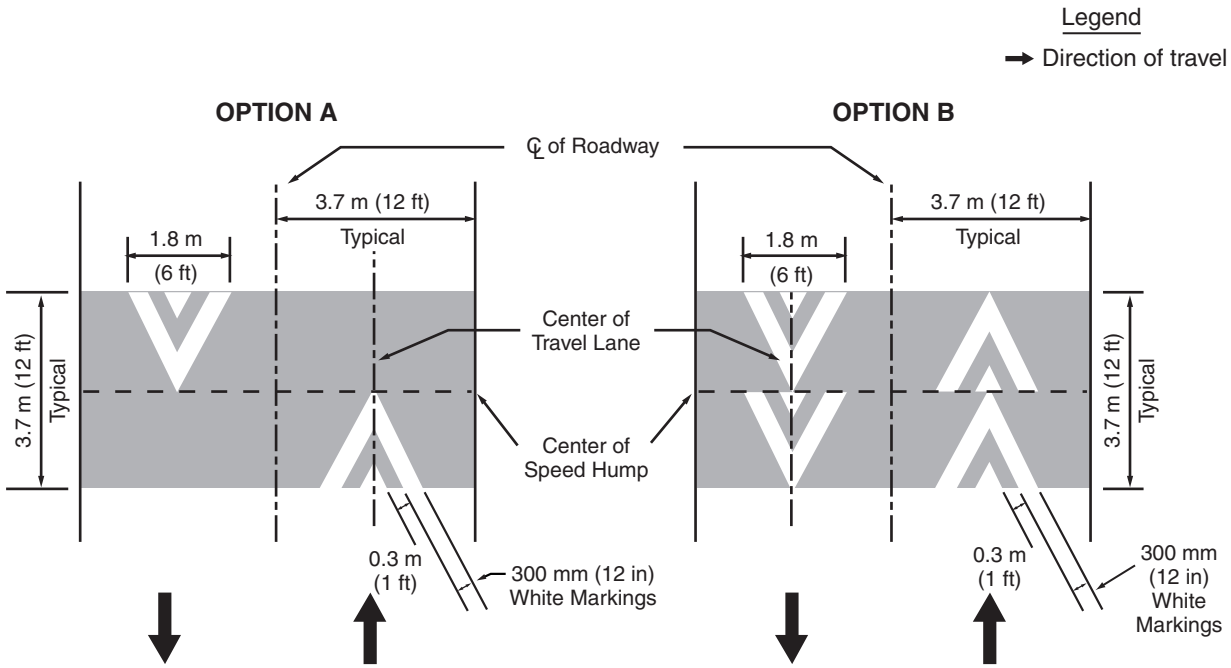


Figure 3B-29. Examples of Pavement Markings for Speed Humps Without Crosswalks



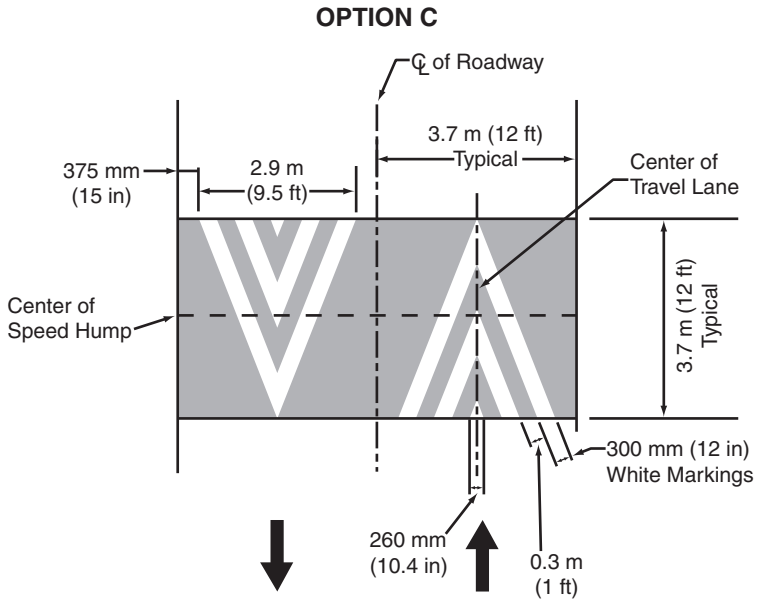
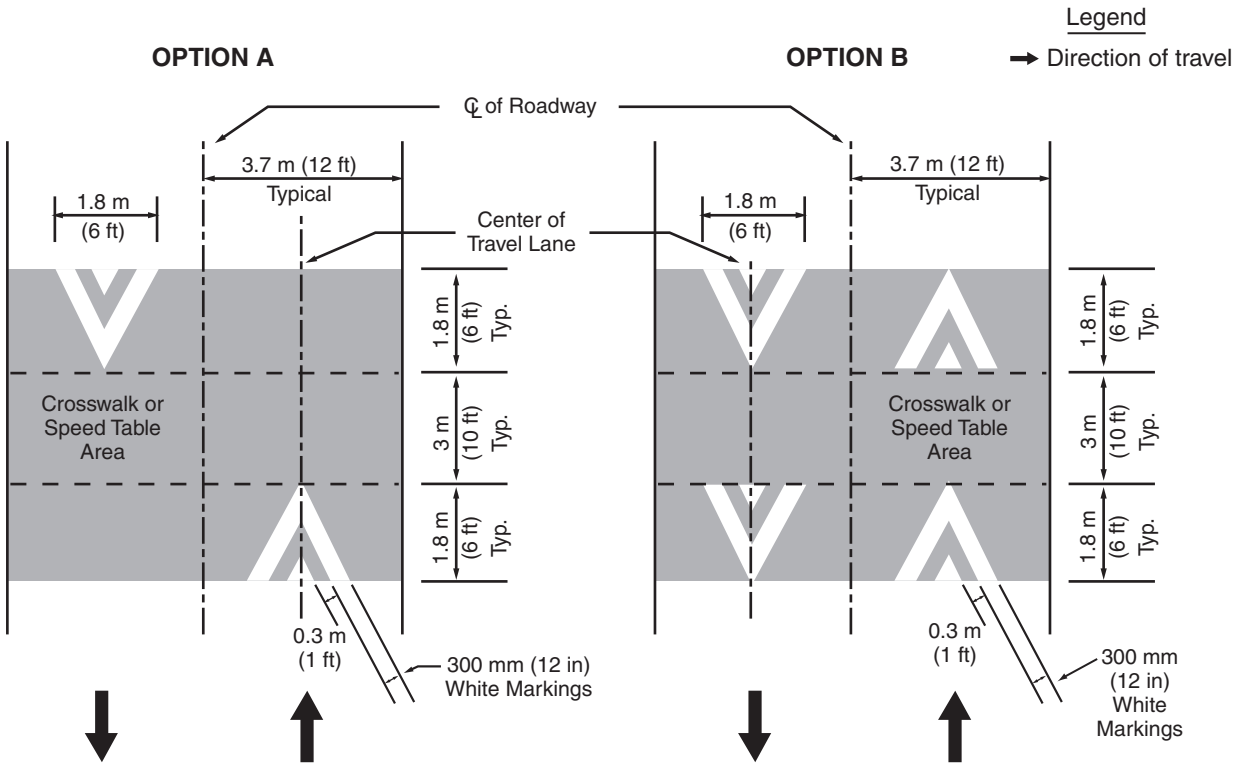


Figure 3B-30. Examples of Pavement Markings for Speed Tables or Speed Humps with Crosswalks



Option:

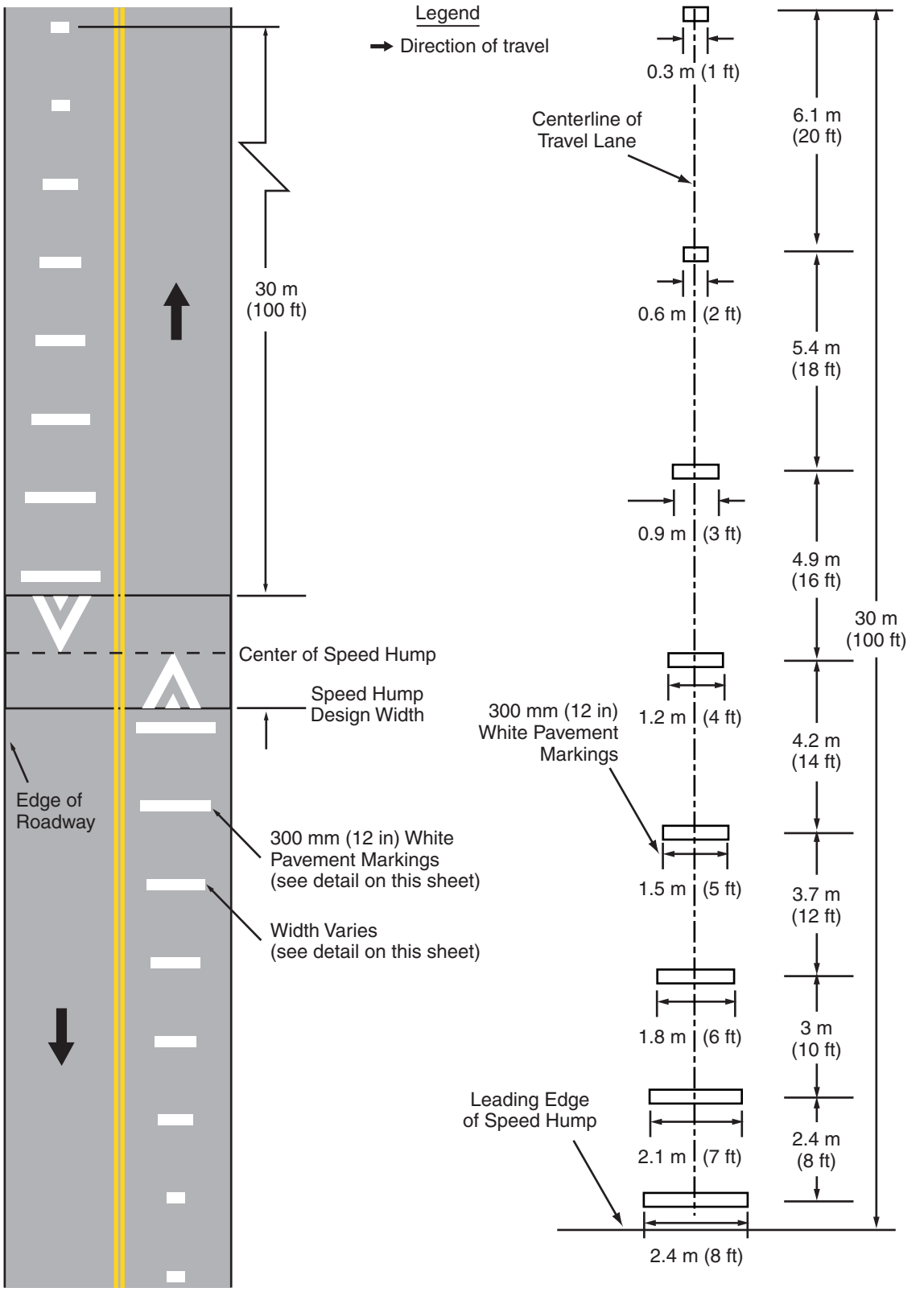
Advance speed hump markings may be used in advance of an engineered vertical roadway deflection where added visibility is desired or where such deflection is not expected (see Figure 3B-31).

Advance pavement wording such as BUMP or HUMP (see Section 3B.19) may be used on the approach to a speed hump either alone or in conjunction with advance speed hump markings. Appropriate advance warning signs may be used in conformance with Section 2C.24.

Guidance:

If used, advance speed hump markings should be installed in each approach lane.

Figure 3B-31. Examples of Advance Warning Markings for Speed Humps



DETAIL—SPEED HUMP ADVANCE WARNING MARKINGS

CHAPTER 3C. OBJECT MARKERS

Section 3C.01 Object Marker Design and Placement Height

Support:

Object markers are used to mark obstructions within or adjacent to the roadway.

Standard:

When used, object markers (see Figure 3C-1) shall consist of an arrangement of one or more of the following types:

Type 1—either a marker consisting of nine yellow retroreflectors, each with a minimum diameter of 75 mm (3 in), mounted symmetrically on a yellow (OM1-1) or black (OM1-2) diamond panel 450 mm (18 in) or more on a side; or on an all-yellow retroreflective diamond panel (OM1-3) of the same size.

Type 2—either a marker (OM2-1V or OM2-1H) consisting of three yellow retroreflectors, each with a minimum diameter of 75 mm (3 in), arranged either horizontally or vertically on a white panel measuring at least 150 x 300 mm (6 x 12 in); or on an all-yellow horizontal or vertical retroreflective panel (OM2-2V or OM2-2H), measuring at least 150 x 300 mm (6 x 12 in).

Type 3—a striped marker, 300 x 900 mm (12 x 36 in), consisting of a vertical rectangle with alternating black and retroreflective yellow stripes sloping downward at an angle of 45 degrees toward the side of the obstruction on which traffic is to pass. The minimum width of the yellow and black stripes shall be 75 mm (3 in).

Support:

A better appearance can be achieved if the black stripes are wider than the yellow stripes.

Type 3 object markers with stripes that begin at the upper right side and slope downward to the lower left side are designated as right object markers (OM-3R). Object markers with stripes that begin at the upper left side and slope downward to the lower right side are designated as left object markers (OM-3L).

Guidance:

When used for marking objects in the roadway or objects that are 2.4 m (8 ft) or less from the shoulder or curb, the mounting height to the bottom of the object marker should be at least 1.2 m (4 ft) above the surface of the nearest traffic lane.

When used to mark objects more than 2.4 m (8 ft) from the shoulder or curb, the mounting height to the bottom of the object marker should be at least 1.2 m (4 ft) above the ground.

Option:

When object markers or markings are applied to an object that by its nature requires a lower or higher mounting, the vertical mounting height may vary according to need.

Section 3C.02 Markings for Objects in the Roadway

Standard:

Obstructions within the roadway shall be marked with a Type 1 or Type 3 object marker. In addition to markers on the face of the obstruction, warning of approach to the obstruction shall be given by appropriate pavement markings (see Section 3B.10).

Option:

To provide additional emphasis, large surfaces such as bridge piers may be painted with diagonal stripes, 300 mm (12 in) or greater in width, similar in design to the Type 3 object marker.

Standard:

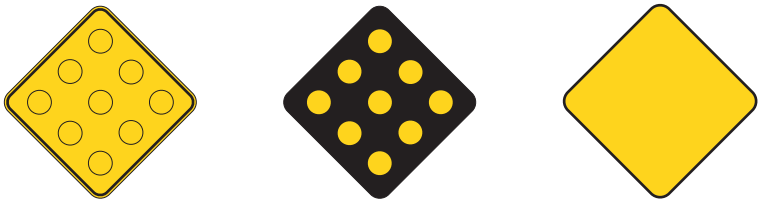
The alternating black and retroreflective yellow stripes (OM-3L, OM-3R) shall be sloped down at an angle of 45 degrees toward the side on which traffic is to pass the obstruction. If traffic can pass to either side of the obstruction, the alternating black and retroreflective yellow stripes (OM-3C) shall form chevrons that point upwards.

Option:

Appropriate signs (see Sections 2B.33 and 2C.20) directing traffic to one or both sides of the obstruction may be used instead of the object marker.

Figure 3C-1. Object Markers and End-of-Roadway Markers

Type 1 Object Markers



OM1-1 OM1-2 OM1-3

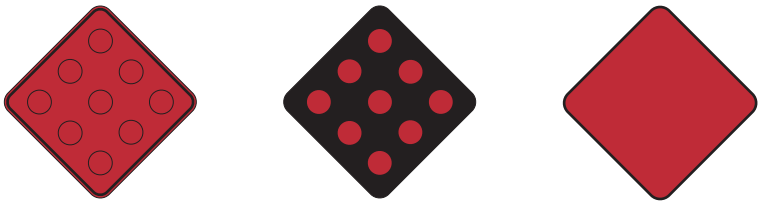
Type 2 Object Markers

OM2-1V OM2-2V OM2-1H OM2-2H

Type 3 Object Markers

OM-3L OM-3C OM-3R

End-of-Roadway Markers



OM4-1 OM4-2 OM4-3

Section 3C.03 Markings for Objects Adjacent to the Roadway

Support:

Objects not actually in the roadway are sometimes so close to the edge of the road that they need a marker. These include underpass piers, bridge abutments, handrails, and culvert headwalls. In other cases there might not be a physical object involved, but other roadside conditions exist, such as narrow shoulders, drop-offs, gores, small islands, and abrupt changes in the roadway alignment, that might make it undesirable for a road user to leave the roadway, and therefore would create a need for a marker.

Option:

Type 2 or Type 3 object markers may be used at locations such as those described in the preceding Support paragraph.

Standard:

If used, the inside edge of the marker shall be in line with the inner edge of the obstruction.

Guidance:

Standard warning signs (see Chapter 2C) should also be used where applicable.

Section 3C.04 End-of-Roadway Markers

Support:

The end-of-roadway marker is used to warn and alert road users of the end of a roadway in other than construction or maintenance areas.

Standard:

The end-of-roadway marker (see Figure 3C-1) shall be one of the following: a marker consisting of nine red retroreflectors, each with a minimum diameter of 75 mm (3 in), mounted symmetrically on a red (OM4-1) or black (OM4-2) diamond panel 450 mm (18 in) or more on a side; or a retroreflective red diamond panel (OM4-3) 450 mm (18 in) or more on a side.

Option:

The end-of-roadway marker may be used in instances where there are no alternate vehicular paths.

Where conditions warrant, more than one marker, or a larger marker with or without a Type III barricade (see Section 3F.01), may be used at the end of the roadway.

Standard:

The minimum mounting height to the bottom of an end-of-roadway marker shall be 1.2 m (4 ft) above the edge of the pavement.

Guidance:

Appropriate advance warning signs (see Chapter 2C) should be used.

CHAPTER 3D. DELINEATORS

Section 3D.01 Delineators

Support:

Delineators are particularly beneficial at locations where the alignment might be confusing or unexpected, such as at lane reduction transitions and curves. Delineators are effective guidance devices at night and during adverse weather. An important advantage of delineators in certain locations is that they remain visible when the roadway is wet or snow covered.

Delineators are considered guidance devices rather than warning devices.

Option:

Delineators may be used on long continuous sections of highway or through short stretches where there are changes in horizontal alignment.

Section 3D.02 Delineator Design

Standard:

Delineators shall be retroreflective devices mounted above the roadway surface and along the side of the roadway in a series to indicate the alignment of the roadway. Delineators shall consist of retroreflector units that are capable of clearly retroreflecting light under normal atmospheric conditions from a distance of 300 m (1,000 ft) when illuminated by the high beams of standard automobile lights.

Retroreflective elements for delineators shall have a minimum dimension of 75 mm (3 in).

Option:

Elongated retroreflective units of appropriate size may be used in place of two retroreflectors mounted as a unit.

Section 3D.03 Delineator Application

Standard:

The color of delineators shall conform to the color of edge lines stipulated in Section 3B.06.

Single delineators shall be provided on the right side of freeways and expressways and on at least one side of interchange ramps, except in the following cases:

A. On tangent sections of freeways and expressways when all of the following conditions are met:
   1. Raised pavement markers are used continuously on lane lines throughout all curves and on all tangents to supplement pavement markings.
   2. Where whole routes or substantial portions of routes have large sections of tangent alignment.
   3. Roadside delineators are used to lead into all curves.

B. On sections of roadways where continuous lighting is in operation between interchanges.

Option:

Delineators may be provided on other classes of roads. Single delineators may be provided on the left side of roadways.

Guidance:

Single delineators should be provided on the outside of curves on interchange ramps.

Where median crossovers are provided for official or emergency use on divided highways and where these crossovers are to be marked, a double yellow delineator should be placed on the left side of the through roadway on the far side of the crossover for each roadway.

Double or vertically elongated delineators should be installed at 30 m (100 ft) intervals along acceleration and deceleration lanes.

Option:

Red delineators may be used on the reverse side of any delineator where it would be viewed by a road user traveling in the wrong direction on that particular ramp or roadway.

Delineators of the appropriate color may be used to indicate a lane reduction transition where either an outside or inside lane merges into an adjacent lane.

Guidance:

For lane reduction transitions, the delineators should be used adjacent to the lane or lanes reduced for the full length of the transition and should be so placed and spaced to show the reduction (see Figure 3B-12).

Support:

Delineators are not necessary for traffic moving in the direction of a wider pavement or on the side of the roadway where the alignment is not affected by the lane reduction transition.

Guidance:

On a highway with continuous delineation on either or both sides, delineators should be carried through transitions.

Option:

On a highway with continuous delineation on either or both sides, the spacing between a series of delineators may be closer.

Standard:

When used on a truck escape ramp, delineators shall be red.

Guidance:

Red delineators should be placed on both sides of truck escape ramps. The delineators should be spaced at 15 m (50 ft) intervals for a distance sufficient to identify the ramp entrance. Delineator spacing beyond the ramp entrance should be adequate for guidance according to the length and design of the escape ramp.

Section 3D.04 Delineator Placement and Spacing

Guidance:

Delineators should be mounted on suitable supports so that the top of the highest retroreflector is 1.2 m (4 ft) above the near roadway edge. They should be placed 0.6 to 2.4 m (2 to 8 ft) outside the outer edge of the shoulder, or if appropriate, in line with the roadside barrier that is 2.4 m (8 ft) or less outside the outer edge of the shoulder.

Delineators should be placed at a constant distance from the edge of the roadway, except that where an obstruction intrudes into the space between the pavement edge and the extension of the line of the delineators, the delineators should be transitioned to be in line with or inside the innermost edge of the obstruction. If the obstruction is a guardrail, the delineators should be transitioned to be either just behind, directly above (in line with), or on the innermost edge of the guardrail.

Delineators should be spaced 60 to 160 m (200 to 530 ft) apart on mainline tangent sections. Delineators should be spaced 30 m (100 ft) apart on ramp tangent sections.

Support:

Examples of delineator installations are shown in Figure 3D-1.

Option:

When uniform spacing is interrupted by such features as driveways and intersections, delineators which would ordinarily be located within the features may be relocated in either direction for a distance not exceeding one quarter of the uniform spacing. Delineators still falling within such features may be eliminated.

Delineators may be transitioned in advance of a lane transition or obstruction as a guide for oncoming traffic.

Guidance:

The spacing of delineators should be adjusted on approaches to and throughout horizontal curves so that several delineators are always simultaneously visible to the road user. The approximate spacing shown in Table 3D-1 should be used.

Figure 3D-1. Examples of Delineator Placement

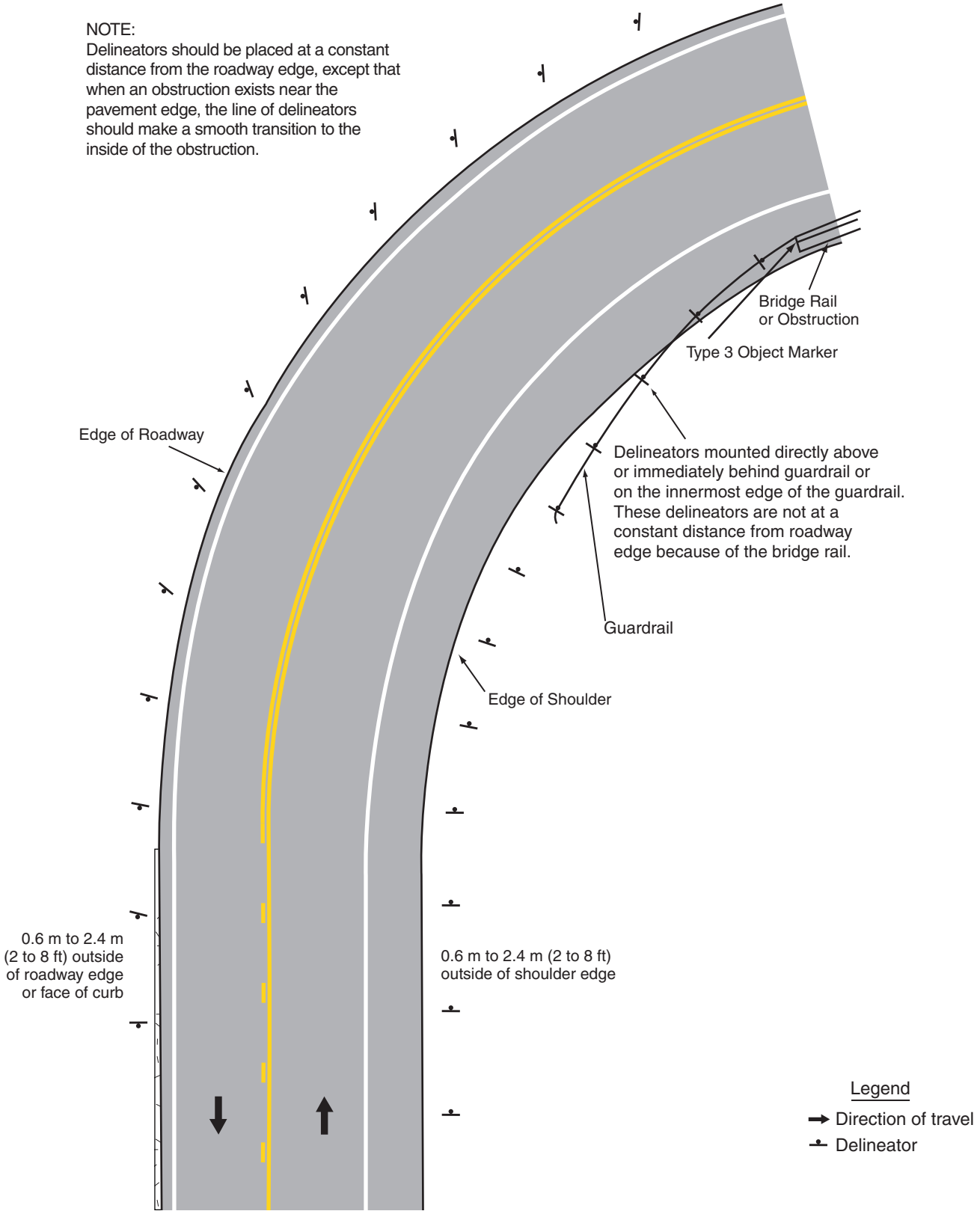


Table 3D-1. Approximate Spacing for Delineators on Horizontal Curves

Radius (R) of Curve (meters)	Approximate Spacing (S) on Curve (meters)
15	6
35	8
55	11
75	13
95	15
125	18
155	20
185	22
215	24
245	26
275	27
305	29

Radius (R) of Curve (feet)	Approximate Spacing (S) on Curve (feet)
50	20
115	25
180	35
250	40
300	50
400	55
500	65
600	70
700	75
800	80
900	85
1,000	90

Distances in feet were rounded to the nearest 5 feet.

Spacing for specific radii may be interpolated from table. The minimum spacing should be 6.1 m (20 ft). The spacing on curves should not exceed 90 m (300 ft). In advance of or beyond a curve, and proceeding away from the end of the curve, the spacing of the first delineator is 2S, the second 3S, and the third 6S but not to exceed 90 m (300 ft). S refers to the delineator spacing for specific radii computed from the formula $S=1.7\sqrt{R-15}$ for metric units and $S=3\sqrt{R-50}$ for English units.

CHAPTER 3E. COLORED PAVEMENTS

Section 3E.01 General

Support:

When used for guidance or regulation of traffic, colored pavements are traffic control devices. Colored pavements also are sometimes used to supplement other traffic control devices.

Colored pavement located between crosswalk lines to emphasize the presence of the crosswalk is not considered to be a traffic control device.

Guidance:

Colored pavements used as traffic control devices should be used only where they contrast significantly with adjoining paved areas.

Colors that degrade the contrast of white crosswalk lines, or that might be mistaken by road users as a traffic control application, should not be used for colored pavement located between crosswalk lines.

Standard:

Colored pavements shall not be used as a traffic control device, unless the device is applicable at all times.

Colored pavements used as traffic control devices shall be limited to the following colors and applications:

A. Yellow shall be used only for flush or raised median islands separating traffic flows in opposite directions.

B. White shall be used for delineation on shoulders, and for flushed or raised channelizing islands where traffic passes on both sides in the same general direction.

CHAPTER 3F. BARRICADES AND CHANNELIZING DEVICES

Section 3F.01 Barricades

Standard:

When used to warn and alert road users of the terminus of a roadway in other than temporary traffic control zones, barricades shall meet the design criteria of Section 6F.63 for a Type III barricade, except that the colors of the stripes shall be retroreflective white and retroreflective red.

Option:

An end-of-roadway marker or markers may be used as described in Section 3C.04. Barricades may be used to mark any of the following conditions:

A. A roadway ends;
B. A ramp or lane closed for operational purposes; or
C. The permanent or semipermanent closure or termination of a roadway.

Guidance:

Appropriate advance warning signs (see Chapter 2C) should be used.

Section 3F.02 Channelizing Devices

Option:

Channelizing devices, such as traffic cones and tubular markers, may be used for general traffic control purposes such as adding emphasis to reversible lane delineation, channelizing lines, or islands.

Standard:

Channelizing devices shall conform to Section 6F.58 and shall be a minimum of 450 mm (18 in) in height.

The minimum height of cones shall be 700 mm (28 in) for use on freeways and other high-speed roadways, and on all facilities when used during hours of darkness or whenever more conspicuous guidance is needed.

The color of channelizing devices used outside of temporary traffic control zones shall be either orange or the same color as the pavement marking that they supplement, or for which they are substituted.

For nighttime use, channelizing devices shall be retroreflective.

Retroreflection of tubular markers shall be a minimum of two 75 mm (3 in) white bands placed a maximum of 50 mm (2 in) from the top with a maximum of 150 mm (6 in) between the bands.

Retroreflection of cones shall be provided by a minimum 150 mm (6 in) white band placed a minimum of 75 mm (3 in) but no more than 100 mm (4 in) from the top.

Retroreflective material shall have a smooth, sealed outer surface that will display a similar color during both day and night.

When 700 mm (28 in) or larger size cones are used, the standard 150 mm (6 in) band shall be supplemented with an additional 100 mm (4 in) white band spaced a minimum of 50 mm (2 in) below the 150 mm (6 in) band.

Guidance:

Channelizing devices should be kept clean and bright to maximize target value.

CHAPTER 3G. ISLANDS

Section 3G.01 General

Support:

Chapter 3G addresses the characteristics of islands as traffic-control devices. Criteria for the design of islands are set forth in "A Policy on Geometric Design of Highways and Streets" (see Section 1A.11).

Standard:

An island for traffic control purposes shall be the defined area between traffic lanes for control of vehicular movements or for pedestrian refuge. Within an intersection area, a median or an outer separation shall be an island.

Option:

An island may be designated by pavement markings, channelizing devices, curbs, pavement edges, or other devices.

Section 3G.02 Approach-End Treatment

Guidance:

The ends of islands first approached by traffic should be preceded by a gradually diverging marking on the roadway surface, to guide vehicles into desired paths of travel along the island edge.

Option:

Approach-end markings that can be readily crossed even at considerable speed may contain slightly raised (usually less than 25 mm (1 in) high) sections of coarse aggregate or other suitable materials to create rumble sections that provide increased visibility of the marked areas and that produce an audible warning to road users traveling across them.

Standard:

Rumble strips or other devices, when used in advance of islands having raised curbs, shall not be placed in such a manner as to constitute an unexpected obstacle.

Guidance:

Bars or buttons should not project more than 25 to 75 mm (1 to 3 in) above the pavement surface and should be designed so that any wheel encroachment within the area will be obvious to the vehicle operator, but will not result in loss of control of the vehicle.

Option:

Bars or buttons may be preceded by rumble sections, or their height may be gradually increased as approached by traffic.

Pavement markings may be used with raised bars to better designate the island area.

Section 3G.03 Island Marking Application

Standard:

Markings, as related to islands, shall consist only of pavement and curb markings, object markers, and delineators.

On the approach to islands, the triangular neutral area in advance of the end of the island shall include pavement markings as described in Section 3B.10.

Option:

As indicated in Section 3G.02, rumble sections, or other similar traffic control designs which contrast with the pavement surface, may also be applied in the triangular neutral area in advance of the end of an island.

Guidance:

When raised bars or buttons are used in these neutral areas, they should be marked with white or yellow retroreflective materials, as determined by the direction or directions of travel they separate.

Section 3G.04 Island Marking Colors

Guidance:

Islands outlined by curbs or pavement markings should be marked with retroreflective white or yellow material as determined by the direction or directions of travel they separate (see Section 3A.04).

The retroreflective area should be of sufficient length to denote the general alignment of the edge of the island along which vehicles travel, including the approach nose, when viewed from the approach to the island.

Option:

On long islands, curb retroreflection may be discontinued such that it does not extend for the entire length of the curb, especially if the island is illuminated or marked with delineators or edge lines.

Section 3G.05 Island Object Markers

Option:

Object markers may be installed alone or in combination with signs (such as KEEP RIGHT, KEEP LEFT, double arrows, or guide signs) located within the island.

Section 3G.06 Island Delineators

Standard:

Delineators installed on islands shall be the same colors as the related edge lines except that, when facing wrong-way traffic, they shall be red (see Section 3D.03).

Each roadway through an intersection shall be considered separately in positioning delineators to assure maximum effectiveness.

Manual on Uniform Traffic Control Devices

for Streets and Highways

2003 EDITION

Part 4
Highway Traffic Signals

U.S. Department of Transportation
Federal Highway Administration

PART 4. HIGHWAY TRAFFIC SIGNALS

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CHAPTER 4A. GENERAL

Section 4A.01 Types

Support:

The following types and uses of highway traffic signals are discussed in Part 4: traffic control signals; pedestrian signals; emergency-vehicle traffic control signals; traffic control signals for one-lane, two-way facilities; traffic control signals for freeway entrance ramps; traffic control signals for movable bridges; lane-use control signals; flashing beacons; and in-roadway lights.

Section 4A.02 Definitions Relating to Highway Traffic Signals

Standard:

The following technical terms, when used in Part 4, shall be defined as follows:

1. **Accessible Pedestrian Signal—a device that communicates information about pedestrian timing in nonvisual format such as audible tones, verbal messages, and/or vibrating surfaces.**
2. **Active Grade Crossing Warning System—the flashing-light signals, with or without warning gates, together with the necessary control equipment used to inform road users of the approach or presence of trains at highway-rail grade crossings or highway-light rail transit grade crossings.**
3. **Actuated Operation—a type of traffic control signal operation in which some or all signal phases are operated on the basis of actuation.**
4. **Actuation—initiation of a change in or extension of a traffic signal phase through the operation of any type of detector.**
5. **Approach—all lanes of traffic moving towards an intersection or a midblock location from one direction, including any adjacent parking lane(s).**
6. **Average Day—a day representing traffic volumes normally and repeatedly found at a location, typically a weekday when volumes are influenced by employment or a weekend day when volumes are influenced by entertainment or recreation.**
7. **Backplate—see Signal Backplate.**
8. **Beacon—a highway traffic signal with one or more signal sections that operates in a flashing mode.**
9. **Conflict Monitor—a device used to detect and respond to improper or conflicting signal indications and improper operating voltages in a traffic controller assembly.**
10. **Controller Assembly—a complete electrical device mounted in a cabinet for controlling the operation of a highway traffic signal.**
11. **Controller Unit—that part of a controller assembly that is devoted to the selection and timing of the display of signal indications.**
12. **Crosswalk—(a) that part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or in the absence of curbs, from the edges of the traversable roadway, and in the absence of a sidewalk on one side of the roadway, the part of a roadway included within the extension of the lateral lines of the sidewalk at right angles to the centerline; (b) any portion of a roadway at an intersection or elsewhere distinctly indicated as a pedestrian crossing by lines on the surface, which may be supplemented by a contrasting pavement texture, style, or color.**
13. **Cycle Length—the time required for one complete sequence of signal indications.**
14. **Dark Mode—the lack of all signal indications at a signalized location. (The dark mode is most commonly associated with power failures, ramp meters, beacons, and some movable bridge signals.)**
15. **Detector—a device used for determining the presence or passage of vehicles or pedestrians.**
16. **Dual-Arrow Signal Section—a type of signal section designed to include both a yellow arrow and a green arrow.**
17. **Emergency Vehicle Traffic Control Signal—a special traffic control signal that assigns the right-of-way to an authorized emergency vehicle.**
18. **Flasher—a device used to turn highway traffic signal indications on and off at a repetitive rate of approximately once per second.**
19. **Flashing—an operation in which a highway traffic signal indication is turned on and off repetitively.**
20. **Flashing Mode—a mode of operation in which at least one traffic signal indication in each vehicular signal face of a highway traffic signal is turned on and off repetitively.**
21. **Full-Actuated Operation—a type of traffic control signal operation in which all signal phases function on the basis of actuation.**

22. Highway Traffic Signal—a power-operated traffic control device by which traffic is warned or directed to take some specific action. These devices do not include signals at toll plazas, power-operated signs, illuminated pavement markers, warning lights (see Section 6F.78), or steady-burning electric lamps.
23. In-Roadway Lights—a special type of highway traffic signal installed in the roadway surface to warn road users that they are approaching a condition on or adjacent to the roadway that might not be readily apparent and might require the road users to slow down and/or come to a stop.
24. Intersection—(a) the area embraced within the prolongation or connection of the lateral curb lines, or if none, the lateral boundary lines of the roadways of two highways that join one another at, or approximately at, right angles, or the area within which vehicles traveling on different highways that join at any other angle might come into conflict; (b) the junction of an alley or driveway with a roadway or highway shall not constitute an intersection.
25. Intersection Control Beacon—a beacon used only at an intersection to control two or more directions of travel.
26. Interval—the part of a signal cycle during which signal indications do not change.
27. Interval Sequence—the order of appearance of signal indications during successive intervals of a signal cycle.
28. Lane-Use Control Signal—a signal face displaying signal indications to permit or prohibit the use of specific lanes of a roadway or to indicate the impending prohibition of such use.
29. Lens—see Signal Lens.
30. Louver—see Signal Louver.
31. Major Street—the street normally carrying the higher volume of vehicular traffic.
32. Malfunction Management Unit—same as Conflict Monitor.
33. Minor Street—the street normally carrying the lower volume of vehicular traffic.
34. Movable Bridge Resistance Gate—a type of traffic gate, which is located downstream of the movable bridge warning gate, that provides a physical deterrent to vehicle and/or pedestrian traffic when placed in the appropriate position.
35. Movable Bridge Signal—a highway traffic signal installed at a movable bridge to notify traffic to stop during periods when the roadway is closed to allow the bridge to open.
36. Movable Bridge Warning Gate—a type of traffic gate designed to warn, but not primarily to block, vehicle and/or pedestrian traffic when placed in the appropriate position.
37. Pedestrian Change Interval—an interval during which the flashing UPRAISED HAND (symbolizing DONT WALK) signal indication is displayed. When a verbal message is provided at an accessible pedestrian signal, the verbal message is "wait."
38. Pedestrian Clearance Time—the time provided for a pedestrian crossing in a crosswalk, after leaving the curb or shoulder, to travel to the far side of the traveled way or to a median.
39. Pedestrian Signal Head—a signal head, which contains the symbols WALKING PERSON (symbolizing WALK) and UPRAISED HAND (symbolizing DONT WALK), that is installed to direct pedestrian traffic at a traffic control signal.
40. Permissive Mode—a mode of traffic control signal operation in which, when a CIRCULAR GREEN signal indication is displayed, left or right turns are permitted to be made after yielding to pedestrians and/or oncoming traffic.
41. Platoon—a group of vehicles or pedestrians traveling together as a group, either voluntarily or involuntarily, because of traffic signal controls, geometrics, or other factors.
42. Preemption Control—the transfer of normal operation of a traffic control signal to a special control mode of operation.
43. Pretimed Operation—a type of traffic control signal operation in which none of the signal phases function on the basis of actuation.
44. Priority Control—a means by which the assignment of right-of-way is obtained or modified.
45. Protected Mode—a mode of traffic control signal operation in which left or right turns are permitted to be made when a left or right GREEN ARROW signal indication is displayed.
46. Pushbutton—a button to activate pedestrian timing.
47. Pushbutton Locator Tone—a repeating sound that informs approaching pedestrians that they are required to push a button to actuate pedestrian timing and that enables pedestrians who have visual disabilities to locate the pushbutton.
48. Ramp Control Signal—a highway traffic signal installed to control the flow of traffic onto a freeway at an entrance ramp or at a freeway-to-freeway ramp connection.
49. Ramp Meter—see Ramp Control Signal.
50. Red Clearance Interval—an optional interval that follows a yellow change interval and precedes the next conflicting green interval.

51. Right-of-Way (Assignment)—the permitting of vehicles and/or pedestrians to proceed in a lawful manner in preference to other vehicles or pedestrians by the display of signal indications.
52. Roadway Network—a geographical arrangement of intersecting roadways.
53. Semiactuated Operation—a type of traffic control signal operation in which at least one, but not all, signal phases function on the basis of actuation.
54. Separate Left-Turn Signal Face—a signal face for controlling a left-turn movement that sometimes displays a different color of circular signal indication than the adjacent through signal faces display.
55. Shared Left-Turn Signal Face—a signal face, for controlling both a left turn movement and the adjacent through movement, that always displays the same color of circular signal indication that the adjacent through signal face or faces display.
56. Signal Backplate—a thin strip of material that extends outward from and parallel to a signal face on all sides of a signal housing to provide a background for improved visibility of the signal indications.
57. Signal Coordination—the establishment of timed relationships between adjacent traffic control signals.
58. Signal Face—that part of a traffic control signal provided for controlling one or more traffic movements on a single approach.
59. Signal Head—an assembly of one or more signal sections.
60. Signal Housing—that part of a signal section that protects the light source and other required components.
61. Signal Indication—the illumination of a signal lens or equivalent device.
62. Signal Lens—that part of the signal section that redirects the light coming directly from the light source and its reflector, if any.
63. Signal Louver—a device that can be mounted inside a signal visor to restrict visibility of a signal indication from the side or to limit the visibility of the signal indication to a certain lane or lanes, or to a certain distance from the stop line.
64. Signal Phase—the right-of-way, yellow change, and red clearance intervals in a cycle that are assigned to an independent traffic movement or combination of movements.
65. Signal Section—the assembly of a signal housing, signal lens, and light source with necessary components to be used for providing one signal indication.
66. Signal System—two or more traffic control signals operating in signal coordination.
67. Signal Timing—the amount of time allocated for the display of a signal indication.
68. Signal Visor—that part of a signal section that directs the signal indication specifically to approaching traffic and reduces the effect of direct external light entering the signal lens.
69. Signal Warrant—a threshold condition that, if found to be satisfied as part of an engineering study, shall result in analysis of other traffic conditions or factors to determine whether a traffic control signal or other improvement is justified.
70. Speed Limit Sign Beacon—a beacon used to supplement a SPEED LIMIT sign.
71. Steady (Steady Mode)—the continuous illumination of a signal indication for the duration of an interval, signal phase, or consecutive signal phases.
72. Stop Beacon—a beacon used to supplement a STOP sign, a DO NOT ENTER sign, or a WRONG WAY sign.
73. Traffic Control Signal (Traffic Signal)—any highway traffic signal by which traffic is alternately directed to stop and permitted to proceed.
74. Vibrotactile Pedestrian Device—a device that communicates, by touch, information about pedestrian timing using a vibrating surface.
75. Visibility-Limited Signal Face or Signal Section—a type of signal face or signal section designed (or shielded, hooded, or louvered) to restrict the visibility of a signal indication from the side, to a certain lane or lanes, or to a certain distance from the stop line.
76. Walk Interval—an interval during which the WALKING PERSON (symbolizing WALK) signal indication is displayed. When a verbal message is provided at an accessible pedestrian signal, the verbal message is "walk sign."
77. Warning Beacon—a beacon used only to supplement an appropriate warning or regulatory sign or marker.
78. Yellow Change Interval—the first interval following the green interval during which the yellow signal indication is displayed.

CHAPTER 4B. TRAFFIC CONTROL SIGNALS—GENERAL

Section 4B.01 General

Standard:

A traffic control signal (traffic signal) shall be defined as any highway traffic signal by which traffic is alternately directed to stop and permitted to proceed.

Traffic shall be defined as pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other conveyances either singularly or together while using any highway for purposes of travel.

Support:

Words such as pedestrians and bicyclists are used redundantly in selected sections of Part 4 to encourage sensitivity to these elements of "traffic."

Standards for traffic control signals are important because traffic control signals need to attract the attention of a variety of road users, including those who are older, those with impaired vision, as well as those who are fatigued or distracted, or who are not expecting to encounter a signal at a particular location.

Section 4B.02 Basis of Installation or Removal of Traffic Control Signals

Guidance:

The selection and use of traffic control signals should be based on an engineering study of roadway, traffic, and other conditions.

Support:

A careful analysis of traffic operations, pedestrian and bicyclist needs, and other factors at a large number of signalized and unsignalized locations, coupled with engineering judgment, has provided a series of signal warrants, described in Chapter 4C, that define the minimum conditions under which installing traffic control signals might be justified.

Guidance:

Engineering judgment should be applied in the review of operating traffic control signals to determine whether the type of installation and the timing program meet the current requirements of all forms of traffic.

If changes in traffic patterns eliminate the need for a traffic control signal, consideration should be given to removing it and replacing it with appropriate alternative traffic control devices, if any are needed.

Option:

If the engineering study indicates that the traffic control signal is no longer justified, removal may be accomplished using the following steps:

A. Determine the appropriate traffic control to be used after removal of the signal.
B. Remove any sight-distance restrictions as necessary.
C. Inform the public of the removal study, for example by installing an informational sign (or signs) with the legend TRAFFIC SIGNAL UNDER STUDY FOR REMOVAL at the signalized location in a position where it is visible to all road users.
D. Flash or cover the signal heads for a minimum of 90 days, and install the appropriate stop control or other traffic control devices.
E. Remove the signal if the engineering data collected during the removal study period confirms that the signal is no longer needed. Instead of total removal of the traffic control signal, the poles and cables may remain in place after removal of the signal heads for continued analysis.

Section 4B.03 Advantages and Disadvantages of Traffic Control Signals

Support:

When properly used, traffic control signals are valuable devices for the control of vehicular and pedestrian traffic. They assign the right-of-way to the various traffic movements and thereby profoundly influence traffic flow.

Traffic control signals that are properly designed, located, operated, and maintained will have one or more of the following advantages:

A. They provide for the orderly movement of traffic.
B. They increase the traffic-handling capacity of the intersection if:
   1. Proper physical layouts and control measures are used, and
   2. The signal operational parameters are reviewed and updated (if needed) on a regular basis (as engineering judgment determines that significant traffic flow and/or land use changes have occurred)

to maximize the ability of the traffic control signal to satisfy current traffic demands.

C. They reduce the frequency and severity of certain types of crashes, especially right-angle collisions.
D. They are coordinated to provide for continuous or nearly continuous movement of traffic at a definite speed along a given route under favorable conditions.
E. They are used to interrupt heavy traffic at intervals to permit other traffic, vehicular or pedestrian, to cross.

Traffic control signals are often considered a panacea for all traffic problems at intersections. This belief has led to traffic control signals being installed at many locations where they are not needed, adversely affecting the safety and efficiency of vehicular, bicycle, and pedestrian traffic.

Traffic control signals, even when justified by traffic and roadway conditions, can be ill-designed, ineffectively placed, improperly operated, or poorly maintained. Improper or unjustified traffic control signals can result in one or more of the following disadvantages:

A. Excessive delay;
B. Excessive disobedience of the signal indications;
C. Increased use of less adequate routes as road users attempt to avoid the traffic control signals; and
D. Significant increases in the frequency of collisions (especially rear-end collisions).

Section 4B.04 Alternatives to Traffic Control Signals

Guidance:

Since vehicular delay and the frequency of some types of crashes are sometimes greater under traffic signal control than under STOP sign control, consideration should be given to providing alternatives to traffic control signals even if one or more of the signal warrants has been satisfied.

Option:

These alternatives may include, but are not limited to, the following:

A. Installing signs along the major street to warn road users approaching the intersection;
B. Relocating the stop line(s) and making other changes to improve the sight distance at the intersection;
C. Installing measures designed to reduce speeds on the approaches;
D. Installing a flashing beacon at the intersection to supplement STOP sign control;
E. Installing flashing beacons on warning signs in advance of a STOP sign controlled intersection on major- and/or minor-street approaches;
F. Adding one or more lanes on a minor-street approach to reduce the number of vehicles per lane on the approach;
G. Revising the geometrics at the intersection to channelize vehicular movements and reduce the time required for a vehicle to complete a movement, which could also assist pedestrians;
H. Installing roadway lighting if a disproportionate number of crashes occur at night;
I. Restricting one or more turning movements, perhaps on a time-of-day basis, if alternate routes are available;
J. If the warrant is satisfied, installing multiway STOP sign control;
K. Installing a roundabout intersection; and
L. Employing other alternatives, depending on conditions at the intersection.

Section 4B.05 Adequate Roadway Capacity

Support:

The delays inherent in the alternating assignment of right-of-way at intersections controlled by traffic control signals can frequently be reduced by widening the major roadway, the minor roadway, or both roadways. Widening the minor roadway often benefits the operations on the major roadway, because it reduces the green time that must be assigned to minor-roadway traffic. In urban areas, the effect of widening can be achieved by eliminating parking on intersection approaches. It is desirable to have at least two lanes for moving traffic on each approach to a signalized location. Additional width on the departure side of the intersection, as well as on the approach side, will sometimes be needed to clear traffic through the intersection effectively.

Guidance:

Adequate roadway capacity should be provided at a signalized location. Before an intersection is widened, the additional green time pedestrians need to cross the widened roadways should be considered to determine if it will exceed the green time saved through improved vehicular flow.

CHAPTER 4C. TRAFFIC CONTROL SIGNAL NEEDS STUDIES

Section 4C.01 Studies and Factors for Justifying Traffic Control Signals

Standard:

An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location.

The investigation of the need for a traffic control signal shall include an analysis of the applicable factors contained in the following traffic signal warrants and other factors related to existing operation and safety at the study location:

Warrant 1, Eight-Hour Vehicular Volume.
Warrant 2, Four-Hour Vehicular Volume.
Warrant 3, Peak Hour.
Warrant 4, Pedestrian Volume.
Warrant 5, School Crossing.
Warrant 6, Coordinated Signal System.
Warrant 7, Crash Experience.
Warrant 8, Roadway Network.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Support:

Sections 8D.07 and 10D.05 contain information regarding the use of traffic control signals instead of gates and/or flashing light signals at highway-railroad grade crossings and highway-light rail transit grade crossings, respectively.

Guidance:

A traffic control signal should not be installed unless one or more of the factors described in this Chapter are met.

A traffic control signal should not be installed unless an engineering study indicates that installing a traffic control signal will improve the overall safety and/or operation of the intersection.

A traffic control signal should not be installed if it will seriously disrupt progressive traffic flow.

The study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the above signal warrants.

Engineering judgment should also be used in applying various traffic signal warrants to cases where approaches consist of one lane plus one left-turn or right-turn lane. The site-specific traffic characteristics dictate whether an approach should be considered as one lane or two lanes. For example, for an approach with one lane for through and right-turning traffic plus a left-turn lane, engineering judgment could indicate that it should be considered a one-lane approach if the traffic using the left-turn lane is minor. In such a case, the total traffic volume approaching the intersection should be applied against the signal warrants as a one-lane approach. The approach should be considered two lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length to accommodate all left-turn vehicles.

Similar engineering judgment and rationale should be applied to a street approach with one lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in the minor-street volume if the movement enters the major street with minimal conflict. The approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn lane considered.

At a location that is under development or construction and where it is not possible to obtain a traffic count that would represent future traffic conditions, hourly volumes should be estimated as part of an engineering study for comparison with traffic signal warrants. Except for locations where the engineering study uses the satisfaction of Warrant 8 to justify a signal, a traffic control signal installed under projected conditions should have an engineering study done within 1 year of putting the signal into stop-and-go operation to determine if the signal is justified. If not justified, the signal should be taken out of stop-and-go operation or removed.

For signal warrant analysis, a location with a wide median, even if the median width is greater than 9 m (30 ft), should be considered as one intersection.

Option:

At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher of the major-street left-turn volumes as the "minor-street" volume and the corresponding single direction of opposing traffic on the major street as the "major-street" volume.

For signal warrant analysis, bicyclists may be counted as either vehicles or pedestrians.

Support:

When performing a signal warrant analysis, bicyclists riding in the street with other vehicular traffic are usually counted as vehicles and bicyclists who are clearly using pedestrian facilities are usually counted as pedestrians.

Option:

Engineering study data may include the following:

A. The number of vehicles entering the intersection in each hour from each approach during 12 hours of an average day. It is desirable that the hours selected contain the greatest percentage of the 24-hour traffic volume.
B. Vehicular volumes for each traffic movement from each approach, classified by vehicle type (heavy trucks, passenger cars and light trucks, public-transit vehicles, and, in some locations, bicycles), during each 15-minute period of the 2 hours in the morning and 2 hours in the afternoon during which total traffic entering the intersection is greatest.
C. Pedestrian volume counts on each crosswalk during the same periods as the vehicular counts in Item B above and during hours of highest pedestrian volume. Where young, elderly, and/or persons with physical or visual disabilities need special consideration, the pedestrians and their crossing times may be classified by general observation.
D. Information about nearby facilities and activity centers that serve the young, elderly, and/or persons with disabilities, including requests from persons with disabilities for accessible crossing improvements at the location under study. These persons might not be adequately reflected in the pedestrian volume count if the absence of a signal restrains their mobility.
E. The posted or statutory speed limit or the 85th-percentile speed on the uncontrolled approaches to the location.
F. A condition diagram showing details of the physical layout, including such features as intersection geometrics, channelization, grades, sight-distance restrictions, transit stops and routes, parking conditions, pavement markings, roadway lighting, driveways, nearby railroad crossings, distance to nearest traffic control signals, utility poles and fixtures, and adjacent land use.
G. A collision diagram showing crash experience by type, location, direction of movement, severity, weather, time of day, date, and day of week for at least 1 year.

The following data, which are desirable for a more precise understanding of the operation of the intersection, may be obtained during the periods specified in Item B of the preceding paragraph:

A. Vehicle-hours of stopped time delay determined separately for each approach.
B. The number and distribution of acceptable gaps in vehicular traffic on the major street for entrance from the minor street.
C. The posted or statutory speed limit or the 85th-percentile speed on controlled approaches at a point near to the intersection but unaffected by the control.
D. Pedestrian delay time for at least two 30-minute peak pedestrian delay periods of an average weekday or like periods of a Saturday or Sunday.
E. Queue length on stop-controlled approaches.

Section 4C.02 Warrant 1, Eight-Hour Vehicular Volume

Support:

The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then the criteria for Warrant 1 is satisfied and Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B is satisfied, then the criteria for Warrant 1 is satisfied and the combination of Conditions A and B is not needed.

Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume

Condition A—Minimum Vehicular Volume									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1.....	1.....	500	400	350	280	150	120	105	84
2 or more...	1.....	600	480	420	336	150	120	105	84
2 or more...	2 or more...	600	480	420	336	200	160	140	112
1.....	2 or more....	500	400	350	280	200	160	140	112

Condition B—Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1.....	1.....	750	600	525	420	75	60	53	42
2 or more...	1.....	900	720	630	504	75	60	53	42
2 or more...	2 or more...	900	720	630	504	100	80	70	56
1.....	2 or more....	750	600	525	420	100	80	70	56

[a] Basic minimum hourly volume.
[b] Used for combination of Conditions A and B after adequate trial of other remedial measures.
[c] May be used when the major-street speed exceeds 70 km/h or exceeds 40 mph or in an isolated community with a population of less than 10,000.
[d] May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 70 km/h or exceeds 40 mph or in an isolated community with a population of less than 10,000.

Standard:

The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:

A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or

B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

In applying each condition the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.

Option:

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 70 km/h or exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

Guidance:

The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Standard:

The need for a traffic control signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:

A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and

B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

Option:

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 70 km/h or exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Section 4C.03 Warrant 2, Four-Hour Vehicular Volume

Support:

The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

Standard:

The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.

Option:

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 70 km/h or exceeds 40 mph or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used in place of Figure 4C-1.

Section 4C.04 Warrant 3, Peak Hour

Support:

The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

Standard:

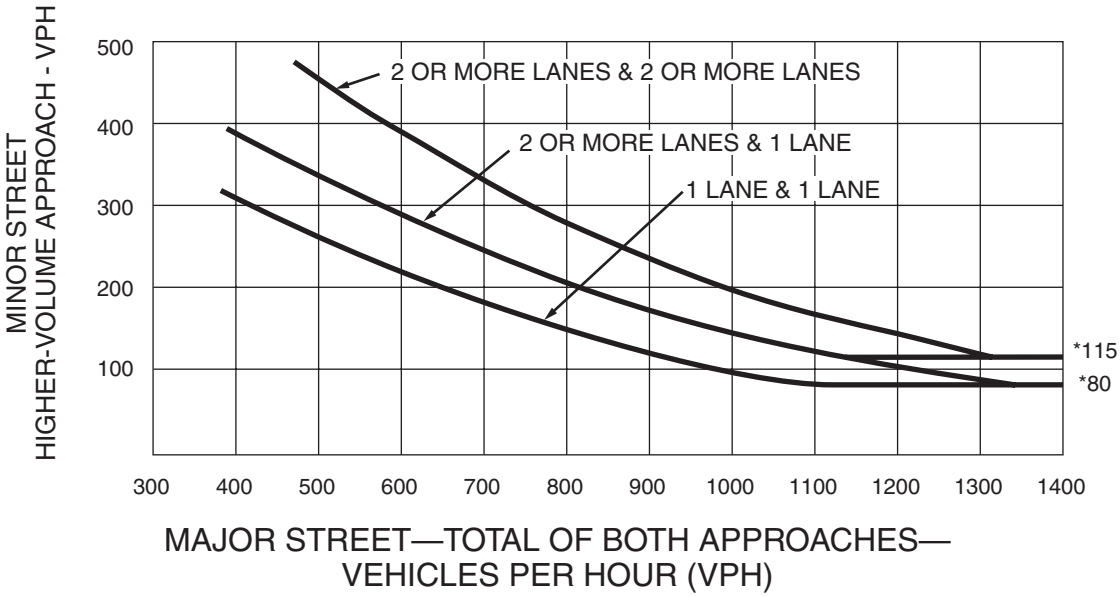
This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:

A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:

1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach; or 5 vehicle-hours for a two-lane approach, and

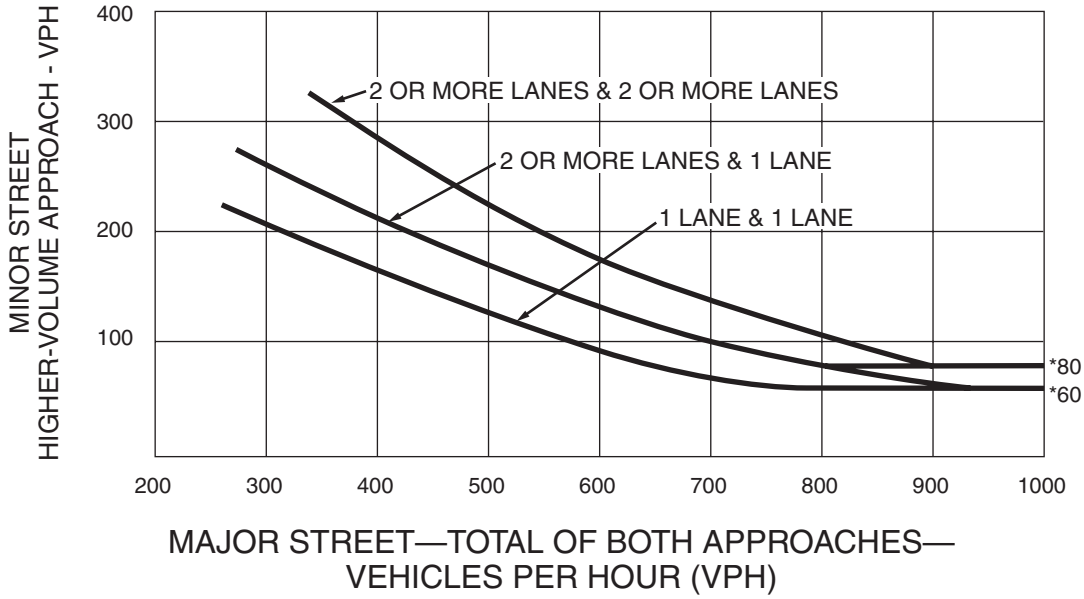
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

2. **The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and**
3. **The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.**

B. **The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.**

Option:

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 70 km/h or exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to satisfy the criteria in the second category of the Standard.

Section 4C.05 Warrant 4, Pedestrian Volume

Support:

The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

Standard:

The need for a traffic control signal at an intersection or midblock crossing shall be considered if an engineering study finds that both of the following criteria are met:

A. **The pedestrian volume crossing the major street at an intersection or midblock location during an average day is 100 or more for each of any 4 hours or 190 or more during any 1 hour; and**
B. **There are fewer than 60 gaps per hour in the traffic stream of adequate length to allow pedestrians to cross during the same period when the pedestrian volume criterion is satisfied. Where there is a divided street having a median of sufficient width for pedestrians to wait, the requirement applies separately to each direction of vehicular traffic.**

The Pedestrian Volume signal warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 90 m (300 ft), unless the proposed traffic control signal will not restrict the progressive movement of traffic.

If this warrant is met and a traffic control signal is justified by an engineering study, the traffic control signal shall be equipped with pedestrian signal heads conforming to requirements set forth in Chapter 4E.

Guidance:

If this warrant is met and a traffic control signal is justified by an engineering study, then:

A. If at an intersection, the traffic control signal should be traffic-actuated and should include pedestrian detectors.
B. If at a nonintersection crossing, the traffic control signal should be pedestrian-actuated, parking and other sight obstructions should be prohibited for at least 30 m (100 ft) in advance of and at least 6.1 m (20 ft) beyond the crosswalk, and the installation should include suitable standard signs and pavement markings.
C. Furthermore, if installed within a signal system, the traffic control signal should be coordinated.

Option:

The criterion for the pedestrian volume crossing the major roadway may be reduced as much as 50 percent if the average crossing speed of pedestrians is less than 1.2 m/sec (4 ft/sec).

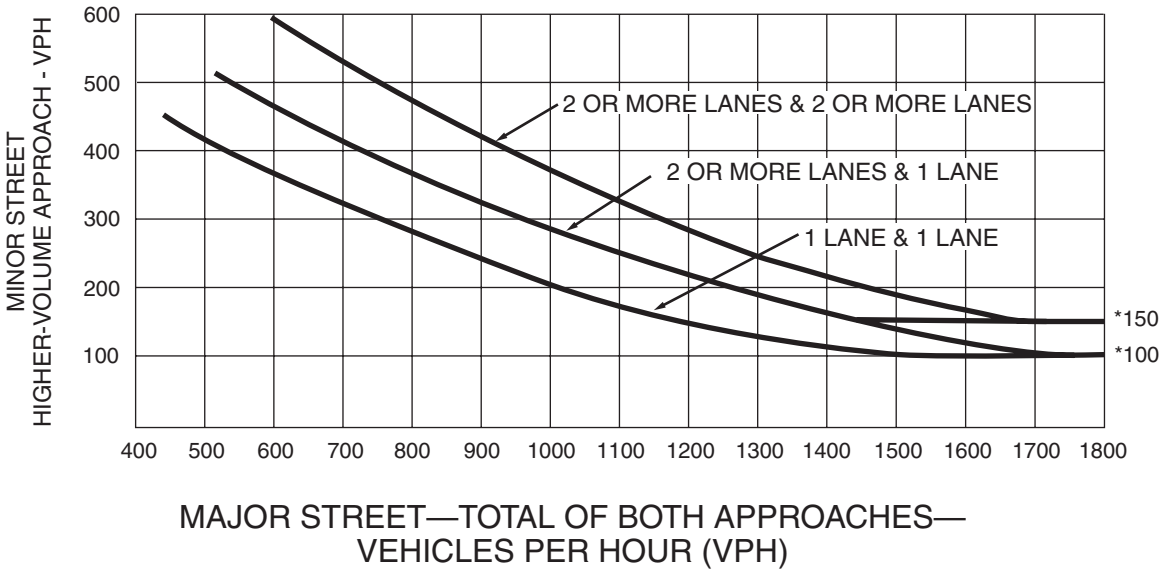
A traffic control signal may not be needed at the study location if adjacent coordinated traffic control signals consistently provide gaps of adequate length for pedestrians to cross the street, even if the rate of gap occurrence is less than one per minute.

Section 4C.06 Warrant 5, School Crossing

Support:

The School Crossing signal warrant is intended for application where the fact that school children cross the major street is the principal reason to consider installing a traffic control signal.

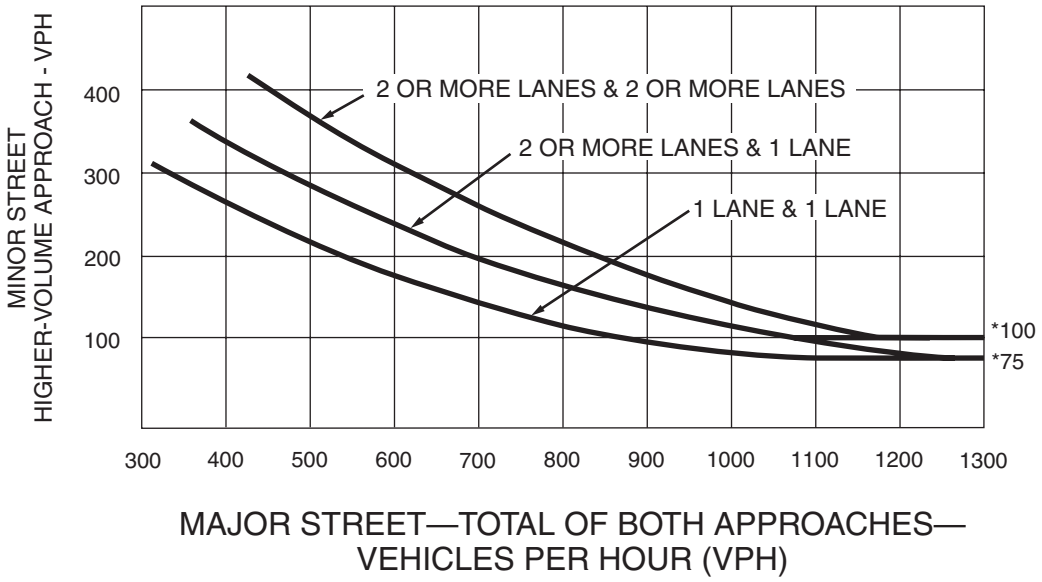
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Standard:

The need for a traffic control signal shall be considered when an engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of school children at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the children are using the crossing is less than the number of minutes in the same period (see Section 7A.03) and there are a minimum of 20 students during the highest crossing hour.

Before a decision is made to install a traffic control signal, consideration shall be given to the implementation of other remedial measures, such as warning signs and flashers, school speed zones, school crossing guards, or a grade-separated crossing.

The School Crossing signal warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 90 m (300 ft), unless the proposed traffic control signal will not restrict the progressive movement of traffic.

Guidance:

If this warrant is met and a traffic control signal is justified by an engineering study, then:

A. If at an intersection, the traffic control signal should be traffic-actuated and should include pedestrian detectors.
B. If at a nonintersection crossing, the traffic control signal should be pedestrian-actuated, parking and other sight obstructions should be prohibited for at least 30 m (100 ft) in advance of and at least 6.1 m (20 ft) beyond the crosswalk, and the installation should include suitable standard signs and pavement markings.
C. Furthermore, if installed within a signal system, the traffic control signal should be coordinated.

Section 4C.07 Warrant 6, Coordinated Signal System

Support:

Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.

Standard:

The need for a traffic control signal shall be considered if an engineering study finds that one of the following criteria is met:

A. On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.
B. On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.

Guidance:

The Coordinated Signal System signal warrant should not be applied where the resultant spacing of traffic control signals would be less than 300 m (1,000 ft).

Section 4C.08 Warrant 7, Crash Experience

Support:

The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.

Standard:

The need for a traffic control signal shall be considered if an engineering study finds that all of the following criteria are met:

A. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and
B. Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and
C. For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not

less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

Option:

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 70 km/h or exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Section 4C.09 Warrant 8, Roadway Network

Support:

Installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network.

Standard:

The need for a traffic control signal shall be considered if an engineering study finds that the common intersection of two or more major routes meets one or both of the following criteria:

A. The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or

B. The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a nonnormal business day (Saturday or Sunday).

A major route as used in this signal warrant shall have one or more of the following characteristics:

A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow; or

B. It includes rural or suburban highways outside, entering, or traversing a City; or

C. It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.

CHAPTER 4D. TRAFFIC CONTROL SIGNAL FEATURES

Section 4D.01 General

Support:

The features of traffic control signals of interest to road users are the location, design, and meaning of the signal indications. Uniformity in the design features that affect the traffic to be controlled, as set forth in this Manual, is especially important for reasonably safe and efficient traffic operations.

Pavement markings (see Part 3) that clearly communicate the operational plan of an intersection to road users play an important role in the effective operation of traffic control signals. By designating the number of lanes, the use of each lane, the length of additional lanes on the approach to an intersection, and the proper stopping points, the engineer can design the signal phasing and timing to best match the goals of the operational plan.

Standard:

When a traffic control signal is not in operation, such as before it is placed in service, during seasonal shutdowns, or when it is not desirable to operate the traffic control signal, the signal faces shall be covered, turned, or taken down to clearly indicate that the traffic control signal is not in operation.

A traffic control signal shall control traffic only at the intersection or midblock location where the signal faces are placed.

STOP signs shall not be used in conjunction with any traffic control signal operation, except in either of the following cases:

A. If the signal indication for an approach is a flashing red at all times; or
B. If a minor street or driveway is located within or adjacent to the area controlled by the traffic control signal, but does not require separate traffic signal control because an extremely low potential for conflict exists.

Midblock crosswalks shall not be signalized if they are located within 90 m (300 ft) from the nearest traffic control signal, unless the proposed traffic control signal will not restrict the progressive movement of traffic.

Guidance:

Midblock crosswalks should not be signalized if they are located within 30 m (100 ft) from side streets or driveways that are controlled by STOP signs or YIELD signs.

Pavement markings should be used at traffic control signal locations as provided in Part 3. If the road surface will not retain pavement markings, signs should be installed to provide the needed road user information.

Engineering judgment should be used to determine the proper phasing and timing for a traffic control signal. Since traffic flows and patterns change, phasing and timing should be reevaluated regularly and updated if needed.

Section 4D.02 Responsibility for Operation and Maintenance

Guidance:

Prior to installing any traffic control signal, the responsibility for the maintenance of the signal and all of the appurtenances, hardware, software, and the timing plan(s) should be clearly established. The responsible agency should provide for the maintenance of the traffic control signal and all of its appurtenances in a competent manner.

To this end the agency should:

A. Keep every controller assembly in effective operation in accordance with its predetermined timing schedule; check the operation of the controller assembly frequently enough to verify that it is operating in accordance with the predetermined timing schedule; and establish a policy to maintain a record of all timing changes and that only authorized persons are permitted to make timing changes;
B. Clean the optical system of the signal sections and replace the light sources as frequently as experience proves necessary;
C. Clean and service equipment and other appurtenances as frequently as experience proves necessary;
D. Provide for alternate operation of the traffic control signal during a period of failure, using flashing mode or manual control, or manual traffic direction by proper authorities as might be required by traffic volumes or congestion, or by erecting other traffic control devices;
E. Have properly skilled maintenance personnel available without undue delay for all emergency and lamp failure calls;

F. Provide spare equipment to minimize the interruption of traffic control signal operation as a result of equipment failure;
G. Provide for the availability of properly skilled maintenance personnel for the repair of all components; and
H. Maintain the appearance of the signal displays and equipment.

Section 4D.03 Provisions for Pedestrians

Support:

Chapter 4E contains additional information regarding pedestrian signals.

Standard:

The design and operation of traffic control signals shall take into consideration the needs of pedestrian as well as vehicular traffic.

If engineering judgment indicates the need for provisions for a given pedestrian movement, signal faces conveniently visible to pedestrians shall be provided by pedestrian signal heads or a signal face for an adjacent vehicular movement.

Guidance:

Safety considerations should include the installation, where appropriate, of accessible pedestrian signals (see Sections 4E.06 and 4E.09) that provide information in nonvisual format (such as audible tones, verbal messages, and/or vibrating surfaces).

Where pedestrian movements regularly occur, pedestrians should be provided with sufficient time to cross the roadway by adjusting the traffic control signal operation and timing to provide sufficient crossing time every cycle or by providing pedestrian detectors.

Option:

If it is desirable to prohibit certain pedestrian movements at a traffic control signal, a PEDESTRIANS PROHIBITED (R9-3) or No Pedestrian Crossing (R9-3a) sign may be used (see Section 2B.44).

Section 4D.04 Meaning of Vehicular Signal Indications

Support:

The "Uniform Vehicle Code" (see Section 1A.11) is the primary source for the standards for the meaning of vehicular signal indications to both vehicle operators and pedestrians as set forth below, and the standards for the meaning of separate pedestrian signal indications as set forth in Section 4E.02.

Standard:

The following meanings shall be given to highway traffic signal indications for vehicles and pedestrians:

A. Steady green signal indications shall have the following meanings:
1. **Traffic, except pedestrians, facing a CIRCULAR GREEN signal indication is permitted to proceed straight through or turn right or left except as such movement is modified by lane-use signs, turn prohibition signs, lane markings, or roadway design. But vehicular traffic, including vehicles turning right or left, shall yield the right-of-way to other vehicles, and to pedestrians lawfully within the intersection or an adjacent crosswalk, at the time such signal indication is exhibited.**
2. **Traffic, except pedestrians, facing a GREEN ARROW signal indication, shown 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 such other movement as is permitted by other signal indications shown at the same time. Such vehicular traffic shall yield the right-of-way to pedestrians lawfully within an adjacent crosswalk and to other traffic lawfully using the intersection.**
3. **Unless otherwise directed by a pedestrian signal head, pedestrians facing any green signal indication, except when the sole green signal indication is a turn arrow, are permitted to proceed across the roadway within any marked or unmarked crosswalk. The pedestrian shall yield the right-of-way to vehicles lawfully within the intersection at the time that the green signal indication is first shown.**

B. Steady yellow signal indications shall have the following meanings:
1. **Traffic, except pedestrians, facing a steady CIRCULAR YELLOW or YELLOW ARROW signal indication is thereby warned that the related green movement is being terminated or that a red signal indication will be exhibited immediately thereafter when vehicular traffic shall not enter the intersection.**

2. **Pedestrians facing a steady CIRCULAR YELLOW or YELLOW ARROW signal indication, unless otherwise directed by a pedestrian signal head, are thereby advised that there is insufficient time to cross the roadway before a red signal indication is shown, and no pedestrian shall then start to cross the roadway.**

C. **Steady red signal indications shall have the following meanings:**

1. **Vehicular traffic facing a steady CIRCULAR RED signal indication alone 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 shown, or as provided below.**

   Except when a sign is in place prohibiting a turn on red or a RED ARROW signal indication is displayed, vehicular traffic facing a CIRCULAR RED signal indication is permitted to enter the intersection to turn right, or to turn left from a one-way street into a one-way street, after stopping. Such vehicular traffic shall yield the right-of-way to pedestrians lawfully within an adjacent crosswalk and to other traffic lawfully using the intersection.

2. **Vehicular traffic 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 permitting the movement indicated by such RED ARROW is shown.**

   When an R10-17a sign (see Section 2B.45) is in place permitting a turn on a RED ARROW signal indication, vehicular traffic facing a RED ARROW signal indication is permitted to enter the intersection to turn right, or to turn left from a one-way street into a one-way street, after stopping. Such vehicular traffic shall yield the right-of-way to pedestrians lawfully within an adjacent crosswalk and to other traffic lawfully using the intersection.

3. **Unless otherwise directed by a pedestrian signal head, pedestrians facing a steady CIRCULAR RED or RED ARROW signal indication alone shall not enter the roadway.**

D. **Flashing signal indications shall have the following meanings:**

1. **Flashing yellow—When a yellow lens is illuminated with rapid intermittent flashes, vehicular traffic is permitted to proceed through the intersection or past such signal indication only with caution.**
2. **Flashing red—When a red lens is illuminated with rapid intermittent flashes, vehicular traffic 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, 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 rules applicable after making a stop at a STOP sign.**
3. **Flashing RED ARROW and flashing YELLOW ARROW signal indications have the same meaning as the corresponding flashing circular signal indication, except that they apply only to vehicular traffic intending to make the movement indicated by the arrow.**

Section 4D.05 Application of Steady Signal Indications

Standard:

When a traffic control signal is being operated in a steady (stop-and-go) mode, at least one lens in each signal face shall be illuminated at any given time.

A signal face(s) that controls a particular vehicular movement during any interval of a cycle shall control that same movement during all intervals of the cycle.

Steady signal indications shall be applied as follows:

A. **A steady CIRCULAR RED signal indication:**

1. **Shall be displayed when it is intended to prohibit traffic, except pedestrians directed by a pedestrian signal head, from entering the intersection or other controlled area. Turning after stopping is permitted as stated in Item C.1 of Section 4D.04.**
2. **Shall be displayed with the appropriate GREEN ARROW signal indications when it is intended to permit traffic to make a specified turn or turns, and to prohibit traffic from proceeding straight ahead through the intersection or other controlled area, except in protected only mode turn signal faces, or in protected/permissive mode left-turn operation with separate left-turn signal faces (see Section 4D.06).**

B. A steady CIRCULAR YELLOW signal indication:
1. **Shall be displayed following a CIRCULAR GREEN or straight-through GREEN ARROW signal indication in the same signal face.**
2. **Shall not be displayed in conjunction with the change from the CIRCULAR RED signal indication to the CIRCULAR GREEN signal indication.**
3. **Shall be followed by a CIRCULAR RED signal indication except that, when entering preemption operation, the return to the previous CIRCULAR GREEN signal indication shall be permitted following a CIRCULAR YELLOW signal indication (see Section 4D.13).**
4. **Shall not be displayed to an approach from which drivers are turning left permissively unless one of the following conditions exists:**
   - **(a) A steady CIRCULAR YELLOW signal indication is also being shown simultaneously to the opposing approach;**
   - **(b) A separate left-turn signal face is provided and operated as described in Section 4D.06;**
   - **(c) An engineering study has determined that, because of unique intersection conditions, the conditions described in items (a) and (b) above cannot reasonably be implemented without causing significant operational or safety problems and that the volume of impacted left-turning traffic is relatively low, and those left-turning drivers are advised that the opposing traffic is not simultaneously being shown a CIRCULAR YELLOW signal indication if this operation occurs continuously by the installation near the left-most signal head of a W25-1 sign (see Section 2C.39) with the legend ONCOMING TRAFFIC HAS EXTENDED GREEN; or**
   - **(d) Drivers are advised of the operation if it occurs only occasionally, such as during a preemption sequence or because of the skipping of actuated phases, by the installation near the left-most signal head of a W25-2 sign (see Section 2C.39) with the legend ONCOMING TRAFFIC MAY HAVE EXTENDED GREEN.**

C. A steady CIRCULAR GREEN signal indication shall be displayed only when it is intended to permit traffic to proceed in any direction that is lawful and practical.

D. A steady RED ARROW signal indication shall be displayed when it is intended to prohibit traffic, except pedestrians directed by a pedestrian signal head, from entering the intersection or other controlled area to make the indicated turn. Except as described in Item C.2 of Section 4D.04, turning on a steady RED ARROW signal indication shall not be permitted.

E. A steady YELLOW ARROW signal indication:
1. **Shall be displayed in the same direction as a GREEN ARROW signal indication following a GREEN ARROW signal indication in the same signal face, unless:**
   - **(a) The GREEN ARROW signal indication and a CIRCULAR GREEN (or straight-through GREEN ARROW) signal indication terminate simultaneously in the same signal face, or**
   - **(b) The green arrow is a straight-through GREEN ARROW.**
2. **Shall not be displayed in conjunction with the change from a RED ARROW signal indication to a GREEN ARROW signal indication.**
3. **Shall not be displayed when any conflicting vehicular movement has a green or yellow signal indication or any conflicting pedestrian movement has a WALKING PERSON (symbolizing WALK) or flashing UPRAISED HAND (symbolizing DONT WALK) signal indication (see Section 4D.09).**
4. **Shall be terminated by a RED ARROW signal indication for the same direction or a CIRCULAR RED signal indication except:**
   - **(a) When entering preemption operation, the return to the previous GREEN ARROW signal indication shall be permitted following a YELLOW ARROW signal indication.**
   - **(b) When the movement controlled by the arrow is to continue on a permissive mode basis during an immediately following CIRCULAR GREEN signal indication.**

F. A steady GREEN ARROW signal indication:
1. **Shall be displayed only to allow vehicular movements, in the direction indicated, that are not in conflict with other vehicles moving on a green or yellow signal indication or with pedestrians crossing in conformance with a WALKING PERSON (symbolizing WALK) or flashing UPRAISED HAND (symbolizing DONT WALK) signal indication (see Section 4D.09).**
2. **Shall be displayed on a signal face that controls a left-turn movement when said movement is not in conflict with other vehicles moving on a green or yellow signal indication or with pedestrians crossing in conformance with a WALKING PERSON (symbolizing WALK) or flashing UPRAISED HAND (symbolizing DONT WALK) signal indication (see Section 4D.09).**
3. **Shall not be required on the stem of T-intersections or for turns from one-way streets.**

Option:

Steady RED ARROW, YELLOW ARROW, and GREEN ARROW signal indications, if not otherwise prohibited, may be used instead of the corresponding circular signal indications at the following locations:

A. On an approach intersecting a one-way street;
B. Where certain movements are prohibited; and
C. Where certain movements are physically impossible.

If U-turns are permitted from the approach and if drivers making a right turn from the conflicting approach to the left are simultaneously being shown a right-turn GREEN ARROW signal indication, drivers making a U-turn may be advised of the operation by the installation near the left-turn signal face of a U-TURN YIELD TO RIGHT TURN (R10-16) sign (see Section 2B.45).

Section 4D.06 Application of Steady Signal Indications for Left Turns

Support:

Left-turning traffic is controlled by one of four modes as follows:

A. Permissive Only Mode—turns made on the CIRCULAR GREEN signal indication after yielding to oncoming traffic and pedestrians;
B. Protected Only Mode—turns made only when the left-turn GREEN ARROW signal indication is displayed;
C. Protected/Permissive Mode—both modes occur on an approach during the same cycle; or
D. Variable Left-Turn Mode—the operating mode changes among the protected only mode and/or the protected/permissive mode and/or the permissive only mode during different periods of the day.

Option:

In areas having a high percentage of elderly drivers, special consideration may be given to the use of protected only mode left-turn phasing, when appropriate.

Standard:

The required left-turn signal faces and operation for an approach shall be determined by the selected mode of left-turn operation, as follows:

A. Permissive Only Mode—The signal indications for permissive only mode left turns shall be provided by the signal faces controlling the through movement, or by a permissive-only left-turn signal face that is either a shared signal face or a separate signal face. A permissive-only shared signal face, regardless of where the permissive-only left-turn signal face is positioned and regardless of how many adjacent through signal faces are provided, shall always simultaneously display the same color of circular indication that the adjacent through signal face or faces display. A separate permissive-only left-turn signal face sometimes displays a different color of circular signal indication than the adjacent through signal faces display.

If a separate left-turn signal face is provided for permissive only left turns, it shall meet the following requirements:

1. During the permissive left-turn movement, the left-turn signal face shall display a CIRCULAR GREEN signal indication.
2. If the CIRCULAR GREEN and CIRCULAR YELLOW signal indications in the left-turn signal face are visibility-limited from the adjacent through movement, the left-turn signal face shall not be required to simultaneously display the same color of circular signal indication as the signal faces for the adjacent through movement.
3. If the CIRCULAR GREEN and CIRCULAR YELLOW signal indications in the left-turn signal face are visibility-limited from the adjacent through movement, the display of a CIRCULAR GREEN signal indication for a permissive left-turn movement while the signal faces for the adjacent through movement display CIRCULAR RED signal indications and the opposing left-turn signal faces display left-turn GREEN ARROW signal indications for a protected left-turn movement shall be permitted.
4. If the left-turn signal face does not simultaneously display the same color of circular signal indication as the signal faces for the adjacent through movement, a LEFT TURN YIELD ON GREEN (symbolic green ball) (R10-12) sign or a LEFT TURN SIGNAL—YIELD ON GREEN (symbolic green ball) (R10-21) sign (see Figure 2B-19) shall be used.

B. Protected Only Mode—The left-turn signal face shall be capable of displaying one of the following sets of signal indications:

1. Left-turn RED ARROW, YELLOW ARROW, and GREEN ARROW signal indications only. At least one left-turn signal face shall be provided in addition to the two approach signal faces

required in Section 4D.15 for the major movement. Only one of the three colors shall be illuminated at any given time. A signal instruction sign shall not be required with this set of signal indications. If used, it shall be a LEFT ON GREEN ARROW ONLY sign (R10-5).

2. **CIRCULAR RED, left-turn YELLOW ARROW, and left-turn GREEN ARROW signal indications. At least one left-turn signal face shall be provided in addition to the two approach signal faces required in Section 4D.15 for the major movement. Only one of the three colors shall be illuminated at any given time. Unless the CIRCULAR RED signal indication is shielded, hooded, louvered, positioned, or designed such that it is not readily visible to drivers in the through lane(s), a LEFT TURN SIGNAL sign (R10-10) shall be used.**
3. **CIRCULAR RED, CIRCULAR YELLOW, CIRCULAR GREEN, and left-turn GREEN ARROW signal indications. This four-section signal face shall be used only when the CIRCULAR GREEN and left-turn GREEN ARROW signal indications begin and terminate together. During each interval, the circular signal indication shall be the same color as the signal indication on the signal face(s) for the adjacent through traffic.**

C. **Protected/Permissive Mode—The signal indications for protected/permissive mode left turns shall be provided in either a shared signal face or a separate signal face. Any protected/permissive left-turn signal face that always simultaneously displays the same color of circular signal indication that the adjacent through signal faces display shall be considered to be a shared signal face, regardless of where the left-turn signal face is positioned and regardless of how many adjacent through signal faces are provided. Any protected/permissive left-turn signal face that sometimes displays a different color of circular signal indication than the adjacent through signal faces display shall be considered to be a separate signal face. The requirements for each type of signal face are as follows:**

1. **If a shared signal face is provided, it shall be considered an approach signal face, and shall meet the following requirements:**
   - (a) **During the protected left-turn movement, the signal face shall simultaneously display a left-turn GREEN ARROW signal indication and a circular signal indication that is the same color as the signal indication for the adjacent through lane on the same approach as the protected left turn.**
     During the protected left-turn movement, the signal faces for through traffic on the opposing approach shall simultaneously display CIRCULAR RED signal indications.
   - (b) **During the permissive left-turn movement, all signal faces on the approach shall display CIRCULAR GREEN signal indications.**
   - (c) **All signal faces on the approach shall simultaneously display the same color of circular signal indications to both through and left-turn road users.**
   - (d) **A supplementary sign shall not be required. If used, it shall be a LEFT TURN YIELD ON GREEN (symbolic green ball) (R10-12) sign (see Figure 2B-19).**
2. **If a separate signal face is provided, it shall be considered a left-turn signal face, and shall meet the following requirements:**
   - (a) **During the protected left-turn movement, the left-turn signal face shall display a left-turn GREEN ARROW signal indication.**
     During the protected left-turn movement, the signal faces for through traffic on the opposing approach shall simultaneously display CIRCULAR RED signal indications.
   - (b) **During the permissive left-turn movement, the left-turn signal face shall display a CIRCULAR GREEN signal indication.**
   - (c) **If the CIRCULAR GREEN and CIRCULAR YELLOW signal indications in the left-turn signal face are visibility-limited from the adjacent through movement, the left-turn signal face shall not be required to simultaneously display the same color of circular signal indication as the signal faces for the adjacent through movement.**
   - (d) **If the CIRCULAR GREEN and CIRCULAR YELLOW signal indications in the left-turn signal face are visibility-limited from the adjacent through movement, the display of a CIRCULAR GREEN signal indication for a permissive left-turn movement while the signal faces for the adjacent through movement display CIRCULAR RED signal indications and the opposing left-turn signal face displays a left-turn GREEN ARROW for a protected left-turn movement shall be permitted.**
   - (e) **If the left-turn signal face does not simultaneously display the same color of circular signal indication as the signal faces for the adjacent through movement, a LEFT TURN SIGNAL—YIELD ON GREEN (symbolic green ball) (R10-21) sign (see Figure 2B-19) shall be used.**

D. Variable Left-Turn Mode—If the protected only mode occurs during one or more periods of the day, and the permissive only mode or the combined protected/permissive mode occurs during other periods of the day, the requirements of Items A, B, and C in this Standard that are appropriate to that mode of operation shall be met, subject to the following:

1. The CIRCULAR GREEN and CIRCULAR YELLOW signal indications shall not be displayed when operating in the protected only mode.

2. The left-turn GREEN ARROW and left-turn YELLOW ARROW signal indications shall not be displayed when operating in the permissive only mode.

Option:

Additional appropriate signal indications or changeable message signs may be used to meet the requirements for the variable left-turn mode.

Section 4D.07 Application of Steady Signal Indications for Right Turns

Support:

Right-turning traffic is controlled by one of four modes as follows:

A. Permissive Only Mode—turns made on the CIRCULAR GREEN signal indication after yielding to pedestrians.
B. Protected Only Mode—turns made only when the right-turn GREEN ARROW signal indication is displayed.
C. Protected/Permissive Mode—both modes occur on an approach during the same cycle.
D. Variable Right-Turn Mode—the operating mode changes among the protected only mode and/or the protected/permissive mode and/or the permissive only mode during different periods of the day.

Standard:

The required right-turn signal faces and operation for an approach shall be determined by the selected mode of right-turn operation, as follows:

A. Permissive Only Mode—A separate signal indication or signal face for right turns shall not be required. The signal indication for permissive only mode right turns shall be the same color as the signal indication for adjacent through traffic, except that if the right turn is held to provide an exclusive pedestrian movement, a separate right-turn RED ARROW signal indication shall be provided.

B. Protected Only Mode—The right-turn signal face shall be capable of displaying one of the following sets of signal indications:

1. Right-turn RED ARROW, YELLOW ARROW, and GREEN ARROW signal indications only. At least one right-turn signal face shall be provided in addition to the two approach signal faces required in Section 4D.15 for the major movement. Only one of the three colors shall be illuminated at any given time. A signal instruction sign shall not be required with this set of signal indications. If used, it shall be a RIGHT ON GREEN ARROW ONLY sign (R10-5a).

2. CIRCULAR RED, right-turn YELLOW ARROW, and right-turn GREEN ARROW signal indications. At least one right-turn signal face shall be provided in addition to the two approach signal faces required in Section 4D.15 for the major movement. Only one of three colors shall be illuminated at any given time. Unless the CIRCULAR RED signal indication is shielded, hooded, louvered, positioned, or designed such that it is not readily visible to drivers in the through lane(s), a RIGHT TURN SIGNAL sign (R10-10R) shall be used.

3. CIRCULAR RED, CIRCULAR YELLOW, CIRCULAR GREEN, and right-turn GREEN ARROW signal indications. This four-section signal face shall be used only when the CIRCULAR GREEN and right-turn GREEN ARROW signal indications begin and terminate together. During each interval, the circular signal indication shall be the same color as the signal indication on the signal faces for the adjacent through traffic.

C. Protected/Permissive Mode—A separate signal face is not required for the right turn, but, if provided, it shall be considered an approach signal face, and shall meet the following requirements:

1. During the protected right-turn movement, the signal face shall simultaneously display:

(a) A right-turn GREEN ARROW signal indication, and

(b) A circular signal indication that is the same color as the signal indication for the adjacent through lane on the same approach as the protected right turn.

2. During the permissive right-turn movement, all signal faces on the approach shall display a CIRCULAR GREEN signal indication.

3. All signal faces on the approach shall simultaneously display the same color of circular signal indications to both through and right-turn road users.

D. Variable Right-Turn Mode—If the protected only mode occurs during one or more periods of the day, and the permissive only mode or the combined protected/permissive mode occurs during other periods of the day, the requirements of Items A, B, and C in this Standard that are appropriate to that mode of operation shall be met subject to the following:

1. The CIRCULAR GREEN and CIRCULAR YELLOW signal indications shall not be displayed when operating in the protected only mode.

2. The right-turn GREEN ARROW and right-turn YELLOW ARROW signal indications shall not be displayed when operating in the permissive only mode.

Option:

Additional appropriate signal indications or changeable message signs may be used to meet the requirements for the variable right-turn mode.

Section 4D.08 Prohibited Steady Signal Indications

Standard:

The following combinations of signal indications shall not be simultaneously displayed on any one signal face:

A. CIRCULAR GREEN with CIRCULAR YELLOW.
B. CIRCULAR RED with CIRCULAR YELLOW.
C. CIRCULAR GREEN with CIRCULAR RED.
D. Straight-through GREEN ARROW with CIRCULAR RED.

The above combinations shall not be simultaneously displayed in different signal faces on any one approach unless one of the following conditions exists:

A. One of the signal faces is a turn signal controlling a protected only mode turn, and a LEFT (RIGHT) TURN SIGNAL sign (R10-10) (see Sections 4D.06 and 4D.07) is mounted adjacent to each such signal face, or
B. The signal faces are shielded, hooded, louvered, positioned, or designed so that the combination is not confusing to approaching road users.

A straight-through RED ARROW signal indication or a straight-through YELLOW ARROW signal indication shall not be displayed on any signal face, either alone or in combination with any other signal indication.

Section 4D.09 Unexpected Conflicts During Green or Yellow Intervals

Standard:

A steady GREEN ARROW or YELLOW ARROW signal indication shall not be displayed to vehicular movements that are in conflict with the following:

A. Other vehicles moving on a green or yellow signal indication, except for the situation regarding U-turns described in Section 4D.05. Vehicles departing in the same direction shall not be considered in conflict if, for each turn lane with moving traffic, there is a separate departing lane, and pavement markings or raised channelization clearly indicate which departure lane to use.
B. Pedestrians crossing in conformance with a WALKING PERSON (symbolizing WALK) or flashing UPRAISED HAND (symbolizing DONT WALK) signal indication.

Guidance:

No movement that creates an unexpected crossing of pathways of moving vehicles or pedestrians should be allowed during any green or yellow interval, except when all three of the following conditions are met:

A. The movement involves only slight conflict, and
B. Serious traffic delays are substantially reduced by permitting the conflicting movement, and
C. Drivers and pedestrians subjected to the unexpected conflict are effectively warned thereof by a sign.

Section 4D.10 Yellow Change and Red Clearance Intervals

Standard:

A yellow signal indication shall be displayed following every CIRCULAR GREEN or GREEN ARROW signal indication.

The exclusive function of the yellow change interval shall be to warn traffic of an impending change in the right-of-way assignment.

The duration of a yellow change interval shall be predetermined.

Guidance:

A yellow change interval should have a duration of approximately 3 to 6 seconds. The longer intervals should be reserved for use on approaches with higher speeds.

Option:

The yellow change interval may be followed by a red clearance interval to provide additional time before conflicting traffic movements, including pedestrians, are released.

Standard:

The duration of a red clearance interval shall be predetermined.

Guidance:

A red clearance interval should have a duration not exceeding 6 seconds.

Section 4D.11 Application of Flashing Signal Indications

Standard:

The light source of a flashing signal indication shall be flashed continuously at a rate of not less than 50 nor more than 60 times per minute. The illuminated period of each flash shall be not less than half and not more than two-thirds of the total flash cycle.

Flashing signal indications shall comply with the requirements of other Sections of this Manual regarding shielding or positioning of conflicting signal indications, except that flashing yellow signal indications for through traffic shall not be required to be shielded or positioned to prevent visual conflict for road users in separately controlled turn lanes.

The following applications shall apply whenever a traffic control signal is operated in the flashing mode:

A. Each approach or protected only mode turn movement that is controlled during steady mode (stop-and-go) operation shall display a signal indication during flashing operation.

B. All signal faces that are flashed on an approach shall flash the same color, either yellow or red, except that separate signal faces for protected only mode turn movements and separate signal faces for protected/permissive left-turn movements shall be permitted to flash a CIRCULAR RED or RED ARROW signal indication when the through signal indications are flashed yellow. Shared signal faces for protected/permissive left-turn movements shall not be permitted to flash a CIRCULAR RED signal indication when the through signal indications are flashed yellow.

C. The appropriate RED ARROW or YELLOW ARROW signal indication shall be flashed when a signal face consists entirely of arrow lenses.

D. If a signal face includes both circular and arrow signal lenses of the color that is to be flashed, only the circular signal indication shall be flashed.

Guidance:

When a traffic control signal is operated in the flashing mode, a flashing yellow signal indication should be used for the major street and a flashing red signal indication should be used for the other approaches unless flashing red signal indications are used on all approaches.

Section 4D.12 Flashing Operation of Traffic Control Signals

Standard:

Each traffic control signal shall be provided with an independent flasher mechanism that operates in compliance with Section 4D.11. The flashing operation shall not be terminated by removal or turn off of the controller unit or of the conflict monitor (malfunction management unit) or both.

When a traffic control signal is operated in the flashing mode:

A. Flashing yellow signal indications shall not be displayed for approaches with conflicting traffic movements, except for permissive left-turn movements.

B. At least one signal indication in each signal face on an approach shall be flashed except in the following circumstance:

A single-section signal face consisting of a continuously-illuminated GREEN ARROW signal lens that is used alone to indicate a continuous movement in the steady (stop-and-go) mode shall remain continuously illuminated when the traffic control signal is operated in the flashing mode.

A manual switch, a conflict monitor (malfunction management unit) circuit, and, if appropriate, automatic means shall be provided to initiate the flashing mode.

The transition from steady (stop-and-go) mode to flashing mode, if initiated by a conflict monitor (malfunction management unit) or by a manual switch, shall be permitted to be made at any time.

Programmed changes from steady (stop-and-go) mode to flashing mode shall be made under either of the following circumstances:

A. At the end of the common major-street red interval (such as just prior to the start of the green in both directions on the major street), or
B. Directly from a steady CIRCULAR GREEN or GREEN ARROW signal indication to a flashing CIRCULAR YELLOW or YELLOW ARROW signal indication, respectively.

During programmed changes, no steady green signal indication or flashing yellow signal indication shall be terminated and immediately followed by a steady red or flashing red signal indication without first displaying the steady yellow signal indication.

Changes from flashing mode to steady (stop-and-go) mode shall be made under one of the following procedures:

A. Yellow-red flashing mode: Changes from flashing mode to steady (stop-and-go) mode shall be made at the beginning of the major-street green interval (when a green signal indication is shown to through traffic in both directions on the major street), or if there is no common major-street green interval, at the beginning of the green interval for the major traffic movement on the major street.
B. Red-red flashing mode: Changes from flashing mode to steady (stop-and-go) mode shall be made by changing the flashing red indications to steady red indications followed by appropriate green indications to begin the steady mode cycle. These green indications shall be the beginning of the major-street green interval (when a green signal indication is shown to through traffic in both directions on the major street) or if there is no common major-street green interval, at the beginning of the green interval for the major traffic movement on the major street.

Guidance:

When changing from the yellow-red flashing mode to steady (stop-and-go) mode, if there is no common major-street green interval, the provision of a steady red clearance interval for the other approaches before changing from a flashing yellow or a flashing red signal indication to a green signal indication on the major approach should be considered.

The steady red clearance interval provided during the change from red-red flashing mode to steady (stop-and-go) mode should have a duration of 6 seconds.

Support:

Section 4E.09 contains information regarding the operation of accessible pedestrian signal detector pushbutton locator tones during flashing operation.

Section 4D.13 Preemption and Priority Control of Traffic Control Signals

Option:

Traffic control signals may be designed and operated to respond to certain classes of approaching vehicles by altering the normal signal timing and phasing plan(s) during the approach and passage of those vehicles. The alternative plan(s) may be as simple as extending a currently displayed green interval or as complex as replacing the entire set of signal phases and timing.

Support:

Preemption control (see definition in Section 4A.02) is typically given to trains, boats, emergency vehicles, and light rail transit.

Examples of preemption control include the following:

A. The prompt displaying of green signal indications at signalized locations ahead of fire vehicles, law enforcement vehicles, ambulances, and other official emergency vehicles;
B. A special sequence of signal phases and timing to provide additional clearance time for vehicles to clear the tracks prior to the arrival of a train; and
C. A special sequence of signal phases to display a red indication to prohibit turning movements towards the tracks during the approach or passage of a train or transit vehicle.

Priority control (see definition in Section 4A.02) is typically given to certain nonemergency vehicles such as buses and light-rail vehicles.

Examples of priority control include the following:

A. The displaying of early or extended green signal indications at an intersection to assist public transit vehicles in remaining on schedule; and

B. Special phasing to assist public transit vehicles in entering the travel stream ahead of the platoon of traffic.

Some types or classes of vehicles supersede others when a traffic control signal responds to more than one type or class. In general, a vehicle that is more difficult to control supersedes a vehicle that is easier to control. Typically, the order of priority is: train, boat, heavy vehicle (fire vehicle, emergency medical service), light vehicle (law enforcement), light rail transit, rubber-tired transit.

Standard:

During the transition into preemption control:

A. The yellow change interval, and any red clearance interval that follows, shall not be shortened or omitted.
B. The shortening or omission of any pedestrian walk interval and/or pedestrian change interval shall be permitted.
C. The return to the previous steady green signal indication shall be permitted following a steady yellow signal indication in the same signal face, omitting the red clearance interval, if any.

During preemption control and during the transition out of preemption control:

A. The shortening or omission of any yellow change interval, and of any red clearance interval that follows, shall not be permitted.
B. A signal indication sequence from a steady yellow signal indication to a steady green signal indication shall not be permitted.

During priority control and during the transition into or out of priority control:

A. The shortening or omission of any yellow change interval, and of any red clearance interval that follows, shall not be permitted.
B. The shortening of any pedestrian walk interval below that time described in Section 4E.10 shall not be permitted.
C. The omission of a pedestrian walk interval and its associated change interval shall not be permitted unless the associated vehicular phase is also omitted or the pedestrian phase is exclusive.
D. The shortening or omission of any pedestrian change interval shall not be permitted.
E. A signal indication sequence from a steady yellow signal indication to a steady green signal indication shall not be permitted.

Guidance:

When a traffic control signal that is returning to a steady mode from a dark mode (typically upon restoration from a power failure) receives a preemption or priority request, care should be exercised to minimize the possibility of vehicles or pedestrians being misdirected into a conflict with the vehicle making the request.

If a traffic control signal is installed near or within a highway-railroad grade crossing or if a highway-railroad grade crossing with active traffic control devices is within or near a signalized highway intersection, Chapter 8D should be consulted.

Traffic control signals operating under preemption control or under priority control should be operated in a manner designed to keep traffic moving.

Traffic control signals that are designed to respond under preemption or priority control to more than one type or class of vehicle should be designed to respond in the relative order of importance or difficulty in stopping the type or class of vehicle.

Option:

During the change from a dark mode to a steady mode under a preemption or priority request, the display of signal indications that could misdirect road users may be prevented by the following:

A. Having the traffic control signal remain in the dark mode;
B. Having the traffic control signal remain in the flashing mode;
C. Altering the flashing mode;
D. Executing the normal start-up routine before responding; and
E. Responding directly to initial or dwell period.

A distinctive indication may be provided at the intersection to show that an emergency vehicle has been given control of the traffic control signal (see Section 11-106 of the “Uniform Vehicle Code”).

Preemption or priority control of traffic control signals may also be a means of assigning priority right-of-way to specified classes of vehicles at certain nonintersection locations such as on approaches to one-lane bridges and tunnels, movable bridges, highway maintenance and construction activities, metered freeway entrance ramps, and transit operations.

Section 4D.14 Coordination of Traffic Control Signals

Guidance:

Traffic control signals within 800 m (0.5 mi) of one another along a major route or in a network of intersecting major routes should be coordinated, preferably with interconnected controller units. However, signal coordination need not be maintained across boundaries between signal systems that operate on different cycle lengths.

Support:

For coordination with railroad-highway grade crossing signals, see Sections 4D.13 and 8D.07.

Section 4D.15 Size, Number, and Location of Signal Faces by Approach

Support:

Sections 4D.05, and 4D.16 through 4D.18 contain additional information regarding the design of signal faces.

Standard:

There shall be two nominal diameter sizes for vehicular signal lenses: 200 mm (8 in) and 300 mm (12 in).

Three-hundred millimeter (12 in) signal lenses shall be used:

A. For signal indications for approaches (see definition in Section 4A.02) where road users view both traffic control and lane-use control signal heads simultaneously;
B. If the nearest signal face is between 35 m (120 ft) and 45 m (150 ft) beyond the stop line, unless a supplemental near-side signal face is provided;
C. For signal faces located more than 45 m (150 ft) from the stop line;
D. For approaches to all signalized locations for which the minimum sight distance in Table 4D-1 cannot be met; and
E. For arrow signal indications.

A 200 mm (8 in) signal lens for a CIRCULAR RED signal indication shall not be used in combination with a 300 mm (12 in) signal lens for a CIRCULAR GREEN signal indication or a 300 mm (12 in) signal lens for a CIRCULAR YELLOW signal indication.

Option:

Different sizes of signal lenses may be used in the same signal face or signal head, except for the prohibitions listed in the Standards in this Section.

Guidance:

Three-hundred millimeter (12 in) signal lenses should be used for all signal indications for the following:

A. Approaches with 85th-percentile approach speeds exceeding 60 km/h (40 mph);
B. Approaches where a traffic control signal might be unexpected;
C. All approaches without curbs and gutters where only post-mounted signal heads are used; and
D. Locations where there is a significant percentage of elderly drivers.

Standard:

The signal faces for each approach to an intersection or a midblock location shall be provided as follows:

A. A minimum of two signal faces shall be provided for the major movement on the approach, even if the major movement is a turning movement.
B. See Section 4D.06 for left-turn signal faces.
C. See Section 4D.07 for right-turn signal faces.
D. Except where the width of an intersecting roadway or other conditions make it physically impractical:
  1. A signal face installed to satisfy the requirements for left-turn signal faces (see Section 4D.06) and right-turn signal faces (see Section 4D.07), and at least one and preferably both of the two signal faces required for the major movement on the approach shall be located:
    (a) Not less than 12 m (40 ft) beyond the stop line.
    (b) Not more than 55 m (180 ft) beyond the stop line unless a supplemental near side signal face is provided.
    (c) As near as practical to the line of the driver's normal view, if mounted over the roadway.

Table 4D-1. Minimum Sight Distance

85th-Percentile Speed (km/h)	Minimum Sight Distance (meters)
30	50
40	65
50	85
60	110
70	140
80	165
90	195
100	220

85th-Percentile Speed (mph)	Minimum Sight Distance (feet)
20	175
25	215
30	270
35	325
40	390
45	460
50	540
55	625
60	715

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2. **Where the nearest signal face is located between 45 and 55 m (150 and 180 ft) beyond the stop line, engineering judgment of the conditions, including the worst-case visibility conditions, shall be used to determine if the provision of a supplemental near side signal face would be beneficial.**
3. **A signal face installed to satisfy the requirements for left-turn signal faces (see Section 4D.06) and right-turn signal faces (see Section 4D.07), and at least one and preferably both of the two signal faces required for the major movement on the approach shall be located no higher than at a maximum height to the top of the signal housing mounted over a roadway of 7.8 m (25.6 ft) above the pavement (see Section 4D.17). For viewing distances between 12 m (40 ft) and 16 m (53 ft) from the stop line, the maximum mounting height to the top of the signal housing shall be as shown on Figure 4D-1. (See Section 4D.17 for additional information regarding mounting heights.)**
4. **At least one and preferably both of the signal faces required by Item A in this Standard shall be located between two lines intersecting with the center of the approach at a point 3 m (10 ft) behind the stop line, one making an angle of approximately 20 degrees to the right of the center of the approach extended, and the other making an angle of approximately 20 degrees to the left of the center of the approach extended (see Figure 4D-2)**
5. **If both of the signal faces required by Item A in this Standard are post-mounted, they shall both be on the far side of the intersection, one on the right and one on the left of the approach lane(s).**

E. If the minimum sight distance in Table 4D-1 cannot be met, a sign shall be installed to warn approaching traffic of the traffic control signal.

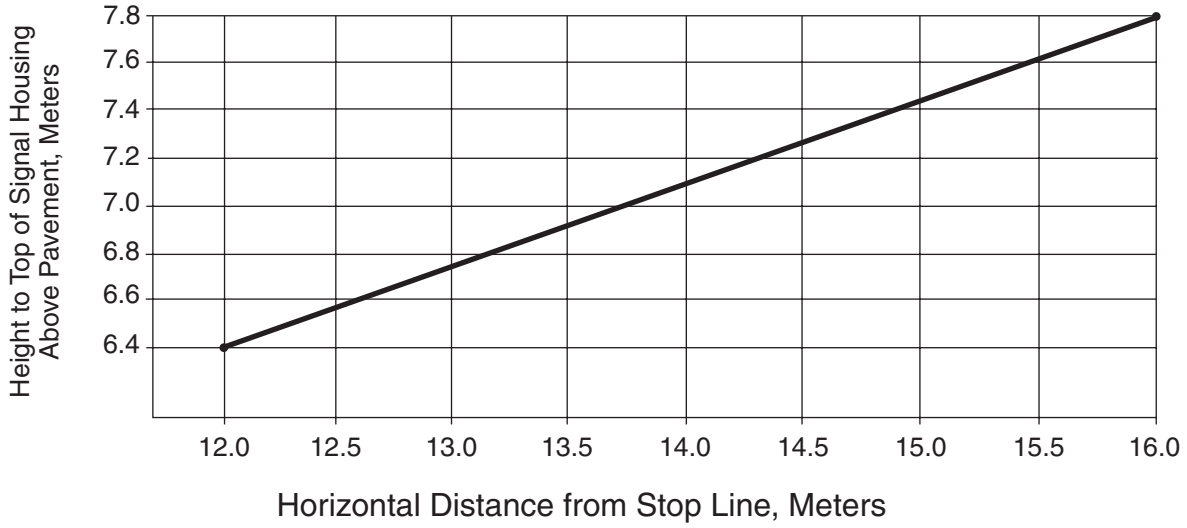
F. Required signal faces for through traffic on any one approach shall be located not less than 2.4 m (8 ft) apart measured horizontally perpendicular to the approach between the centers of the signal faces.

G. If more than one turn signal face is provided for a protected-mode turn and if one or both of the signal faces are located over the roadway, the signal faces shall be located not less than 2.4 m (8 ft) apart measured horizontally perpendicular to the approach between the centers of the signal faces.

H. If supplemental signal faces are used, the following limitations shall apply:

1. **Left-turn arrows shall not be used in near-right signal faces.**
2. **Right-turn arrows shall not be used in far-left signal faces. A far-side median-mounted signal face shall be considered a far-left signal for this application.**

Figure 4D-1. Maximum Mounting Height of Signal Faces Located Between 12 Meters (40 Feet) and 16 Meters (53 Feet) from Stop Line



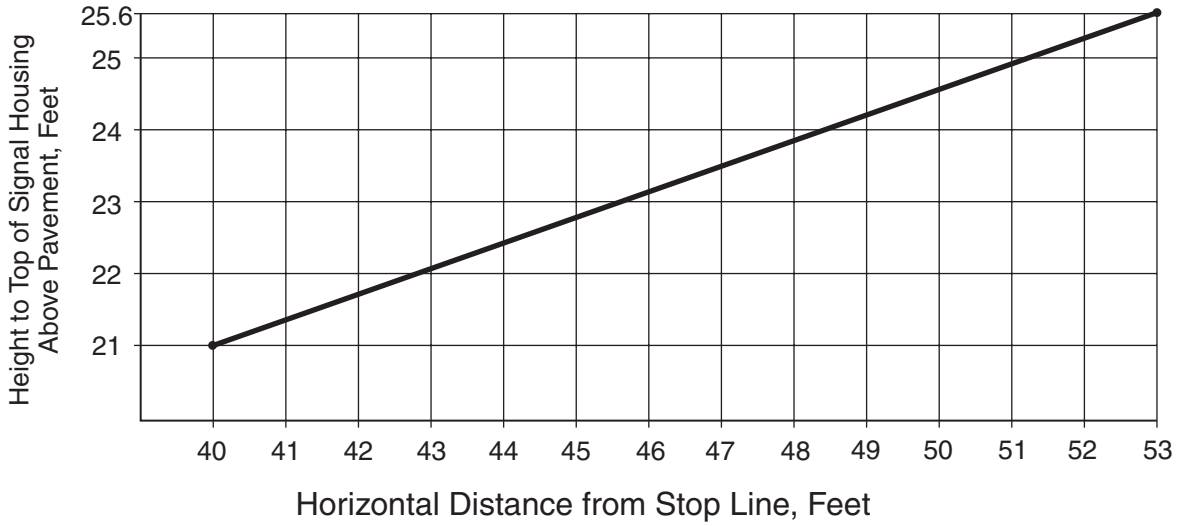
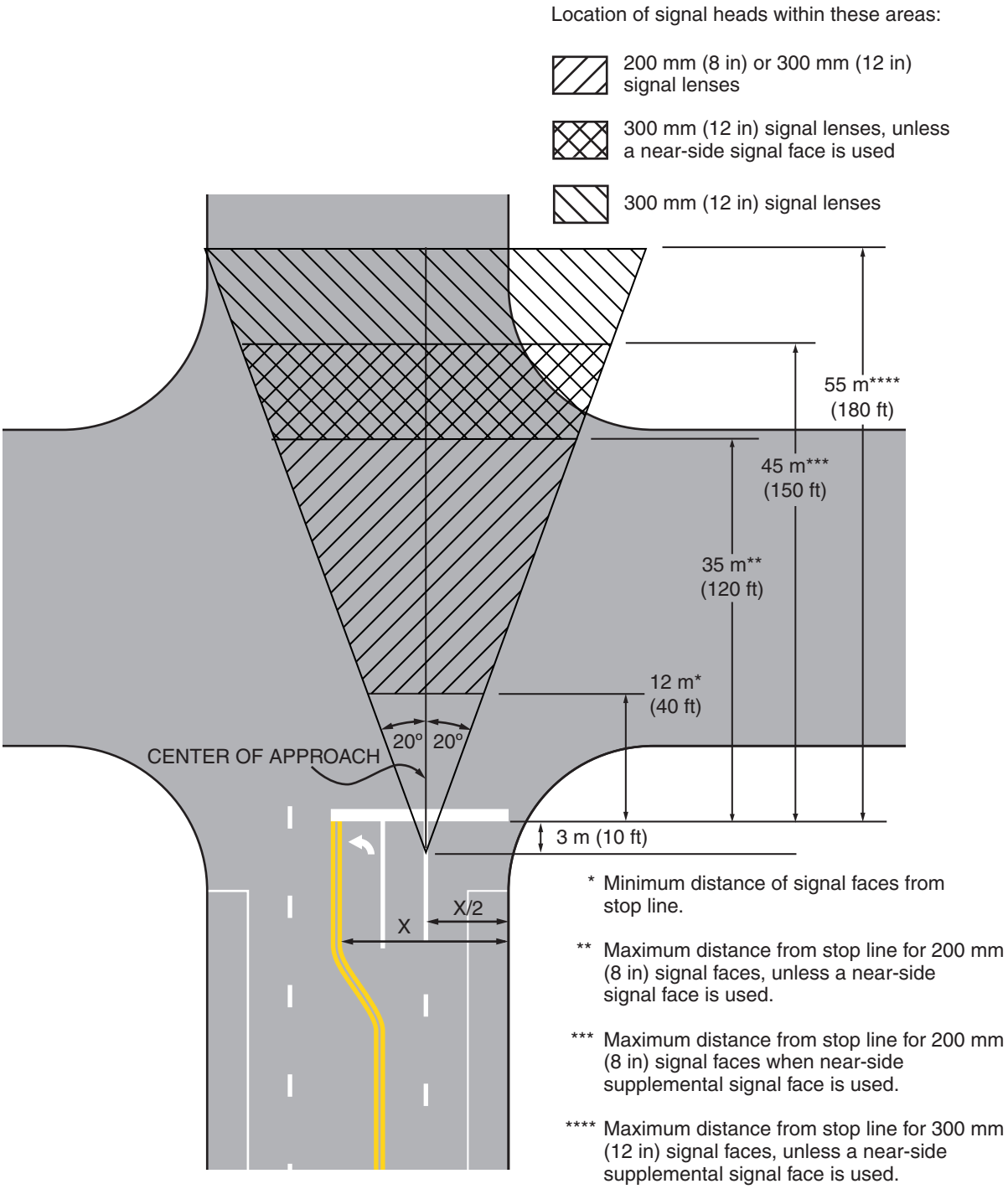


Figure 4D-2. Horizontal Location of Signal Faces



Guidance:

The two signal faces required for each approach should be continuously visible to traffic approaching the traffic control signal, from a point at least the minimum sight distance indicated in Table 4D-1 in advance of and measured to the stop line. This range of continuous visibility should be provided unless precluded by a physical obstruction or unless another signalized location is within this range.

If two or more left-turn lanes are provided for a separately controlled protected only mode left-turn movement, or if a left-turn movement represents the major movement from an approach, two left-turn signal faces should be provided.

If two or more right-turn lanes are provided for a separately controlled right-turn movement, or if a right-turn movement represents the major movement from an approach, two right-turn signal faces should be provided.

Near-side signal faces should be located as near as practical to the stop line.

If a signal face controls a specific lane or lanes of an approach, its position should make it readily visible to road users making that movement.

Supplemental signal faces should be used if engineering judgment has shown that they are needed to achieve intersection visibility both in advance and immediately before the signalized location. If supplemental signal faces are used, they should be located to provide optimum visibility for the movement to be controlled.

At signalized midblock crosswalks, at least one of the signal faces should be over the traveled way for each approach.

Option:

If a sign is installed to warn approaching road users of the traffic control signal, the sign may be supplemented by a Warning Beacon (see Section 4K.03).

A Warning Beacon used in this manner may be interconnected with the traffic signal controller assembly in such a manner as to flash yellow during the period when road users passing this beacon at the legal speed for the roadway might encounter a red signal indication (or a queue resulting from the display of the red signal indication) upon arrival at the signalized location.

Section 4D.16 Number and Arrangement of Signal Sections in Vehicular Traffic Control Signal Faces

Standard:

Each signal face at a signalized location shall have three, four, or five signal sections.

A single-section signal face shall be permitted at a traffic control signal if it consists of a continuously illuminated GREEN ARROW signal lens that is being used to indicate a continuous movement.

Arrows shall be pointed:

A. Vertically upward to indicate a straight-through movement;
B. Horizontally in the direction of the turn to indicate a turn at approximately or greater than a right angle; and
C. Upward with a slope at an angle approximately equal to that of the turn if the angle of the turn is substantially less than a right angle.

The signal lenses in a signal face shall be arranged in a vertical or horizontal straight line, except that in a vertical array, signal lenses of the same color may be arranged horizontally adjacent to each other at right angles to the basic straight line arrangement. Such clusters shall be limited to two identical signal lenses or to two or three different signal lenses of the same color.

In each signal face, all red signal lenses in vertically arranged signal faces shall be located above, and in horizontally arranged signal faces shall be located to the left, of all yellow and green signal lenses.

If a CIRCULAR YELLOW signal lens is used, it shall be located between the red signal lens or lenses and all other signal lenses.

In vertically arranged signal faces, each YELLOW ARROW signal lens shall be located immediately above the GREEN ARROW signal lens to which it applies. If a dual-arrow signal section (capable of alternating between the display of a GREEN ARROW and a YELLOW ARROW signal indication) is used, the lenses shall be in the same position relative to other lenses as are the GREEN ARROW signal lenses in a vertically arranged signal face.

In horizontally arranged signal faces, the YELLOW ARROW signal lens shall be located immediately to the left of the GREEN ARROW signal lens. If a dual-arrow signal section (capable of alternating between the display of a GREEN ARROW and a YELLOW ARROW signal indication) is used, the dual left-turn arrow signal lens shall be located immediately to the right of the CIRCULAR YELLOW signal

lens, the straight-through GREEN ARROW signal lens shall be located immediately to the right of the CIRCULAR GREEN signal lens, and the dual right-turn arrow signal lens shall be located to the right of all other signal lenses.

The relative positions of signal lenses within the signal face shall be as follows:

A. In a vertically arranged signal face from top to bottom:
CIRCULAR RED
Left-turn RED ARROW
Right-turn RED ARROW
CIRCULAR YELLOW
CIRCULAR GREEN
Straight-through GREEN ARROW
Left-turn YELLOW ARROW
Left-turn GREEN ARROW
Right-turn YELLOW ARROW
Right-turn GREEN ARROW

B. In a horizontally arranged signal face from left to right:
CIRCULAR RED
Left-turn RED ARROW
Right-turn RED ARROW
CIRCULAR YELLOW
Left-turn YELLOW ARROW
Left-turn GREEN ARROW
CIRCULAR GREEN
Straight-through GREEN ARROW
Right-turn YELLOW ARROW
Right-turn GREEN ARROW

C. If adjacent signal indications in a signal face are not identical, their arrangement shall follow Items A or B above, as applicable.

Option:

In a vertically arranged signal face, identical signal indications may be repeated in adjacent horizontal locations within the same signal face.

Horizontally arranged and vertically arranged signal faces may be used on the same approach provided they are separated to meet the lateral separation spacing required in Section 4D.15.

Support:

Figure 4D-3 illustrates some of the possible arrangements of signal lenses in signal faces.

Section 4D.17 Visibility, Shielding, and Positioning of Signal Faces

Standard:

The primary consideration in signal face placement, aiming, and adjustment shall be to optimize the visibility of signal indications to approaching traffic. Road users approaching a signalized intersection or other signalized area, such as a midblock crosswalk, shall be given a clear and unmistakable indication of their right-of-way assignment.

The geometry of each intersection to be signalized, including vertical grades, horizontal curves, and obstructions as well as the lateral and vertical angles of sight toward a signal face, as determined by typical driver-eye position, shall be considered in determining the vertical, longitudinal, and lateral position of the signal face.

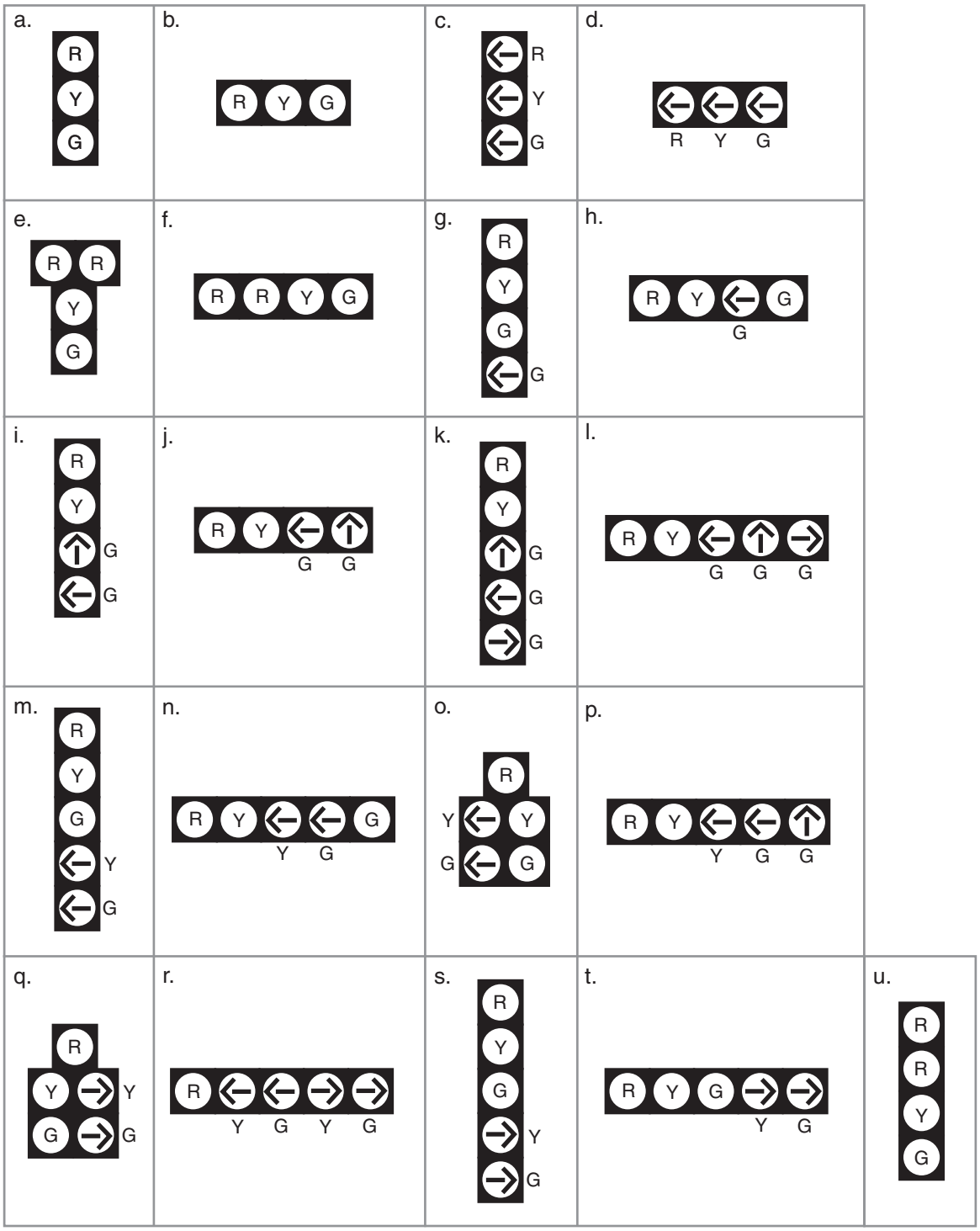
In cases where irregular street design necessitates placing signal faces for different street approaches with a comparatively small angle between their respective signal lenses, each signal lens shall, to the extent practical, be shielded or directed by signal visors, signal louvers, or other means so that an approaching road user can see only the signal lens(es) controlling the movements on the road user's approach.

The bottom of the signal housing and any related attachments to a vehicular signal face located over a roadway shall be at least 4.6 m (15 ft) above the pavement. The top of the signal housing of a vehicular signal face located over a roadway shall not be more than 7.8 m (25.6 ft) above the pavement.

Signal visors exceeding 300 mm (12 in) in length shall not be used on free-swinging signal heads.

The bottom of the signal housing (including brackets) of a vehicular signal face that is vertically arranged and not located over a roadway:

Figure 4D-3. Typical Arrangements of Signal Lenses in Signal Faces



A. Shall be at least 2.4 m (8 ft) but not more than 5.8 m (19 ft) above the sidewalk or, if there is no sidewalk, above the pavement grade at the center of the roadway.

B. Shall be at least 1.4 m (4.5 ft) but not more than 5.8 m (19 ft) above the median island grade of a center median island if located on the near side of the intersection.

The bottom of the signal housing (including brackets) of a vehicular signal face that is horizontally arranged and not located over a roadway:

A. Shall be at least 2.4 m (8 ft) but not more than 6.7 m (22 ft) above the sidewalk or, if there is no sidewalk, above the pavement grade at the center of the roadway.

B. Shall be at least 1.4 m (4.5 ft) but not more than 6.7 m (22 ft) above the median island grade of a center median island if located on the near side of the intersection.

Signal heads mounted at less than 4.6 meters (15 feet) from the bottom of the housing and any related attachments at the side of a roadway with curbs shall have a horizontal clearance of not less than 0.6 m (2 ft) from the face of a vertical curb. If there is no curb, signal heads shall have a horizontal clearance of not less than 0.6 m (2 ft) from the edge of a shoulder.

Guidance:

There should be legal authority to prohibit the display of any unauthorized sign, signal, marking, or device that interferes with the effectiveness of any official traffic control device (see Section 11-205 of the "Uniform Vehicle Code").

Signal visors should be used on signal faces to aid in directing the signal indication specifically to approaching traffic, as well as to reduce "sun phantom," which can result when external light enters the lens.

The use of signal visors, or the use of signal faces or devices that direct the light without a reduction in intensity, should be considered as an alternative to signal louvers because of the reduction in light output caused by signal louvers.

The use of a signal backplate for target value enhancement should be considered on signal faces viewed against a bright sky or bright or confusing backgrounds.

Support:

The use of backplates enhances the contrast between the traffic signal indications and their surroundings for both day and night conditions, which is also helpful to elderly drivers.

Option:

Special signal faces, such as visibility-limited signal faces, may be used such that the road user does not see signal indications intended for other approaches before seeing the signal indications for their own approach, if simultaneous viewing of both signal indications could cause the road user to be misdirected.

If the sight distance to the signal heads facing the approach is limited by horizontal or vertical alignment, supplemental signal faces aimed at a point on the approach at which the signal indications first become visible may be used.

Section 4D.18 Design, Illumination, and Color of Signal Sections

Standard:

Each signal indication, except those used for pedestrian signal heads and lane-use control signals, shall be circular or arrow.

Letters or numbers shall not be displayed as part of a vehicular signal indication.

Each signal indication shall be independently illuminated.

Each circular signal indication shall emit a single color: red, yellow, or green.

Each arrow signal indication shall emit a single color: red, yellow, or green except that the alternate display (dual-arrow signal section) of a GREEN ARROW and a YELLOW ARROW signal indication, both pointing in the same direction, shall be permitted, provided that they are not displayed simultaneously.

The arrow, which shall show only one direction, shall be the only illuminated part of an arrow signal indication.

Except for the requirements of this section, the requirements of the "Standards for Vehicle Traffic Control Signal Heads" (see Section 1A.11) shall be met.

References to signal lenses in this section shall not be used to limit signal optical units to incandescent lamps within optical assemblies that include lenses.

Support:

Research has resulted in signal optical units that are not lenses, such as, but not limited to, light-emitting diode (LED) traffic signal modules. Some units are practical for all signal indications, and some are practical for specific types such as visibility-limited signal indications.

Guidance:

The intensity and distribution of light from each illuminated signal lens should conform to the current "Standards for Vehicle Traffic Control Signal Heads" and "Traffic Signal Lamps" (see Section 1A.11).

If a signal indication is operated in the flashing mode for nighttime operation and the signal indication is so bright as to cause excessive glare, some form of automatic dimming should be used to reduce the brilliance of the signal indication.

Standard:

The inside of signal visors (hoods), the entire surface of louvers and fins, and the front surface of backplates shall have a dull black finish to minimize light reflection and to increase contrast between the signal indication and its background.

Section 4D.19 Lateral Placement of Signal Supports and Cabinets

Guidance:

The following items should be considered when placing signal supports and cabinets:

A. Reference should be made to the American Association of State Highway and Transportation Officials (AASHTO) "Roadside Design Guide" (see Section 1A.11) and to the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" (see Section 1A.11).
B. Signal supports should be placed as far as practical from the edge of the traveled way without adversely affecting the visibility of the signal indications.

   Where supports cannot be located based on the recommended AASHTO clearances, consideration should be given to the use of appropriate safety devices.

   No part of a concrete base for a signal support should extend more than 100 mm (4 in) above the ground level at any point. This limitation does not apply to the concrete base for a rigid support.
C. In order to minimize hindrance to the passage of persons with physical disabilities, a signal support or controller cabinet should not obstruct the sidewalk, or access from the sidewalk to the crosswalk.
D. Controller cabinets should be located as far as practical from the edge of the roadway.
E. On medians, the above minimum clearances for signal supports should be obtained if practical.

Section 4D.20 Temporary Traffic Control Signals

Standard:

A temporary traffic control signal shall be defined as a traffic control signal that is installed for a limited time period. A portable traffic control signal shall be defined as a temporary traffic control signal that is designed so that it can be easily transported and reused at different locations.

Support:

A temporary traffic control signal is generally installed using methods that minimize the costs of installation, relocation, and/or removal. Typical temporary traffic control signals are for specific purposes, such as for one-lane, two-way facilities in temporary traffic control zones (see Chapter 4G), for a haul-road intersection, or for access to a site that will have a permanent access point developed at another location in the near future.

Standard:

Advance signing shall be used when employing a temporary traffic control signal.

A temporary traffic control signal shall:

A. Meet the physical display and operational requirements of a conventional traffic control signal.
B. Be removed when no longer needed.
C. Be placed in the flashing mode when not being used if it will be operated in the steady mode within 5 working days; otherwise, it shall be removed.
D. Be placed in the flashing mode during periods when it is not desirable to operate the signal, or the signal heads shall be covered, turned, or taken down to indicate that the signal is not in operation.

Guidance:

A temporary traffic control signal should be used only if engineering judgment indicates that installing the signal will improve the overall safety and/or operation of the location. The use of temporary traffic control signals by a work crew on a regular basis in their work area should be subject to the approval of the jurisdiction having authority over the roadway.

A temporary traffic control signal should not operate longer than 30 days unless associated with a longer-term temporary traffic control zone project.

For use of temporary traffic control signals in temporary traffic control zones, reference should be made to Section 6F.80.

Section 4D.21 Traffic Signal Signs, Auxiliary

Support:

Traffic signal signs are sometimes used at highway traffic signal locations to instruct or guide pedestrians, bicyclists, or motorists.

Standard:

The minimum vertical and horizontal clearance of the total assembly of traffic signal signs (see Section 2B.45) shall conform to the provisions of Section 4D.17.

If used, illuminated traffic signal signs shall be designed and mounted in such a manner as to avoid glare and reflections that seriously detract from the signal indications. Traffic control signal faces shall be given dominant position and brightness to maximize their priority in the overall display.

Guidance:

Traffic signal signs should be located adjacent to the signal face to which they apply.

CHAPTER 4E. PEDESTRIAN CONTROL FEATURES

Section 4E.01 Pedestrian Signal Heads

Support:

Pedestrian signal heads provide special types of traffic signal indications exclusively intended for controlling pedestrian traffic. These signal indications consist of the illuminated symbols of a WALKING PERSON (symbolizing WALK) and an UPRAISED HAND (symbolizing DONT WALK).

Guidance:

Engineering judgment should determine the need for separate pedestrian signal heads (see Section 4D.03) and accessible pedestrian signals (see Section 4E.06).

Section 4E.02 Meaning of Pedestrian Signal Head Indications

Standard:

Pedestrian signal head indications shall have the following meanings:

A. A steady WALKING PERSON (symbolizing WALK) signal indication 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 (symbolizing WALK) signal indication is first shown.

B. A flashing UPRAISED HAND (symbolizing DONT WALK) signal indication 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 (symbolizing WALK) signal indication shall proceed out of the traveled way.

C. A steady UPRAISED HAND (symbolizing DONT WALK) signal indication means that a pedestrian shall not enter the roadway in the direction of the signal indication.

D. A flashing WALKING PERSON (symbolizing WALK) signal indication has no meaning and shall not be used.

Section 4E.03 Application of Pedestrian Signal Heads

Standard:

Pedestrian signal heads shall be used in conjunction with vehicular traffic control signals under any of the following conditions:

A. If a traffic control signal is justified by an engineering study and meets either Warrant 4, Pedestrian Volume or Warrant 5, School Crossing (see Chapter 4C);

B. If an exclusive signal phase is provided or made available for pedestrian movements in one or more directions, with all conflicting vehicular movements being stopped; or

C. At an established school crossing at any signalized location.

D. Where engineering judgment determines that multiphase signal indications (as with split-phase timing) would tend to confuse or cause conflicts with pedestrians using a crosswalk guided only by vehicular signal indications.

Guidance:

Pedestrian signal heads should be used under any of the following conditions:

A. If it is necessary to assist pedestrians in making a reasonably safe crossing or if engineering judgment determines that pedestrian signal heads are justified to minimize vehicle-pedestrian conflicts;

B. If pedestrians are permitted to cross a portion of a street, such as to or from a median of sufficient width for pedestrians to wait, during a particular interval but are not permitted to cross the remainder of the street during any part of the same interval; and/or

C. If no vehicular signal indications are visible to pedestrians, or if the vehicular signal indications that are visible to pedestrians starting or continuing a crossing provide insufficient guidance for them to decide when it is reasonably safe to cross, such as on one-way streets, at T-intersections, or at multiphase signal operations.

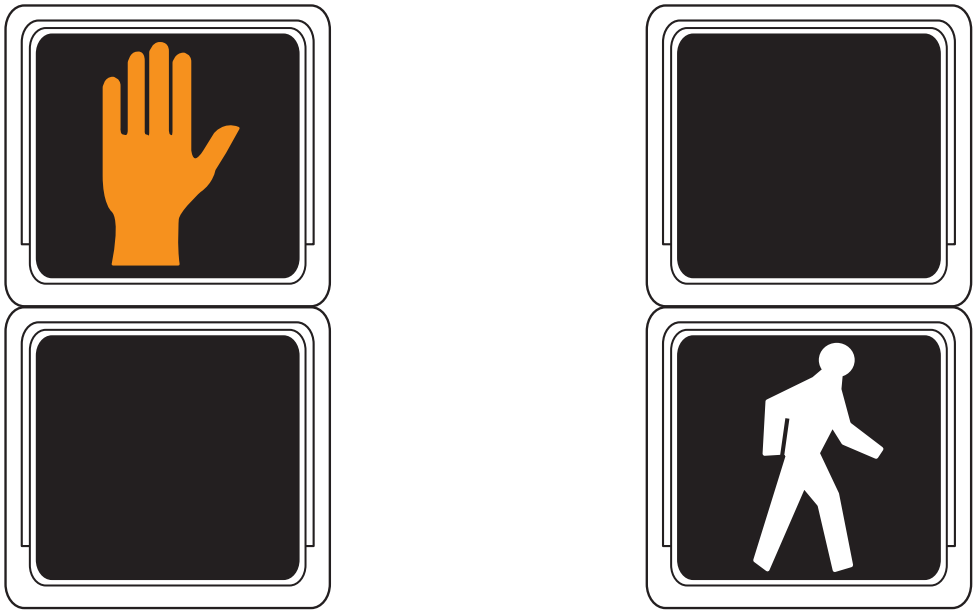
Section 4E.04 Size, Design, and Illumination of Pedestrian Signal Head Indications

Standard:

All new pedestrian signal head indications shall be displayed within a rectangular background and shall consist of symbolized messages (see Figure 4E-1), except that existing pedestrian signal head indications with lettered or outline style symbol messages may be retained for the remainder of their useful

Figure 4E-1. Typical Pedestrian Signal Indications

One Section



Two Section

service life. The symbol designs that are set forth in the "Standard Highway Signs" book shall be used. Each pedestrian signal head indication shall be independently illuminated and emit a single color.

The UPRAISED HAND (symbolizing DONT WALK) signal section shall be mounted directly above or integral with the WALKING PERSON (symbolizing WALK) signal section.

The WALKING PERSON (symbolizing WALK) signal indication shall be white, conforming to the publication entitled "Pedestrian Traffic Control Signal Indications" (see Section 1A.11), with all except the symbol obscured by an opaque material.

The UPRAISED HAND (symbolizing DONT WALK) signal indication shall be Portland orange, conforming to the publication entitled "Pedestrian Traffic Control Signal Indications" (see Section 1A.11), with all except the symbol obscured by an opaque material.

When not illuminated, the WALKING PERSON (symbolizing WALK) and UPRAISED HAND (symbolizing DONT WALK) symbols shall not be readily visible to pedestrians at the far end of the crosswalk that the pedestrian signal head indications control.

For pedestrian signal head indications, the symbols shall be at least 150 mm (6 in) high.

The light source of a flashing UPRAISED HAND (symbolizing DONT WALK) signal indication shall be flashed continuously at a rate of not less than 50 nor more than 60 times per minute. The illuminated period of each flash shall be not less than half and not more than two-thirds of the total flash cycle.

Guidance:

Pedestrian signal head indications should be conspicuous and recognizable to pedestrians at all distances from the beginning of the controlled crosswalk to a point 3 m (10 ft) from the end of the controlled crosswalk during both day and night.

For crosswalks where the pedestrian enters the crosswalk more than 30 m (100 ft) from the pedestrian signal head indications, the symbols should be at least 225 mm (9 in) high.

Option:

An animated eyes symbol may be added to a pedestrian signal head in order to prompt pedestrians to look for vehicles in the intersection during the time that the WALK signal indication is displayed.

Standard:

If used, the animated eyes symbol shall consist of an outline of a pair of white steadily-illuminated eyes with white eyeballs that scan from side to side at a rate of approximately once per second. The animated eyes symbol shall be at least 300 mm (12 in) wide with each eye having a width of at least 125 mm (5 in) and a height of at least 62 mm (2.5 in). The animated eyes symbol shall be illuminated at the start of the walk interval and shall terminate at the end of the walk interval.

Section 4E.05 Location and Height of Pedestrian Signal Heads

Standard:

Pedestrian signal heads shall be mounted with the bottom of the signal housing including brackets not less than 2.1 m (7 ft) nor more than 3 m (10 ft) above sidewalk level, and shall be positioned and adjusted to provide maximum visibility at the beginning of the controlled crosswalk.

If pedestrian signal heads are mounted on the same support as vehicular signal heads, there shall be a physical separation between them.

Section 4E.06 Accessible Pedestrian Signals

Support:

The primary technique that pedestrians who have visual disabilities use to cross streets at signalized locations is to initiate their crossing when they hear the traffic in front of them stop and the traffic alongside them begin to move, corresponding to the onset of the green interval. This technique is effective at many signalized locations. The existing environment is often sufficient to provide the information that pedestrians who have visual disabilities need to operate reasonably safely at a signalized location. Therefore, many signalized locations will not require any accessible pedestrian signals.

Guidance:

If a particular signalized location presents difficulties for pedestrians who have visual disabilities to cross reasonably safely and effectively, an engineering study should be conducted that considers the safety and effectiveness for pedestrians in general, as well as the information needs of pedestrians with visual disabilities.

Support:

The factors that might make crossing at a signalized location difficult for pedestrians who have visual disabilities include: increasingly quiet cars, right turn on red (which masks the beginning of the through phase), continuous right-turn movements, complex signal operations, traffic circles, and wide streets. Further, low traffic volumes might make it difficult for pedestrians who have visual disabilities to discern signal phase changes.

Local organizations, providing support services to pedestrians who have visual and/or hearing disabilities, can often act as important advisors to the traffic engineer when consideration is being given to the installation of devices to assist such pedestrians. Additionally, orientation and mobility specialists or similar staff also might be able to provide a wide range of advice. The U.S. Access Board's Document A-37, "Accessible Pedestrian Signals," provides various techniques for making pedestrian signal information available to persons with visual disabilities (see Page i for the address for the U.S. Access Board).

Accessible pedestrian signals provide information in nonvisual format (such as audible tones, verbal messages, and/or vibrating surfaces).

Information regarding detectors for accessible pedestrian signals is found in Section 4E.09.

Standard:

When used, accessible pedestrian signals shall be used in combination with pedestrian signal timing. The information provided by an accessible pedestrian signal shall clearly indicate which pedestrian crossing is served by each device.

Under stop-and-go operation, accessible pedestrian signals shall not be limited in operation by the time of day or day of week.

Guidance:

The installation of accessible pedestrian signals at signalized locations should be based on an engineering study, which should consider the following factors:

A. Potential demand for accessible pedestrian signals;
B. A request for accessible pedestrian signals;
C. Traffic volumes during times when pedestrians might be present, including periods of low traffic volumes or high turn-on-red volumes;
D. The complexity of traffic signal phasing; and
E. The complexity of intersection geometry.

Support:

Technology that provides different sounds for each nonconcurrent signal phase has frequently been found to provide ambiguous information.

Standard:

When choosing audible tones, possible extraneous sources of sounds (such as wind, rain, vehicle back-up warnings, or birds) shall be considered in order to eliminate potential confusion to pedestrians who have visual disabilities.

Guidance:

Audible pedestrian tones should be carefully selected to avoid misleading pedestrians who have visual disabilities when the following conditions exist:

A. Where there is an island that allows unsignalized right turns across a crosswalk between the island and the sidewalk.
B. Where multileg approaches or complex signal phasing require more than two pedestrian phases, such that it might be unclear which crosswalk is served by each audible tone.
C. At intersections where a diagonal pedestrian crossing is allowed, or where one street receives a WALKING PERSON (symbolizing WALK) signal indication simultaneously with another street.

Standard:

When accessible pedestrian signals have an audible tone(s), they shall have a tone for the walk interval. The audible tone(s) shall be audible from the beginning of the associated crosswalk. If the tone for the walk interval is similar to the pushbutton locator tone, the walk interval tone shall have a faster repetition rate than the associated pushbutton locator tone.

Support:

A pushbutton locator tone is a repeating sound that informs approaching pedestrians that they are required to push a button to actuate pedestrian timing, and that enables visually impaired pedestrians to locate the pushbutton (see Section 4E.09).

Guidance:

The accessible walk signal tone should be no louder than the locator tone, except when there is optional activation to provide a louder signal tone for a single pedestrian phase.

Automatic volume adjustment in response to ambient traffic sound level should be provided up to a maximum volume of 89 dBA. Where automatic volume adjustment is used, tones should be no more than 5 dBA louder than ambient sound. The A-weighted sound pressure level should conform to the requirements of "ISO 1996-1:1982" and "ISO 1996-2:1987" (see Page i for the address for the International Organization for Standards).

Standard:

When verbal messages are used to communicate the pedestrian interval, they shall provide a clear message that the walk interval is in effect, as well as to which crossing it applies.

The verbal message that is provided at regular intervals throughout the timing of the walk interval shall be the term "walk sign," which may be followed by the name of the street to be crossed.

A verbal message is not required at times when the walk interval is not timing, but, if provided:

A. It shall be the term "wait."
B. It need not be repeated for the entire time that the walk interval is not timing.

Option:

Accessible pedestrian signals that provide verbal messages may provide similar messages in languages other than English, if needed, except for the terms "walk sign" and "wait."

Support:

A vibrotactile pedestrian device communicates information about pedestrian timing through a vibrating surface by touch.

Standard:

Vibrotactile pedestrian devices, where used, shall indicate that the walk interval is in effect, and for which direction it applies, through the use of a vibrating directional arrow or some other means.

Guidance:

When provided, vibrotactile pedestrian devices should be located next to, and on the same pole as, the pedestrian pushbutton, if any, and adjacent to the intended crosswalk.

Section 4E.07 Countdown Pedestrian Signals

Option:

A pedestrian interval countdown display may be added to a pedestrian signal head in order to inform pedestrians of the number of seconds remaining in the pedestrian change interval.

Standard:

If used, countdown pedestrian signals shall consist of Portland orange numbers that are at least 150 mm (6 in) in height on a black opaque background. The countdown pedestrian signal shall be located immediately adjacent to the associated UPRAISED HAND (symbolizing DONT WALK) pedestrian signal head indication.

If used, the display of the number of remaining seconds shall begin only at the beginning of the pedestrian change interval. After the countdown displays zero, the display shall remain dark until the beginning of the next countdown.

If used, the countdown pedestrian signal shall display the number of seconds remaining until the termination of the pedestrian change interval. Countdown displays shall not be used during the walk interval nor during the yellow change interval of a concurrent vehicular phase.

Guidance:

If used with a pedestrian signal head that does not have a concurrent vehicular phase, the pedestrian change interval (flashing UPRAISED HAND) should be set to be approximately 4 seconds less than the required pedestrian crossing time (see Section 4E.10) and an additional clearance interval (during which steady UPRAISED HAND is displayed) should be provided prior to the start of the conflicting vehicular phase. In this case, the countdown display of the number of remaining seconds should be displayed only during the display of the flashing UPRAISED HAND, should display zero at the time when the flashing UPRAISED HAND changes to steady UPRAISED HAND, and should be dark during the additional clearance interval prior to the conflicting vehicular phase.

For crosswalks where the pedestrian enters the crosswalk more than 30 m (100 ft) from the countdown pedestrian signal display, the numbers should be at least 225 mm (9 in) in height.

Because some technology includes the countdown pedestrian signal logic in a separate timing device that is independent of the timing in the traffic signal controller, care should be exercised by the engineer when timing changes are made to pedestrian change intervals.

If the pedestrian change interval is interrupted or shortened as a part of a transition into a preemption sequence (see Section 4E.10), the countdown pedestrian signal display should be discontinued and go dark immediately upon activation of the preemption transition.

Section 4E.08 Pedestrian Detectors

Guidance:

When pedestrian actuation is used, pedestrian pushbutton detectors should be capable of easy activation and conveniently located near each end of the crosswalks.

Standard:

Signs (see Section 2B.44) shall be mounted adjacent to or integral with pedestrian pushbutton detectors, explaining their purpose and use.

Option:

At certain locations, a sign in a more visible location may be used to call attention to the pedestrian detector.

Guidance:

If two crosswalks, oriented in different directions, end at or near the same location, the positioning of pedestrian detectors and/or the legends on the pedestrian detector signs should clearly indicate which crosswalk signal is actuated by each pedestrian detector.

Standard:

If the pedestrian clearance time is sufficient only to cross from the curb or shoulder to a median of sufficient width for pedestrians to wait and the signals are pedestrian actuated, an additional pedestrian detector shall be provided in the median.

Guidance:

The use of additional pedestrian detectors on islands or medians where a pedestrian might become stranded should be considered.

A mounting height of approximately 1.1 m (3.5 ft) above the sidewalk should be used for pedestrian pushbutton detectors.

If used, special purpose pushbuttons (to be operated only by authorized persons) should include a housing capable of being locked to prevent access by the general public and do not need an instructional sign.

Standard:

If used, a pilot light or other means of indication installed with a pedestrian pushbutton shall not be illuminated until actuation. Once it is actuated, it shall remain illuminated until the pedestrian's green or WALKING PERSON (symbolizing WALK) signal indication is displayed.

Option:

At signalized locations with a demonstrated need and subject to equipment capabilities, pedestrians with special needs may be provided with additional crossing time by means of an extended pushbutton press.

Section 4E.09 Accessible Pedestrian Signal Detectors

Standard:

An accessible pedestrian signal detector shall be defined as a device designated to assist the pedestrian who has visual or physical disabilities in activating the pedestrian phase.

At accessible pedestrian signal locations with pedestrian actuation, each pushbutton shall activate both the walk interval and the accessible pedestrian signals.

Option:

Accessible pedestrian signal detectors may be pushbuttons or passive detection devices.

Pushbutton locator tones may be used with accessible pedestrian signals.

Guidance:

At accessible pedestrian signal locations, pushbuttons should clearly indicate which crosswalk signal is actuated by each pushbutton. Pushbuttons and tactile arrows should have high visual contrast as described in the

"Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" (see Section 1A.11). Tactile arrows should point in the same direction as the associated crosswalk. At corners of signalized locations with accessible pedestrian signals where two pedestrian pushbuttons are provided, the pushbuttons should be separated by a distance of at least 3 m (10 ft). This enables pedestrians who have visual disabilities to distinguish and locate the appropriate pushbutton.

Pushbuttons for accessible pedestrian signals should be located (see Figure 4E-2) as follows:

A. Adjacent to a level all-weather surface to provide access from a wheelchair, and where there is an all-weather surface, wheelchair accessible route to the ramp;
B. Within 1.5 m (5 ft) of the crosswalk extended;
C. Within 3 m (10 ft) of the edge of the curb, shoulder, or pavement; and
D. Parallel to the crosswalk to be used.

If the pedestrian clearance time is sufficient only to cross from the curb or shoulder to a median of sufficient width for pedestrians to wait and accessible pedestrian detectors are used, an additional accessible pedestrian detector should be provided in the median.

Standard:

When used, pushbutton locator tones shall be easily locatable, shall have a duration of 0.15 seconds or less, and shall repeat at 1-second intervals.

Guidance:

Pushbuttons should be audibly locatable. Pushbutton locator tones should be intensity responsive to ambient sound, and be audible 1.8 to 3.7 m (6 to 12 ft) from the pushbutton, or to the building line, whichever is less. Pushbutton locator tones should be no more than 5 dBA louder than ambient sound.

Pushbutton locator tones should be deactivated during flashing operation of the traffic control signal.

Option:

At locations with pretimed traffic control signals or nonactuated approaches, pedestrian pushbuttons may be used to activate the accessible pedestrian signals.

The audible tone(s) may be made louder (up to a maximum of 89 dBA) by holding down the pushbutton for a minimum of 3 seconds. The louder audible tone(s) may also alternate back and forth across the crosswalk, thus providing optimal directional information.

The name of the street to be crossed may also be provided in accessible format, such as Braille or raised print.

Section 4E.10 Pedestrian Intervals and Signal Phases

Standard:

When pedestrian signal heads are used, a WALKING PERSON (symbolizing WALK) signal indication shall be displayed only when pedestrians are permitted to leave the curb or shoulder.

A pedestrian clearance time shall begin immediately following the WALKING PERSON (symbolizing WALK) signal indication. The first portion of the pedestrian clearance time shall consist of a pedestrian change interval during which a flashing UPRAISED HAND (symbolizing DONT WALK) signal indication shall be displayed. The remaining portions shall consist of the yellow change interval and any red clearance interval (prior to a conflicting green being displayed), during which a flashing or steady UPRAISED HAND (symbolizing DONT WALK) signal indication shall be displayed.

If countdown pedestrian signals are used, a steady UPRAISED HAND (symbolizing DONT WALK) signal indication shall be displayed during the yellow change interval and any red clearance interval (prior to a conflicting green being displayed) (see Section 4E.07).

At intersections equipped with pedestrian signal heads, the pedestrian signal indications shall be displayed except when the vehicular traffic control signal is being operated in the flashing mode. At those times, the pedestrian signal lenses shall not be illuminated.

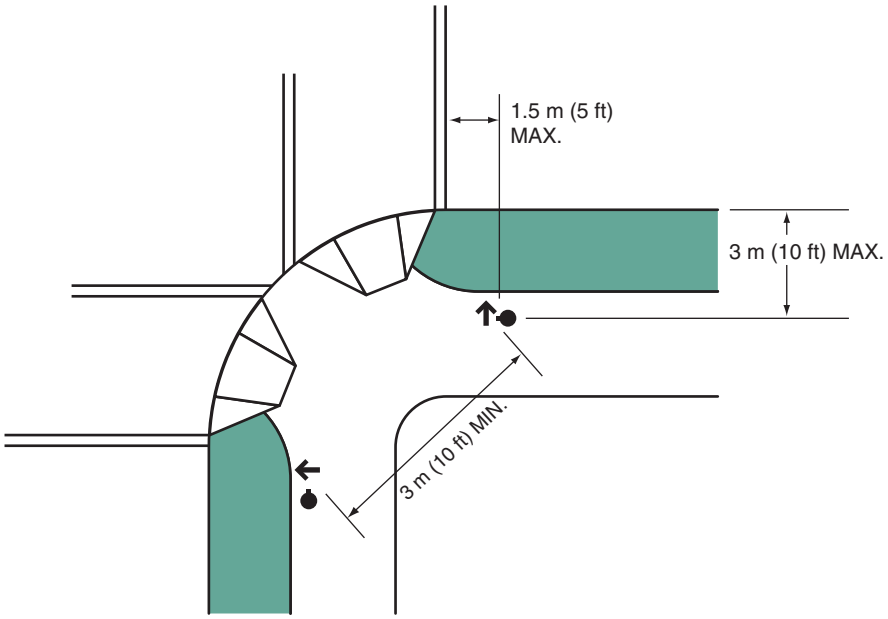
Guidance:

Except as noted in the Option, the walk interval should be at least 7 seconds in length so that pedestrians will have adequate opportunity to leave the curb or shoulder before the pedestrian clearance time begins.

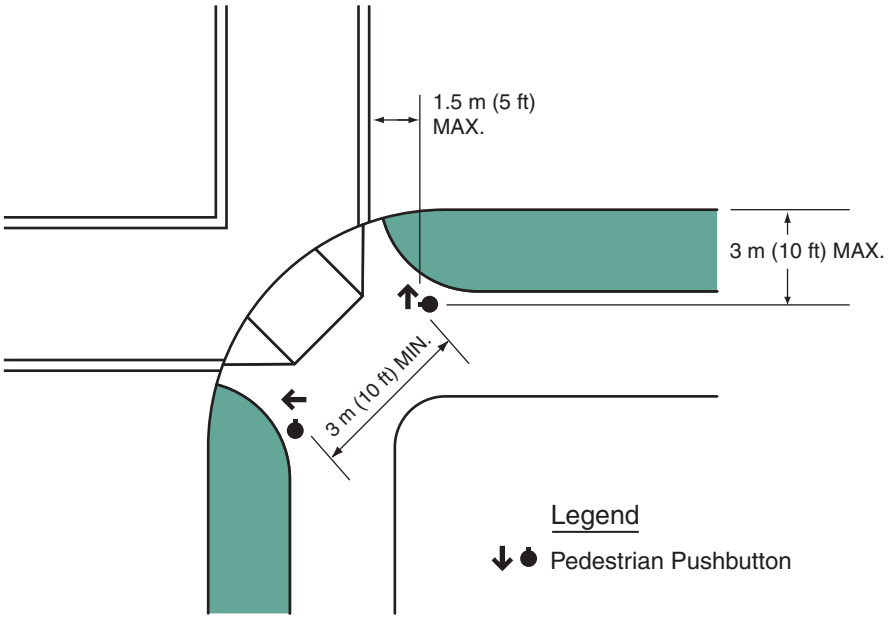
Option:

If pedestrian volumes and characteristics do not require a 7-second walk interval, walk intervals as short as 4 seconds may be used.

Figure 4E-2. Recommended Pushbutton Locations for Accessible Pedestrian Signals



Two Curb-Cut Ramps



One Curb-Cut Ramp

Support:

The walk interval itself need not equal or exceed the pedestrian clearance time calculated for the roadway width, because many pedestrians will complete their crossing during the pedestrian clearance time.

Guidance:

The pedestrian clearance time should be sufficient to allow a pedestrian crossing in the crosswalk who left the curb or shoulder during the WALKING PERSON (symbolizing WALK) signal indication to travel at a walking speed of 1.2 m (4 ft) per second, to at least the far side of the traveled way or to a median of sufficient width for pedestrians to wait. Where pedestrians who walk slower than 1.2 m (4 ft) per second, or pedestrians who use wheelchairs, routinely use the crosswalk, a walking speed of less than 1.2 m (4 ft) per second should be considered in determining the pedestrian clearance time.

Option:

Passive pedestrian detection equipment, which can detect pedestrians who need more time to complete their crossing and can extend the length of the pedestrian clearance time for that particular cycle, may be used in order to avoid using a lower walking speed to determine the pedestrian clearance time.

Guidance:

Where the pedestrian clearance time is sufficient only for crossing from the curb or shoulder to a median of sufficient width for pedestrians to wait, additional measures should be considered, such as median-mounted pedestrian signals or additional signing.

Option:

The pedestrian clearance time may be entirely contained within the vehicular green interval, or may be entirely contained within the vehicular green and yellow change intervals.

On a street with a median of sufficient width for pedestrians to wait, a pedestrian clearance time that allows the pedestrian to cross only from the curb or shoulder to the median may be provided.

During the transition into preemption, the walk interval and the pedestrian change interval may be shortened or omitted as described in Section 4D.13.

CHAPTER 4F. TRAFFIC CONTROL SIGNALS FOR EMERGENCY VEHICLE ACCESS

Section 4F.01 Applications of Emergency-Vehicle Traffic Control Signals

Support:

An emergency-vehicle traffic control signal is a special traffic control signal that assigns the right-of-way to an authorized emergency vehicle.

Option:

An emergency-vehicle traffic control signal may be installed at a location that does not meet other traffic signal warrants such as at an intersection or other location to permit direct access from a building housing the emergency vehicle.

Guidance:

If a traffic control signal is not justified under the signal warrants of Chapter 4C and if gaps in traffic are not adequate to permit reasonably safe entrance of emergency vehicles, or the stopping sight distance for vehicles approaching on the major street is insufficient to permit reasonably safe entrance of emergency vehicles, installing an emergency-vehicle traffic control signal should be considered. If one of the signal warrants of Chapter 4C is met and a traffic control signal is justified by an engineering study, and if a decision is made to install a traffic control signal, it should be installed based upon the provisions of Chapter 4D.

The sight distance determination should be based on the location of the visibility obstruction for the critical approach lane for each street or drive and the posted or statutory speed limit or 85th-percentile speed on the major street, whichever is higher.

Section 4F.02 Design of Emergency-Vehicle Traffic Control Signals

Standard:

Except as specified in this Section, an emergency-vehicle traffic control signal shall meet the requirements of this Manual.

An Emergency Vehicle (W11-8) sign (see Section 2C.40) with an EMERGENCY SIGNAL AHEAD (W11-12p) supplemental plaque shall be placed in advance of all emergency-vehicle traffic control signals. If a warning beacon is installed to supplement the W11-8 sign, the design and location of the beacon shall conform to the Standards specified in Sections 4K.01 and 4K.03.

Guidance:

At least one of the two required signal faces for each approach on the major street should be located over the roadway.

The following size signal lenses should be used for emergency-vehicle traffic control signals: 300 mm (12 in) diameter for red and steady yellow signal indications, and 200 mm (8 in) diameter for flashing yellow or steady green signal indications.

Standard:

An EMERGENCY SIGNAL (R10-13) sign shall be mounted adjacent to a signal face on each major street approach (see Section 2B.45). If an overhead signal face is provided, the EMERGENCY SIGNAL sign shall be mounted adjacent to the overhead signal face.

Option:

An approach that only serves emergency vehicles may be provided with only one signal face consisting of one or more signal sections.

Besides using a 200 mm (8 in) diameter signal indication, other appropriate means to reduce the flashing yellow light output may be used.

Section 4F.03 Operation of Emergency-Vehicle Traffic Control Signals

Standard:

Right-of-way for emergency vehicles at signalized locations operating in the steady (stop-and-go) mode shall be obtained as specified in Section 4D.13.

As a minimum, the signal indications, sequence, and manner of operation of an emergency-vehicle traffic control signal installed at a midblock location shall be as follows:

A. The signal indication, between emergency-vehicle actuations, shall be either steady green or flashing yellow. If the flashing yellow signal indication is used instead of the steady green signal indication, it shall be displayed in the normal position of the steady green signal indication, while the red and steady yellow signal indications shall be displayed in their normal positions.

B. When an emergency vehicle actuation occurs, a steady yellow change interval followed by a steady red interval shall be displayed to traffic on the major street.

C. A yellow change interval is not required following the green interval for the emergency-vehicle driveway.

Emergency-vehicle traffic control signals located at intersections shall either be operated in the flashing mode between emergency-vehicle actuations (see Section 4D.12) or be fully or semi-traffic-actuated, to accommodate normal vehicular and pedestrian traffic on the streets.

Warning beacons, if used with an emergency-vehicle traffic control signal, shall be flashed only:

A. For an appropriate time in advance of and during the steady yellow change interval for the major street; and

B. During the steady red interval for the major street.

Guidance:

The duration of the red interval for traffic on the major street should be determined by on-site test-run time studies, but should not exceed 1.5 times the time required for the emergency vehicle to clear the path of conflicting vehicles.

Option:

An emergency-vehicle traffic control signal sequence may be initiated manually from a local control point such as a fire station or law enforcement headquarters or from an emergency vehicle equipped for remote operation of the signal.