

1 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES  
2 FOR STREETS AND HIGHWAYS (MUTCD)

3  
4 INTRODUCTION

5 All text in the Introduction has been moved to and combined with Part 1, except Paragraph 6  
6 (historical development of the MUTCD), which has been deleted as it is unneeded, and Paragraphs 3,  
7 10, 12, 13, and 14 which are either duplicative of text in existing Part 1 or pertain to the use of metric  
8 units no longer used.

9  
10 PART 1  
11 GENERAL

12 The text in Part 1 has been reorganized and separated into four Chapters, and text from the existing  
13 Introduction has been inserted into and combined with existing Part 1 text.

14  
15 CHAPTER 1A. GENERAL

16 Section 1A.01 Purpose of the MUTCD

17 Support:

18 The purpose of the MUTCD is to establish national criteria for the use of traffic control devices that meet  
19 the needs and expectancy of road users on all streets, highways, bikeways, and site roadways open to public  
20 travel. This purpose is achieved through the following objectives:

- 21 A. Promote national uniformity in the meaning and appearance of traffic control devices.  
22 B. Promote national consistency in the use, installation, and operation of traffic control devices.  
23 C. Provide basic principles for traffic engineers to use in making decisions regarding the use, installation,  
24 operation, maintenance, and removal of traffic control devices.  
25 D. Promote safety and efficiency through appropriate use of traffic control devices.

26 Applicability of the MUTCD to facilities open to public travel is independent of the type of ownership or  
27 jurisdiction (public or private) and the source of funding (Federal, State, local, or private).

28 This Manual presumes sufficient working knowledge, professional training and experience, and education  
29 in the principles of engineering. Other resources can be consulted to understand the basis for decisions that  
30 are made in which engineering study or judgment will be applied.

31 ~~Section 1A.01-1A.02 Purpose of Traffic Control Devices – Definition~~

32 Support:

33 ~~The purpose of traffic control devices, as well as the principles for their use, is to promote highway safety~~  
34 ~~and efficiency by providing for the orderly movement of all road users on streets, highways, bikeways, and~~  
35 ~~private roads open to public travel throughout the Nation. This paragraph moved to new Section 1D.01~~

36 ~~Traffic control devices notify road users of regulations and provide warning and guidance needed for the~~  
37 ~~uniform and efficient operation of all elements of the traffic stream in a manner intended to minimize the~~  
38 ~~occurrences of crashes. This paragraph deleted since it is redundant with the definition provided in~~  
39 ~~Section 1C.02~~

40 ~~Standard:~~

41 ~~As defined in Section 1C.02, T~~traffic control devices ~~shall be defined as~~include all signs, signals,  
42 markings, ~~channelizing devices, and or~~ other devices ~~that use color, shapes, symbols, words, sounds, and/or~~  
43 ~~tactile information for the primary purpose of communicating a~~ ~~used to~~ regulatory, warning, or guidance  
44 ~~message to road users on~~ traffic, placed on, over, or adjacent to a street, highway, pedestrian facility,  
45 bikeway, ~~pathway or private road~~site roadway open to public travel ~~(see definition in Section 1A.13) by~~  
46 ~~authority of a public agency or official having jurisdiction, or, in the case of a private road, by authority of the~~  
47 ~~private owner or private official having jurisdiction. This paragraph moved from the existing Introduction~~

1 Certain types of signs and other devices that do not have any traffic control purpose are sometimes placed  
2 within the highway right-of-way by or with the permission of the public agency or the official having  
3 jurisdiction over the street or highway. ~~Most of these signs and other devices are not intended for use by road~~  
4 ~~users in general, and their message is only important to individuals who have been instructed in their~~  
5 ~~meanings.~~ These signs and other devices are not considered to be traffic control devices and provisions  
6 regarding their design and use are not included in this Manual. Among these signs and other devices are the  
7 following:

- 8 A. Devices whose purpose is to assist highway maintenance personnel. Examples include markers to  
9 guide snowplow operators, devices that identify culvert and drop inlet locations, and devices that  
10 precisely identify highway locations for maintenance or mowing purposes.
- 11 B. Devices whose purpose is to assist fire or law enforcement personnel. Examples include markers that  
12 identify fire hydrant locations, signs that identify fire or water district boundaries, speed measurement  
13 pavement markings, small indicator lights to assist in enforcement of red light violations, and photo  
14 enforcement systems.
- 15 C. Devices whose purpose is to assist utility company personnel and highway contractors, such as  
16 markers that identify underground utility locations.
- 17 D. Signs posting local non-traffic ordinances.
- 18 E. Signs giving civic organization meeting information.
- 19 F. Messages displayed on changeable message signs for America's Missing: Broadcast Emergency  
20 Response (AMBER) alerts and homeland security information during declared states of emergency  
21 (see Chapter 2L of this Manual for specific provisions and limitations).

22 **This paragraph moved from existing Section 1A.08, except for the second sentence, which has been**  
23 **deleted as it is unnecessary**

24 Infrastructure elements that restrict the road user's travel paths or vehicle speeds, such as curbs, speed  
25 bumps or humps, and other raised roadway surfaces, are not traffic control devices. Certain operational  
26 devices associated with the application of traffic control strategies, such as in-vehicle electronics, fencing,  
27 roadway lighting, barriers, and attenuators are shown in this Manual for context but their design, application,  
28 and usage are not specified since they are not traffic control devices.

29 **Standard:**

30 ~~Traffic control devices or their supports shall not bear any advertising message or any other~~  
31 ~~message that is not related to traffic control.~~ **This paragraph has been moved to new Section 1D.09**

32 **Support:**

33 ~~Tourist-oriented directional signs and Specific Service signs are not considered advertising; rather, they~~  
34 ~~are classified as motorist service signs.~~ **This paragraph has been moved to new Section 1D.09**

35 **Section 1A.03 Target Road Users**

36 **Support:**

37 There are two groups of target road users for traffic control devices:

- 38 A. Operators of vehicles, including bicyclists -- This target user is a reasonable and prudent individual  
39 who is alert and attentive, has demonstrated a basic proficiency in operating a vehicle on a specific  
40 facility, has demonstrated a basic understanding of traffic control devices and traffic laws, and is  
41 operating in a lawful manner that is appropriate for the facility and conditions, while demonstrating  
42 due care for the current conditions on the roadway.
- 43 B. Pedestrians – This target user is an alert and attentive individual who is functioning in a lawful  
44 manner that is appropriate for the facility and conditions, while demonstrating due care for the current  
45 conditions on the roadway. Pedestrians with disabilities might be blind or vision-impaired, have  
46 mobility limitations, or other impairments.

47 Because of the connectivity of the transportation network, familiarity of the target road users with a  
48 particular location cannot be presumed for the purpose of selecting and installing traffic control devices.

49 **Section 1A.04 Use of the MUTCD**

50 **Standard:**

1 Traffic control device principles in the MUTCD shall be developed for and used by individuals who  
2 are duly authorized and qualified to conduct traffic control device activities.

3 Where MUTCD content requires a decision for implementation, such decisions shall be made by  
4 individuals who have the appropriate levels of experience and expertise to make traffic control device  
5 decisions.

6 Support:

7 See Section 1C.02 for definitions of “engineering study” and “engineering judgment.”

8 Guidance:

9 In making traffic control device decisions, individuals should consider the impacts of the decision on the  
10 following: safety and operational efficiency (mobility) of road users at that location; the effective utilization  
11 of agency resources; cost-effectiveness; and enforcement and education aspects of traffic control devices.

12 Support:

13 Throughout this Manual the headings Standard, Guidance, Option, and Support, the meanings of which  
14 are defined in Section 1C.01, are used to classify the nature of the text that follows. Figures and tables,  
15 including the notes contained therein, supplement the text and might constitute a Standard, Guidance, Option,  
16 or Support. The user needs to refer to the appropriate text to classify the nature of the figure, table, or note  
17 contained therein. **This paragraph moved from the existing Introduction**

18 **Standard:**

19 **When used in this Manual, the text headings of Standard, Guidance, Option, and Support shall be**  
20 **as defined in Paragraph 1 of Section 1A.13. This paragraph deleted; redundant**

21 **Support:**

22 ~~Throughout this Manual all dimensions and distances are provided in English units. Appendix A2~~  
23 ~~contains tables for converting each of the English unit numerical values that are used in this Manual to the~~  
24 ~~equivalent Metric (International System of Units) values. This paragraph deleted; metric units are no~~  
25 ~~longer referenced in the MUTCD~~

26 **Guidance:**

27 ~~If Metric units are to be used in laying out distances or determining sizes of devices, such units should be~~  
28 ~~specified on plan drawings and made known to those responsible for designing, installing, or maintaining~~  
29 ~~traffic control devices. This paragraph deleted; metric units are no longer referenced in the MUTCD~~

30 **Guidance:**

31 *Except when a specific numeral is required or recommended by the text of a Section of this Manual,*  
32 *numerals displayed on the images of devices in the figures that specify quantities such as times, distances,*  
33 *speed limits, and weights should be regarded as examples only. When installing any of these devices, the*  
34 *numerals should be appropriately altered to fit the specific situation. This paragraph moved from the*  
35 *existing Introduction*

36 Similarly, destination names, route numbers, and State route shields that are displayed on the images of  
37 devices in the figures should be regarded as examples only. When installing any of these devices, the  
38 destination names, route numbers, and State route shields should be appropriately altered to fit the specific  
39 situation.

40 **Support: The following Support paragraphs moved from the existing Introduction**

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

43 There are nine Parts in this Manual and each Part ~~is comprised~~ comprises of one or more Chapters.  
44 Each Chapter ~~is comprised~~ comprises of one or more Sections. Parts are given a single-digit numerical  
45 identification, such as Part 2 – Signs. Chapters are identified by the Part number and a letter, such as  
46 Chapter 2B – Regulatory Signs, ~~Barricades, and Gates~~. Sections are identified by the Chapter number and  
47 letter followed by a decimal point and a 2-digit number, such as Section 2B.03 – Size of Regulatory Signs.  
48 In some Chapters the Sections are grouped together by subject into un-numbered sub-chapters with a  
49 heading, such as “Signing for Right-of-Way at Intersections” (Sections 2B.06 through 2B.22).

1 Each Section ~~is comprised~~**comprises** ~~of~~ one or more paragraphs. The paragraphs are indented and are  
2 identified by a number. Paragraphs are counted from the beginning of each Section without regard to the  
3 intervening text headings (Standard, Guidance, Option, or Support) or any intervening text in embedded  
4 Figures or Tables. Some paragraphs have lettered or numbered items. As an example of how to cite this  
5 Manual, the phrase “Not less than 40 feet beyond the stop line” that appears in Section 4D.~~44-07~~  
6 Manual would be referenced in writing a “Section 4D.~~4407~~, Par.1, A.1,” and would be verbally referenced as  
7 “Item A.1 of Paragraph 1 of Section 4D.~~4407~~.”

## 8 **Section ~~1A.11~~ 1A.05 Relation to Other Publications**

### 9 **Standard:**

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

### 15 **Support:**

16 **The “Standard Highway Signs ~~and Markings~~” ~~book-publication~~ includes standard alphabets and**  
17 **symbols and arrows for signs and pavement markings.**

18 ~~For information about the publications mentioned in Paragraph 1, visit the Federal Highway~~  
19 ~~Administration’s MUTCD website at <http://muted.fhwa.dot.gov>, or write to the FHWA, 1200 New~~  
20 ~~Jersey Avenue, SE, HOTO, Washington, DC 20590.~~

21 Other publications that are not regulatory in nature, and are not independently legally enforceable, but  
22 are might be useful sources of information with respect to the use of this Manual ~~are listed in this~~  
23 ~~paragraph include: See Page i of this Manual for ordering information for the following publications (later~~  
24 ~~editions might also be available as useful sources of information):~~ **The following list has been reorganized**  
25 **by title**

- 26 1. “AAA School Safety Patrol Operations Manual,” 2006 Edition (American Automobile Association—  
27 AAA)
- 28 2. “Accessible Pedestrian Signals—A Guide to Best Practices (NCHRP Web-Only Document 117A),”  
29 2008 Edition (Transportation Research Board—TRB)
- 30 3. “American National Standard for High-Visibility Public Safety Vests,” (ANSI/ISEA 207-~~2006~~2011),  
31 20062011 Edition (International Safety Equipment Association—ISEA)
- 32 4. “American National Standard for High-Visibility Safety Apparel and Headwear,” ~~(ANSI/ISEA 107-~~  
33 ~~2004~~2010), 20042010 Edition (ISEA)
- 34 5. “A Policy on Geometric Design of Highways and Streets,” 20042011 Edition (American Association  
35 of State Highway and Transportation Officials—AASHTO)
- 36 6. “Changeable Message Sign Operation and Messaging Handbook (FHWA-OP-03-070),” 2004 Edition  
37 (Federal Highway Administration—FHWA)
- 38 7. “Designing Sidewalks and Trails for Access—Part 2—Best Practices Design Guide (FHWA-EP-01-  
39 027),” 2001 Edition (FHWA)
- 40 8. “Equipment and Materials Standards of the Institute of Transportation Engineers,” 1988 Edition  
41 (available at <http://www.ite.org/standards/led/signals.asp>); which includes “Chapter 1 – Traffic Signal  
42 Lamps,” 1980 Edition; “Chapter 2 – Vehicle Traffic Control Signal Heads,” 1985 Edition; “Chapter 3  
43 – Pedestrian Traffic Control Signal Indications,” 1985 Edition; and “Chapter 13 – Purchase  
44 Specification for Flashing and Steady Burn Warning Lights,” 2001 Edition (ITE)
- 45 9. “Federal-Aid Highway Program Guidance on High Occupancy Vehicle (HOV) Lanes,” ~~2001~~2012  
46 (FHWA)
- 47 10. “Guide for the Development of Bicycle Facilities,” ~~1999~~2012 Edition (AASHTO)
- 48 11. “Guide for the Planning, Design, and Operation of Pedestrian Facilities,” 2004 Edition (AASHTO)
- 49 12. “Guide to Metric Conversion,” 1993 Edition (AASHTO)
- 50 13. “Guidelines for Accessible Pedestrian Signals (NCHRP Web-Only Document 117B),” 2008 Edition  
51 (TRB)

- 1 14. [“Guidelines for Determining Traffic Signal Change and Clearance Intervals: A Recommended](#)  
2 [Practice of Institute of Transportation Engineers,” 2020 \(Institute of Transportation Engineers – ITE\)](#)
- 3 15. “Guidelines for the Selection of Supplemental Guide Signs for Traffic Generators Adjacent to  
4 Freeways,” ~~4th-5th~~ Edition/Guide Signs, Part II: Guidelines for Airport Guide Signing/Guide Signs,  
5 Part III: List of Control Cities for Use in Guide Signs on Interstate Highways,” Item Code: ~~GSGLC-~~  
6 ~~4GSLC~~, ~~2001-2016~~ Edition (AASHTO)
- 7 16. “Highway Capacity Manual,” ~~2000~~2010 Edition (TRB)
- 8 17. [“LRFD Standard Specifications for Movable Highway Bridges Design Specifications,” 1988](#)  
9 [2007](#)  
10 [Edition \(AASHTO\)](#)
- 11 18. “Maintaining Traffic Sign Retroreflectivity,” ~~2007~~2013 Edition (FHWA)
- 12 19. [“Manual for Assessing Safety Hardware,” 2009 Edition \(AASHTO\)](#)
- 13 20. “Manual of Traffic Signal Design,” 1998 Edition (Institute of Transportation Engineers—ITE)
- 14 21. “Manual of Transportation Engineering Studies, ~~2nd~~ Edition,” ~~1994~~2010 Edition (ITE)
- 15 22. “NEMA Standards Publication TS 4-~~2005~~2010 Hardware Standards for Dynamic Message Signs  
16 (DMS) With NTCIP Requirements,” ~~2005~~2010 Edition (National Electrical Manufacturers  
17 Association—NEMA)
- 18 23. “Occupational Safety and Health Administration Regulations (Standards - 29 CFR), General Safety  
19 and Health Provisions - 1926.20,” amended ~~June 30, 1993~~[December 12, 2008](#) (Occupational Safety  
20 and Health Administration—OSHA)
- 21 24. ~~“Pedestrian Traffic Control Signal Indications--,” Part 1—1985 Edition; Part 2—Light Emitting Diode~~  
22 ~~(LED) Pedestrian Traffic Signal Modules.”~~—~~2004~~2010 Edition (ITE)
- 23 25. “Practice for Roadway Lighting,” RP-8, 2001 (Illuminating Engineering Society—IES)
- 24 26. “Preemption of Traffic Signals Near Railroad Crossings,” 2006 Edition (ITE)
- 25 27. ~~“Purchase Specification for Flashing and Steady Burn Warning Lights,” 1981 Edition (ITE)~~
- 26 28. “Railroad-Highway Grade Crossing Handbook—Revised Second Edition (FHWA-SA-07-010),” 2007  
27 Edition (FHWA)
- 28 29. “Ramp Management and Control Handbook (FHWA-HOP-06-001),” 2006 Edition (FHWA)
- 29 30. “Recommended Procedures for the Safety Performance Evaluation of Highway Features,” (NCHRP  
30 Report 350), 1993 Edition (TRB)
- 31 31. “Roadside Design Guide,” ~~2006~~2011 Edition (AASHTO)
- 32 32. “Roundabouts-An Informational Guide. ~~2nd~~ Edition-~~(FHWA-RD-00-067)~~[\(NCHRP Report 672\)](#),”  
33 ~~2000~~2010 Edition (~~FHWA~~TRB)
- 34 33. “Safety Guide for the Prevention of Radio Frequency Radiation Hazards in the Use of Commercial  
35 Electric Detonators (Blasting Caps),” Safety Library Publication No. 20, ~~July 2001~~2011 Edition  
36 (Institute of Makers of Explosives)
- 37 34. “Signal Timing Manual (FHWA-HOP-08-024),” 2008 Edition (FHWA)
- 38 35. “Signalized Intersections: an Informational Guide (FHWA-~~HRT-04-091~~[SA-13-027](#)),” ~~2004~~2013  
39 Edition (FHWA)
- 40 36. “The Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities  
41 (ADAAG),” July 1998 Edition (The U.S. Access Board)
- 42 37. “Traffic Control Devices Handbook,” ~~2001~~2013 Edition (ITE)
- 43 38. “Traffic Detector Handbook, [Third Edition \(FHWA-HRT-06-018 & 139\)](#)” ~~1991~~2006 Edition  
44 (~~ITE~~FHWA)
- 45 39. “Traffic Engineering Handbook,” 2009 Edition (ITE)
- 46 40. “Traffic Engineering Metric Conversion Folders—Addendum to the Guide to Metric Conversion,”  
47 1993 Edition (AASHTO)
- 48 41. ~~“Traffic Signal Lamps,” 1980 Edition (ITE)~~
- 49 42. “Travel Better, Travel Longer: A Pocket Guide to Improving Traffic Control and Mobility for Our  
50 Older Population (FHWA-OP-03-098),” 2003 Edition (FHWA)
- 51 43. ~~“2009~~2014 AREMA Communications & Signals Manual,” (American Railway Engineering &  
52 Maintenance-of-Way Association—AREMA)
- 53 44. “Uniform Vehicle Code (UVC) and Model Traffic Ordinance,” 2000 Edition” [and subsequent updates](#)  
54 [to “Rules of the Road” through 2014](#) (National Committee on Uniform Traffic ~~Laws and Ordinances~~ [Control Devices—NCUTLONCUTCD](#))

- 1 45. . “Vehicle Traffic Control Signal Heads;” ~~Part 1—1985 Edition; Part 2 Light Emitting Diode (LED)~~  
2 ~~Circular Signal Supplement.”—~~ 2005 Edition (ITE); ~~Part 3 (LED Vehicular Arrow Traffic Signal~~  
3 ~~Supplement)—2004 Edition (ITE)~~  
4 46. “Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Vehicle Arrow Traffic Signal  
5 Supplement.” 2007 Edition (ITE)

6 Contact information for the organizations that publish the references in the preceding list is contained in  
7 Appendix A3 of this Manual.

8 The provisions of this Manual have been developed based on the content included in the specific editions  
9 of the resources listed in Paragraph 3 of this Section. Newer editions of those resources are typically reflected  
10 in subsequent editions of or revisions to this Manual, which might result in one or more changes in the  
11 provisions to which the resources apply.

12 **Standard:**

13 **To the extent that they are referenced in this Manual, the resources listed in this Section shall refer**  
14 **only to the specific edition cited. Subsequent editions of those resources shall not be applied to the**  
15 **provisions of this Manual until such time as it is officially revised.**

16 **Section 1A.06 Uniform Vehicle Code - Rules of the Road**

17 Support:

18 The “Uniform Vehicle Code” (UVC)<sup>22</sup> is one of the publications referenced in the MUTCD. The UVC  
19 contains a model set of motor vehicle codes and traffic laws for use throughout the United States, the intent of  
20 which is to promote national uniformity in these laws. The Rules of the Road contained in the UVC are  
21 intended to be recommendations for States to adopt in their State statutes and are not independently legally  
22 enforceable.

23 *Guidance:*

24 *The actions required of road users to obey regulatory devices should be specified by State statute, or in*  
25 *cases not covered by State statute, ~~by~~ in local ordinances or resolutions. Such statutes, ordinances, and*  
26 *resolutions should be consistent with the “Uniform Vehicle Code” (see Section 1A.405). **This paragraph***  
27 **moved from the existing Introduction and existing Section 1A.02 and revised**

1 CHAPTER 1B. LEGAL REQUIREMENTS FOR TRAFFIC CONTROL DEVICES

2 Section 1B.01 National Standard

3 Standard: **The following Standard paragraphs moved from the existing Introduction**

4 The Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) is  
5 incorporated by reference in 23 Code of Federal Regulations (CFR), Part 655, Subpart F and shall be  
6 recognized as the national standard for all traffic control devices installed on any street, highway,  
7 bikeway, or ~~private road site roadways~~ open to public travel (see definition in Section ~~1A.13-1C.02~~ in  
8 accordance with 23 U.S.C. 109(d) and 402(a). ~~In accordance with 23 CFR 655.603(a), for the purposes~~  
9 ~~of applicability of the MUTCD:–~~

10 ~~A. Toll roads under the jurisdiction of public agencies or authorities or public-private partnerships~~  
11 ~~shall be considered to be public highways;–~~

12 ~~B. Private roads open to public travel shall be as defined in Section 1A.13; and~~

13 ~~C. Parking areas, including the driving aisles within those parking areas, that are either publicly-~~  
14 ~~or privately owned shall not be considered to be “open to public travel” for purposes of~~  
15 ~~MUTCD applicability.–~~

16 In accordance with 23 CFR 655.603(a), the MUTCD shall apply to all of the following types of  
17 facilities:

18 A. Any street, roadway, or bikeway open to public travel, either publicly or privately owned;

19 B. Streets and roadways on sites that are off the public right-of-way that are open to public travel  
20 without full-time access restrictions. Examples include roadways within shopping centers, office  
21 parks, airports, sports arenas, other similar business and/or recreation facilities, governmental  
22 office complexes, schools, universities, airports recreational parks, and other similar publicly  
23 owned complexes and/or recreation facilities. The above-described examples of streets and  
24 roadways are referred to in this Manual as Site Roadways Open to Public Travel;

25 C. Publicly-owned toll roads, including those under the jurisdiction of a public agency, public  
26 authority, or public-private partnership;

27 D. Privately-owned toll roads where the public is allowed to travel without access restriction. This  
28 includes gated toll roads or roadways where the general public is able to pay to access the  
29 facility and

30 E. Grade crossings of publicly-owned roadways with railroads or light rail transit.

31 The MUTCD shall not apply to the following types of facilities:

32 A. Roadways within private gated properties where access to the general public is restricted at all  
33 times;

34 B. Grade crossings of privately-owned roadways with railroads;

35 C. Parking areas, including the driving aisles within those parking areas, that are either publicly  
36 or privately owned and

37 D. Pedestrian ways internal to buildings.

38 Support:

39 The policies and procedures of the Federal Highway Administration (FHWA) to obtain basic uniformity  
40 of traffic control devices ~~shall be are~~ as described in 23 CFR 655, Subpart F. **This paragraph moved from**  
41 **the existing Introduction**

42 Section 15-116 of the UVC states, “No person shall install or maintain in any area of private property  
43 used by the public any sign, signal, marking, or other device intended to regulate, warn, or guide traffic unless  
44 it conforms with the State manual and specifications adopted under Section 15-104.” Adoption by agencies of  
45 such a provision through statute or ordinance can help maintain the integrity of official traffic control devices  
46 and provide continuity of uniformity at locations that are not subject to the provisions of this Manual.

47 Section 1B.02 State Adoption and Conformance

48 Support:

49 All States have officially adopted the National MUTCD either in its entirety, with supplemental  
50 provisions, or as a separate published document. The National MUTCD has also been adopted by the  
51

1 National Park Service, the U.S. Forest Service, the U.S. Military Command, the Bureau of Indian Affairs, the  
2 Bureau of Land Management, and the U.S. Fish and Wildlife Service. **This paragraph moved from existing**  
3 **Section 1A.07**

4 *Guidance:*

5 *These individual State or agency manuals or supplements should be reviewed for specific provisions*  
6 *relating to that State or agency.* **This paragraph moved from existing Section 1A.07**

7 **Standard:**

8 ~~In accordance with 23 CFR 655.603(b)(3),~~ States or other Federal agencies that have their own  
9 MUTCDs or Supplements shall revise these MUTCDs or Supplements to be in substantial conformance  
10 with changes to the National MUTCD within 2 years of the effective date of the Final Rule for the  
11 changes [23 CFR 655.603(b)(3)]. Substantial conformance of such State or other Federal agency  
12 MUTCDs or Supplements shall be as defined in 23 CFR 655.603(b)(1). **This paragraph moved from the**  
13 **existing Introduction**

14 For purposes of Paragraph 3 of this Section, policies, directives, specifications, standard drawings,  
15 or similar documents related to traffic control devices that are issued by an agency shall be considered  
16 as supplements to the MUTCD and shall be in substantial conformance with the National MUTCD.

17 *Guidance:*

18 Traffic control devices that have been granted Interim Approval in accordance with Section 1B.07, but  
19 which have not yet been adopted into the National MUTCD, should not be included in State MUTCDs or  
20 Supplements.

### 21 Section 1B.03 Compliance of Devices

22 **Standard:**

23 The U.S. Secretary of Transportation, under authority granted by the Highway Safety Act of 1966,  
24 decreed that traffic control devices on all streets and highways open to public travel in accordance with  
25 23 U.S.C. 109(d) and 402(a) in each State shall be in substantial conformance with the Standards issued  
26 or endorsed by the FHWA. **This paragraph moved from the existing Introduction.**

27 ~~Standard~~Support:

28 23 CFR 655.603 also ~~states that requires~~ traffic control devices on all streets, highways, bikeways, and  
29 ~~site roadways private roads~~ open to public travel in each State ~~shall~~ be in substantial conformance with  
30 standards issued or endorsed by the Federal Highway Administrator. **This paragraph moved from existing**  
31 **Section 1A.07.**

32 **Standard:**

33 After the effective date of a new edition of the MUTCD or a revision thereto, or after the adoption  
34 thereof by the State, whichever occurs later, new or reconstructed devices installed shall ~~be in-~~  
35 ~~compliance~~ comply with the new edition or revision. **This paragraph moved from the existing**  
36 **Introduction**

37 In cases involving Federal-aid projects for new ~~highway or bikeway~~ construction or reconstruction  
38 of a facility to which this Manual applies, the traffic control devices installed (temporary or permanent)  
39 shall ~~be in conformance~~ comply with the most recent edition of the National MUTCD before that  
40 highway is opened or re-opened to the public for unrestricted travel [23 CFR 655.603(d)(2) and (d)(3)].  
41 **This paragraph moved from the existing Introduction**

42 Unless a particular device is no longer serviceable (see Section 1C.02 for definition), non-compliant  
43 devices on existing highways and bikeways shall be brought into compliance with the current edition of  
44 the National MUTCD as part of the systematic upgrading of substandard traffic control devices (and  
45 installation of new required traffic control devices) required pursuant to the Highway Safety Program,  
46 23 U.S.C. §402(a). **This paragraph moved from the existing Introduction**

47 Support:

48 The FHWA has the authority to establish other target compliance dates for implementation of particular  
49 changes to the MUTCD [23 CFR 655.603(d)(1)]. **This paragraph moved from the existing Introduction**

50 **Standard:**

1 **These target compliance dates established by the FHWA shall be as shown in Table I-2 1B-1. This**  
2 **paragraph moved from the existing Introduction**

3 **Table 1B-1. Target Compliance Dates Established by FHWA**

4 Design, application, and placement of traffic control devices other than those adopted in this  
5 Manual shall be prohibited unless the provisions of ~~this~~ Sections 1B.04 through 1B.07 are followed  
6 regarding official interpretations, experiments, changes to the MUTCD, and interim approvals granted  
7 by the FHWA. **This paragraph moved from existing Section 1A.10**

8 Support:

9 Many of the provisions in this Manual that are explicitly prohibitive have been included to address  
10 practices that have come to be known as counterintuitive, ineffective, or inconsistent with uniformity. A  
11 provision of mandatory or recommended practice represents the accepted and established practice that  
12 promotes uniformity and consistency. The absence of a provision in this Manual that explicitly prohibits a  
13 particular practice, use, design, application, operation, or other aspect of a traffic control device does not, in  
14 itself, constitute acceptability or permission to use the device. The FHWA can issue an official interpretation  
15 (see Section 1B.05) in a case where an agency is considering employing a practice or application that is not  
16 explicitly addressed in this Manual.

17 **Standard:** **This paragraph has been moved from the existing Introduction**

18 ~~Except as provided in Paragraph 24, when a~~ A non-compliant traffic control device that is being  
19 replaced or refurbished because it is damaged, missing, or no longer serviceable (see Section 1C.02 for  
20 definition) for any reason, it shall be replaced with a compliant device, except when engineering  
21 judgment indicates that replacement in kind is more appropriate because:

22 Option:

23 ~~A damaged, missing, or otherwise non-serviceable device that is non-compliant may be replaced in kind if~~  
24 ~~engineering judgment indicates that:~~

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

29 ~~Section 1A.10 Interpretations, Experimentation, Changes, and Interim Approvals~~ **This section**  
30 **removed and divided into Sections 1B.03 through 1B.09**

31 Section 1B.04 Issuance of Official Rulings Related to this Manual

32 Option:

33 The FHWA, in response to requests for interpretation, experimentation, or change, may issue an Official  
34 Ruling in response to such requests.

35 Support:

36 Official Rulings are issued by the FHWA. Official Rulings include responses to requests for  
37 interpretation of the provisions of this Manual, experimentation with novel traffic control devices or  
38 application, and changes to the provisions of this Manual. Each Official Ruling is assigned a unique number  
39 and title for recordkeeping purposes.

40 Official Rulings issued under previous editions of the MUTCD are typically addressed, either in whole or  
41 part, in the next rulemaking to amend the MUTCD. Official Rulings issued under previous editions of the  
42 MUTCD are considered to be superseded by the new edition of the MUTCD.

43 The MUTCD Web site contains a searchable database of current and past Official Rulings.

44 Section 1B.05 Official Interpretations **Paragraphs in this section moved from existing Section 1A.10**

45 Support:

46 ~~In addition,~~ Unique situations often arise for device applications that might require interpretation or  
47 clarification of this Manual. **This paragraph moved from existing Section 1A.10**

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

3 *Guidance:*

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

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

### 9 **Section 1B.06 Experimentation**

10 Support:

11 Requests ~~to~~ for experimentation include consideration of field deployment for the purpose of testing or  
12 evaluating a new traffic control device, its application or manner of use, or a provision not specifically  
13 described in this Manual. **This paragraph moved from existing Section 1A.10**

14 **Standard:**

15 **A traffic control device or application that does not comply with the provisions of this Manual shall**  
16 **not be used on any street, highway, bikeway, or site roadway open to public travel (see definition in**  
17 **Section 1A.13) without first receiving official approval to experiment from the FHWA's Office of**  
18 **Transportation Operations.**

19 Support:

20 A request for permission to experiment will be considered only when submitted by the public agency or  
21 toll facility ~~operator~~ authority responsible for the operation of the road or street on which the experiment is to  
22 take place. For a ~~private road~~ site roadway open to public travel, the request will be considered only if it is  
23 submitted by the private owner or ~~private~~ official having jurisdiction. **This paragraph has been moved from**  
24 **existing Section 1A.10.**

25 Manufacturers or inventors of novel devices are encouraged to engage the services of a qualified traffic  
26 engineer or other professional who is versed in traffic control devices. Early engagement during the concept  
27 and development processes will help ensure the efficacy of the device with regard to human factors,  
28 operational, safety, and other considerations prior to an agency requesting experimentation.

29 In some cases, an off-roadway closed-course or laboratory study might be required before a request for  
30 experimentation can be considered. The purpose of such a study is to determine whether testing the  
31 experimental device or application in an open-road setting could result in an undue safety risk.

32 *Guidance:*

33 Before requesting permission to experiment with a new device or application, an owner of a site  
34 roadway open to public travel should first check for any laws, regulations, and/or directives covering the  
35 application of the MUTCD that might apply.

36 Support:

37 A diagram indicating the process for experimenting with traffic control devices is shown in Figure ~~1A-~~  
38 ~~1B-1.~~ **This paragraph moved from existing Section 1A.10**

### 39 **Figure 1B-1. Process for Requesting and Conducting Experimentations for New Traffic Control** 40 **Devices**

41 **Standard:** **This paragraph moved from existing Section 1A.10 and revised**

42 The request for permission to experiment ~~should~~ shall contain the following:

- 43 A. A statement indicating the nature of the problem and a hypothesis establishing the premise of  
44 the experiment.
- 45 B. A description of the proposed change to the traffic control device or application of the traffic  
46 control device, ~~how it was developed,~~ including the manner in which it deviates from the  
47 standard, and how it is expected to be an improvement over existing standards.
- 48 C. ~~Any illustration~~ Illustrations that would ~~be helpful~~ to ~~understand~~ explain the traffic control  
49 device or use of the traffic control device.

1 D. Any supporting data explaining how the traffic control device was developed, including if it has  
2 been ~~tried-tested~~, in what ways it was found to be adequate or inadequate, and how this choice  
3 of device or application was derived.

4 E. Comparison of the proposed device to other compliant devices or treatments, either individually  
5 or in combination, that address the same condition, if applicable.

6 F. A legally binding statement that the experimental device or application is in the public domain,  
7 in accordance with Paragraph 11 of this Section.

8 G. The time period and location(s) of the experiment.

9 H. Control sites for comparison purposes.

10 I. A detailed research ~~or-and~~ evaluation plan that ~~must~~ provides for close monitoring of the  
11 experimentation, ~~especially in the early~~ throughout all stages of its field implementation. The  
12 evaluation plan ~~should~~ shall include before and after studies as well as quantitative data  
13 describing the performance of the experimental device.

14 J. An agreement to restore the site of the experiment to a condition that complies with the  
15 provisions of this Manual within 3 months following the end of the time period of the  
16 experiment. This agreement ~~must~~ shall also provide that the agency sponsoring the  
17 experimentation will terminate the experimentation at any time that it determines ~~significant-~~  
18 that safety concerns are directly or indirectly attributable to the experimentation ~~and the~~  
19 agency shall provide timely notification to the FHWA's Office of Transportation Operations.  
20 The FHWA's Office of Transportation Operations ~~has~~ shall have the right to terminate  
21 approval of the experimentation at any time if there is an indication of safety ~~or operational~~  
22 concerns, ~~or if the terms of the approval are not being adhered to.~~ If, as a result of the  
23 experimentation, a request is made that this Manual be changed to include the device or  
24 application being experimented with, ~~the FHWA's Office of Transportation Operations will~~  
25 determine whether the device or application ~~will~~ can be permitted to remain in place until an  
26 official rulemaking action has occurred.

27 K. An agreement to provide semi-annual progress reports for the duration of the experimentation,  
28 in accordance with the schedule provided in Paragraph 8 of this Section, and an agreement to  
29 provide a ~~copy~~ report of the final results of the experimentation to the FHWA's Office of  
30 Transportation Operations within 3 months following completion of the experimentation (see  
31 Paragraph 10 of this Section). The FHWA's Office of Transportation Operations ~~has~~ shall have  
32 the right to terminate approval of an agency's experiment if reports are not ~~provided~~ received  
33 in accordance with this schedule.

34 The required semi-annual progress reports shall be submitted throughout the course of an  
35 approved experiment in accordance with the following schedule:

36 A. August 1, for the preceding period of January through June; and

37 B. February 1, for the preceding period of July through December.

38 The experimenting agency shall submit a semi-annual progress report for any approved experiment  
39 even if no work was performed during the previous reporting period. Failure to submit two consecutive  
40 progress reports shall result in termination of the experiment and shall constitute rescission of the  
41 FHWA's approval to the experimenting agency, requiring restoration of the site(s) to a condition that  
42 complies with the provisions of this Manual within 3 months.

43 The experimenting agency shall submit a final report within 3 months of the conclusion of an  
44 approved experiment. If a final report is not received by the FHWA's Office of Transportation  
45 Operations, and the experimenting agency fails to notify the FHWA of any mitigating circumstances  
46 within 6 months of the end of the approved experimentation period, then the experiment shall be  
47 considered terminated and shall constitute rescission of the FHWA's approval to the experimenting  
48 agency, requiring restoration of the site(s) to a condition that complies with the provisions of this  
49 Manual within 3 months.

50 A request for experimentation that involves a new traffic control device or a new application of an  
51 existing traffic control device shall include from the agency conducting the experiment, the  
52 manufacturer and/or developer of the device, and the supplier of the device, a legally binding statement

1 certifying that the traffic control device is not protected by a patent, trademark, or copyright, and that  
2 the traffic control device is in the public domain and may be used freely in traffic control device design  
3 and application without infringement or claim of trade secret misappropriation. The legally binding  
4 statement shall also state that the agency conducting the experiment, the manufacturer and/or  
5 developer of the device, and the supplier of the device are aware that if patent, trademark, or copyright  
6 protection is established in the future for the device or application, such action will result in its removal  
7 from the MUTCD, cancellation of its interim approval, or cancellation of the authorization for  
8 experimentation.

9 Support:

10 For the purpose of the Standard in the Paragraph 7 of this Section, traffic control device means those  
11 aspects of a sign, signal, marking or other device which regulates, warns, or guides traffic. The limitation on  
12 patent, trademark, or copyright protection does not include the legal protection of individual elements of such  
13 devices. For example, manufacturing methods, assembly methods, or individual components of such devices  
14 can be protected, whereas the traffic control device cannot be subject to protection so long as it remains in this  
15 Manual. As further example, an internal circuit board for an electronic traffic control device can be legally  
16 protected, but the electronic traffic control device itself or its operational function cannot be legally  
17 protected by any of the above forms of intellectual property.

## 18 Section 1B.07 Changes to the MUTCD

19 Support:

20 Continuing advances in technology will produce changes in the highway, vehicle, and road user  
21 proficiency; therefore, portions of the system of traffic control devices in this Manual will require updating. ~~In~~  
22 ~~addition, unique situations often arise for device applications that might require interpretation or clarification~~  
23 ~~of this Manual.~~ **This sentence moved to new Section 1B.05** It is important to have a procedure for  
24 recognizing these developments and for introducing new ideas and modifications into the system. **This**  
25 **paragraph moved from existing Section 1A.10**

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

29 Guidance:

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

- 31 A. *A statement indicating what change is proposed;*
- 32 B. *Any illustration that would be helpful to understand the request; and*
- 33 C. *Any supporting research data that is pertinent to the item to be reviewed.* **This paragraph moved**  
34 **from existing Section 1A.10**

35 Support:

36 Requests for a change to this Manual will be evaluated for consideration in the next rulemaking to issue a  
37 new edition of the Manual. A diagram indicating the process for incorporating new traffic control devices  
38 into this Manual is shown in Figure ~~1A-2~~1B-2. **This paragraph moved from existing Section 1A.10**

### 39 **Figure 1B-2. Process for Incorporating New Traffic Control Devices into the MUTCD**

## 40 Section 1B.08 Interim Approvals **Paragraphs in this section moved from existing Section 1A.10**

41 Support:

42 Interim approval allows ~~interim~~ for provisional use, pending official rulemaking, of a new traffic control  
43 device, a revision to the application or manner of use of an existing traffic control device, or a provision not  
44 specifically described in this Manual.

45 The FHWA issues an ~~interim~~ Aapproval by official memorandum signed by the Associate Administrator  
46 for Operations and posts this memorandum on the MUTCD website.

47 Interim approval allows for optional use of a traffic control device or application and does not create a  
48 new mandate or recommendation for use. Interim approval includes conditions that jurisdictions, toll facility

1 authorities, or owners of site roadways open to public travel agree to comply with in order to use the traffic  
2 control device or application until an official rulemaking action has occurred.

3 The issuance by FHWA of an interim approval ~~will typically may might~~ result in the traffic control device  
4 or application being proposed for adoption in placed into the next scheduled rulemaking process ~~for revisions-~~  
5 ~~to issue a new edition of this Manual.~~ If the device or application under interim approval is not proposed in  
6 the next rulemaking for a new edition, then a statement of the status of the interim approval, whether it is to be  
7 rescinded or remain in effect, will be included in the Federal Register notice for the rulemaking.

8 Interim approval is considered based on the results of successful experimentation, results of analytical or  
9 laboratory studies, and/or review of documented non-U.S. experience with a traffic control device or  
10 application. Interim approval considerations include an assessment of relative risks, benefits, costs, impacts,  
11 and other factors.

12 Interim approval is ordinarily considered only after published authoritative research demonstrates that the  
13 device or application provides a safety or operational improvement or meets other objectives established by  
14 FHWA. Individual experiments by various jurisdictions, without a research report on the overall findings of  
15 the experimental device or application, will not ordinarily qualify for issuance of an interim approval.

#### 16 **Standard:**

17 A jurisdiction, toll facility ~~operator authority~~, or owner of a ~~private road site roadway~~ open to  
18 public travel that desires to use a traffic control device for which FHWA has issued an interim approval  
19 shall request permission from FHWA in writing prior to applying the device.

20 **Guidance:** Changed from Guidance to Standard and revised

21 The request ~~for permission~~ to place a traffic control device under an existing interim approval ~~should~~  
22 shall contain the following:

- 23 A. A description of where the device will be used, such as a list of specific locations or highway  
24 segments or types of situations, or a statement of the intent to use the device jurisdiction-wide;
- 25 B. An agreement to abide by the specific conditions for use of the device as contained in the  
26 FHWA's interim approval ~~document~~ memorandum;
- 27 C. An agreement to maintain and continually update a list of locations where the device has been  
28 installed; and
- 29 D. An agreement to:
  - 30 1. Restore the site(s) of the interim approval to a condition that complies with the provisions in  
31 this Manual within 3 months following the issuance of a Final Rule on this traffic control  
32 device; and
  - 33 2. Terminate use of the device or application installed under the interim approval at any time  
34 that it determines significant that safety concerns are directly or indirectly attributable to  
35 the device or application. The FHWA's Office of Transportation Operations ~~has~~ shall have  
36 the right to terminate the interim approval at any time if there is an indication of safety,  
37 operational, or other concerns.

#### 38 **Option:**

39 A State may submit a request for ~~the permission to use of~~ a device under an existing interim approval for  
40 all jurisdictions in that State, as long as the request contains the information ~~listed required~~ in Paragraph ~~188~~  
41 of this Section.

42 **Guidance:** Standard: Changed from Guidance to Standard and revised

43 ~~If a~~ A jurisdiction, toll facility authority, or owner of a site roadway open to public travel that elects  
44 to use a device or application under a statewide interim approval ~~state requests and receives approval~~  
45 ~~from FHWA of a statewide interim approval, the State~~

46 ~~maintain a list of jurisdictions, toll facility authorities, and owners of site roadways open to public~~  
47 ~~travel that are using the statewide interim approval. The jurisdictions, toll facility authorities, an~~  
48 ~~owners of site roadways open to public travel shall inform the State of their its use of a the device or~~  
49 application under the statewide interim approval.

50 The respective jurisdictions, toll facility authorities, and owners of site roadways open to public  
51 travel shall keep maintain and continually update a record of all locations on their roads where the

1 device or application is implemented (see Item C of Paragraph 8 of this Section) ~~under any interim~~  
2 ~~approval, statewide or otherwise~~ shall furnish this information to the State.

3 Option:

4 Except in a case in which an interim approval is rescinded and such rescission explicitly requires removal  
5 of the device or application installed under that interim approval, A device or application installed under an  
6 interim approval may remain in place, under the conditions established in the interim approval, until an  
7 official rulemaking action has occurred.

8 **Section 1B.09 Requesting Official Interpretations, Experiments, Changes to the MUTCD, or Interim**  
9 **Approvals** Paragraphs in this section moved from existing Section 1A.10

10 *Guidance:*

11 *A local jurisdiction, toll facility ~~operator authority~~, or owner of a ~~private road site roadway~~ open to*  
12 *public travel that is requesting permission to experiment or permission to use a device or application under*  
13 *an existing interim approval should first check for any State laws, regulations, and/or directives covering the*  
14 *application of the MUTCD provisions that might ~~exist apply. in their State.~~*

15 **Standard:**

16 **Except as provided in Paragraph 43 of this Section, requests for any interpretation, permission to**  
17 **experiment, a change to the MUTCD, granting of an interim approval, ~~or change or permission to use~~**  
18 **an existing interim approval shall be submitted electronically to the Federal Highway Administration**  
19 **(FHWA), Office of Transportation Operations, MUTCD team, at the following e-mail address:**  
20 **MUTCDofficialrequest@dot.gov.**

21 Option:

22 If electronic submittal is not possible, requests for an interpretations, permission to experiment, a change  
23 to the MUTCD, or granting of an interim approvals, ~~or changes~~ may instead be mailed to the Office of  
24 Transportation Operations, HOTO-1, Federal Highway Administration, 1200 New Jersey Avenue, SE,  
25 Washington, DC 20590.

26 Support:

27 Communications regarding other MUTCD matters that are not related to official requests will receive  
28 quicker attention if they are submitted electronically to the MUTCD Team Leader or to the appropriate  
29 individual MUTCD technical lead team member. Their e-mail addresses are available through the links  
30 contained on the “~~Who’s Who~~ MUTCD Team” page on the MUTCD website at  
31 <http://mutcd.fhwa.dot.gov/team.htm>.

32 For additional information concerning interpretations, experimentation, changes, or interim approvals,  
33 visit the MUTCD ~~website~~ Web site at <http://mutcd.fhwa.dot.gov>.

34 Each official ruling (response to a request for interpretation, experimentation, or change) issued by the  
35 FHWA is assigned a unique alphanumeric designation that corresponds to the relevant Part and edition of the  
36 MUTCD under which it was issued. Beginning with the 11th edition, the designation includes the consecutive  
37 edition number, in parentheses, following the MUTCD Part number. The number that follows the Part and  
38 edition numbers is the sequential number of the official ruling for that Part and edition. The type of official  
39 ruling is denoted in parentheses by the letter I, E, or C for interpretation, experimentation, or change,  
40 respectively. For example, Official Ruling “4(11)-20 (I)” denotes the twentieth official ruling for Part 4 of the  
41 11th edition of the MUTCD, which is an official interpretation.

42 The 10th edition of the MUTCD, issued in 2009, included the edition reference as “(09)” denoting the  
43 2009 edition of the MUTCD rather than the 10th edition of the MUTCD. The reference to the year of the  
44 edition is discontinued and replaced with the consecutive number of the edition beginning with the 11th  
45 edition of the MUTCD.

1 CHAPTER 1C. DEFINITIONS, ACRONYMS, AND ABBREVIATIONS USED IN THIS MANUAL

2 Section 1C.01 Definitions of Headings, Words, and Phrases Used in this Manual

3 Standard:

4 When used in this Manual, the text headings of Standard, Guidance, Option, and Support shall be  
5 as defined ~~in Paragraph 1 in Section 1A.13~~ as follows:

- 6 A. Standard—a statement of required, mandatory, or specifically prohibitive practice regarding a  
7 traffic control device. In limited, location-specific cases, the results of a documented  
8 engineering study (see Section 1D.05) might indicate a deviation from one or more requirements  
9 of a Standard provision to be appropriate. Based on Official Ruling No. 1(09)-1(I) All Standard  
10 statements are labeled, and the text appears in bold type. The verb “shall” is typically used.  
11 The verbs “should” and “may” are not used in Standard statements. Standard statements are  
12 sometimes modified by Options statements.
- 13 B. Guidance—a statement of recommended, ~~but not mandatory,~~ practice in typical situations, with  
14 deviations allowed if engineering judgment or engineering study (see Section 1D.05) indicates  
15 the deviation to be appropriate. All Guidance statements are labeled, and the text appears in  
16 unbold type. The verb “should” is typically used. The verbs “shall” and “may” are not used in  
17 Guidance statements. Guidance statements are sometimes modified by Options statements.
- 18 C. Option—a statement of practice that is a permissive condition and carries no requirement or  
19 recommendation. Option statements sometimes contain allowable modifications to a Standard  
20 or Guidance statement. All Option statements are labeled, and the text appears in unbold type.  
21 The verb “may” is typically used. The verbs “shall” and “should” are not used in Option  
22 statements.
- 23 D. Support—an informational statement that does not convey any degree of mandate,  
24 recommendation, authorization, prohibition, or enforceable condition. Support statements are  
25 labeled, and the text appears in unbold type. The verbs “shall,” “should,” and “may” are not  
26 used in Support statements.

27 Section 1C.02 Definitions of Words and Phrases Used in this Manual

28 Standard:

29 Unless otherwise defined in this Section, or in other Parts of this Manual, words or phrases shall  
30 have the meaning(s) as defined in the most recent editions of the “Uniform Vehicle Code,” “AASHTO  
31 Transportation Glossary (Highway Definitions),” and other publications ~~mentioned~~ referenced in  
32 Section ~~1A.11~~ 1A.05.

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

- 34 1. Accessible Pedestrian Signal—a device that communicates information about pedestrian signal  
35 timing in non-visual format such as audible tones, speech messages, and/or vibrating surfaces.
- 36 2. Accessible Pedestrian Signal Detector—a device designated to assist the pedestrian who has  
37 visual or physical disabilities in activating the pedestrian phase.
- 38 3. Active Grade Crossing--a grade crossing equipped with automatic traffic control devices, such  
39 as flashing-light signals, gates, and/or traffic control signals, that are activated upon the  
40 detection of approaching rail traffic.
- 41 4. Actuated-Operation—a type of traffic control signal operation in which some or all signal  
42 phases are operated on the basis of actuation.
- 43 5. Actuation—initiation of, a change in, or an extension of a traffic signal phase or a sign legend  
44 through the operation of any type of detector.
- 45 ~~6.—Advance Preemption—the notification of approaching rail traffic that is forwarded to the~~  
46 ~~highway traffic signal controller unit or assembly by the railroad or light rail transit equipment~~  
47 ~~in advance of the activation of the railroad or light rail transit warning devices.~~
- 48 ~~7.—Advance Preemption Time—the period of time that is the difference between the required~~  
49 ~~maximum highway traffic signal preemption time and the activation of the railroad or light rail~~  
50 ~~transit warning devices.~~

- 1 **6.** Advisory Speed—a recommended speed for all vehicles operating on a section of highway and  
2 based on the highway design, operating characteristics, and conditions.
- 3 **7.** Agency—an organization with the responsibility for providing, maintaining, and/or operating a  
4 public or private road system.
- 5 **8.** Alley—a street or highway intended to provide access to the rear or side of lots or buildings in  
6 urban areas and not intended for the purpose of through vehicular traffic.
- 7 **9.** Altered Speed Zone—a speed limit, other than a statutory speed limit, that is based upon an  
8 engineering study.
- 9 **10.** Application—in regard to a traffic control device, the act of deciding to use a device, generally  
10 or at a particular location for a particular condition.
- 11 **11.** Approach—all lanes of traffic moving toward an intersection or a midblock location from one  
12 direction, including any adjacent parking lane(s).
- 13 **12.** Arterial Highway (Street)—a general term denoting a highway primarily used by through  
14 traffic, usually on a continuous route or a highway designated as part of an arterial system.
- 15 **13.** Attended Lane (Manual Lane)—a toll lane adjacent to a toll booth occupied by a human toll  
16 collector who makes change, issues receipts, and perform other toll-related functions. Attended  
17 lanes at toll plazas typically require vehicles to stop to pay the toll.
- 18 **14.** Automatic Lane—see Exact Change Lane.
- 19 **15.** Average Annual Daily Traffic (AADT)—the total volume of traffic passing a point or segment  
20 of a highway facility in both directions for one year divided by the number of days in the year.  
21 Normally, periodic daily traffic volumes are adjusted for hours of the day counted, days of the  
22 week, and seasons of the year to arrive at average annual daily traffic.
- 23 **16.** Average Daily Traffic (ADT)—the average 24 hour volume, being the total volume during a  
24 stated period divided by the number of days in that period. Normally, this would be periodic  
25 daily traffic volumes over several days, not adjusted for days of the week or seasons of the year.
- 26 ~~**17.** Average Day—a day representing traffic volumes normally and repeatedly found at a location,~~  
27 ~~typically a weekday when volumes are influenced by employment or a weekend day when~~  
28 ~~volumes are influenced by entertainment or recreation.~~
- 29 **17.** Backplate—see Signal Backplate.
- 30 **18.** Barrier-Separated Lane—a preferential lane or other special purpose lane that is separated  
31 from the adjacent general-purpose lane(s) by a physical barrier.
- 32 **19.** Beacon—a highway traffic signal with one or more signal sections that operates in a flashing  
33 mode.
- 34 **20.** Bicycle—a pedal-powered vehicle upon which the human operator sits.
- 35 **21.** Bicycle Facilities—a general term denoting improvements and provisions that accommodate or  
36 encourage bicycling, including parking and storage facilities, and shared roadways not  
37 specifically defined for bicycle use.
- 38 **22.** Bicycle Lane—a portion of a roadway that has been designated for preferential or exclusive use  
39 by bicyclists by pavement markings and, if used, signs.
- 40 **23.** Bicycle Signal Face—a signal face that displays only bicycle symbol signal indications, that  
41 exclusively controls a bicycle movement from a designated bicycle lane or from a separate  
42 facility such as a shared use path, and that displays signal indications that are applicable only to  
43 the bicycle movement.
- 44 **24.** Bicycle Symbol Signal Indication—a red, yellow, or green signal indication that displays a  
45 bicycle symbol rather than a circular or arrow indication.
- 46 **25.** Bikeway—a generic term for any road, street, path, or way that in some manner is specifically  
47 designated for bicycle travel, regardless of whether such facilities are designated for the  
48 exclusive use of bicycles or are to be shared with other transportation modes.
- 49 **26.** Blank-Out Sign—a sign that displays a single predetermined message only when activated.  
50 When not activated, the sign legend is not visible.
- 51 **27.** Buffer-Separated Lane—a preferential lane or other special purpose lane that is separated from  
52 the adjacent general-purpose lane(s) by a pattern of standard longitudinal pavement markings  
53 that is wider than a normal or wide lane line marking. The buffer area might include rumble  
54 strips, textured pavement, or channelizing devices such as tubular markers or traversable  
55 curbs, but does not include a physical barrier.

- 1 **28. Busway – traveled way that is used exclusively by buses.**  
2 ~~**26. Cantilevered Signal Structure—a structure, also referred to as a mast arm, that is rigidly**~~  
3 ~~**attached to a vertical pole and is used to provide overhead support of highway traffic signal**~~  
4 ~~**faces or grade crossing signal units.**~~  
5 **29. Center Line Markings—the yellow pavement marking line(s) that delineates the separation of**  
6 **traffic lanes that have opposite directions of travel on a roadway. These markings need not be**  
7 **at the geometrical center of the pavement.**  
8 **30. Changeable Message Sign—a sign that is capable of displaying more than one message (one of**  
9 **which might be a “blank” display), changeable manually, by remote control, or by automatic**  
10 **control. Electronic-display changeable message signs are referred to as Dynamic Message Signs**  
11 **in the National Intelligent Transportation Systems (ITS) Architecture and are referred to as**  
12 **Variable Message Signs in the National Electrical Manufacturers Association (NEMA)**  
13 **standards publication.**  
14 **31. Channelizing Line Markings—a solid wide or double white line marking used to form islands**  
15 **where traffic in the same direction of travel is permitted on both sides of the island.**  
16 **32. Circular Intersection—an intersection that has an island, generally circular in design, located in**  
17 **the center of the intersection where traffic passes to the right of the island. Circular**  
18 **intersections include roundabouts, rotaries, and traffic circles.**  
19 **33. Circulatory Roadway—the roadway within a circular intersection on which traffic travels in a**  
20 **counterclockwise direction around an island in the center of the circular intersection.**  
21 **34. Clear Storage Distance—when used in Part 8, the distance available for vehicle storage**  
22 **measured between 6 feet from the rail nearest the intersection to the intersection stop line or the**  
23 **normal stopping point on the highway. At skewed grade crossings and intersections, the 6-foot**  
24 **distance shall be measured perpendicular to the nearest rail either along the center line or edge**  
25 **line of the highway, as appropriate, to obtain the shorter distance. Where exit gates are used,**  
26 **the distance available for vehicle storage is measured from the point where the rear of the**  
27 **vehicle would be clear of the exit gate arm. In cases where the exit gate arm is parallel to the**  
28 **track(s) and is not perpendicular to the highway, the distance is measured either along the**  
29 **center line or edge line of the highway, as appropriate, to obtain the shorter distance.**  
30 **35. Clear Zone—the total roadside border area, starting at the edge of the traveled way, that is**  
31 **available for an errant driver to stop or regain control of a vehicle. This area might consist of a**  
32 **shoulder, a recoverable slope, and/or a non-recoverable, traversable slope with a clear run-out**  
33 **area at its toe.**  
34 **36. Collector Highway—a term denoting a highway that in rural areas connects small towns and**  
35 **local highways to arterial highways, and in urban areas provides land access and traffic**  
36 **circulation within residential, commercial, and business areas and connects local highways to**  
37 **the arterial highways.**  
38 ~~**35. Concurrent Flow Preferential Lane—a preferential lane that is operated in the same direction**~~  
39 ~~**as the adjacent mixed flow lanes, separated from the adjacent general-purpose freeway lanes by**~~  
40 ~~**a standard lane stripe, painted buffer, or barrier.**~~  
41 **37. Conflict Monitor—a device used to detect and respond to improper or conflicting signal**  
42 **indications and improper operating voltages in a traffic controller assembly.**  
43 **38. Constant Warning Time Train Detection—a means of detecting rail traffic that provides**  
44 **relatively uniform warning time for the approach of through trains or light rail transit traffic**  
45 **that are not accelerating or decelerating after being detected.**  
46 **39. Contiguous Lane—a lane, preferential or otherwise, that is separated from the adjacent lane(s)**  
47 **only by a normal or wide lane line marking.**  
48 **40. Controller Assembly—a complete electrical device mounted in a cabinet for controlling the**  
49 **operation of a highway traffic signal.**  
50 **41. Controller Unit—that part of a controller assembly that is devoted to the selection and timing of**  
51 **the display of signal indications.**  
52 **42. Conventional Road—a street or highway other than an low-volume road (as defined in Section**  
53 **5A.01), expressway, or freeway.**  
54 **43. Counter-Flow Lane—a lane operating in a direction opposite to the normal flow of traffic**  
55 **designated for peak direction of travel during at least a portion of the day. Counter-flow lanes**

1 are usually separated from the off-peak direction lanes by tubular markers or other flexible  
2 channelizing devices, temporary lane separators, or movable or permanent barrier.

- 3 **44.** Crashworthy—a characteristic the ability of a roadside safety hardware device or appurtenance  
4 that has been successfully crash tested is intended to minimize risks to design vehicle occupants  
5 by allowing a vehicle impacting the appurtenance to be slowed, slowed before stopping,  
6 redirected, or to continue without significant resistance. in accordance with a national standard  
7 such as the National Cooperative Highway Research Program Report 350, “Recommended  
8 Procedures for the Safety Performance Evaluation of Highway Features.” Acceptable  
9 performance of a crashworthy device is determined by a nationally established standard.  
10 Roadside appurtenances include permanent and portable sign supports, other permanent or  
11 temporary traffic control devices, and other roadside fixtures that are not traffic control  
12 devices, such as longitudinal barriers, bridge railings, barricades, crash cushions, within the  
13 clear zone. Information on the FHWA’s policy on crashworthiness of devices on the National  
14 Highway System and other roadways is available at the FHWA Office of Safety Web site at  
15 [https://safety.fhwa.dot.gov/roadway\\_dept/countermeasures/reduce\\_crash\\_severity/](https://safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/policy_memo_guidance.cfm)  
16 [policy\\_memo\\_guidance.cfm](https://safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/policy_memo_guidance.cfm).
- 17 **45.** Crosswalk—(a) that part of a roadway at an intersection included within the connections of the  
18 lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or in the  
19 absence of curbs, from the edges of the traversable roadway, and in the absence of a sidewalk on  
20 one side of the roadway, the part of a roadway included within the extension of the lateral lines  
21 of the sidewalk at right angles to the center line; (b) any portion of a roadway at an intersection  
22 or elsewhere distinctly indicated as a pedestrian crossing by pavement marking lines on the  
23 surface, which might be supplemented by contrasting pavement texture, style, or color.
- 24 **46.** Crosswalk Lines—white pavement marking lines that identify a crosswalk.
- 25 **47.** Cycle Length—the time required for one complete sequence of signal indications.
- 26 **48.** Dark Mode—the lack of all signal indications at a signalized location. (The dark mode is most  
27 commonly associated with power failures, ramp meters, hybrid beacons, beacons, and some  
28 movable bridge signals.)
- 29 **49.** Delineator—a retroreflective device mounted ~~on the roadway surface or~~ at the side of the  
30 roadway in a series to indicate the alignment of the roadway, especially at night or in adverse  
31 weather.
- 32 **50.** Design Vehicle—the longest vehicle permitted by statute of the road authority (State or other)  
33 on that roadway.
- 34 **51.** Designated Bicycle Route—a system of bikeways designated by the jurisdiction having authority  
35 with appropriate directional and informational route signs, with or without specific bicycle  
36 route numbers.
- 37 **52.** Detectable—having a continuous edge within 6 inches of the surface so that pedestrians who  
38 have visual disabilities can sense its presence and receive usable guidance information.
- 39 **53.** Detector—a device used for determining the presence or passage of vehicles or pedestrians.
- 40 **54.** Diagnostic Team – a group of knowledgeable representatives of the parties of interest in a grade  
41 crossing or group of grade crossings (see 23 CFR Section 109, Part 646.204).
- 42 **55.** Downstream—a term that refers to a location that is encountered by traffic subsequent to an  
43 upstream location as it flows in an “upstream to downstream” direction. For example, “the  
44 downstream end of a lane line separating the turn lane from a through lane on the approach to  
45 an intersection” is the end of the lane line that is closest to the intersection.
- 46 **56.** Driveway – an access from a roadway to a building, site, or abutting property.
- 47 **57.** Driving Aisle - circulation area for motor vehicles within a parking area, typically between  
48 rows of parking spaces. Driving aisle provide a one-way or two-way travel. Driving aisles are  
49 exempted from compliance with MUTCD provisions.
- 50 **58.** Dropped Lane—a through lane that becomes a mandatory turn lane on a conventional  
51 roadway, or a through lane that becomes a mandatory exit lane on a freeway or expressway.  
52 The end of an acceleration lane and reductions in the number of through lanes that do not  
53 involve a mandatory turn or exit are not considered dropped lanes.
- 54 **59.** Dual-Arrow Signal Section—a type of signal section designed to include both a yellow arrow  
55 and a green arrow.

- 1 **60.** Dynamic Envelope—the clearance required for light rail transit traffic or a train and its cargo  
2 overhang due to any combination of loading, lateral motion, or suspension failure (see Figure  
3 8B-8).
- 4 **61.** Dynamic Exit Gate Operating Mode—a mode of operation where the exit gate operation is  
5 based on the presence of vehicles within the minimum track clearance distance.
- 6 **62.** Dynamic Message Sign—see Changeable Message Sign.
- 7 **63.** Edge Line Markings—white or yellow pavement marking lines that delineate the right or left  
8 edge(s) of a traveled way.
- 9 **64.** Electronic Toll Collection (ETC)—a system for automated collection of tolls from moving or  
10 stopped vehicles through wireless technologies such as radio-frequency communication or  
11 optical scanning. ETC systems are classified as one of the following: (1) systems that require  
12 users to have registered toll accounts, with the use of equipment inside or on the exterior of  
13 vehicles, such as a transponder or barcode decal, that communicates with or is detected by  
14 roadside or overhead receiving equipment, or with the use of license plate optical scanning, to  
15 automatically deduct the toll from the registered user account, or (2) systems that do not  
16 require users to have registered toll accounts because vehicle license plates are optically scanned  
17 and invoices for the toll amount are sent through postal mail to the address of the vehicle owner.
- 18 **65.** Electronic Toll Collection (ETC) Account Only Lane—a non-attended toll lane that is restricted  
19 to use only by vehicles with a registered toll payment account.
- 20 **66.** Emergency-Vehicle Hybrid Beacon—a special type of hybrid beacon used to warn and control  
21 traffic at an unsignalized location to assist authorized emergency vehicles in entering or crossing  
22 a street or highway.
- 23 **67.** Emergency-Vehicle Traffic Control Signal—a special traffic control signal that ~~assigns the~~  
24 ~~right-of-way~~ directs all conflicting traffic to stop in order to permit the driver of ~~to~~ an  
25 authorized emergency vehicle to proceed into the roadway or intersection.
- 26 ~~63.—End-of-Roadway Marker—a device used to warn and alert road users of the end of a roadway~~  
27 ~~in other than temporary traffic control zones.~~
- 28 **68.** Engineer—see Professional Engineer.
- 29 **69.** Engineering Judgment—the evaluation of available pertinent information, and the application  
30 of appropriate principles, provisions, and practices as contained in this Manual and other  
31 sources, for the purpose of deciding upon the appearance, use, installation, or applicability,  
32 ~~design, operation, or installation~~ of a traffic control device. Engineering judgment shall be  
33 exercised by an professional engineer (see Definition 169) with appropriate traffic engineering  
34 expertise, or by an individual working under the supervision of such an engineer, through the  
35 application of procedures and criteria established by the engineer. Documentation of  
36 engineering judgment is not required.
- 37 **70.** Engineering Study—the ~~comprehensive~~ analysis and evaluation of available pertinent  
38 information, and the application of appropriate principles, provisions, and practices as  
39 contained in this Manual and other sources, for the purpose of deciding upon the appearance,  
40 use, installation, or applicability, ~~design, operation, or installation~~ of a traffic control device.  
41 An engineering study shall be performed by an professional engineer (see Definition 169) with  
42 appropriate traffic engineering expertise, or by an individual working under the supervision of  
43 such an engineer, through the application of procedures and criteria established by the  
44 engineer. An engineering study shall be documented in writing.
- 45 **71.** Entrance Gate—an automatic gate that can be lowered across the lanes approaching a grade  
46 crossing to block road users from entering the grade crossing.
- 47 **72.** Exact Change Lane (Automatic Lane)—a non-attended toll lane that has a receptacle into which  
48 road users deposit coins totaling the exact amount of the toll. Exact Change lanes at toll plazas  
49 typically require vehicles to stop to pay the toll.
- 50 **73.** Exclusive Alignment---a light rail transit track(s) or a bus rapid transit busway that is grade-  
51 separated or protected by a fence or traffic barrier. No grade crossings exist along the track(s)  
52 or busway. Motor vehicles, bicycles, and pedestrians are prohibited within the right-of-way.  
53 Subways and elevated structures are included within this definition.
- 54 **74.** Exit Gate—an automatic gate that can be lowered across the lanes departing a grade crossing to  
55 block road users from entering the grade crossing by driving in the opposing traffic lanes.

- 1 **75.** Exit Gate Clearance Time—for Four-Quadrant Gate systems at grade crossings, the amount of  
2 time provided to delay the descent of the exit gate arm(s) after entrance gate arm(s) begin to  
3 descend.
- 4 **76.** Exit Gate Operating Mode—for Four-Quadrant Gate systems at grade crossings, the mode of  
5 control used to govern the operation of the exit gate arms.
- 6 **77.** Expressway—a divided highway with partial control of access.
- 7 **78.** Fail-Safe—when used in Part 8, a railroad signal design philosophy applied to a system or  
8 device such that the result of a hardware failure or the effect of a software error shall either  
9 prohibit the system or device from assuming or maintaining an unsafe state or shall cause the  
10 system or device to assume a state that is known to be safe.
- 11 **79.** Flagger—a person who actively controls the flow of vehicular traffic into and/or through a  
12 temporary traffic control zone using hand-signaling devices or an Automated Flagger  
13 Assistance Device (AFAD).
- 14 **80.** Flasher—a device used to turn highway traffic signal indications on and off at a repetitive rate  
15 of approximately once per second.
- 16 **81.** Flashing—an operation in which a light source, such as a traffic signal indication or LEDs in a  
17 sign, is turned on and off repetitively.
- 18 **82.** Flashing-Light Signals—a warning device consisting of two red signal indications arranged  
19 horizontally that are activated to flash alternately when rail traffic is approaching or present at  
20 a grade crossing.
- 21 **83.** Flashing Mode—a mode of operation in which at least one traffic signal indication in each  
22 vehicular signal face of a highway traffic signal is turned on and off repetitively.
- 23 **84.** Four-Quadrant Gate System – an exit gate system that includes entrance and exit gates that  
24 control and block road users on all lanes entering and exiting the grade crossing.
- 25 **85.** Freeway—a divided highway with full control of access.
- 26 **86.** Full-Actuated ~~Operation~~—a type of traffic control signal operation in which all signal phases  
27 function on the basis of actuation.
- 28 **87.** Gate—an automatically-operated or manually-operated traffic control device that is used to  
29 physically obstruct road users such that they are discouraged from proceeding past a particular  
30 point on a roadway or pathway, or such that they are discouraged from entering a particular  
31 grade crossing, ramp, lane, roadway, or facility.
- 32 **88.** General-Purpose Lane— a highway lane or set of lanes, other than a preferential lane (see  
33 Definition No. 169), on which all or most traffic that is allowed on that highway is also allowed  
34 use. Certain classes of vehicles, such as commercial vehicles or vehicles exceeding a certain  
35 weight, might be prohibited from using one or more of the general-purpose lanes. A  
36 general-purpose lane might also be restricted to certain uses, such as passing or turning.
- 37 **89.** Gore Area—see Physical Gore, Theoretical Gore.
- 38 **90.** Grade Crossing—the general area where a highway and a railroad and/or light rail transit  
39 route cross at the same level, within which are included the tracks, highway, and traffic control  
40 devices for traffic traversing that area.
- 41 **91.** ~~Active~~ Grade Crossing Warning System—the flashing-light signals, with or without ~~warning-~~  
42 ~~automatic~~ gates, together with the necessary control equipment used to inform road users of the  
43 approach or presence of rail traffic at grade crossings. **Name changed; moved in alphabetical**  
44 **order**
- 45 **92.** Guide Sign—a sign that shows route designations, highway names, destinations, directions,  
46 distances, services, points of interest, or other geographical, recreational, or cultural  
47 information.
- 48 **93.** High-Occupancy Vehicle (HOV)—a motor vehicle carrying at least two or more persons,  
49 including carpools, vanpools, and buses.
- 50 **94.** Highway—a general term for denoting a public way for purposes of vehicular travel, including  
51 the entire area within the right-of-way.
- 52 **95.** Highway-Light Rail Transit Grade Crossing—the general area where a highway and a light rail  
53 transit route cross at the same level, within which are included the light rail transit tracks,  
54 highway, and traffic control devices for traffic traversing that area.

- 1 **96.** Highway-Rail Grade Crossing—the general area where a highway and a railroad cross at the  
2 same level, within which are included the railroad tracks, highway, and traffic control devices  
3 for highway traffic traversing that area.
- 4 **97.** Highway Traffic Signal—a power-operated traffic control device by which traffic is warned or  
5 directed to take some specific action. These devices do not include power-operated signs,  
6 steadily-illuminated pavement markers, gates, flashing light signals (see Section 8D.03), warning  
7 lights (see Section ~~6F.836L.07~~), or ~~steady-steady~~-burning electric lamps.
- 8 **98.** HOV Lane—any preferential lane designated for exclusive use by high-occupancy vehicles for  
9 all or part of a day—including a designated lane on a freeway, other highway, street, or  
10 independent roadway on a separate right-of-way.
- 11 **99.** Hybrid Beacon—a special type of beacon that is intentionally placed in a dark mode (no  
12 indications displayed) between periods of operation and, when operated, displays both steady  
13 and flashing traffic control signal indications.
- 14 **100.** Identification Marker--a shape, color, and/or pictograph that is used as a visual identifier for a  
15 destination guide signing system of a community wayfinding system or a shared-use path system  
16 for an area.
- 17 **101.** Inherently Low Emission Vehicle (ILEV)—any kind of vehicle that, because of inherent  
18 properties of the fuel system design, will not have significant evaporative emissions, even if its  
19 evaporative emission control system has failed.
- 20 **102.** In-Roadway Lights—a special type of highway traffic signal installed in the roadway surface to  
21 warn road users that they are approaching a condition on or adjacent to the roadway that  
22 might not be readily apparent and might require the road users to ~~slow-down~~reduce speed  
23 and/or come to a stop.
- 24 **103.** Interchange—a system of interconnecting roadways providing for traffic movement between  
25 two or more highways that do not intersect at grade.
- 26 **104.** Interconnection—when used in Part 8, the electrical connection between the railroad or light  
27 rail transit active warning system and the highway traffic signal controller assembly for the  
28 purpose of preemption.
- 29 **105.** Intermediate Interchange—an interchange with an urban or rural route that is not a major or  
30 minor interchange as defined in this Section.
- 31 **106.** Intersection—intersection is defined as follows:
- 32 (a) The area embraced within the prolongation or connection of the lateral curb lines, or if  
33 none, the lateral boundary lines of the roadways of two highways that join one another at,  
34 or approximately at, right angles, or the area within which vehicles traveling on different  
35 highways that join at any other angle might come into conflict.
- 36 (b) The junction of an alley, ~~or~~ driveway, or side roadway with a public roadway or highway  
37 shall not constitute an intersection, unless the public roadway or highway at said junction is  
38 controlled by a traffic control device.
- 39 (c) If a highway includes two roadways separated by a median, then every crossing of each  
40 roadway of such divided highway by an intersecting highway shall be a separate intersection  
41 if the opposing left-turn paths cross and there is sufficient interior storage for the design  
42 vehicle. (see Figure 2A-XX)~~If a highway includes two roadways that are 30 feet or more~~  
43 ~~apart (see definition of Median), then every crossing of each roadway of such divided~~  
44 ~~highway by an intersecting highway shall be a separate intersection.~~
- 45 ~~(d) If both intersecting highways include two roadways that are 30 feet or more apart, then~~  
46 ~~every crossing of any two roadways of such highways shall be a separate intersection.~~
- 47 (ed) At a location controlled by a traffic control signal, regardless of the distance between the  
48 separate intersections as defined in (c) ~~and (d)~~ above:
- 49 (1) If a stop line, yield line, or crosswalk has not been designated on the roadway (within the  
50 median) between the separate intersections, the two intersections and the roadway  
51 (median) between them shall be considered as one intersection;
- 52 (2) Where a stop line, yield line, or crosswalk is designated on the roadway on the  
53 intersection approach, the area within the crosswalk and/or beyond the designated stop  
54 line or yield line shall be part of the intersection; and

(3) Where a crosswalk is designated on a roadway on the departure from the intersection, the intersection shall include the area extending to the far side of such crosswalk.

107. Intersection Control Beacon—a beacon used only at an intersection to control two or more directions of travel.
108. Interval—the part of a signal cycle during which signal indications do not change.
- ~~97. Interval Sequence—the order of appearance of signal indications during successive intervals of a signal cycle.~~
109. Island—a defined area between traffic lanes for control of vehicular movements, for toll collection, 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.
110. Jughandle Turn--- a left-turn or U-turn that, in conjunction with special geometry, is made by initially making a right-turn or diverging to the right. With other special geometry, a right-turn or U-turn makes a jughandle turn by initially making a left-turn or diverging to the left.
111. Lane Drop—see Dropped Lane.
112. Lane Line Markings—white pavement marking lines that delineate the separation of traffic lanes that have the same direction of travel on a roadway.
113. 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.
114. Legend—see Sign Legend.
115. Lens—see Signal Lens.
116. Light Rail Transit Traffic (Light Rail Transit Equipment)—every device in, upon, or by which any person or property can be transported on light rail transit tracks, including single-unit light rail transit cars (such as streetcars and trolleys) and assemblies of multiple light rail transit cars coupled together.
117. Loading Zone – a specially marked, signed or designated area for the loading or unloading of vehicles (passenger or freight)
118. Locomotive Horn—an air horn, steam whistle, or similar audible warning device (see 49 CFR Part 229.129) mounted on a locomotive or control cab car. The terms “locomotive horn,” “train whistle,” “locomotive whistle,” and “train horn” are used interchangeably in the railroad industry.
119. Logo—a distinctive emblem or trademark that identifies a commercial ~~and/or non-commercial~~ business, program, or organization, and/or the product or service offered by the business.
120. Longitudinal Markings—pavement markings that are generally placed parallel and adjacent to the flow of traffic such as lane lines, center lines, edge lines, channelizing lines, and others.
121. Louver—see Signal Louver.
122. Low-Volume Rural Road – A category of paved or unpaved conventional or special-purpose roadways having an AADT of less than 400 vehicles and lying outside of built-up or urbanized areas of cities, towns, and communities.
123. 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.
124. Major Street—the street normally carrying the higher volume of vehicular traffic.
125. Malfunction Management Unit—same as Conflict Monitor.
126. Managed Lane—a highway lane or set of lanes, or a highway facility, for which variable operational strategies such as direction of travel, tolling, pricing, and/or vehicle type or occupancy requirements are implemented and managed in real-time in response to changing conditions. Managed lanes are typically buffer- or barrier-separated lanes parallel to the general-purpose lanes of a highway in which access is restricted to designated locations. There are also some highways on which all lanes are managed.
127. Manual Lane—see Attended Lane.
- ~~114. Maximum Highway Traffic Signal Preemption Time—the maximum amount of time needed following initiation of the preemption sequence for the highway traffic signals to complete the timing of the right-of-way transfer time, queue clearance time, and separation time.~~
128. Median—the portion of a highway separating opposing directions of the traveled way. the area between two roadways of a divided highway measured from edge of traveled way to edge of

1 traveled way. The median excludes turn lanes. The median width might be different between  
2 intersections, interchanges, and at opposite approaches of the same intersection.

3 **129. Minimum Track Clearance Distance**— ~~for standard two quadrant warning devices, the~~  
4 ~~minimum track clearance distance is~~ the length along a highway over the track(s) where a  
5 vehicle could be struck by rail traffic, at one or more railroad or light rail transit tracks,  
6 measured from the highway stop line, warning device, or 12 feet perpendicular to the track-  
7 center line, to 6 feet beyond the track(2) measured perpendicular to the far rail, along the center  
8 line or edge line of the highway, as appropriate, to obtain the longer distance. ~~The minimum~~  
9 ~~track clearance distance is measured from a point upstream from the track(s) on the approach~~  
10 ~~to the grade crossing to a point downstream from the track(s) on the departure from the grade~~  
11 ~~crossing. The length along the highway between the two points is the minimum track clearance~~  
12 ~~distance. For Four-Quadrant Gate systems, the minimum track clearance distance is the length~~  
13 ~~along a highway at one or more railroad or light rail transit tracks, measured either from the~~  
14 ~~highway stop line or entrance warning device, to the point where the rear of the vehicle would~~  
15 ~~be clear of the exit gate arm. In cases where the exit gate arm is parallel to the track(s) and is~~  
16 ~~not perpendicular to the highway, the distance is measured either along the center line or edge~~  
17 ~~line of the highway, as appropriate, to obtain the longer distance.~~

18 ~~117. Minimum Warning Time~~—~~when used in Part 8, the least amount of time active warning devices~~  
19 ~~shall operate prior to the arrival of rail traffic at a grade crossing.~~

20 **130. Minor Interchange**—an interchange where traffic is local and very light, such as interchanges  
21 with land service access roads. Where the sum of the exit volumes is estimated to be lower than  
22 100 vehicles per day in the design year, the interchange is classified as local.

23 **131. Minor Street**—the street normally carrying the lower volume of vehicular traffic.

24 **132. Mixed-Use Alignment**—a light rail transit track(s), a busway, or a bus only lane(s) where the  
25 LRT or BRT vehicles operate in mixed traffic with all types of road users. This includes streets,  
26 transit malls and pedestrian malls where the right-of-way is shared. In a mixed-use alignment,  
27 the light rail transit or the bus rapid transit traffic does not have the right-of-way over other  
28 road users at grade crossings and intersections. If the LRT traffic or buses are controlled by  
29 traffic control signals or LRT signal faces at an intersection with a roadway, the alignment is  
30 considered to be mixed-use even if some of the approaches to the intersection are used  
31 exclusively by LRT traffic or buses.

32 **133. Movable Bridge Resistance Gate**—a type of traffic gate, which is located downstream of the  
33 movable bridge warning gate, that provides a physical deterrent to vehicle and/or pedestrian  
34 traffic when placed in the appropriate position.

35 **134. Movable Bridge Signal**—a highway traffic signal installed at a movable bridge to notify traffic  
36 to stop during periods when the roadway is closed to allow the bridge to open.

37 **135. Movable Bridge Warning Gate**—a type of traffic gate designed to warn, but not primarily to  
38 block, vehicle and/or pedestrian traffic when placed in the appropriate position.

39 **136. Multi-Lane**—more than one lane moving in the same direction. A multi-lane street, highway, or  
40 roadway has a basic cross-section comprised of two or more through lanes in one or both  
41 directions. A multi-lane approach has two or more lanes moving toward the intersection,  
42 including turning lanes.

43 **137. Neutral Area**—the paved area between the channelizing lines separating an entrance or exit  
44 ramp or a channelized turn lane or channelized entering lane from the adjacent through lane(s).

45 **138. Object Marker**—a device used to mark obstructions within or adjacent to the roadway.

46 **139. Occupancy Requirement**—any restriction that regulates the use of a facility or one or more  
47 lanes of a facility for any period of the day based on a specified number of persons in a vehicle.

48 **140. Occupant**—a person driving or riding in a car, truck, bus, or other vehicle.

49 **141. On-Street Parking** – parking within or along, and accessed directly from, a public roadway or a  
50 site roadway open to public travel.

51 **142. Open-Road ETC Lane**—a non-attended lane that is designed to allow toll payments to be  
52 electronically collected from vehicles traveling at normal highway speeds. Open-Road ETC  
53 lanes are typically physically separated from the toll plaza, often following the alignment of the  
54 mainline lanes, with toll plaza lanes for cash toll payments being on a different alignment after  
55 diverging from the mainline lanes or a subset thereof.

- 1 **143. Open-Road Tolling**—a system designed to allow electronic toll collection (ETC) from vehicles  
2 traveling at normal highway speeds. Open-Road Tolling might be used on toll roads or toll  
3 facilities in conjunction with toll plazas. Open-Road Tolling is also typically used on managed  
4 lanes and on toll facilities that only accept payment by ETC.
- 5 **144. Open-Road Tolling Point**—the location along an Open-Road ETC lane at which roadside or  
6 overhead detection and receiving equipment are placed and vehicles are electronically assessed  
7 a toll.
- 8 **145. Opposing Traffic**—vehicles that are traveling in the opposite direction. At an intersection,  
9 vehicles entering from an approach that is approximately straight ahead would be considered to  
10 be opposing traffic, but vehicles entering from approaches on the left or right would not be  
11 considered to be opposing traffic.
- 12 **146. Option Lane – A lane that widens on the approach to, then splits into two lanes at, the**  
13 **theoretical gore of a decision point or bifurcation to allow traffic within the lane the option to**  
14 **continue on either route without changing lanes.**
- 15 **147. Overhead Sign**—a sign that is placed such that a portion or the entirety of the sign or its  
16 support is directly above the roadway or shoulder such that vehicles travel below it. Typical  
17 installations include signs placed on cantilever arms that extend over the roadway or shoulder,  
18 on sign support structures that span the entire width of the pavement, on mast arms or span  
19 wires **either independently or** that also support traffic control signals, and on highway bridges  
20 that cross over the roadway.
- 21 **148. Parking Area**—a parking lot or parking garage that is separated from a roadway. **Parallel,**  
22 **perpendicular,** or angle parking spaces along a roadway are not considered a parking area.
- 23 **149. Parking Space – an area marked or designated for storage of a vehicle while the driver is not**  
24 **present.**
- 25 **150. Passive Grade Crossing**—a grade crossing where none of the automatic traffic control devices  
26 associated with an Active Grade Crossing Warning System are present and at which the traffic  
27 control devices consist entirely of signs and/or markings.
- 28 **151. Pathway**—a general term denoting a public way for purposes of travel by authorized users  
29 outside the traveled way and physically separated from the roadway by an open space or  
30 barrier and either within the highway right-of-way or within an independent alignment.  
31 Pathways include shared-use paths, but do not include sidewalks.
- 32 **152. Pathway Grade Crossing**—the general area where a pathway and railroad or light rail transit  
33 tracks cross at the same level, within which are included the tracks, pathway, and traffic control  
34 devices for pathway traffic traversing that area.
- 35 **153. Paved**—**having a roadway surface that has both a structural (weight bearing) and a sealing**  
36 **purpose for the roadway, such as** a bituminous surface treatment, mixed bituminous concrete,  
37 or Portland cement concrete ~~roadway surface that has both a structural (weight bearing) and a~~  
38 ~~sealing purpose for the roadway.~~
- 39 **154. Pedestrian**—a person on foot, in a wheelchair, on skates, or on a skateboard.
- 40 **155. Pedestrian Change Interval**—an interval during which the flashing UPRAISED HAND  
41 (symbolizing DONT WALK) signal indication is displayed.
- 42 **156. Pedestrian Clearance Time**—the time provided for a pedestrian crossing in a crosswalk, after  
43 leaving the curb or ~~shoulder~~**edge of traveled way,** to travel to the far side of the traveled way or  
44 to a median.
- 45 **157. Pedestrian Facility**—a general term denoting **a location where** improvements and provisions  
46 made to accommodate or encourage walking.
- 47 **158. Pedestrian Hybrid Beacon**— a special type of hybrid beacon used to warn and control traffic at  
48 an unsignalized location to assist pedestrians in crossing a street or highway at a marked  
49 crosswalk.
- 50 **159. Pedestrian Signal Head**—a signal head, which contains the symbols WALKING PERSON  
51 (symbolizing WALK) and UPRAISED HAND (symbolizing DONT WALK), that is installed to  
52 direct pedestrian traffic at a traffic control signal.
- 53 **160. Permissive Mode**—a mode of traffic control signal operation in which left or right turns are  
54 permitted to be made after yielding to pedestrians, if any, and/or opposing traffic, if any. When  
55 a CIRCULAR GREEN signal indication is displayed, both left and right turns are permitted

1 unless otherwise prohibited by another traffic control device. When a flashing YELLOW  
2 ARROW or flashing RED ARROW signal indication is displayed, the turn indicated by the  
3 arrow is permitted.

4 **161.** Physical Gore—a longitudinal point where a physical barrier or the lack of a paved surface  
5 inhibits road users from crossing from a ramp or channelized turn lane or channelized entering  
6 lane to the adjacent through lane(s) or vice versa.

7 **162.** Pictograph—a pictorial representation used to identify a governmental jurisdiction, ~~an area of~~  
8 ~~jurisdiction~~, a governmental or other public transportation agency or provider, ~~a military base~~  
9 ~~or branch of service, a governmental approved university or college, or~~ a toll payment system,  
10 ~~or a government approved institution.~~

11 **163.** Plaque—a traffic control device intended to communicate specific information to road users  
12 through a word, symbol, or arrow legend that is placed immediately adjacent to a sign to  
13 supplement the message on the sign. The difference between a plaque and a sign is that a  
14 plaque cannot be used alone. The designation for a plaque includes a “P” suffix.

15 **164.** Platoon—a group of vehicles or pedestrians traveling together as a group, either voluntarily or  
16 involuntarily, because of traffic signal controls, geometrics, or other factors.

17 **165.** Portable Traffic Control Signal—a temporary traffic control signal that is designed so that it  
18 can be easily transported and reused at different locations.

19 **166.** Post-Mounted Sign—a sign that is placed to the side of the roadway such that no portion of the  
20 sign or its support is directly above the roadway or shoulder.

21 **167.** Posted Speed Limit—a speed limit determined by law or regulation and displayed on Speed  
22 Limit signs.

23 **168.** Preemption—the transfer of normal operation of a traffic control signal or a hybrid beacon to a  
24 special control mode of operation.

25 **169.** Preferential Lane—a highway lane or set of lanes, or a highway facility, reserved for the  
26 exclusive use of one or more specific types of vehicles or vehicles with at least a specific number  
27 of occupants.

28 **170.** Pre-Signal—traffic control signal faces that are located upstream from a signalized intersection  
29 ~~control traffic approaching a grade crossing and are operated~~ in conjunction with the traffic  
30 control signal faces ~~that control traffic approaching a highway-highway intersection beyond the~~  
31 ~~tracks at the downstream signalized intersection in a manner that is designed to keep the area~~  
32 between the stop line for the upstream traffic control signal faces and the stop line for the  
33 downstream signalized intersection clear of queued vehicles. Supplemental near-side traffic  
34 control signal faces for the ~~highway-highway~~ downstream signalized intersection are not  
35 considered to be pre-signals. ~~Pre-signals are typically used where the clear storage distance is~~  
36 ~~insufficient to store one or more design vehicles.~~

37 **171.** Pretimed Operation—a type of traffic control signal operation in which none of the signal  
38 phases function on the basis of actuation.

39 **172.** Primary Signal Face—one of the required or recommended minimum number of signal faces  
40 for a given approach or separate turning movement, but not including near-side signal faces  
41 required as a result of the far-side signal faces exceeding the maximum distance from the stop  
42 line.

43 **173.** Principal Legend—place names, street names, and route numbers placed on guide signs.

44 **174.** Priority Control—a means by which the assignment of right-of-way is obtained or modified.

45 **175.** Private Road ~~Open to Public Travel—see Site Roadways Open to Public Travel.~~ ~~private toll~~  
46 ~~roads and roads (including any adjacent sidewalks that generally run parallel to the road)~~  
47 ~~within shopping centers, airports, sports arenas, and other similar business and/or recreation~~  
48 ~~facilities that are privately owned, but where the public is allowed to travel without access~~  
49 ~~restrictions. Roads within private gated properties (except for gated toll roads) where access is~~  
50 ~~restricted at all times, parking areas, driving aisles within parking areas, and private grade~~  
51 ~~crossings shall not be included in this definition.~~

52 **176.** Professional Engineer (P.E.) —An individual who has fulfilled education and experience  
53 requirements and passed examinations that, under State licensure laws, permit the individual to  
54 offer engineering services within areas of expertise directly to the public.

- 1 **177. Protected Mode**—a mode of traffic control signal operation in which left or right turns are  
2 permitted to be made when a left or right GREEN ARROW signal indication is displayed.
- 3 **178. Public Road**—any road, street, or similar facility under the jurisdiction of and maintained by a  
4 public agency and open to public travel.
- 5 **179. Pushbutton**—a button to activate a device or signal timing for pedestrians, bicyclists, or other  
6 road users.
- 7 **180. Pushbutton Information Message**—a recorded message that can be actuated by pressing a  
8 pushbutton when the walk interval is not timing and that provides the name of the street that  
9 the crosswalk associated with that particular pushbutton crosses and can also provide other  
10 information about the intersection signalization or geometry.
- 11 **181. Pushbutton Locator Tone**—a repeating sound that informs approaching pedestrians that a  
12 pushbutton exists to actuate pedestrian timing or receive additional information and that  
13 enables pedestrians who have visual disabilities to locate the pushbutton.
- 14 **182. Queue Clearance Time**—when used in Part 8, the time required for the design vehicle of  
15 maximum length stopped just inside the minimum track clearance distance to start up and  
16 move through and clear the entire minimum track clearance distance. ~~If pre-signals are  
17 present, this time shall be long enough to allow the vehicle to move through the intersection, or  
18 to clear the tracks if there is sufficient clear storage distance. If a Four-Quadrant Gate system  
19 is present, this time shall be long enough to permit the exit gate arm to lower after the design  
20 vehicle is clear of the minimum track clearance distance.~~
- 21 **183. Queue Cutter Signal**—an independently-controlled traffic control signal (not operated in  
22 conjunction with the traffic control signal faces at a downstream signalized intersection) located  
23 at a grade crossing that controls traffic in one direction only on the roadway for the purpose of  
24 minimizing vehicular queuing across the tracks. The display of red signal indications is  
25 activated from a downstream queue detection system, by time of day, by approaching rail  
26 traffic, by an approaching bus on a busway, or by a combination of any of these methods.
- 27 **184. Quiet Zone**—a segment of a rail line, within which is situated one or a number of consecutive  
28 public highway-rail grade crossings at which locomotive horns are not routinely sounded per 49  
29 CFR Part 222.
- 30 **185. Rail Traffic**—every device in, upon, or by which any person or property can be transported on  
31 rails or tracks and to which all other traffic must yield the right-of-way by law at grade  
32 crossings, including trains, one or more locomotives coupled (with or without cars), other  
33 railroad equipment, and light rail transit operating in exclusive or semi-exclusive alignments.  
34 Light rail transit operating in a mixed-use alignment, to which other traffic is not required to  
35 yield the right-of-way by law, is a vehicle and is not considered to be rail traffic.
- 36 **186. Raised Pavement Marker**—a device mounted on or in a road surface that has a height generally  
37 not exceeding approximately 1 inch above the road surface for a permanent marker, or not  
38 exceeding approximately 2 inches above the road surface for a temporary flexible marker, and  
39 that is intended to be used as a positioning guide and/or to supplement or substitute for  
40 pavement markings. Raised pavement markers might also be recessed into or flush with the  
41 pavement surface.
- 42 **187. Ramp Control Signal**—a highway traffic signal installed to control the flow of traffic onto a  
43 freeway at an entrance ramp or at a freeway-to-freeway ramp connection.
- 44 **188. Ramp Meter**—see Ramp Control Signal.
- 45 **189. Reconstructed**—a term used to describe a roadway or a traffic control device. When used to  
46 describe a roadway, it describes a roadway that has been rebuilt or restored to its former use or  
47 that has been improved through major renovation of its structural elements. When used to  
48 describe a traffic control device, it describes a device that has been rebuilt or improved through  
49 major renovation of its structural or control elements.
- 50 **190. Rectangular Rapid-Flashing Beacon**—a pedestrian-activated device comprising two horizontally  
51 arranged, rapidly flashed, rectangular-shaped yellow indications that is used to provide  
52 supplemental emphasis for a pedestrian, school, or trail crossing warning sign at a marked  
53 crosswalk across an uncontrolled approach.
- 54 **191. Red Clearance Interval**—an interval that follows a yellow change interval and precedes the next  
55 conflicting green interval.

- 1 **192. Regulatory Sign**—a sign that gives notice to road users of traffic laws or regulations.
- 2 **193. Retroreflectivity**—a property of a surface that allows a large portion of the light coming from a
- 3 point source to be returned directly back to a point near its origin.
- 4 **194. Right-of-Way [Assignment]**—the permitting of vehicles and/or pedestrians to proceed in a
- 5 lawful manner in preference to other vehicles or pedestrians by the display of a sign or signal
- 6 indications.
- 7 **195. Right-of-Way, Public Highway**—the limits of real property, including the traveled way,
- 8 shoulders, median, and the land alongside, that are owned by the public highway agency having
- 9 jurisdiction. The land within these limits is dedicated to highway uses, including roadside areas
- 10 such as rest areas, scenic overlooks, and weigh stations.
- 11 ~~**175. Right-of-Way Transfer Time**—when used in Part 8, the maximum amount of time needed for~~
- 12 ~~the worst case condition, prior to display of the track clearance green interval. This includes~~
- 13 ~~any railroad or light rail transit or highway traffic signal control equipment time to react to a~~
- 14 ~~preemption call, and any traffic control signal green, pedestrian walk and clearance, yellow~~
- 15 ~~change, and red clearance intervals for conflicting traffic.~~
- 16 **196. Road**—see Roadway.
- 17 **197. Road User**—a vehicle operator, bicyclist, or pedestrian, including persons with disabilities,
- 18 within the highway or on a ~~private road~~ **site roadway** open to public travel.
- 19 **198. Roadway**—that portion of a highway improved, designed, or ordinarily used for vehicular
- 20 travel and parking lanes, but exclusive of the sidewalk, berm, or shoulder even though such
- 21 sidewalk, berm, or shoulder is used by persons riding bicycles or other human-powered
- 22 vehicles. In the event a highway includes two or more separate roadways, the term roadway as
- 23 used in this Manual shall refer to any such roadway separately, but not to all such roadways
- 24 collectively.
- 25 **199. Roadway Network**—a geographical arrangement of intersecting roadways.
- 26 **200. Roundabout**—a circular intersection with yield control at entry, which permits a vehicle on the
- 27 circulatory roadway to proceed, and with deflection of the approaching vehicle counter-
- 28 clockwise around a central island.
- 29 **201. Rumble Strip**—a series of intermittent, narrow, transverse areas of rough-textured, slightly
- 30 raised, or depressed road surface that extend across the travel lane to alert road users to
- 31 unusual traffic conditions or are located along the shoulder, along the roadway center line, or
- 32 within islands formed by pavement markings to alert road users that they are leaving the travel
- 33 lanes.
- 34 **202. Rural Highway**—a type of roadway normally characterized by lower volumes, higher speeds,
- 35 fewer turning conflicts, and less conflict with pedestrians.
- 36 ~~**183. Safe Positioned**—the positioning of emergency vehicles at an incident in a manner that attempts~~
- 37 ~~to protect both the responders performing their duties and road users traveling through the~~
- 38 ~~incident scene, while minimizing, to the extent practical, disruption of the adjacent traffic flow.~~
- 39 **Relocated to Part 6.**
- 40 **203. School**—a public or private educational institution recognized by the State education authority
- 41 for one or more grades K through 12 or as otherwise defined by the State.
- 42 **204. School Zone**—a designated roadway segment approaching, adjacent to, and beyond school
- 43 buildings or grounds, or along which school related activities occur.
- 44 **205. Semi-Actuated ~~Operation~~**—a type of traffic control signal operation in which at least one, but
- 45 not all, signal phases function on the basis of actuation.
- 46 **206. Semi-Exclusive Alignment**—a light rail transit track(s) or a bus rapid transit busway that is in a
- 47 separate right-of-way or that is along a street or railroad right-of-way where motor vehicles,
- 48 bicycles, and pedestrians have limited access and cross only at designated locations, such as at
- 49 grade crossings where road users must yield the right-of-way to the light rail transit or the bus
- 50 rapid transit traffic.
- 51 **207. Separate Turn Signal Face**—a signal face that exclusively controls a turn movement and that
- 52 displays signal indications that are applicable only to the turn movement.
- 53 ~~**188. Separation Time**—the component of maximum highway traffic signal preemption time during~~
- 54 ~~which the minimum track clearance distance is clear of vehicular traffic prior to the arrival of~~
- 55 ~~rail traffic.~~

- 1 **208. Serviceable—the condition of a traffic control device in which it appears and operates as**  
2 **intended, until it requires replacement due to damage or wear. Whether a device is serviceable**  
3 **will depend on the type of device under consideration. In general, if the device is capable of**  
4 **being serviced with minimal effort or replacement parts so that it continues to appear and**  
5 **operate as intended, and the device is otherwise substantially intact, then it can be considered to**  
6 **be in serviceable condition. If the device is damaged or not operational beyond reasonable**  
7 **repair, then it is likely no longer serviceable.**
- 8 **209. Shared Roadway—a roadway that is officially designated and marked as a bicycle route, but**  
9 **which is open to motor vehicle travel and upon which no bicycle lane is designated.**
- 10 **210. Shared Turn Signal Face—a signal face, for controlling both a turn movement and the adjacent**  
11 **through movement, that always displays the same color of circular signal indication that the**  
12 **adjacent through signal face or faces display.**
- 13 **211. Shared-Use Path—a bikeway outside the traveled way and physically separated from motorized**  
14 **vehicular traffic by an open space or barrier and either within the highway right-of-way or**  
15 **within an independent alignment. Shared-use paths are also used by pedestrians (including**  
16 **skaters, users of manual and motorized wheelchairs, and joggers) and other authorized**  
17 **motorized and non-motorized users.**
- 18 **212. Shoulder--a longitudinal area contiguous with the traveled way that is primarily for**  
19 **accommodation of stopped vehicles for emergency use and for lateral support of base and**  
20 **surface courses, and that is graded for emergency stopping. A shoulder might be paved or**  
21 **unpaved. A paved shoulder might be opened to part-time travel by some or all vehicles.**
- 22 **213. Sidewalk—that portion of a street between the curb line, or the lateral line of a roadway, and**  
23 **the adjacent property line or on easements of private property that is paved or improved and**  
24 **intended for use by pedestrians.**
- 25 **214. Sidewalk Grade Crossing – the portion of a highway-rail grade crossing or of a highway-light**  
26 **rail transit grade crossing where a sidewalk and railroad tracks or a sidewalk and light rail**  
27 **transit tracks cross at the same level, within which are included the tracks, sidewalk, and traffic**  
28 **control devices for sidewalk users traversing that area.**
- 29 **215. Sign—with regard to controlling traffic, any traffic control device that is intended to**  
30 **communicate specific information to road users through a word, symbol, and/or arrow legend.**  
31 **Signs do not include highway traffic signals, pavement markings, delineators, or channelization**  
32 **devices. Signs whose purpose is unrelated to traffic control are addressed in Section 1D.04.**
- 33 **216. Sign Assembly—a group of signs, located on the same support(s), that supplement one another**  
34 **in conveying information to road users.**
- 35 **217. Sign Illumination—either internal or external lighting that shows similar color by day or night.**  
36 **Street or highway lighting shall not be considered as meeting this definition.**
- 37 **218. Sign Legend—all word messages, logos, pictographs, and symbol and arrow designs that are**  
38 **intended to convey specific meanings. The border, if any, on a sign is not considered to be a**  
39 **part of the legend.**
- 40 **219. Sign Panel—a separate panel or piece of material containing a word, logo, pictograph, symbol,**  
41 **and/or arrow legend that is affixed to the face of a sign.**
- 42 **220. Signal Backplate—a thin strip of material that extends outward from and parallel to a signal**  
43 **face on all sides of a signal housing to provide a background for improved visibility of the signal**  
44 **indications.**
- 45 **221. Signal Coordination—the establishment of timed relationships between adjacent traffic control**  
46 **signals.**
- 47 **222. Signal Dimming---a reduction of the light output from a signal indication, hybrid beacon, or**  
48 **rectangular rapid-flashing beacon indication, typically for nighttime conditions, to a value that**  
49 **is below the minimum specified intensity for daytime conditions. If a variety of intensity levels**  
50 **are used during daytime conditions and all of the various levels (including the lowest of the**  
51 **intensities) are above the minimum specified intensity for daytime conditions, this would not be**  
52 **considered to be signal dimming.**
- 53 **223. Signal Face—an assembly of one or more signal sections that is provided for controlling one or**  
54 **more traffic movements on a single approach.**

- 1 **224. Signal Head**—an assembly of one or more signal faces that is provided for controlling traffic  
2 movements on one or more approaches.
- 3 **225. Signal Housing**—that part of a signal section that protects the light source and other required  
4 components.
- 5 **226. Signal Indication**—the illumination of a signal lens or equivalent device.
- 6 **227. Signal Lens**—that part of the signal section that redirects the light coming directly from the  
7 light source and its reflector, if any.
- 8 **228. Signal Louver**—a device that can be mounted inside a signal visor to restrict visibility of a signal  
9 indication from the side or to limit the visibility of the signal indication to a certain lane or  
10 lanes, or to a certain distance from the stop line.
- 11 **229. Signal Phase**—the right-of-way, yellow change, and red clearance intervals in a cycle that are  
12 assigned to an independent traffic movement or combination of movements.
- 13 **230. Signal Section**—the assembly of a signal housing, signal lens, if any, and light source with  
14 necessary components to be used for displaying one signal indication.
- 15 **231. ~~Interval~~ Signal Sequence (Sequence of Indications)**—the order of appearance of signal  
16 indications during successive intervals of a signal cycle.
- 17 **232. Signal System**—two or more traffic control signals operating in signal coordination.
- 18 **233. Signal Timing**—the amount of time allocated for the display of a signal indication.
- 19 **234. Signal Visor**—that part of a signal section that directs the signal indication specifically to  
20 approaching traffic and reduces the effect of direct external light entering the signal lens.
- 21 **235. Signing**—individual signs or a group of signs, not necessarily on the same support(s), that  
22 supplement one another in conveying information to road users.
- 23 ~~**212. Simultaneous Preemption**—notification of approaching rail traffic is forwarded to the highway  
24 traffic signal controller unit or assembly and railroad or light rail transit active warning devices  
25 at the same time.~~
- 26 **236. Site Roadways Open to Public Travel –Roadways and bikeways on sites of shopping centers,  
27 office parks, airports, schools, universities, sports arenas, recreational parks, and other similar  
28 business, governmental, and/or recreation facilities that are publicly or privately owned but  
29 where the public is allowed to travel without full-time access restrictions. Two types of  
30 roadways are not included in this definition: (1) roadways where access is restricted at all times  
31 by gates and/or guards to residents, employees or other specifically authorized persons; and (2)  
32 private highway-rail grade crossings. Site roadways open to public travel do not include  
33 parking areas, including the driving aisles (see Definition 148) within those parking areas.**
- 34 **237. Special-Purpose Road**—a low-volume, low-speed road that serves recreational areas or resource  
35 development activities.
- 36 **238. Speed**—speed is defined based on the following classifications:
- 37 (a) **Average Speed**—the summation of the instantaneous or spot-measured speeds at a specific  
38 location of vehicles divided by the number of vehicles observed.
- 39 (b) **Design Speed**—a selected speed used to determine the various geometric design features of a  
40 roadway.
- 41 (c) **85<sup>th</sup>-Percentile Speed**—the speed at or below which 85 percent of the motor vehicles travel.
- 42 (d) **Operating Speed**—a speed at which a typical vehicle or the overall traffic operates.  
43 Operating speed might be defined with speed values such as the average, pace, or 85<sup>th</sup>-  
44 percentile speeds.
- 45 (e) **Pace**—the 10 mph speed range representing the speeds of the largest percentage of vehicles  
46 in the traffic stream.
- 47 **239. Speed Limit**—the maximum (or minimum) speed applicable to a section of highway as  
48 established by law or regulation.
- 49 **240. Speed Limit Sign Beacon**—a beacon used to supplement a SPEED LIMIT sign.
- 50 **241. Speed Measurement Markings**—a white transverse pavement marking placed on the roadway  
51 to assist the enforcement of speed regulations.
- 52 **242. Speed Zone**—a section of highway with a speed limit that is established by law or regulation,  
53 but which might be different from a legislatively specified statutory speed limit.

- 1 **243.** Splitter Island—a median island used to separate opposing directions of traffic entering and  
2 exiting a roundabout.
- 3 **244.** Station Crossing—a pathway grade crossing that is associated with a station platform.
- 4 **245.** Statutory Speed Limit—a speed limit established by legislative action (e.g., Federal or State law)  
5 that typically is applicable for a particular class of highways with specified design, functional,  
6 jurisdictional and/or location characteristics and that is not necessarily displayed on Speed  
7 Limit signs.
- 8 **246.** Steady (Steady Mode)—the continuous display of a signal indication for the duration of an  
9 interval, signal phase, or consecutive signal phases.
- 10 **247.** Stop Beacon—a beacon used to supplement a STOP sign, a DO NOT ENTER sign, or a  
11 WRONG WAY sign.
- 12 **248.** Stop Line—a solid white pavement marking line extending across approach lanes to indicate the  
13 point at which a stop is intended or required to be made.
- 14 **249.** Street—see Highway.
- 15 **250.** Supplemental Signal Face—a signal face that is not a primary signal face but which is provided  
16 for a given approach or separate turning movement to enhance visibility or conspicuity.
- 17 **251.** Swing Gate—a self-closing fence-type gate designated to swing open away from the track area  
18 and return to the closed position upon release.
- 19 **252.** Symbol—the approved design of a pictorial or graphical representation of a specific traffic  
20 control message for signs, pavement markings, traffic control signals, or other traffic control  
21 devices, as shown in the MUTCD.
- 22 **253.** Temporary Traffic Control Signal—a traffic control signal that is installed for a limited time  
23 period.
- 24 **254.** Temporary Traffic Control Zone—an area of a highway where road user conditions are  
25 changed because of a work zone or incident by the use of temporary traffic control devices,  
26 flaggers, uniformed law enforcement officers, or other authorized personnel.
- 27 **255.** Theoretical Gore—a longitudinal point at the upstream end of a neutral area at an exit ramp or  
28 channelized turn lane where the channelizing lines that separate the ramp or channelized turn  
29 lane from the adjacent through lane(s) begin to diverge, or a longitudinal point at the  
30 downstream end of a neutral area at an entrance ramp or channelized entering lane where the  
31 channelizing lines that separate the ramp or channelized entering lane from the adjacent  
32 through lane(s) intersect each other.
- 33 **256.** Through Train—a train movement that continues without stopping or reversing direction  
34 throughout the entire length of the rail traffic detection circuit length approaching a highway-  
35 rail grade crossing.
- 36 **257.** Timed Exit Gate Operating Mode—a mode of operation where the exit gate descent at a grade  
37 crossing is based on a predetermined time interval.
- 38 **258.** Toll Booth—a shelter where a toll attendant is stationed to collect tolls or issue toll tickets. A  
39 toll booth is located adjacent to a toll lane and is typically set on a toll island.
- 40 **259.** Toll Island—a raised island on which a toll booth or other toll collection and related equipment  
41 are located.
- 42 **260.** Toll Lane—an individual lane located within a toll plaza in which a toll payment is collected or,  
43 for toll-ticket systems, a toll ticket is issued.
- 44 **261.** Toll Plaza—the location at which tolls are collected consisting of a grouping of toll booths, toll  
45 islands, toll lanes, and, typically, a canopy. Toll plazas might be located on highway mainlines  
46 or on interchange ramps. A mainline toll plaza is sometimes referred to as a barrier toll plaza  
47 because it interrupts the traffic flow.
- 48 **262.** Toll Road (facility)---a road or facility that is open to traffic only by payment of a user toll or  
49 fee.
- 50 **263.** Toll-Ticket System—a system in which the user of a toll road receives a ticket from a machine  
51 or toll booth attendant upon entering a toll system. The ticket denotes the user’s point of entry  
52 and, upon exiting the toll system, the user surrenders the ticket and is charged a toll based on  
53 the distance traveled between the points of entry and exit.

- 1 **264.** Traffic—pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other  
2 conveyances either singularly or together while using for purposes of travel any highway or  
3 ~~private road~~ site roadway open to public travel.
- 4 **265.** Traffic Control Device—all signs, signals, markings, channelization devices, or other devices  
5 that use colors, shapes, symbols, words, sounds, and/or tactile information for the primary  
6 purpose of communicating ~~used to a~~ regulatory, warning, or guidance message to road users  
7 on traffic, placed on, over, or adjacent to a street, highway, ~~private road open to public travel,~~  
8 pedestrian facility, bikeway, pathway, or private site roadway open to public travel ~~shared-use~~  
9 ~~path by authority of a public agency or official having jurisdiction, or, in the case of a private~~  
10 ~~road open to public travel, by authority of the private owner or private official having~~  
11 ~~jurisdiction.~~ Infrastructure elements that restrict the road user’s travel paths or vehicle speeds,  
12 such as curbs, speed humps, and other raised roadway surfaces, are not traffic control devices.  
13 Transverse or longitudinal rumble strips are also not traffic control devices. Operational  
14 devices associated with the application of traffic control strategies such as in-vehicle electronics,  
15 fencing, roadway lighting, barriers, and attenuators are shown in the Manual for context but  
16 their design, application, and usage are not specified since they are not traffic control devices.
- 17 **266.** Traffic Control Signal (Traffic Signal)—any highway traffic signal by which traffic is  
18 alternately directed to stop and permitted to proceed. These devices do not include pedestrian  
19 hybrid beacons (see Chapter 4J) or emergency-vehicle hybrid beacons (see Chapter 4N).
- 20 **267.** Train—one or more locomotives coupled, with or without cars, that operates on rails or tracks  
21 and to which all other traffic must yield the right-of-way by law at highway-rail grade crossings.
- 22 **268.** Transverse Markings—pavement markings that are generally placed perpendicular and across  
23 the flow of traffic such as shoulder markings; word, symbol, and arrow markings; stop lines;  
24 crosswalk lines; speed measurement markings; parking space markings; and others.
- 25 **269.** Traveled Way—the portion of the roadway for the movement of vehicles, exclusive of the  
26 shoulders, berms, sidewalks, and parking lanes.
- 27 **270.** Turn Bay—a lane for the exclusive use of turning vehicles that is formed on the approach to the  
28 location where the turn is to be made. In most cases where turn bays are provided, drivers who  
29 desire to turn must move out of a through lane into the newly formed turn bay in order to turn.  
30 A through lane that becomes a turn lane is considered to be a dropped lane rather than a turn  
31 bay.
- 32 **271.** Uncontrolled Approach--an approach on which vehicles are not controlled by a traffic control  
33 signal, hybrid beacon, STOP sign, or YIELD sign.
- 34 **272.** Upstream—a term that refers to a location that is encountered by traffic prior to a downstream  
35 location as it flows in an “upstream to downstream” direction. For example, “the upstream end  
36 of a lane line separating the turn lane from a through lane on the approach to an intersection” is  
37 the end of the line that is furthest from the intersection.
- 38 **273.** Urban Street—a type of street normally characterized by relatively low speeds, wide ranges of  
39 traffic volumes, narrower lanes, frequent intersections and driveways, significant pedestrian  
40 traffic, and more businesses and houses.
- 41 **274.** Variable Message Sign—see Changeable Message Sign.
- 42 **275.** Vehicle—every device in, upon, or by which any person or property can be transported or  
43 drawn upon a highway, except trains and light rail transit operating in exclusive or semi-  
44 exclusive alignments. Light rail transit equipment operating in a mixed-use alignment, to which  
45 other traffic is not required to yield the right-of-way by law, is a vehicle.
- 46 **276.** Vibrotactile Pedestrian Device—an accessible pedestrian signal feature that communicates, by  
47 touch, information about pedestrian timing using a vibrating surface.
- 48 **277.** Visibility-Limited Signal Face or Visibility-Limited Signal Section—a type of signal face or  
49 signal section designed (or shielded, hooded, or louvered) to restrict the visibility of a signal  
50 indication from the side, to a certain lane or lanes, or to a certain distance from the stop line.
- 51 **278.** Walk Interval—an interval during which the WALKING PERSON (symbolizing WALK) signal  
52 indication is displayed.
- 53 **279.** Warning Beacon—a beacon used only to supplement an appropriate warning or regulatory sign  
54 or marker.

- 1 **280.** Warning Light—a portable, powered, yellow, lens-directed, enclosed light that is used in a  
2 temporary traffic control zone in either a steady burn or a flashing mode.
- 3 **281.** Warning Sign—a sign that gives notice to road users of a situation that might not be readily  
4 apparent.
- 5 **282.** Warrant—a warrant describes a threshold condition based upon average or normal conditions  
6 that, if found to be satisfied as part of an engineering study, shall result in analysis of other  
7 traffic conditions or factors to determine whether a traffic control device or other improvement  
8 is justified. Warrants are not a substitute for engineering judgment. The fact that a warrant  
9 for a particular traffic control device is met is not conclusive justification for the installation of  
10 the device.
- 11 ~~**254.** Wayside Equipment—the signals, switches, and/or control devices for railroad or light rail  
12 transit operations housed within one or more enclosures located along the railroad or light rail  
13 transit right-of-way and/or on railroad or light rail transit property.~~
- 14 **283.** Wayside Horn System—a stationary horn (or series of horns) located at a grade crossing that is  
15 used in conjunction with train-activated or light rail transit-activated warning systems to  
16 provide audible warning of approaching rail traffic to road users on the highway or pathway  
17 approaches to a grade crossing, either as a supplement or alternative to the sounding of a  
18 locomotive horn.
- 19 **284.** Worker—a person on foot whose duties place him or her within the right-of-way of a street,  
20 highway, or pathway, such as: ~~street, highway, or pathway~~ construction and maintenance  
21 forces; survey crews; utility crews; responders to incidents within the ~~street, highway, or~~  
22 ~~pathway~~ right-of-way; and law enforcement personnel when directing traffic, investigating  
23 crashes, and handling lane closures, obstructed roadways, and disasters within the right-of-way  
24 ~~of a street, highway, or pathway.~~
- 25 **285.** Wrong-Way Arrow—a slender, elongated, white pavement marking arrow placed upstream  
26 from the ramp terminus to indicate the correct direction of traffic flow. Wrong-way arrows are  
27 intended primarily to warn wrong-way road users that they are going in the wrong direction.
- 28 **286.** Yellow Change Interval—the first interval following the green or flashing arrow interval during  
29 which the steady yellow signal indication is displayed.
- 30 **287.** Yield Line—a row of solid white isosceles triangles pointing toward approaching  
31 vehicles extending across approach lanes to indicate the point at which the yield is  
32 intended or required to be made.

33 Section **1A.141C.03** Meanings of Acronyms and Abbreviations Used in this Manual

34 Standard:

35 The following acronyms and abbreviations, when used in this Manual, shall have the following  
36 meanings:

- 37 1. ADT—annual average daily traffic
- 38 2. AASHTO—American Association of State Highway and Transportation Officials
- 39 3. ADA—Americans with Disabilities Act
- 40 4. ADAAG—Americans with Disabilities Accessibility Guidelines
- 41 5. ADT—average daily traffic
- 42 6. AFAD—Automated Flagger Assistance Device
- 43 7. ANSI—American National Standards Institute
- 44 **8.** cd/lx/m<sup>2</sup>---candelas per lux per square meter
- 45 **9.** CFR—Code of Federal Regulations
- 46 **10.** CMS—changeable message sign
- 47 **11.** dBA—A-weighted decibels
- 48 ~~**11.** EPA—Environmental Protection Agency~~
- 49 12. ETC—electronic toll collection
- 50 13. EV—electric vehicle
- 51 14. FHWA—Federal Highway Administration
- 52 15. FRA—Federal Railroad Administration
- 53 **16.** ft --- foot or feet
- 54 **17.** FTA—Federal Transit Administration

- 1 **17. HOT—high-occupancy tolls**
- 2 **18. HOTM—FHWA’s Office of Transportation Management**
- 3 **19. HOTO—FHWA’s Office of Transportation Operations**
- 4 **18. HOV—high-occupancy vehicle**
- 5 **19. ILEV—inherently ~~low~~ low-emission vehicle**
- 6 **20. in---inch(es)**
- 7 **21. ISEA—International Safety Equipment Association**
- 8 **22. ITE—Institute of Transportation Engineers**
- 9 **23. ITS—intelligent transportation systems**
- 10 **24. LED—~~light~~ light-emitting diode**
- 11 **25. LP—liquid petroleum**
- 12 **26. LRT—light rail transit**
- 13 **27. mi --- mile(s)**
- 14 **28. MPH or mph—miles per hour**
- 15 **29. MUTCD—Manual on Uniform Traffic Control Devices [for Streets and Highways](#)**
- 16 **30. NCHRP—National Cooperative Highway Research Program**
- 17 **31. ORT—open-road tolling**
- 18 **~~32. PCMS—portable changeable message sign~~**
- 19 **32. PRT—perception-response time**
- 20 **33. RPM—raised pavement marker**
- 21 **~~35. RRPM—raised retroreflective pavement marker~~**
- 22 **34. RV—recreational vehicle**
- 23 **~~37. TDD—telecommunication devices for the deaf~~**
- 24 **35. TRB—Transportation Research Board**
- 25 **36. TTC—temporary traffic control**
- 26 **37. U.S.—United States**
- 27 **38. U.S.C.—United States Code**
- 28 **39. USDOT—United States Department of Transportation**
- 29 **40. UVC—Uniform Vehicle Code**
- 30 **41. VPH or vph—vehicles per hour**
- 31

1 **CHAPTER 1D. PROVISIONS APPLICABLE TO TRAFFIC CONTROL DEVICES IN GENERAL**

2 **Section 1A.02 1D.01 Purpose and Principles of Traffic Control Devices**

3 Support:

4 The purpose of traffic control devices, as well as the principles for their use, is to promote highway safety  
5 and efficiency by providing for the orderly movement of all reasonable and prudent road users on streets,  
6 highways, bikeways, and ~~private roads~~ site roadways open to public travel throughout the Nation. See Section  
7 1A.03 for additional information on target road users. **This paragraph moved from existing Section 1A.01**

8 This Manual contains the basic principles that govern the design and use of traffic control devices for all  
9 streets, highways, bikeways, and ~~private roads~~ site roadways open to public travel (see definition in Section  
10 ~~1A.13~~ 1C.02) regardless of type or class or the public agency, official, or owner having jurisdiction. This  
11 Manual’s text specifies the restriction on the use of a device if it is intended for limited application or for a  
12 specific system. It is important that these principles be given primary consideration in the selection and  
13 application of each device.

14 *Guidance:*

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

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

21 *Design, placement, operation, maintenance, and uniformity are aspects that should be carefully*  
22 *considered in order to maximize the ability of a traffic control device to ~~meet the five requirements~~ be*  
23 *consistent with the five principles listed in the ~~previous~~ preceding paragraph. Vehicle speed should be*  
24 *carefully considered as an element that governs the design, operation, placement, and location of various*  
25 *traffic control devices.*

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

28 **This paragraph relocated from later in this Section**

29 **Standard:**

30 All traffic control devices used on site roadways open to public travel shall have the same shape,  
31 color, and meaning as those required by the MUTCD for use on public highways, except as provided in  
32 Paragraph 5 of Section 1A.03. Sign size exceptions are noted in each Chapter as applicable.

33 Support:

34 ~~The definition of the word “speed” varies depending on its use. The definitions of specific speed terms~~  
35 ~~are contained in Section 1A.13.~~

36 *Guidance:*

37 ~~The actions required of road users to obey regulatory devices should be specified by State statute, or in~~  
38 ~~eases not covered by State statute, by local ordinance or resolution. Such statutes, ordinances, and~~  
39 ~~resolutions should be consistent with the “Uniform Vehicle Code” (see Section 1A.11).~~ **This paragraph**  
40 **moved to new Section 1A.06**

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

43 **This paragraph moved up from earlier in this Section**

44 Support:

45 ~~Uniformity of the meaning of traffic control devices is vital to their effectiveness. The meanings ascribed~~  
46 ~~to devices in this Manual are in general accord with the publications mentioned in Section 1A.05.~~ **The first**  
47 **sentence of this paragraph moved to new Section 1D.03, while the second sentence has been deleted.**

48 **Section 1D.02 Traffic Control Device Characteristics and Activities**

49 Support:

1 The characteristics and activities associated with traffic control devices are:

2 A. Meaning—The message the device is intended to convey and the expected road user response to the  
3 device.

4 B. Appearance—The general physical characteristics of a specific device as it appears to the road user.  
5 These characteristics include color, shape, legend, acoustical and tactile features, and the relative  
6 position and layout of individual elements.

7 C. Use (Application) —The process of making a decision to use a specific device at a specific location  
8 and the manner and criteria by which such a decision is made given the specific circumstances at that  
9 location.

10 D. Installation—The process of determining the proper position for a device and providing appropriate  
11 visibility for the device. Considerations related to installation include height, lateral distance (offset),  
12 longitudinal distance from a reference point, and distance from other devices. Installation also  
13 includes addressing the visibility/detection of a device. In addition to height, lateral distance, and  
14 longitudinal distance, visibility/detection incorporates size, conspicuity, and contrast with the  
15 environmental background. The physical activity of installing a device is not an activity for MUTCD  
16 content purposes.

17 E. Operation—The process of establishing how the physical characteristics of a device changes over a  
18 relatively short period of time to impact the movement of traffic. Most traffic control devices are  
19 static and do not have an operational aspect. However, some devices do operate (such as traffic  
20 control signals and changeable message signs). Operation does not include gradual deterioration over  
21 an extended period of time of physical characteristics due to aging, weathering, or other factors.

22 F. Maintenance—The process of monitoring the visibility, crashworthiness, operational, acoustical and  
23 tactile features of a device and its performance and taking appropriate actions so that that it will  
24 function in the intended manner throughout the life of the device and be replaced at the end of its  
25 useful life.

26 G. Removal—The process of determining when to remove a specific device from service.

### 27 **Section ~~1A.06~~ 1D.03 **Uniformity of Traffic Control Devices****

28 Support:

29 Uniformity of the meaning of traffic control devices is vital to their effectiveness. ~~The meanings ascribed~~  
30 ~~to devices in this Manual are in general accord with the publications mentioned in Section 1A.11. Uniformity~~  
31 ~~means treating similar situations in a similar way.~~ The first sentence of this paragraph moved from  
32 ~~existing Section 1A.02; third sentence moved from later in existing Section 1A.06~~

33 Uniformity of devices simplifies the task of the road user because it aids in recognition and understanding,  
34 thereby reducing perception/reaction time. Uniformity assists road users, law enforcement officers, and traffic  
35 courts by giving everyone the same interpretation. Uniformity assists public highway officials through  
36 efficiency in manufacture, installation, maintenance, and administration. ~~Uniformity means treating similar~~  
37 ~~situations in a similar way.~~ This sentence moved to earlier in this section

38 The use of uniform traffic control devices does not, in itself, constitute uniformity. A standard device  
39 used where it is not appropriate is as objectionable as a non-standard device; in fact, this might be worse,  
40 because such misuse might result in disrespect at those locations where the device is needed and appropriate.

### 41 **Section ~~1A.07~~ 1D.04 **Responsibility and Authority for Traffic Control Devices****

42 Standard:

43 **The responsibility for the design, placement, operation, maintenance, and uniformity of traffic**  
44 **control devices in compliance with the provisions of this Manual shall rest with the public agency or the**  
45 **official having jurisdiction, or, in the case of ~~private roads~~ site roadways or private toll roads open to**  
46 **public travel, with the private owner or private official having jurisdiction. ~~23 CFR 655.603 adopts the~~**  
47 **~~MUTCD as the national standard for all traffic control devices installed on any street, highway, bikeway, or~~**  
48 **~~private road open to public travel (see definition in Section 1A.13). When a State or other Federal agency~~**  
49 **~~manual or supplement is required, that manual or supplement shall be in substantial conformance with the~~**  
50 **~~National MUTCD.~~**

1 ~~23 CFR 655.603 also states that traffic control devices on all streets, highways, bikeways, and private~~  
2 ~~roads open to public travel in each State shall be in substantial conformance with standards issued or endorsed~~  
3 ~~by the Federal Highway Administrator. **This paragraph moved to new Section 1B.03**~~

4 **Support:**

5 The Introduction of this Manual contains information regarding the meaning of substantial conformance  
6 and the applicability of the MUTCD to private roads open to public travel.

7 The “Uniform Vehicle Code” (see Section 1A.11) has the following provision in Section 15-104 for the  
8 adoption of a uniform manual:

9 ~~“(a) The [State Highway Agency] shall adopt a manual and specification for a uniform system of~~  
10 ~~traffic control devices consistent with the provisions of this code for use upon highways within this~~  
11 ~~State. Such uniform system shall correlate with and so far as possible conform to the system set forth~~  
12 ~~in the most recent edition of the Manual on Uniform Traffic Control Devices for Streets and~~  
13 ~~Highways, and other standards issued or endorsed by the Federal Highway Administrator.”~~

14 ~~“(b) The Manual adopted pursuant to subsection (a) shall have the force and effect of law.”~~

15 **Paragraph deleted; all States have a law on adoption and have adopted the MUTCD; this is**  
16 **covered in new Section 1B.02**

17 ~~All States have officially adopted the National MUTCD either in its entirety, with supplemental~~  
18 ~~provisions, or as a separate published document. **This paragraph moved to new Section 1B.02**~~

19 **Guidance:**

20 ~~These individual State manuals or supplements should be reviewed for specific provisions relating to that~~  
21 ~~State. **This paragraph moved to new Section 1B.02**~~

22 **Support:**

23 The National MUTCD has also been adopted by the National Park Service, the U.S. Forest Service, the  
24 U.S. Military Command, the Bureau of Indian Affairs, the Bureau of Land Management, and the U.S. Fish  
25 and Wildlife Service. **This paragraph moved to new Section 1B.02**

26 **Guidance:**

27 ~~States should adopt Section 15-116 of the “Uniform Vehicle Code,” which states that, “No person shall~~  
28 ~~install or maintain in any area of private property used by the public any sign, signal, marking, or other~~  
29 ~~device intended to regulate, warn, or guide traffic unless it conforms with the State manual and specifications~~  
30 ~~adopted under Section 15-104.” **This paragraph deleted; duplicative of text in new Section 1B.01**~~

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

#### 32 **Standard:**

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

34 Traffic control devices, ~~advertisements~~, ~~public~~ announcements ~~or notices~~, and other signs or  
35 messages within the highway right-of-way shall be placed only as authorized by a public authority or  
36 the official having jurisdiction, or, in the case of ~~private roads~~ ~~site roadways~~ or ~~private toll roads~~ open to  
37 public travel, by the private owner or private official having jurisdiction, for the purpose of regulating,  
38 warning, or guiding traffic.

39 When the public agency or the official having jurisdiction over a street or highway or, in the case of  
40 private roads open to public travel, the private owner or private official having jurisdiction, has  
41 granted proper authority, others such as contractors and public utility companies shall be permitted to  
42 install temporary traffic control devices in temporary traffic control zones. Such traffic control devices  
43 shall ~~conform~~ comply with the ~~Standards~~ provisions of this Manual.

44 **Support:**

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

47 Although some highway design features, such as curbs, median barriers, guardrails, speed humps or  
48 tables, and textured pavement, have a significant impact on traffic operations and safety, they are not  
49 considered to be traffic control devices and provisions regarding their design and use are generally not  
50 included in this Manual.

1 Certain types of signs and other devices that do not have any traffic control purpose are sometimes placed  
2 within the highway right of way by or with the permission of the public agency or the official having  
3 jurisdiction over the street or highway. Most of these signs and other devices are not intended for use by road  
4 users in general, and their message is only important to individuals who have been instructed in their  
5 meanings. These signs and other devices are not considered to be traffic control devices and provisions  
6 regarding their design and use are not included in this Manual. Among these signs and other devices are the  
7 following:

- 8 A. ~~Devices whose purpose is to assist highway maintenance personnel. Examples include markers to~~  
9 ~~guide snowplow operators, devices that identify culvert and drop inlet locations, and devices that~~  
10 ~~precisely identify highway locations for maintenance or mowing purposes.~~
- 11 B. ~~Devices whose purpose is to assist fire or law enforcement personnel. Examples include markers that~~  
12 ~~identify fire hydrant locations, signs that identify fire or water district boundaries, speed measurement~~  
13 ~~pavement markings, small indicator lights to assist in enforcement of red light violations, and photo-~~  
14 ~~enforcement systems.~~
- 15 C. ~~Devices whose purpose is to assist utility company personnel and highway contractors, such as~~  
16 ~~markers that identify underground utility locations.~~
- 17 D. ~~Signs posting local non-traffic ordinances.~~
- 18 E. ~~Signs giving civic organization meeting information.~~ **This paragraph moved to new Section 1A.02**

19 **Standard:**

20 **Signs and other devices that do not have any traffic control purpose that are placed within the**  
21 **highway right-of-way shall not be located where they will interfere with, or detract from, traffic control**  
22 **devices.**

23 *Guidance:*

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

27 Support:

28 23 CFR 1.23(b) requires that the highway right-of-way be used exclusively for highway purposes.

29 States are encouraged to adopt, through policy or legislation, the provisions of 23 CFR 750.108 that  
30 restrict outdoor advertising from resembling traffic control devices.

31 **Section ~~1A.09~~ 1D.05 **Engineering Study and Engineering Judgment****

32 **Support:**

33 Definitions of ~~an~~ professional engineer, engineering study, and engineering judgment are contained in  
34 Section ~~1A.13~~ 1C.02.

35 The application of engineering study and engineering judgment is a fundamental tenet of the application  
36 of traffic control devices. It is for this reason that, in most cases, the selection of a particular device is not  
37 required by a Standard provision, but is determined by engineering study or engineering judgment. Many  
38 Standard provisions in this Manual specifically require, by explicit language in the individual provisions or by  
39 implication, the application of engineering study or engineering judgment in applying those Standards. Site-  
40 specific conditions might result in the determination that it is impossible or impracticable to comply with a  
41 Standard. In such a case, a deviation from the requirement of a particular Standard at that location might be  
42 the only possibility. In such limited, specific cases, the deviation is allowed, provided that the agency or  
43 official having jurisdiction fully document, through engineering study, the engineering basis for the deviation.

44 **Standard:**

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

47 *Guidance:*

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

1 and application of traffic control devices, as well as in the location and design of roads and streets that the  
2 devices complement.

3 Early in the processes of location and design of roads and streets, engineers should coordinate such  
4 location and design with the design and placement of the traffic control devices to be used with such roads  
5 and streets.

6 Jurisdictions, or owners of ~~private roads~~ site roadways or private toll roads open to public travel, with  
7 responsibility for traffic control that do not have engineers on their staffs who are trained and/or experienced  
8 in traffic control devices should seek engineering assistance from others, such as the State transportation  
9 agency, their county, a nearby large city, or a traffic engineering consultant.

10 Support: **Revisions to the following Support paragraphs are based on Official Ruling No. 1(09)-1(I)**

11 The provisions of this Manual are intended to be interpreted and applied by engineers or those under the  
12 supervision of an engineer. The construction of the provisions of this Manual, therefore, are informed by  
13 bases referenced in Paragraphs 8 and 9 of this Section.

14 The National Council of Examiners for Engineering and Surveying (NCEES) has defined the practice of  
15 engineering as “any service or creative work requiring engineering education, training, and experience in the  
16 application of engineering principles and the interpretation of engineering data to engineering activities that  
17 potentially impact the health, safety, and welfare of the public.” The practice of engineering is, therefore,  
18 subject to regulation in the public interest and is regulated by the State licensing boards in order to safeguard  
19 the health, safety, and welfare of the public. The NCEES has defined an engineer as “an individual who is  
20 qualified to practice engineering by reason of engineering education, training, and experience in the  
21 application of engineering principles and the interpretation of engineering data.”

22 The U. S. Office of Personnel Management (OPM) has defined the professional knowledge of engineering  
23 as “the comprehensive, in-depth knowledge of mathematical, physical, and engineering sciences applicable to  
24 a specialty field of engineering that characterizes a full 4-year engineering program leading to a bachelor's  
25 degree, or the equivalent.” The OPM has defined professional ability to apply engineering knowledge as “the  
26 ability to (a) apply fundamental and diversified professional engineering concepts, theories, and practices to  
27 achieve engineering objectives with versatility, judgment, and perception; (b) adapt and apply methods and  
28 techniques of related scientific disciplines; and (c) organize, analyze, interpret, and evaluate scientific data in  
29 the solution of engineering problems.”

30 ~~As part of the Federal aid Program, each State is required to have a Local Technical Assistance Program~~  
31 ~~(LTAP) and to provide technical assistance to local highway agencies.~~ Requisite technical training in the  
32 application of the principles of the MUTCD is available from the State’s Local Technical Assistance Program  
33 (LTAP) for needed engineering guidance and assistance. **First sentence deleted; not needed**

#### 34 **Section 1A.03 1D.06 Design of Traffic Control Devices**

35 *Guidance:*

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

41 *Option:*

42 ~~With the e~~ Exception of for symbols and colors, minor modifications in the specific design elements of a  
43 device may be made based on an engineering study or engineering judgment, in accordance with Paragraph 3  
44 of this Section, provided the essential appearance characteristics are preserved. **This paragraph moved from**  
45 **later in this Section**

46 *Guidance:*

47 *Aspects of a traffic control device’s standard design should not be modified ~~only if~~ unless there is a*  
48 *demonstrated need in unusual circumstances, based on an engineering study or engineering judgment.*

49 Support:

1 An example of modifying a device's design would be to modify the Combination Horizontal  
2 Alignment/Intersection (W1-10) sign to show intersecting side roads on both sides rather than on just one side  
3 of the major road within the curve.

4 **Standard:**

5 **Shapes that are exclusive to a particular sign (e.g., octagon for Stop, pennant for No Passing Zone,**  
6 **or circle for Railroad Advance) shall not be obscured by another sign mounted on the back of the same**  
7 **assembly.**

8 **Colors (see Section 1D.07) shall be consistent across the face of a sign or a sign panel. Color**  
9 **gradients (smooth or defined gradual transitions either within a color or transition to another color)**  
10 **shall not be allowed.**

11 **Section ~~1A.12~~ 1D.07 Color Code**

12 Support:

13 The following color code establishes general meanings for 11 colors of a total of 13 colors that have been  
14 identified as being appropriate for use in conveying traffic control information.

15 **Standard:**

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

17 **A. Black—regulation**

18 **B. Blue—road-user services guidance, tourist information, and evacuation route**

19 **C. Brown—recreational and cultural interest area guidance**

20 **D. Coral—unassigned (reserved for future designation)**

21 **E. Fluorescent Pink—incident management**

22 **F. Fluorescent Yellow-Green—pedestrian warning, bicycle warning, playground warning, school**  
23 **bus and school warning**

24 **G. Green—indicated movements or actions permitted, direction guidance**

25 **H. Light Blue—unassigned (reserved for future designation)**

26 **I. Orange—temporary traffic control**

27 **J. Purple—~~lanes~~ restricted to use only by vehicles with registered electronic toll collection (ETC)**  
28 **accounts**

29 **K. Red—stop or prohibition**

30 **L. White—regulation**

31 **M. Yellow—warning**

32 **These colors shall be used only as prescribed for the specific devices or applications throughout this**  
33 **Manual.**

34 **Support:**

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

39 **This paragraph moved from earlier in the Section**

40 Tolerance limits for each color are contained in 23 CFR Part 655, Appendix to Subpart F and are available  
41 at the Federal Highway Administration's MUTCD ~~web~~Web site at <http://mutcd.fhwa.dot.gov> or by writing to  
42 the FHWA, Office of Safety Research and Development (HRD-T-301), 6300 Georgetown Pike, McLean, VA  
43 22101. **This paragraph moved from earlier in this Section**

44 **Section 1D.08 Public Domain, Copyrights, and Patents**

45 **Standard:**

46 **Any ~~traffic~~ Traffic control device design or application provisions contained in this Manual shall ~~be~~**  
47 **considered to be in the public domain. Traffic control devices contained in this Manual shall not be**  
48 **protected by a patent, trademark, or copyright, except for the Interstate Shield, 511 Travel**  
49 **Information pictograph, and any items owned by FHWA. This paragraph moved from the existing**  
50 **Introduction.**

1 A traffic control device design or application shall not be eligible for official experimentation (see  
2 Section 1B.05) or interim approval (see Section 1B.07) unless it is in the public domain. Express  
3 abandonment of any and all forms of proprietary protection, such as patents, trademarks, or  
4 copyrights, related to the design and application of the traffic control device shall satisfy the  
5 requirement for the traffic control device to be in the public domain.

6 The requirement for the traffic control device to be in the public domain shall not apply to  
7 individual components used in the assembly or manufacture of the traffic control device.

8 Support:

9 The limitation on patented, trademarked, or copyrighted traffic control devices applies to the message that  
10 the device conveys to the road user. If a patent or other protection covers the device's communication to the  
11 road user by virtue of its appearance, audible message, or other aspects of the message conveyed (e.g., the  
12 order in which traffic control signal indications change from green to yellow and red), then the device is  
13 considered to be protected and not in the public domain. Such a device is precluded from inclusion in this  
14 Manual. The purpose of this limitation is to ensure uniformity of the messaging of individually approved  
15 traffic control devices. This limitation does not apply to other aspects of a device (e.g., internal controls,  
16 circuitry, electronics, mechanics, housing, etc.) so long as the appearance, audible message, or other aspects of  
17 the message conveyed, including the manner of conveyance, remain freely reproducible by all without  
18 infringing on any proprietary rights or interests. This Manual does not prohibit such other aspects of a traffic  
19 control device that meet the legal requirements from being protected through patent, trademark, or copyright;  
20 and does not restrict components, parts, manufacturing processes, or similar aspects of traffic control devices  
21 from being patented or otherwise protected.

22 Pictographs, as defined in Section ~~1A-13~~1C.02, are embedded in traffic control devices but the  
23 pictographs themselves are not considered traffic control devices for the purposes of Paragraph 4 of this  
24 Section.

25 Business identification logos, as defined in Section 1C.02, are embedded in traffic control devices but the  
26 pictographs themselves are not considered traffic control devices for the purposes of Paragraph 4 of this  
27 Section.

## 28 Section 1D.09 Advertising

29 **Standard:**

30 **Traffic control devices or their supports shall not bear any advertising message or any other**  
31 **message that is not related to traffic control. ~~This paragraph moved from existing Section 1A.01~~**

32 Support:

33 Tourist-oriented ~~d~~Directional signs, ~~and~~ Specific Service signs, and Acknowledgment signs are not  
34 considered advertising; rather, they are classified as motorist service signs. **~~This paragraph moved from~~**  
35 **~~existing Section 1A.01~~**

## 36 ~~Section 1A-15~~ 1D.10 Abbreviations Used on Traffic Control Devices

37 **Standard:**

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

### 40 **Table 1D-1. Acceptable Abbreviations**

41 **When the word messages shown in Table ~~1A-2~~1D-2 need to be abbreviated on a portable**  
42 **changeable message sign, the abbreviations shown in Table ~~1A-2~~1D-2 shall be used. Unless indicated by**  
43 **an asterisk, these abbreviations shall only be used on portable changeable message signs.**

### 44 **Table 1D-2. Abbreviations That Shall be Used Only on Portable Changeable Message Signs**

45 *Guidance:*

46 *The abbreviations for the words listed in Table ~~1A-2~~1D-2 that also show a prompt word should not be*  
47 *used on a portable changeable message sign (or a static sign if indicated in Table 1D-2 by an asterisk) unless*  
48 *the prompt word shown in Table ~~1A-2~~1D-2 either precedes or follows the abbreviation, as applicable.*

49 **Standard:**

1 The abbreviations shown in Table ~~1A-31D-3~~ shall not be used in connection with traffic control  
2 devices because of their potential to be misinterpreted by road users.

3 **Table 1D-3. Unacceptable Abbreviations**

4 *Guidance:*

5 If ~~multiple abbreviations are permitted in~~ Table ~~1A-11D-1~~ or ~~1A-21D-2~~ indicates that more than one  
6 abbreviation is permitted for a given word or phrase, the same abbreviation should be used throughout a  
7 single jurisdiction.

8 Except as otherwise provided in Table ~~1A-11D-1~~ or ~~1A-21D-2~~ or unless necessary to avoid confusion,  
9 periods, commas, apostrophes, question marks, ampersands, and other punctuation marks or characters that  
10 are not letters or numerals should not be used in any abbreviation.

11 **Section ~~1A-04~~ 1D.11 Placement and Operation of Traffic Control Devices**

12 **Standard:**

13 Before any new highway, ~~private road~~ site roadway open to public travel (see definition in Section  
14 ~~1A.131C.02~~), ~~paved detour~~, or temporary route is opened to public travel, all necessary ~~marking~~ traffic  
15 control devices ~~should~~ shall be in place. Relocated from existing Sections 3A.01 and 6B.01 and changed  
16 from Guidance to Standard

17 *Guidance:*

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

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

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

26 **Support:**

27 Section 2A.02 contains information on excessive use of signs and other considerations that can reduce  
28 their effectiveness and the effectiveness of other traffic control devices.

29 **Section ~~1A-05~~ 1D.12 Maintenance of Traffic Control Devices**

30 *Guidance:*

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

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

35 **Support:**

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

1 CHAPTER 2A. GENERAL

2 **Section 2A.01 Function and Purpose of Signs**

3 Support:

4 This Manual contains Standards, Guidance, and Options for the signing of all types of highways, and  
5 private roads open to public travel. The functions of signs are to provide regulations, warnings, and guidance  
6 information for road users. Words, symbols, and arrows are used to convey the messages. Signs are not  
7 typically used to confirm rules of the road ([see Paragraph 4 of this Section](#)).

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

9 Chapter 2B—Regulatory Signs, Barricades, and Gates

10 Chapter 2C—Warning Signs and Object Markers

11 Chapter 2D—Guide Signs for Conventional Roads

12 Chapter 2E—Guide Signs for Freeways and Expressways

13 Chapter 2F—Toll Road Signs

14 Chapter 2G—Preferential and Managed Lane Signs

15 Chapter 2H—General Information Signs

16 Chapter 2I—General Service Signs

17 Chapter 2J—Specific Service (~~Logo~~) Signs

18 Chapter 2K—Tourist-Oriented Directional Signs

19 Chapter 2L—Changeable Message Signs

20 Chapter 2M—Recreational and Cultural Interest Area Signs

21 Chapter 2N—Emergency Management Signs

22 Definitions and acronyms that are applicable to signs are given in ~~Sections 1A.13 and 1A.14~~[Chapter 1C](#).

23 **Moved from Section 2A.02**

24 **Standard:**

25 ~~Because the requirements and standards for signs depend on the particular type of highway upon~~  
26 ~~which they are to be used, the definitions for freeway, expressway, conventional road, and special~~  
27 ~~purpose road given in Section 1A.13 shall apply in Part 2.~~ **Deleted, repetitive and not necessary**

28 **Guidance:**

29 *Signs should not be used on a frequent basis to confirm rules of the road or statutes. Instead, when*  
30 *determined necessary to advise of new regulations as part of an educational campaign, temporary signs or*  
31 *messages should be used instead of permanent signs. These temporary signs or messages should be used*  
32 *sparingly and only at strategic locations, and should be considered only as a supporting element of a larger*  
33 *educational campaign rather than as the primary source of notification. If engineering judgment determines*  
34 *a need for a permanent sign to distinguish between differing requirements of similar statutes in different*  
35 *States or jurisdictions, then a sign should be located in the vicinity of the State or jurisdictional boundary,*  
36 *removed from warning, directional, and higher priority regulatory signs, so as not to contribute to sign clutter*  
37 *(see Section 2A.19).*

38 ~~Section 2A.02—Definitions~~ **Moved to Section 2A.01**

39 **Section ~~2A.03~~ 2A.02 Standardization of Application**

40 Support:

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

44 Low-volume [rural](#) roads typically include [access to rural residences](#), agricultural, recreational, resource  
45 management and development such as mining, ~~and~~ logging, and grazing, and local roads in rural areas. ~~At~~  
46 ~~some locations on~~ [On](#) low-volume [rural](#) roads, the use of traffic control devices ~~might be needed to provide~~  
47 ~~the road user limited, but essential, information regarding regulation, guidance, and warning is limited to~~  
48 [essential information regarding regulation, guidance and warning. On low-volume rural roads, it is important](#)  
49 [to consider the needs of unfamiliar road users for occasional, recreational, and commercial transportation](#)  
50 [purposes.](#) **Moved from existing Section 5A.01 and edited**

51 **Guidance:**

1 Signs should be used only where justified by engineering judgment or studies, as provided in Section  
2 1A.09.

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

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

7 **Standard:**

8 Each standard sign shall be displayed only for the specific purpose as prescribed in this Manual.  
9 ~~Determination of the particular signs to be applied to a specific condition shall be made in accordance~~  
10 ~~with the provisions set forth in Part 2.~~ Deleted, redundant and implied Before any new highway,  
11 private road open to public travel (see definition in Section 1A.13), detour, or temporary route is  
12 opened to public travel, all necessary signs shall be in place. Signs required by road conditions or  
13 restrictions shall be removed when those conditions cease to exist or the restrictions are withdrawn.

14 ~~Section 2A.04 Excessive Use of Signs~~ Moved to Section 2A.19

15 **Section 2A.05 2A.03 Classification of Signs**

16 **Standard:**

17 Signs shall be defined by their function as follows:

18 A. Regulatory signs give notice of traffic laws or regulations.

19 B. Warning signs give notice of a situation that might not be readily apparent.

20 C. Guide signs show route designations, destinations, directions, distances, services, points of  
21 interest, and other geographical, recreational, or cultural information.

22 Support:

23 [Barricades are defined in Section 2B.76.](#)

24 [Gates are defined in Section 2B.77.](#)

25 Object markers are defined in Section 2C.693.

26 **Section 2A.06 2A.04 Design of Signs**

27 Support:

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

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

32 Detailed drawings of standard signs, object markers, alphabets, symbols, and arrows (see Figure 2D-42)  
33 are shown in the “Standard Highway Signs and Markings” ~~book~~ [publication](#). Section 1A.05+1 contains  
34 information regarding how to obtain this publication.

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

37 A. High visibility by day and night; and

38 B. High legibility (adequately sized letters, symbols, or arrows, and a short legend for quick  
39 comprehension by a road user approaching a sign).

40 Standardized colors and shapes are specified so that the several classes of traffic signs can be promptly  
41 recognized. Simplicity and uniformity in design, position, and application are ~~important~~ [essential for a sign to](#)  
42 [be effective](#).

43 **Standard:**

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

46 Uniformity in design shall include shape, color, dimensions, legends, [letter style](#), borders, and  
47 illumination or retroreflectivity.

48 Standardization of these designs does not preclude further improvement by minor ~~changes-~~  
49 ~~in modifications to~~ the ~~proportion or~~ orientation of symbols ([see Section 2A.09](#)), width of borders, or  
50 layout of word messages, but all shapes and colors shall be as indicated.

1 All symbols (see Section 2A.09) shall be unmistakably similar to, or mirror images of, the adopted  
2 symbol signs, all of which are shown in the “Standard Highway Signs ~~and Markings~~” ~~book-publication~~  
3 (see Section 1A.0511). Symbols and colors shall not be modified unless otherwise provided in this  
4 Manual. All symbols, ~~and~~ colors, or other design features for signs not shown in the “Standard  
5 Highway Signs ~~and Markings~~” ~~book-publication~~ shall follow the procedures for experimentation and  
6 change described in ~~Section 1A.10~~ Chapter 1B.

7 ~~Option:~~

8 ~~Although the standard design of symbol signs cannot be modified, the orientation of the symbol may be~~  
9 ~~changed to better reflect the direction of travel, if appropriate.~~ **Modification of the orientation of symbols is**  
10 **provided in Section 2A.09**

11 ~~Standard:~~

12 Where a standard word message is applicable, the wording shall be as provided in this Manual.

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

15 Where a standard sign is a symbol legend, an alternative word legend shall not be allowed in place  
16 of the symbol, except as otherwise provided in this Manual.

17 Where a standard sign provided in this Manual or the “Standard Highway Signs” publication is  
18 applicable, an alternative legend sign or alternative sign design shall not be allowed in place of the  
19 standardized legend or design except as provided in this Manual.

20 Where a standard sign provided in this Manual or the “Standard Highway Signs” publication is  
21 applicable, but the legend is variable, such as for destination names, an alternative sign design or  
22 dimensions shall not be allowed in place of the standardized design for the non-variable elements except  
23 as provided in this Manual.

24 ~~Option:~~

25 State and local highway agencies may develop special word ~~message-legend~~ signs in situations where  
26 roadway conditions make it necessary to provide road users with additional regulatory, warning, or guidance  
27 information, such as when road users need to be notified of special regulations or warned about a situation that  
28 might not be readily apparent. Unlike colors that have not been assigned or symbols that have not been  
29 approved for signs, new word ~~message-legend~~ signs may be used without the need for experimentation.

30 ~~Support:~~

31 The message conveyed by some special word legend signs might be unclear to the road user. Although  
32 experimentation is not required for such word legends, they might still warrant an evaluation to determine  
33 comprehension or possible misinterpretation of the intended message by the road user.

34 ~~Standard:~~

35 ~~Except as~~ Unless otherwise provided in ~~Paragraph 16 and except for the Carpool Information (D12-~~  
36 ~~2) sign (see Section 2L11)~~ this Manual for a specific sign, and as provided in Option statement that  
37 follows, telephone numbers; Internet addresses; and e-mail addresses, including; domain names and;  
38 uniform resource locators (URL); metadata tags (“hash-tags”); quick-response (QR) codes; bar codes  
39 or other graphics for optical scanning for the purpose of obtaining information; shall not be displayed  
40 on any sign, supplemental plaque, sign panel (including logo sign panels on Specific Service signs), or  
41 changeable message sign.

42 ~~Guidance:~~

43 ~~Unless otherwise provided in this Manual for a specific sign, and except as provided in Paragraph 16,~~  
44 ~~telephone numbers of more than four characters should not be displayed on any sign, supplemental plaque,~~  
45 ~~sign panel (including logo sign panels on Specific Service signs), or changeable message sign.~~

46 ~~Option:~~

47 Internet addresses, e-mail addresses, ~~or~~ telephone numbers, quick-response (QR) codes, bar codes or other  
48 graphics for the purpose of obtaining information (other than those for maintenance or inventory purposes, see  
49 Paragraphs 20 and 21 of this Section) ~~with more than four characters~~ may be displayed on the face of signs,  
50 ~~supplemental~~ plaques, sign panels, and changeable message signs that are intended for viewing only by  
51 pedestrians, bicyclists, occupants of parked vehicles, ~~or drivers of vehicles on low speed roadways where~~  
52 ~~engineering judgment indicates that an area is available for drivers to stop out of the traffic flow to read the~~  
53 ~~message.~~ and are oriented away from and not visible to operators of motor vehicles.

1 **Standard:**

2 Pictographs (see definition in Section ~~1C.021A.13~~) shall not be displayed on signs except as  
3 specifically provided in this Manual. Pictographs shall be simple, dignified, and devoid of any  
4 advertising and not contain any quick-response (QR) codes, bar codes, or other graphics designed for  
5 optical scanning for the purpose of obtaining information. When used to represent a political  
6 jurisdiction (such as a State, county, or municipal corporation) the pictograph shall be the official  
7 designation adopted by the jurisdiction. When used to represent a college or university, the pictograph  
8 shall be the official seal adopted by the institution. Pictorial representations of university or college  
9 programs shall not be permitted to be displayed on a sign.

10 Business Identification sign panels (see definition in Section 1A.13) shall not be displayed on signs  
11 except as specifically provided in this Manual. Business Identification sign panels, including any logo  
12 displayed thereupon, shall not contain any quick-response (QR) codes, bar codes, or other graphics  
13 designed for optical scanning for the purpose of obtaining information.

14 No items other than official traffic control signs, inventory stickers or decals, sign installation dates,  
15 sign sizes, sign designations, anti-vandalism stickers, and ~~bar codes~~ inventory or maintenance codes  
16 shall be mounted on the back of ~~STOP or YIELD signs~~ a sign. **Moved from Section 2B.10 and edited**  
17 Option:

18 Date of fabrication, sign designation, sign size, and manufacturer name may be displayed on the front of a  
19 sign face in accordance with the provisions of Paragraph 22 of this Section.

20 **Standard:**

21 If displayed on the sign face, the date of fabrication, sign designation, sign size, and manufacturer  
22 name shall be completely within the border or inset along the bottom edge of the sign. The letter height  
23 shall not exceed 3/4 of the width of the border or inset or, if no border is used, shall not exceed 1 3/4 inches  
24 and shall be within 2 inches of the edge of the sign. The color of the lettering within the border shall be  
25 the same as the color of the sign background. The color of the lettering within the inset shall be the  
26 same as the color of the sign border. For changeable message signs or blank-out signs, such  
27 information, if displayed, shall be embossed in a non-contrasting color in the housing of the sign.

28 ~~Section 2A.07 Retroreflectivity and Illumination~~ **Moved to Section 2A.20**

29 **Section 2A.08 Maintaining Minimum Retroreflectivity** **Moved to Section 2A.21**

30 **Section ~~2A.09~~2A.05 Shapes**

31 **Standard:**

32 Particular shapes, as shown in Table ~~2A-42A-1~~, shall be used exclusively for specific signs or series  
33 of signs, unless otherwise provided ~~in the text discussion~~ in this Manual for a particular sign or class of  
34 signs.

35 **Table 2A-1. Use of Sign Shapes**

36 Guidance:

37 Where the lateral space available in which to install a diamond-shaped warning sign is constrained, such  
38 as mounting on a narrow median barrier or adjacent to a retaining wall, the following methods should be  
39 considered to maintain the diamond-shaped sign:

- 40 A. Angle the sign toward the roadway while still maintaining adequate legibility.  
41 B. Install the sign at a different location that still provides adequate advance warning, supplementing the  
42 sign with a Distance plaque (see Section 2C.61), if appropriate.  
43 C. Reduce the size of the sign at the advance warning location, but supplement it with a duplicate sign on  
44 the opposite side of the roadway (see Section 2A.11).  
45 D. In addition to either angling or reducing the size of the sign at the advance warning location,  
46 supplement with a duplicate warning sign and Distance plaque at an upstream location.  
47 E. Mount the sign asymmetrically on the sign support, such as when the support is mounted on a bridge  
48 parapet or railing, such that the edge of the sign does not overhang the roadway.  
49 F. Increase the mounting height of the sign to above the statutory maximum vehicle height for the tallest  
50 vehicle allowed on that roadway.

51 Option:

1 Where the methods described in Paragraph 2 of this Section are impracticable, the legend of the  
2 warning sign may be displayed in a vertically oriented rectangle.

3 **Standard:**

4 Other modifications to sign shapes, such as cutting off the left and right points of a diamond, shall  
5 not be allowed.

6 **Section ~~2A.102A.06~~ 2A.06 Sign Colors**

7 **Standard:**

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

11 Support:

12 ~~As a quick reference, c~~Common uses of sign colors are shown in Table ~~2A-52A-2~~. Color schemes on  
13 specific signs are shown in the illustrations located in each ~~appropriate applicable~~ Chapter.

14 Whenever white is specified in this Manual or in the “Standard Highway Signs ~~and Markings~~” ~~book-~~  
15 ~~publication~~ (see Section 1A.~~0511~~) as a color, it is understood to include silver-colored retroreflective coatings  
16 or elements that reflect white light.

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

19 Information regarding color coding of destinations on guide signs, including community wayfinding  
20 signs, is contained in Chapter 2D.

21 Option:

22 The approved fluorescent version of the standard red, yellow, green, or orange color may be used as an  
23 alternative to the corresponding standard color.

24 **Table 2A-2. Common Uses of Sign Colors**

25 **Section ~~2A.112A.07~~ 2A.07 Dimensions**

26 Support:

27 The “Standard Highway Signs ~~and Markings~~” ~~book-~~ ~~publication~~ (see Section 1A.~~0511~~) prescribes design  
28 details for ~~up to five~~ different sizes of each sign or plaque depending on the type of traffic facility, including  
29 bikeways. Smaller sizes are designed to be used on bikeways and some other off-road applications. Larger  
30 sizes are designed for use on freeways and expressways, and can also be used in oversized applications to  
31 enhance road user safety and convenience on other facilities, especially on multi-lane divided highways and  
32 on undivided highways having five or more lanes of traffic and/or high speeds. The intermediate sizes are  
33 designed to be used on other highway types. Minimum sizes of signs and plaques for specific applications are  
34 prescribed in the various sign size tables in each Chapter of this Manual.

35 **Standard:**

36 The sign dimensions prescribed in the sign size tables in the various Parts and Chapters in this  
37 Manual and in the “Standard Highway Signs ~~and Markings~~” ~~book-~~ ~~publication~~ (see Section 1A.~~0511~~)  
38 shall be used unless engineering judgment determines that other sizes are appropriate in accordance  
39 with the following. Except as provided in Paragraph 3 of this Section, where engineering judgment  
40 determines that sizes smaller than the prescribed dimensions are appropriate for use, the sign  
41 dimensions shall not be less than the minimum dimensions specified in this Manual. The sizes shown in  
42 the Minimum columns that are smaller than the sizes shown in the Conventional Road columns in the  
43 various sign size tables in this Manual shall only be used on low-speed roadways, alleys, ~~and private-~~  
44 ~~roads~~ site roadways open to public travel, and on low-volume rural roads with operating speeds of 30  
45 mph or less; and only where the reduced legend size would be adequate for the regulation or warning  
46 or where physical conditions preclude the use of larger sizes.

47 Option:

48 For alleys with restrictive physical conditions and vehicle ~~usage-~~ ~~use~~ that limits installation of the  
49 Minimum size sign (or the Conventional Road size sign if no Minimum size is shown), both the sign height  
50 and the sign width may be decreased by up to 6 inches.

51 *Guidance:*

1 The sizes shown in the Freeway and Expressway columns in the various sign size tables in this Manual  
2 should also be used ~~on freeways and expressways, and~~ for other higher-speed applications on conventional  
3 roads based upon engineering judgment, to provide larger signs for increased visibility and recognition.

4 The sizes shown in the Oversized columns in the various sign size tables in this Manual size should be  
5 used for those special applications where speed, volume, or other factors result in conditions where increased  
6 emphasis, improved recognition, or increased legibility is needed, as determined by engineering judgment or  
7 study.

8 Except as provided in first paragraph of Standard that follows Paragraph 7 of this Section, and where  
9 specifically prohibited in this Manual, increases above the minimum prescribed sizes should be used where  
10 greater legibility or emphasis is needed. If signs larger than the prescribed sizes are used, the overall sign  
11 dimensions should be increased in 6-inch increments.

12 **Standard:**

13 Where a maximum allowable sign size is prescribed, increases in sign size shall not be allowed.

14 Where engineering judgment determines that sizes that are different ~~than from the minimum~~  
15 prescribed dimensions are appropriate for use, standard shapes and colors shall be used. ~~and standard-~~  
16 Standard proportions shall be retained as much as practical/practicable.

17 *Guidance:*

18 Except where specifically prohibited in this Manual, ~~W~~hen supplemental plaques are installed with  
19 larger sized signs, a corresponding increase in the size of the plaque and its legend should also be made. The  
20 resulting plaque size should be approximately in the same relative proportion to the larger sized sign as the  
21 conventional sized plaque is to the conventional sized sign.

22 **Section ~~2A.13~~2A.08 Word Messages**

23 **Standard:**

24 Except as provided otherwise in this Manual, all word messages shall be aligned horizontally across  
25 a sign, reading left to right.

26 Except as provided in Section 2A.04, all word messages shall use standard wording ~~and letters~~ as  
27 shown in this Manual and in the “Standard Highway Signs ~~and Markings~~” ~~book~~ publication (see  
28 Section 1A.054).

29 All sign lettering, numerals, and other characters shall be ~~in upper-case letters of the Standard~~  
30 Alphabets as provided in the “Standard Highway Signs and Markings” ~~book~~ publication ~~(see Section~~  
31 ~~1A.11)~~, unless provided otherwise ~~provided~~ in this Manual ~~for a particular sign or type of message.~~

32 The sign lettering for names of places, streets, and highways shall be composed of a combination of  
33 lower-case letters with initial upper-case letters. The sign lettering for other legends shall be composed  
34 of upper-case letters, unless otherwise provided in this Manual for a particular sign or type of message.

35 Except as provided in Chapter 2E of this Manual, ~~W~~hen a mixed-case legend is used, the nominal  
36 loop height of the lower-case letters shall be 3/4 of the height of the initial upper-case letter.

37 The unique letter forms for each of the Standard Alphabet series shall not be stretched,  
38 compressed, warped, or otherwise manipulated. Moved from later in this section and edited

39 *Support:*

40 Section 2D.07 contains information regarding the acceptable methods of modifying the length of a word  
41 for a given letter height and series.

42 *Guidance:*

43 Word messages should be as brief as ~~possible~~ practical to convey a clear, simple meaning, and the  
44 lettering should be large enough to provide the necessary legibility distance. A minimum specific ratio of 1  
45 inch of letter height per 30 feet of legibility distance should be used.

46 Abbreviations (see Section ~~1A.15~~1D.10) should be kept to a minimum, except as otherwise prescribed in  
47 this Manual.

48 Word messages should not contain periods, apostrophes, question marks, ampersands, or other  
49 punctuation or characters that are not letters, numerals, or hyphens unless necessary to avoid confusion.

50 *Support:*

51 Diacritical marks on words or names that are adapted to English are not normally needed on signs for  
52 comprehension or navigational purposes.

1 Guidance:

2 *The solidus (~~slanted line or forward slash~~) is intended to be used for fractions only and should not be used*  
3 *to separate words on the same line of legend. Instead, a hyphen should be used for this purpose, such as*  
4 *“TRUCKS - BUSES.”*

5 **Standard:**

6 **Fractions shall be displayed with the numerator and denominator diagonally arranged about the**  
7 **solidus (~~slanted line or forward slash~~). The overall height of the fraction is measured from the top of**  
8 **the numerator to the bottom of the denominator, each of which is vertically aligned with the upper and**  
9 **lower ends of the solidus. The overall height of the fraction shall be determined by the height of the**  
10 **numerals within the fraction, and shall be 1.5 times the height of an individual numeral within the**  
11 **fraction.**

12 **Except as otherwise provided in this Manual, distances shall be displayed on signs using fractions of**  
13 **a mile rather than decimals.**

14 Support:

15 The “Standard Highway Signs ~~and Markings~~” book-publication (see Section 1A.0544) contains details  
16 regarding the layouts of fractions on signs.

17 *Guidance:*

18 *When initials are used to represent an abbreviation for separate words (such as “U S” for a United States*  
19 *route), the initials should be separated by a space of between 1/2 and 3/4 of the letter height of the initials.*

20 *When an Interstate route is displayed in text form instead of using the route shield, a hyphen should be*  
21 *used for clarity, such as “I-50.”*

22 **Standard:**

23 ~~All sign lettering shall be in upper-case letters as provided in the “Standard Highway Signs and~~  
24 ~~Markings” book (see Section 1A.11), unless otherwise provided in this Manual for a particular sign or~~  
25 ~~type of message.~~

26 ~~The sign lettering for names of places, streets, and highways shall be composed of a combination of~~  
27 ~~lower-case letters with initial upper-case letters. Moved earlier in this section~~

28 Support:

29 Letter height is expressed in terms of the height of an upper-case letter. For mixed-case legends (those  
30 composed of an initial upper-case letter followed by lower-case letters), the height of the lower-case letters is  
31 derived from the specified height of the initial upper-case letter based on a prescribed ratio. Letter heights for  
32 mixed-case legends might be expressed in terms of both the upper- and lower-case letters, or in terms of the  
33 initial upper-case letter alone. When the height of a lower-case letter is specified or determined from the  
34 prescribed ratio, the reference is to the nominal loop height of the letter. The term loop height refers to the  
35 portion of a lower-case letter that excludes any ascending or descending stems or tails of the letter, such as  
36 with the letters “d” or “q.” The nominal loop height is equal to the actual height of a non-rounded lower-case  
37 letter whose form does not include ascending or descending stems or tails, such as the letter “x.” The rounded  
38 portions of a lower-case letter extend slightly above and below the baselines projected from the top and  
39 bottom of such a non-rounded letter so that the appearance of a uniform letter height within a word is  
40 achieved. The actual loop height of a rounded lower-case letter is slightly greater than the nominal loop  
41 height and this additional height is excluded from the expression of the lower-case letter height.

42 **Standard:**

43 ~~When a mixed-case legend is used, the height of the lower-case letters shall be 3/4 of the height of~~  
44 ~~the initial upper-case letter.~~

45 ~~The unique letter forms for each of the Standard Alphabet series shall not be stretched,~~  
46 ~~compressed, warped, or otherwise manipulated.~~

47 Support:

48 ~~Section 2D.04 contains information regarding the acceptable methods of modifying the length of~~  
49 ~~a word for a given letter height and series. Moved earlier in this section~~

50 **Section 2A.122A.09 Symbols**

51 **Standard:**

1 Symbol designs shall in all cases be unmistakably similar to those shown in this Manual and in the  
2 “Standard Highway Signs ~~and Markings~~” ~~book~~ publication (see Section 1A.0511).

3 Support:

4 New symbol designs are adopted by the Federal Highway Administration based on research evaluations to  
5 determine road user comprehension, sign conspicuity, and sign legibility.

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

9 *Guidance:*

10 New standardized warning or regulatory symbol signs ~~not readily recognizable by the public~~ should be  
11 accompanied by an educational plaque where engineering judgment determines that the plaque will improve  
12 road user comprehension during the transition from word message to symbol signs.

13 Option:

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

15 State and/or local highway agencies may conduct research studies to determine road user comprehension,  
16 sign conspicuity, and sign legibility in compliance with the provisions for official experimentation when a  
17 new symbol design is under consideration (see Section 1A.10).

18 *Guidance:*

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

21 **Guidance to Option**

22 **Standard:**

23 A symbol used for a given category of signs (regulatory, warning, or guide) shall not be used for a  
24 different category of signs, except as specifically authorized in this Manual.

25 ~~Except as provided in Paragraph 11, a~~ A recreational and cultural interest area symbol (see  
26 Chapter 2M) shall not be used on streets or highways outside of recreational and cultural interest areas.

27 A recreational and cultural interest area guide sign symbol (see Chapter 2M) shall not be used on  
28 any regulatory or warning sign on any street, road, or highway.

29 *Option:*

30 ~~A recreational and cultural interest area guide sign symbol (see Section 2M.04) may be used on a highway~~  
31 ~~guide sign outside of a recreational and cultural interest area to supplement a comparable word message for~~  
32 ~~which there is no approved symbol for that message in Chapters 2B through 2I or 2N.~~

33 Support:

34 Section 2M.07 contains provisions for the use of recreational and cultural interest area symbols to indicate  
35 prohibited activities or items in non-road applications.

36 ~~Section 2A.13 Word Messages~~ **Moved to Section 2A.08**

37 ~~Section 2A.14~~ 2A.10 **Sign Borders**

38 **Standard:**

39 Unless otherwise provided, ~~each sign illustrated in this Manual~~ signs shall have a border of the same  
40 color as the legend in order to outline their distinctive shape and thereby give them easy recognition  
41 and a finished appearance, at or just inside the edge.

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

43 *Guidance:*

44 A dark border on a light background should be set in from the edge, while a light border on a dark  
45 background should extend to the edge of the sign. A border for 30-inch signs with a light background should  
46 be from 1/2 to 3/4 inch in width, 1/2 inch from the edge. For similar signs with a light border, a width of 1  
47 inch should be used. For other sizes, the border width should be of similar proportions, but should not exceed  
48 the stroke-width of the major lettering of the sign. On signs exceeding 72 x 120 inches in size, the border  
49 should be 2 inches wide. On unusually large signs with oversized letter heights, route shields, or other  
50 legend elements, the border should be 2-1/2 inches wide and should not exceed, ~~or on larger signs,~~ 3 inches

1 ~~wide~~ *in width*. Except for STOP signs and as otherwise provided in Section 2E.164, the corners of the sign  
2 should be rounded to a radius that is concentric with that of the border.

3 Support:

4 See Section 2A.20 regarding the use of light-emitting diode (LED) units within the border of a sign.

### 5 **Section 2A.152A.11 Enhanced Conspicuity for Standard Signs**

6 Option:

7 Based upon engineering judgment, where the improvement of the conspicuity of a standard regulatory,  
8 warning, or guide sign is desired, any of the following methods may be used, as appropriate, to enhance the  
9 sign's conspicuity (see Figure 2A-1):

- 10 A. Increasing the size of a standard regulatory, warning, or guide sign.
- 11 B. ~~Doubling up~~ Dual signing of a standard regulatory, warning, or guide sign by adding a second  
12 identical sign on the left-hand side of the roadway at the same location.
- 13 C. Adding a solid yellow or fluorescent yellow rectangular ~~"header panel"~~ above a standard regulatory  
14 sign, with the width of the panel corresponding to the width of the standard regulatory sign. A legend  
15 of "NOTICE," "STATE LAW," or other appropriate text may be added in black letters within the  
16 header panel for a period of time determined by engineering judgment.
- 17 D. Adding a NEW plaque (see Section 2C.602) above a new standard regulatory or warning sign, for a  
18 period of time determined by engineering judgment, but not to exceed six months, to call attention to  
19 the new sign.
- 20 E. Adding one or more red or orange flags (cloth or retroreflective sheeting) above a standard regulatory  
21 or warning sign, with the flags oriented ~~so as to be~~ at 45 degrees to the vertical.
- 22 F. Adding a solid yellow, a solid fluorescent yellow, or a diagonally striped black and yellow (or black  
23 and fluorescent yellow) strip of retroreflective sheeting at least 3 inches wide around the perimeter of  
24 a standard warning sign. This may be accomplished by affixing the standard warning sign on a  
25 background that is 6 inches larger than the size of the standard warning sign.
- 26 G. Adding a warning beacon (see Section 4L.034S.03) to a standard regulatory (other than a STOP, DO  
27 NOT ENTER, WRONG WAY, or a Speed Limit sign), warning, or guide sign.
- 28 H. Adding a speed limit sign beacon (see Section 4L.044S.04) to a standard Speed Limit sign.
- 29 I. Adding a stop beacon (see Section 4L.054S.05) to a STOP sign.
- 30 J. Adding a rectangular rapid-flashing beacon (see Chapter 4L) to a Pedestrian or School warning sign at  
31 an uncontrolled, midblock crosswalk.
- 32 ~~JK.~~ Adding ~~light-light~~ light-emitting diode (LED) units within the symbol ~~or~~, legend, or border of a ~~sign or~~  
33 ~~border of a~~ standard regulatory, warning, or guide sign, as provided in Section 2A.2007.
- 34 ~~KL.~~ Adding a strip of retroreflective material to the sign support in ~~compliance~~ accordance with the  
35 provisions of ~~Section 2A.21~~ Paragraph 4 of this Section.
- 36 ~~LM.~~ Using other methods that are specifically allowed for certain signs as described elsewhere in  
37 this Manual.

38 Support:

39 Sign conspicuity improvements can also be achieved by removing non-essential and illegal signs from the  
40 right-of-way (see Section 1D.041A.08), and by relocating signs to provide better spacing. Section 2A.19  
41 contains information on excessive use of signs.

42 **Standard:**

43 ~~The NEW plaque (see Section 2C.62) shall not be used alone.~~ Deleted; plaques by definition may  
44 not be used alone

45 **Strobe lights shall not be used to enhance the conspicuity of highway signs.**

46 **If a strip of retroreflective material is used on the sign support, it shall be at least 2 inches in width,**  
47 **it shall be placed for the full length of the support from the sign to within 2 feet above the edge of the**  
48 **roadway, and its color shall match the background color of the sign, except that the color of the strip**  
49 **for the YIELD and DO NOT ENTER signs shall be red. The retroreflective strip shall not display any**  
50 **legend or other information. Relocated from existing Section 2A.21**

51 For a post-mounted sign installation, placing a duplicate sign in the same assembly facing the same  
52 direction of traffic shall not be considered an acceptable method of enhancing conspicuity.

### 53 **Figure 2A-1. Examples of Enhanced Conspicuity for Signs**

1 **Section ~~2A.16~~2A.12 Standardization of Location**

2 Support:

3 Standardization of position cannot always be attained in practice. Examples of heights and lateral  
4 locations of signs for typical installations are illustrated in Figure 2A-2, and examples of locations for some  
5 typical signs at intersections are illustrated in Figures 2A-3 ~~and~~, 2A-4 and 2-5A and B.

6 Examples of advance signing on ~~an~~ intersection approaches are illustrated in Figures 2A-4 and 2A-5A and  
7 B. Chapters 2B, 2C, and 2D contain provisions regarding the application of regulatory, warning, and guide  
8 signs, respectively.

9 **Standard:**

10 **Signs requiring separate decisions by the road user shall be spaced sufficiently far apart for the**  
11 **appropriate decisions to be made. ~~One of the factors considered when determining the appropriate~~**  
12 **~~spacing shall be the posted or 85<sup>th</sup>-percentile speed. Changed to Guidance below~~**

13 *Guidance:*

14 *One of the factors considered when determining the appropriate spacing of signs should be the posted or*  
15 *85th-percentile speed. **Changed from Standard above***

16 *Except as provided in Paragraph 8 of this Section, Signs signs should be located on the right-hand side of*  
17 *the roadway where they are easily recognized and understood by road users. Signs in other locations should*  
18 *be considered only as supplementary to signs in the normal locations, except as otherwise provided in this*  
19 *Manual.*

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

- 21 A. *One sign supplements another;*
- 22 B. *Route or directional signs are grouped to clarify information to motorists;*
- 23 C. *Regulatory signs that do not conflict with each other are grouped, such as Turn Prohibition signs*  
24 *posted with ONE WAY signs or a parking regulation sign posted with a Speed Limit sign; or*
- 25 D. *Street Name signs are posted with a STOP or YIELD sign.*

26 *Signs should be located so that they:*

- 27 A. *Are outside the clear zone unless placed on a ~~breakaway or yielding~~ crashworthy support (see Section*  
28 *2A.15~~19~~),*
- 29 B. *Optimize nighttime visibility,*
- 30 C. *Minimize the effects of mud splatter and debris,*
- 31 D. *Do not obscure each other,*
- 32 E. *Do not obscure the sight distance to approaching vehicles on the major street for drivers who are*  
33 *stopped on minor-street approaches, and*
- 34 F. *Are not hidden from view.*

35 *Except for Stop, Yield, Do Not Enter, and Wrong Way signs, or as otherwise provided in this Manual,*  
36 *where a sign indicates an action by a road user in the left lane or at the left-hand side of a one-way road, such*  
37 *as Lane Ends Merge Right, the sign should be located on the left-hand side of the roadway. In the case of a*  
38 *divided road, the sign should be located in median if adequate width is available.*

39 Support:

40 *Signs located on the left-hand side of a one-way road or in the median of a divided road, in accordance*  
41 *with the Guidance above, may be supplemented by an identical sign located on the right-hand side of the road.*

42 The clear zone is the total roadside border area, starting at the edge of the traveled way, available for use  
43 by errant vehicles. The width of the clear zone is dependent upon traffic volumes, speeds, and roadside  
44 geometry. Additional information can be found in AASHTO’s “Roadside Design Guide” (see Section  
45 1A.05~~11~~).

46 *Guidance:*

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

49 Support:

50 An order of priority is especially critical where space is limited for sign installation and there is a demand  
51 for several different types of signs. Overloading road users with too much information is not desirable.  
52 *Primacy according type of sign will depend on the specific situation and conditions of the site at which the*  
53 *signs are to be installed. For example, in the vicinity of an exit ramp, guide signs and warning signs for the*

1 [exit ramp might take precedence over regulatory signs that confirm rules of the road, such as for passing or for](#)  
2 [the mainline speed limit where there is no change in the speed zone.](#)

3 *Guidance:*

4 *Because regulatory and warning information is [typically](#) more critical to the road user than guidance*  
5 *information, regulatory and warning signing whose locations ~~is~~ [are](#) critical should be displayed rather than*  
6 *guide signing in cases where conflicts occur. [In such cases, the guide sign should be relocated to another](#)*  
7 *[appropriate location where it will still be effective. In other cases, such as at a decision point, the guide sign](#)*  
8 *[should take precedence over other signs whose locations are not as critical to an immediate decision or action](#)*  
9 *[necessary by the road user. In all cases, careful attention should be given to minimizing sign clutter.](#)*

10 *Community wayfinding and acknowledgment guide signs should have a lower priority as to placement than*  
11 *other guide signs. Information of a less critical nature should be moved to less critical locations or omitted.*

12 *Option:*

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

16 *Guidance:*

17 *In urban areas where crosswalks exist, signs should not be placed within 4 feet in advance of the*  
18 *crosswalk (see Drawing D in Figure 2A-3).*

19 **Figure 2A-2. Examples of Heights and Lateral Locations of Sign Installations**

20 **Figure 2A-3. Examples of Locations for Some Typical Signs at Intersections**

21 **Figure 2A-4. Relative Locations of Regulatory, Warning, and Guide Signs on an Intersection**  
22 **Approach**

23 **Section ~~2A.17~~2A.13 Overhead Sign Installations**

24 *Guidance:*

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

27 *Support:*

28 The operational requirements of the present highway system are such that overhead signs have value at  
29 many locations. The factors to be considered for the installation of overhead sign displays are not definable in  
30 specific numerical terms. [In some cases, overhead mounting of a sign might be required by other provisions](#)  
31 [of this Manual.](#)

32 *Option:*

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

- 35 A. Traffic volume at or near capacity,
- 36 B. Complex interchange design,
- 37 C. Three or more lanes in each direction,
- 38 D. Restricted sight distance,
- 39 E. Closely-spaced interchanges,
- 40 F. Multi-lane exits,
- 41 G. Large percentage of trucks,
- 42 H. Street lighting background,
- 43 I. High-speed traffic,
- 44 J. Consistency of sign message location through a series of interchanges,
- 45 K. Insufficient space for post-mounted signs,
- 46 L. Junction of two freeways, and
- 47 M. [Left-side](#) exit ramps.

48 Over-crossing structures may be used to support overhead signs.

49 *Support:*

1 Under some circumstances, the use of over-crossing structures as sign supports might be the only  
2 practical solution that will provide adequate viewing distance. The use of such structures as sign supports  
3 might eliminate the need for the foundations and sign supports along the roadside.

#### 4 **Section ~~2A.18~~2A.14 Mounting Height**

##### 5 **Standard:**

6 The provisions of this Section shall apply unless specifically stated otherwise for a particular sign or  
7 object marker elsewhere in this Manual.

8 The minimum mounting heights prescribed in this Section or as provided otherwise in this Manual  
9 shall not supersede those necessary for crash performance of sign installations that are required to be  
10 crashworthy (see Paragraph 2 of Section 2A.15).

##### 11 Support:

12 ~~The mounting height requirements for object markers are provided in Chapter 2C.~~

13 In addition to the provisions of this Section, information affecting the minimum mounting height of signs  
14 as a function of crash performance can be found in AASHTO's "Roadside Design Guide" (see Section  
15 1A.0544).

##### 16 **Standard:**

17 The minimum height, measured vertically from the bottom of the sign to the elevation of the near  
18 edge of the pavement, of signs installed at the side of the road in rural areas shall be 5 feet (see Figure  
19 2A-2).

20 The minimum height, measured vertically from the bottom of the sign to the top of the curb, or in  
21 the absence of curb, measured vertically from the bottom of the sign to the elevation of the near edge of  
22 the traveled way, of signs installed at the side of the road in business, commercial, or residential areas  
23 where parking or pedestrian movements are likely to occur, or where the view of the sign might be  
24 obstructed, shall be 7 feet (see Figure 2A-2).

##### 25 Option:

26 The height to the bottom of a secondary sign mounted below another sign may be 1 foot less than the  
27 height specified in Paragraphs 4 and 5 of this Section.

##### 28 **Standard:**

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

31 If the bottom of a secondary sign that is mounted below another sign is mounted lower than 7 feet  
32 above a pedestrian sidewalk or pathway (see Section ~~6D.02~~6C.03), the secondary sign shall not project  
33 more than 4 inches into the pedestrian facility.

##### 34 Option:

35 Except as required in Paragraph 10 of this Section, signs that are placed 30 feet or more from the edge of  
36 the traveled way may be installed with a minimum height of 5 feet, measured vertically from the bottom of the  
37 sign to the elevation of the near edge of the pavement.

##### 38 **Standard:**

39 Directional signs on freeways and expressways shall be installed with a minimum height of 7 feet,  
40 measured vertically from the bottom of the sign to the elevation of the near edge of the pavement. All  
41 route signs, warning signs, and regulatory signs on freeways and expressways shall be installed with a  
42 minimum height of 7 feet, measured vertically from the bottom of the sign to the elevation of the near  
43 edge of the pavement. If a secondary sign is mounted below another sign on a freeway or expressway,  
44 the major sign shall be installed with a minimum height of 8 feet and the secondary sign shall be  
45 installed with a minimum height of 5 feet, measured vertically from the bottom of the sign to the  
46 elevation of the near edge of the pavement.

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

##### 49 Option:

50 A route sign assembly consisting of a route sign and auxiliary signs (see Section 2D.31) may be treated as  
51 a single sign for the purposes of this Section.

1 The mounting height may be adjusted when supports are located near the edge of the right-of-way on a  
2 steep backslope in order to avoid the sometimes less desirable alternative of placing the sign closer to the  
3 roadway.

4 **Standard:**

5 **Overhead signs shall provide a vertical clearance of not less than 17 feet to the sign, light fixture, or**  
6 **sign bridge over the entire width of the pavement and shoulders except where the structure on which**  
7 **the overhead signs are to be mounted or other structures along the roadway near the sign structure**  
8 **have a lesser vertical clearance.**

9 **Option:**

10 If the vertical clearance of other structures along the roadway near the sign structure is less than 16 feet,  
11 the vertical clearance to an overhead sign structure or support may be as low as 1 foot higher than the vertical  
12 clearance of the other structures in order to improve the visibility of the overhead signs.

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

15 **Reworded to be consistent with Option language**

16 Guidance:

17 While a maximum mounting height for signs is generally not prescribed in this Manual, agencies should  
18 ensure that signs are not mounted at such a height as to be out of the road user's normal field of vision (see  
19 Paragraph 2 of Section 1D.11), especially in urban settings where signs are mounted on traffic signal or light  
20 poles.

21 **Support:**

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

23 **Section ~~2A.19~~2A.15 Lateral Offset**

24 **Standard:**

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

29 **Post-mounted sign and object marker supports shall be crashworthy (~~breakaway, yielding, or~~**  
30 **~~shielded with a longitudinal barrier or crash cushion~~) if within the clear zone.**

31 Support:

32 Information on the FHWA's policy on crashworthiness of devices on the National Highway System and  
33 other roadways is available at the FHWA Office of Departure Web site at [https://safety.fhwa.dot.gov/](https://safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/policy_memo_guidance.cfm)  
34 [roadway\\_dept/countermeasures/reduce\\_crash\\_severity/policy\\_memo\\_guidance.cfm](https://safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/policy_memo_guidance.cfm).

35 Guidance:

36 *For post-mounted signs, the minimum lateral offset should be 12 feet from the edge of the traveled way. If*  
37 *a shoulder wider than 6 feet exists, the minimum lateral offset for post-mounted signs should be 6 feet from*  
38 *the edge of the shoulder.*

39 **Support:**

40 The minimum lateral offset requirements for object markers are provided in Chapter 2C.

41 The minimum lateral offset is intended to keep trucks and cars that use the shoulders from striking the  
42 signs or supports. The minimum lateral offset requirements do not supersede the requirement for  
43 crashworthiness (see Paragraph 2 of this Section) if the sign is located within the clear zone. **Added to**  
44 **further clarify the intent of minimum lateral offsets**

45 Guidance:

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

49 ~~Option:~~

50 ~~Where permitted, signs may be placed on existing supports used for other purposes, such as highway-~~  
51 ~~traffic signal supports, highway lighting supports, and utility poles.~~ **Moved to Section 2A.17**

1 **Standard:**

2 ~~If signs are placed on existing supports, they shall meet other placement criteria contained in this~~  
3 ~~Manual. Deleted, repetitive and not necessary~~

4 Option:

5 Lesser lateral offsets may be used on connecting roadways or ramps at interchanges, but not less than 6  
6 feet from the edge of the traveled way.

7 On conventional, low-volume rural, and special-purpose roads in areas where it is impractical to locate a  
8 sign with the lateral offset prescribed by this Section because of roadside features such as terrain or  
9 vegetation, a lateral offset of at least 2 feet may be used.

10 A lateral offset of at least 1 foot from the face of the curb may be used in business, commercial or  
11 residential areas where sidewalk width is limited or where existing poles are close to the curb.

12 *Guidance:*

13 *Overhead sign supports and post-mounted sign and object marker supports should not intrude into the*  
14 *usable width of a sidewalk or other pedestrian facility.*

15 Support:

16 Figures 2A-2 and 2A-3 illustrate some examples of the lateral offset requirements contained in this  
17 Section.

18 **Section ~~2A.20~~2A.16 Orientation**

19 *Guidance:*

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

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

26 Option:

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

29 **Section ~~2A.21~~2A.17 Posts and Mountings**

30 **Standard:**

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

33 Support:

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

37 Option:

38 Where permitted, signs may be placed on existing supports used for other purposes, such as highway  
39 traffic signal supports, highway lighting supports, and utility poles. Relocated from existing Section 2A.19

40  
41 Support:

42 See Section 2A.11 for criteria for enhanced conspicuity of standard signs.

43 See Section 2A.15 for lateral and height placement criteria for signs placed on existing supports.

44 ~~Option:~~

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

47 **Standard:**

48 ~~If a strip of retroreflective material is used on the sign support, it shall be at least 2 inches in width,~~  
49 ~~it shall be placed for the full length of the support from the sign to within 2 feet above the edge of the~~

1 ~~roadway, and its color shall match the background color of the sign, except that the color of the strip~~  
2 ~~for the YIELD and DO NOT ENTER signs shall be red.~~ **Relocated to new Section 2A.11**

3 **Standard:**

4 If mounted to the sign support, equipment for powering electronic components of a sign, including  
5 solar panels, shall be mounted so as not to compromise the crashworthy performance of the sign  
6 installation (see Section 2A.15). Such equipment shall be mounted either below or behind the sign so as  
7 not to detract from or obscure the face of the sign, either directly or by casting shadows onto the sign,  
8 and so as not to obscure the shape of the sign.

9 **Section ~~2A.222~~2A.18 Maintenance**

10 *Guidance:*

11 *Maintenance activities should consider proper position, cleanliness, legibility, and daytime and nighttime*  
12 *visibility (see Section 2A.~~0821~~).* *Damaged or deteriorated signs, gates, or object markers should be replaced.*

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

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

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

20 **Section ~~2A.04~~2A.19 Excessive Use of Signs**

21 *Guidance:*

22 Signs should be used and located judiciously, minimizing their proliferation in order to maintain their  
23 effectiveness. Regulatory and warning signs should be used conservatively because these signs, if used to  
24 excess, tend to lose their effectiveness. ~~If used,~~ Route signs and directional guide signs for primary routes  
25 and destinations should be used frequently at strategic locations because their use promotes efficient  
26 operations by keeping road users informed of their location. In all cases, however, sign clutter (see  
27 Paragraph 2 of this Section) should be avoided and minimized as much as practicable.

28 **Support:**

29 Sign clutter is the proliferation of sign installations or assemblies along the roadway or roadside, either  
30 separately or grouped, to such an extent that adequate spacing between installations necessary for orderly  
31 processing of the sign messages by the driver cannot be achieved. Sign clutter can reduce the effectiveness of  
32 one or more signs in a sequence of signs.

33 Vanity signs display information that is of little value or interest to the majority or significant number of  
34 road users. Vanity signs often take the form of General Information signs, but provide no navigational  
35 guidance or orientation to the road user. Vanity signs are usually of importance only to the entity requesting  
36 the sign. Vanity signs can result in sign clutter and undermine the basic role of official traffic control devices  
37 in providing only as much information to the road user as necessary to promote the safe and efficient  
38 operation of streets and highways.

39 *Guidance:*

40 Signs and other traffic control devices should be installed and maintained from a systematic standpoint  
41 rather than individually. When a new sign is installed, the existing signs in the vicinity should be considered  
42 for replacement, relocation, or removal as a result of the new sign that is installed. Existing systems of signs  
43 should be reviewed periodically for evidence of sign clutter and adjustments should be made accordingly.

44 **Section ~~2A.072~~2A.20 RetroreflectivityRetroreflection and Illumination**

45 **Support:**

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

50 Paragraphs 3 through 7 of this Section regarding illumination apply to nighttime visibility of signs whose  
51 legends are otherwise visible under daytime viewing conditions without illumination. Paragraphs 8 through

1 20 of this Section regarding illumination apply to the use of illuminated elements that supplement a sign  
2 legend to enhance conspicuity of the sign. Changeable message or blank-out signs whose legends change or  
3 extinguish by means of illuminated elements are addressed elsewhere in this Manual.

4 **Standard:**

5 Regulatory, warning, and guide signs, and object markers, shall be retroreflective (see Section  
6 2A.08) or illuminated to show the same shape and similar color by both day and night, unless otherwise  
7 provided ~~in the text discussion~~ in this Manual for a particular sign or group of signs.

8 Where the color black is specified for the legend or background of a sign, an opaque or non-  
9 retroreflective material shall be used.

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

12 **Option:**

13 Sign elements may be illuminated by the means shown in Table ~~2A-1~~2A-3.

14 Retroreflection of sign elements may be accomplished by the means shown in Table ~~2A-2~~2A-4.

15 Light ~~Emitting emitting Diode diode~~ (LED) units may be used individually within the ~~border~~ or legend  
16 ~~or symbol~~ of a sign to enhance the sign conspicuity and legibility (see Section 2A.11) ~~and in the border of a~~  
17 ~~sign, except for changeable message signs, to improve the conspicuity, increase the legibility of sign legends~~  
18 ~~and borders, or provide a changeable message.~~

19 Except as provided in Paragraph 17 of this Section, LED units may either operate continuously or be  
20 actuated.

21 **Support:**

22 The application of LED units in compliance with Paragraph 14 of this Section does not create a  
23 changeable message sign because the legend of the sign is always displayed when the LED units are not  
24 illuminated.

25 LED units that are used to illuminate the full sign display, background, and legend, are changeable  
26 message signs (CMS), which are covered in Chapters 2B, 2C, and 2L, and Part 7.

27 **Standard:**

28 Where LED units are used to enhance conspicuity of a sign (see Paragraph 8 of this Section), the  
29 sign shall otherwise comply with the requirements for retroreflection and illumination for nighttime  
30 viewing.

31 Except as provided in Paragraphs ~~11~~20 and ~~12~~21 of this Section, and for changeable message signs,  
32 neither individual LEDs nor groups of LEDs shall be placed within the background area of a sign.

33 The application of LEDs to display sign legends or symbols shall use a maximum pitch of 20 mm to  
34 cover the stroke width of the letter or symbol.

35 If used, the LEDs shall have a maximum diameter of 1/4 inch and shall be the following colors  
36 based on the type of sign:

- 37 A. White or red, ~~if used with STOP or YIELD~~ with STOP, YIELD, DO NOT ENTER, or WRONG  
38 WAY signs.  
39 B. White, ~~if used with other regulatory signs other than STOP or YIELD signs.~~  
40 C. White or yellow, ~~if used~~ with warning signs.  
41 D. White or green, ~~if used~~ with guide signs.  
42 E. White, yellow, or orange, ~~if used~~ with temporary traffic control signs.  
43 F. White or yellow, ~~if used~~ with school area or pedestrian or bicycle warning signs.

44 If flashed, all LED units shall flash simultaneously at any steady rate between 50 and 60 times per  
45 minute. All the LED units in a sign legend or border shall be illuminated simultaneously with no  
46 sequential (chasing) or variable flash rates. A cluster of LEDs shall not be used within the border of a  
47 sign.

48 Where used in STOP or YIELD signs, flashing LED units shall operate continuously. Actuation of  
49 the LED units shall not be allowed.

50 Where LED units are used along the edge of a sign, at least one LED unit shall be placed along each  
51 edge of the sign, in addition to one LED unit at each corner of the sign, so that the distinct outline of the  
52 sign shape is recognized under nighttime viewing conditions. The LED units along each side of the sign

1 shall be spaced approximately equidistantly. For a circular sign shape, the number of LED units shall  
2 clearly form the appearance of a circle and not be perceived as some other shape.

3 The uniformity of the sign design shall be maintained without any decrease in visibility, legibility, or  
4 driver comprehension during either daytime or nighttime conditions. The LED units shall have the  
5 capability to be dimmed automatically by a timing mechanism or a device sensitive to ambient light  
6 (photoelectric cell) such that the LEDs do not reduce the visibility of the sign legend .

7 Option:

8 For STOP ~~and~~, YIELD, DO NOT ENTER, and WRONG WAY signs, LEDs may be placed within the  
9 border or within one border width within the background of the sign.

10 ~~For STOP/SLOW paddles (see Section 6E.03) used by flaggers and the STOP paddles (see Section~~  
11 ~~7D.05) used by adult crossing guards, individual LEDs or groups of LEDs may be used.~~ **Revised and**  
12 **changed to Support below**

13 Support:

14 For STOP/SLOW paddles used by flaggers, see Section 6D.02. For STOP paddles used by adult crossing  
15 guards, see Section 7D.02. **Revised and changed from Option above**

16 Other methods of enhancing the conspicuity of standard signs are described in Section 2A.11~~15~~.

17 Information regarding the use of retroreflective material on the sign support is contained in Section  
18 2A.2~~11~~.

### 19 **Table 2A-3. Illumination of Sign Elements**

### 20 **Table 2A-4. Retroreflection of Sign Elements**

## 21 **Section ~~2A.08~~2A.21 Maintaining Minimum Retroreflectivity**

22 Support:

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

25 **Standard:**

26 **Public agencies or officials having jurisdiction shall use an assessment or management method that**  
27 **is designed to maintain sign retroreflectivity at or above the minimum levels in Table ~~2A-3~~2A-5.**

28 Support:

29 Compliance with the Standard in Paragraph 2 of this Section is achieved by having a method in place and  
30 using the method to maintain the minimum levels established in Table ~~2A-3~~2A-5. Provided that an  
31 assessment or management method is being used, an agency or official having jurisdiction would be in  
32 compliance with the Standard in Paragraph 2 of this Section even if there are some individual signs that do not  
33 meet the minimum retroreflectivity levels at a particular point in time.

34 *Guidance:*

35 *Except for those signs specifically identified in Paragraph ~~6-5~~ of this Section, one or more of the following*  
36 *assessment or management methods described in “Maintaining Traffic Sign Retroreflectivity” (see Section*  
37 *1A.05) or a method developed based on an engineering study should be used to maintain sign retroreflectivity*  
38 *at or above the minimum levels in Table 2A-5. Signs that are below the minimum levels should be replaced.*

39 *A. Visual Nighttime Inspection—The retroreflectivity of an existing sign is assessed by a trained sign*  
40 *inspector conducting a visual inspection from a moving vehicle during nighttime conditions. Signs*  
41 *that are visually identified by the inspector to have retroreflectivity below the minimum levels should*  
42 *be replaced.*

43 *B. Measured Sign Retroreflectivity—Sign retroreflectivity is measured using a retroreflectometer. Signs*  
44 *with retroreflectivity below the minimum levels should be replaced.*

45 *C. Expected Sign Life—When signs are installed, the installation date is labeled or recorded so that the*  
46 *age of a sign is known. The age of the sign is compared to the expected sign life. The expected sign*  
47 *life is based on the experience of sign retroreflectivity degradation in a geographic area compared to*  
48 *the minimum levels. Signs older than the expected life should be replaced.*

49 *D. Blanket Replacement—All signs in an area/corridor, or of a given type, should be replaced at*  
50 *specified intervals. This eliminates the need to assess retroreflectivity or track the life of individual*

1 ~~signs. The replacement interval is based on the expected sign life, compared to the minimum levels,~~  
2 ~~for the shortest life material used on the affected signs.~~

3 ~~E. Control Signs—Replacement of signs in the field is based on the performance of a sample of control~~  
4 ~~signs. The control signs might be a small sample located in a maintenance yard or a sample of signs~~  
5 ~~in the field. The control signs are monitored to determine the end of retroreflective life for the~~  
6 ~~associated signs. All field signs represented by the control sample should be replaced before the~~  
7 ~~retroreflectivity levels of the control sample reach the minimum levels.~~

8 ~~F. Other Methods—Other methods developed based on engineering studies can be used.~~

9 **Support:**

10 Additional information about these methods is contained in the 2007 Edition of FHWA’s “Maintaining  
11 Traffic Sign Retroreflectivity” (see Section 1A.11): **Incorporated into preceding Guidance**

12 **Option:**

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

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

20 **Table 2A-5. Minimum Maintained Retroreflectivity Levels**

21 **Section ~~2A.23~~2A.22 Median Opening Treatments for Divided Highways with Wide Medians**

22 **Guidance:**

23 ~~Where divided highways are separated by median widths at the median opening itself of 30 feet or more,~~  
24 ~~median openings should be signed as two separate intersections.~~

25 A divided highway crossing should be signed and marked as separate intersections when both of the  
26 following conditions are present:

- 27 A. The paths of opposing left turns from the divided highway cross each other (see Figure 2A-5) and
- 28 B. There is adequate storage in the interior approaches for the design vehicles expected to cross the  
29 divided highway.

30 If either one or both of the conditions in Paragraph 1 of this Section do not exist, the divided highway  
31 crossing should be signed and marked as a single intersection.

32 At the crossing of two divided highways, engineering judgment should be used to determine the number of  
33 separate intersections.

34 **Support:**

35 Divided highway crossings with median widths between 30 feet and 85 feet might function as either one  
36 or two intersections depending upon the interaction of the opposing left-turn vehicle paths and the available  
37 interior storage in the median for a crossing vehicle. Other factors that could determine whether a divided  
38 highway crossing is operating as one or two intersections include:

- 39 A. the geometric design of the divided highway crossing,
- 40 B. the use of positive offset mainline left turn lanes,
- 41 C. the length of the median opening (as measured parallel to the centerline of the divided highway),
- 42 D. the geometric design of the median noses,
- 43 E. other roadway geometric considerations such as a skewed side street approach or a variable median  
44 width,
- 45 F. intersection sight distance,
- 46 G. the physical characteristics of the design vehicle, and
- 47 H. the observed prevailing driver behavior with regard to opposing left turn path interaction.

48 **Figure 2A-5. Types of Left Turn Paths at a Divided Highway Crossing**

1 **CHAPTER 2B. REGULATORY SIGNS, BARRICADES, AND GATES**

2  
3 **Chapter 2B Subchapter and Section Organization**

4  
5 **General**

- 6 [2B.01 Application of Regulatory Signs](#)  
7 [2B.02 Design of Regulatory Signs](#)  
8 [2B.03 Size of Regulatory Signs](#)  
9 [2B.04 STOP Sign \(R1-1\) and ALL-WAY Plaque \(R1-3P\)](#)  
10 [2B.05 YIELD Sign \(R1-2\)](#)

11 **Signing for Right-Of-Way at Intersections**

- 12 [2B.06 General Considerations](#)  
13 [2B.07 Determining the Minor Road for Unsignalized Intersections](#)  
14 [2B.08 Right-of-Way Intersection Control Considerations](#)  
15 [2B.09 No Intersection Control](#)  
16 [2B.10 Yield Control](#)  
17 [2B.11 Minor Road Stop Control](#)  
18 [2B.12 All-Way Stop Control](#)  
19 [2B.13 All-Way Stop Control Warrant A: Crash Experience](#)  
20 [2B.14 All-Way Stop Control Warrant B: Sight Distance](#)  
21 [2B.15 All-Way Stop Control Warrant C: Transition to Signal Control or YIELD Control at a](#)  
22 [Roundabout](#)  
23 [2B.16 All-Way Stop Control Warrant D: 8-Hour Volume \(Vehicle, Pedestrians, Bicycles\)](#)  
24 [2B.17 All-Way Stop Control Warrant E: Other Factors](#)  
25 [2B.18 STOP Sign or YIELD Sign Placement](#)  
26 [2B.19 Yield Here to Pedestrians Signs and Stop Here for Pedestrians Signs \(R1-5 Series\)](#)  
27 [2B.20 In-Street and Overhead Pedestrian and Trail Crossing Signs \(R1-6 and R1-9 Series\)](#)

28 **Speed Limit Signs and Plaques**

- 29 [2B.21 Speed Limit Sign \(R2-1\)](#)  
30 [2B.22 Vehicle Speed Limit Plaques \(R2-2P Series\)](#)  
31 [2B.23 Night Speed Limit Plaque \(R2-3P\)](#)  
32 [2B.24 Minimum Speed Limit Plaque \(R2-4P\) and Combined Maximum and Minimum Speed Limits](#)  
33 [\(R2-4a\) Sign](#)  
34 [2B.25 Higher Fines Signs and Plaque \(R2-6P, R2-10, and R2-11\)](#)

35 **Movement and Lane Control Signs**

- 36 [2B.26 Movement Prohibition Signs \(R3-1 through R3-4, R3-18, and R3-27\)](#)  
37 [2B.27 Intersection Lane Control Signs \(R3-5 through R3-8\)](#)  
38 [2B.28 Mandatory Movement Lane Control Signs \(R3-5, R3-5a, R3-7, R3-19 Series, and R3-20\)](#)  
39 [2B.29 Optional Movement Lane Control Sign \(R3-6 Series\)](#)  
40 [2B.30 Advance Intersection Lane Control Signs \(R3-8 Series\)](#)  
41 [2B.31 RIGHT \(LEFT\) LANE MUST EXIT Signs \(R3-33, R3-33a\)](#)  
42 [2B.32 Two-Way Left Turn Only Signs \(R3-9a, R3-9b\)](#)  
43 [2B.33 BEGIN and END Plaques \(R3-9cP, R3-9dP\)](#)  
44 [2B.34 Reversible Lane Control Signs \(R3-9e through R3-9i\)](#)  
45 [2B.35 Jughandle Signs \(R3-23, R3-24, R3-25, and R3-26 Series\)](#)

46 **Passing, Keep Right and Slow Traffic Signs**

- 47 [2B.36 DO NOT PASS Sign \(R4-1\)](#)  
48 [2B.37 PASS WITH CARE Sign \(R4-2\)](#)  
49 [2B.38 KEEP RIGHT EXCEPT TO PASS Sign \(R4-16\) and SLOWER TRAFFIC KEEP RIGHT](#)  
50 [Sign \(R4-3\)](#)  
51 [2B.39 TRUCKS USE RIGHT LANE Sign \(R4-5\)](#)  
52 [2B.40 Keep Right and Keep Left Signs \(R4-7 Series, R4-8 Series\)](#)  
53 [2B.41 STAY IN LANE Sign \(R4-9\)](#)  
54 [2B.42 RUNAWAY VEHICLES ONLY Sign \(R4-10\)](#)

1	<a href="#"><u>2B.43</u></a>	<a href="#"><u>Slow Vehicle Turn-Out Signs (R4-12, R4-13, and R4-14)</u></a>
2	<a href="#"><u>2B.44</u></a>	<a href="#"><u>DO NOT DRIVE ON SHOULDER Sign (R4-17) and DO NOT PASS ON SHOULDER Sign</u></a>
3		<a href="#"><u>(R4-18)</u></a>
4	<a href="#"><u>2B.45</u></a>	<a href="#"><u>ALL TRAFFIC Sign (R4-20) and RIGHT (LEFT) TURN ONLY Sign (R4-21)</u></a>
5	<a href="#"><u>Selective Exclusion Signs</u></a>	
6	<a href="#"><u>2B.46</u></a>	<a href="#"><u>Selective Exclusion Signs</u></a>
7	<a href="#"><u>DO NOT ENTER, WRONG WAY, ONE-WAY and Related Signs and Plaques</u></a>	
8	<a href="#"><u>2B.47</u></a>	<a href="#"><u>DO NOT ENTER Sign (R5-1)</u></a>
9	<a href="#"><u>2B.48</u></a>	<a href="#"><u>WRONG WAY Sign (R5-1a)</u></a>
10	<a href="#"><u>2B.49</u></a>	<a href="#"><u>Wrong-Way Traffic Control at Interchange Ramps</u></a>
11	<a href="#"><u>2B.50</u></a>	<a href="#"><u>ONE WAY Signs (R6-1, R6-2)</u></a>
12	<a href="#"><u>2B.51</u></a>	<a href="#"><u>Divided Highway Crossing Signs (R6-3, R6-3a)</u></a>
13	<a href="#"><u>2B.52</u></a>	<a href="#"><u>Roundabout Circulation Plaque (R6-5P)</u></a>
14	<a href="#"><u>Parking, Standing, Stopping and Emergency Signs</u></a>	
15	<a href="#"><u>2B.53</u></a>	<a href="#"><u>Parking, Standing, and Stopping Signs (R7 and R8 Series)</u></a>
16	<a href="#"><u>2B.54</u></a>	<a href="#"><u>Design of Parking, Standing, and Stopping Signs</u></a>
17	<a href="#"><u>2B.55</u></a>	<a href="#"><u>Placement of Parking, Stopping, and Standing Signs</u></a>
18	<a href="#"><u>2B.56</u></a>	<a href="#"><u>Emergency Restriction Signs (R8-4, R8-7, R8-8)</u></a>
19	<a href="#"><u>Pedestrian Signs</u></a>	
20	<a href="#"><u>2B.57</u></a>	<a href="#"><u>WALK ON LEFT FACING TRAFFIC and No Hitchhiking Signs (R9-1, R9-4, R9-4a)</u></a>
21	<a href="#"><u>2B.58</u></a>	<a href="#"><u>Pedestrian Crossing Signs (R9-2, R9-3)</u></a>
22	<a href="#"><u>2B.59</u></a>	<a href="#"><u>Traffic Signal Pedestrian and Bicycle Actuation Signs (R10-1 through R10-4, and R10-24</u></a>
23		<a href="#"><u>through R10-26)</u></a>
24	<a href="#"><u>Traffic Signal Signs</u></a>	
25	<a href="#"><u>2B.60</u></a>	<a href="#"><u>Traffic Signal Signs (R10-5 through R10-30)</u></a>
26	<a href="#"><u>2B.61</u></a>	<a href="#"><u>No Turn on Red Signs (R10-11 Series, R10-17a, and R10-30)</u></a>
27	<a href="#"><u>2B.62</u></a>	<a href="#"><u>Photo Enforced Signs and Plaques (R10-18, R10-19P, R10-19aP, R10-18a)</u></a>
28	<a href="#"><u>2B.63</u></a>	<a href="#"><u>Ramp Metering Signs (R10-28 and R10-29)</u></a>
29	<a href="#"><u>ROAD CLOSED and Weight Limit Signs</u></a>	
30	<a href="#"><u>2B.64</u></a>	<a href="#"><u>KEEP OFF MEDIAN Sign (R11-1)</u></a>
31	<a href="#"><u>2B.65</u></a>	<a href="#"><u>ROAD CLOSED Sign (R11-2) and LOCAL TRAFFIC ONLY Signs (R11-3 Series, R11-4)</u></a>
32	<a href="#"><u>2B.66</u></a>	<a href="#"><u>Weight Limit Signs (R12-1 through R12-7)</u></a>
33	<a href="#"><u>2B.67</u></a>	<a href="#"><u>Vehicle Inspection Area Signs (R13-1 Series)</u></a>
34	<a href="#"><u>2B.68</u></a>	<a href="#"><u>TRUCK ROUTE Sign (R14-1)</u></a>
35	<a href="#"><u>2B.69</u></a>	<a href="#"><u>Hazardous Material Signs (R14-2, R14-3)</u></a>
36	<a href="#"><u>2B.70</u></a>	<a href="#"><u>National Network Signs (R14-4, R14-5)</u></a>
37	<a href="#"><u>Other Regulatory Signs</u></a>	
38	<a href="#"><u>2B.71</u></a>	<a href="#"><u>MINOR CRASES MOVE VEHICLES FROM TRAVEL LANES (R16-4) Sign</u></a>
39	<a href="#"><u>2B.72</u></a>	<a href="#"><u>Move Over or Reduce Speed Sign</u></a>
40	<a href="#"><u>2B.73</u></a>	<a href="#"><u>No Hand-Held Phones by Driver Signs (R16-15, R16-15a)</u></a>
41	<a href="#"><u>2B.74</u></a>	<a href="#"><u>Headlight Use Signs (R16-5 through R16-11)</u></a>
42	<a href="#"><u>2B.75</u></a>	<a href="#"><u>Seat Belt Symbol</u></a>
43	<a href="#"><u>Barricades and Gates</u></a>	
44	<a href="#"><u>2B.76</u></a>	<a href="#"><u>Barricades</u></a>
45	<a href="#"><u>2B.77</u></a>	<a href="#"><u>Gates</u></a>
46		

GENERAL

**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 (see Section 2A.0720). ~~to show the same shape and similar color by both day and night, unless specifically stated otherwise in the text discussion in this Manual for a particular sign or group of signs.~~

~~The requirements for sign illumination shall not be considered to be satisfied by street or highway lighting.~~ **Not needed because this is already covered in new Section 2A.20**

**Support:**

~~Section 1A.09 contains information regarding the assistance that is available to jurisdictions that do not have engineers on their staffs who are trained and/or experienced in traffic control devices.~~ **Not needed because this is covered in new Section 1D.05**

**Section 2B.02 Design of Regulatory Signs**

**Standard:**

Regulatory signs shall be rectangular unless specifically designated otherwise. Regulatory signs shall be designed in accordance with the sizes, shapes, colors, and legends contained in the “Standard Highway Signs and Markings” ~~book~~ publication (see Section 1A.1105).

**Option:**

~~Regulatory word message signs other than those classified and specified in this Manual and the “Standard Highways Signs and Markings” book (see Section 1A.11) may be developed to aid the enforcement of other laws or regulations.~~

~~Except for symbols on regulatory signs, minor modifications may be made to the design provided that the essential appearance characteristics are met.~~ **Not needed because this is covered in new Section 2A.04 and is redundant**

**Support:**

The use of educational plaques to supplement symbol signs is described in Section 2A.1219.

**Guidance Standard:**

~~Changeable message~~ **LED** signs displaying a part-time regulatory message incorporating a prohibitory message that includes a red circle and ~~slash-diagonal on of~~ a static sign ~~should~~ shall display a red symbol that approximates the same red circle and ~~slash-diagonal~~ as closely as possible. The prohibited movement symbol shall be a white LED symbol on a black background or a black symbol on a full-matrix white LED background.

**Option:**

The LEDs in the border of regulatory signs may be static or flash at rates per Section 2A. 20.

**Standard:**

A regulatory sign displayed entirely with LEDs and incorporated within the border of a larger full-matrix changeable message sign shall display the regulatory sign legend in the size, shape, color and legend of the standard regulatory sign.

A blank-out or changeable display shall not be used for a STOP (R1-1) sign or a YIELD (R1-2) sign.

**Section 2B.03 Size of Regulatory Signs**

**Standard:**

Except as provided in Section 2A.1107, the sizes for regulatory signs shall be as shown in Table 2B-1.

1 Support:

2 Section 2A.407 contains information regarding the applicability of the various columns in Table 2B-1.

3 **Standard:**

4 **Except as provided in Paragraphs 45 and 56, the minimum sizes for regulatory signs facing traffic**  
5 **on multi-lane conventional roads shall be as shown in the Multi-Lane column of Table 2B-1.**

6 The typical size of regulatory signs applied on low-volume rural roads with operating speeds of 30  
7 mph or less shall be as shown in the Minimum column of Table 2B-1. **Content relocated from Part 5.**

8 Option:

9 Where the posted speed limit is 35 mph or less on a multi-lane highway or street, other than for a STOP  
10 sign, the ~~minimum~~ size shown in the Single Lane column in Table 2B-1 may be used.

11 Where a regulatory sign, other than a STOP sign, is placed on the left-hand side of a multi-lane roadway  
12 in addition to the installation of the same regulatory sign on the right-hand side or the roadway, the size shown  
13 in the Single Lane column in Table 2B-1 may be used for both the sign on the right-hand side and the sign on  
14 the left-hand side of the roadway.

15 **Standard:**

16 ~~A minimum size of 36 x 36 inches shall be used for STOP signs that face multi-lane approaches.~~

17 ~~Where side roads intersect a multi-lane street or highway that has a speed limit of 45 mph or~~  
18 ~~higher, the minimum size of the STOP signs facing the side road approaches, even if the side road only~~  
19 ~~has one approach lane, shall be 36 x 36 inches.~~

20 ~~Where side roads intersect a multi-lane street or highway that has a speed limit of 40 MPH or~~  
21 ~~lower, the minimum size of the STOP signs facing the side road approaches shall be as shown in the~~  
22 ~~Single Lane or Multi-Lane columns of Table 2B-1 based on the number of approach lanes on the side~~  
23 ~~street approach.~~

24 **Table 2B-1. Regulatory Sign and Plaque Sizes**

25 *Guidance:*

26 *The minimum sizes for regulatory signs facing traffic on exit and entrance ramps at major interchanges*  
27 *connecting an Expressway or Freeway with an Expressway or Freeway (see Section 2E.11) should be as*  
28 *shown in the column of Table 2B-1 that corresponds to the mainline roadway classification (Expressway or*  
29 *Freeway). If a minimum size is not provided in the Freeway column, the minimum size in the Expressway*  
30 *column should be used. If a minimum size is not provided in the Freeway or Expressway Column, the size in*  
31 *the Oversized column should be used.*

32 *The minimum size for all regulatory signs facing traffic on exit and entrance ramps at all other*  
33 *interchanges (see Section 2E.11) should be the regulatory sign size shown in Table 2B-1 Conventional Road*  
34 *Single Lane column for single-lane ramps and Multi-lane column for multi-lane ramps.*

35 Option:

36 The size shown in the Single-Lane column of Table 2B-1 may be used on a multi-lane approach for the  
37 following signs:

38 A. The NO TURN ON RED (R10-11, R10-11a, and R10-11b) signs.

39 B. The RIGHT (LEFT) ON RED ARROW AFTER STOP (R10-17a) sign.

40 **Standard:**

41 If a single-lane R10-11, R10-11a, R10-11b, or R10-17a sign size as shown in Table 2B-1 is used on an  
42 approach on the far side of the intersection, and the distance between the stop line and the sign is more  
43 than 120 feet, then a duplicate sign shall be required on the near side of the intersection to supplement  
44 the sign on the far side of the intersection.

45 ~~Section 2B.04 Right-of-Way at Intersections~~ **Incorporated into new Subchapter: Signing for**  
46 **Right-of-Way at Intersections**

47 ~~Section 2B.05~~ **2B.04 STOP Sign (R1-1) and ALL-ALL-WAY Plaque (R1-3P)**

48 **Standard:**

1 When it is determined that a full stop is always required on an approach to an intersection, a STOP  
2 (R1-1) sign (~~see Figure 2B-1~~) shall be used.

3 The STOP sign shall be an octagon with a white legend and border on a red background.

4 Secondary legends shall not be used on STOP sign faces.

5 At intersections where all approaches are controlled by STOP signs (see Section 2B.0713), an ALL-  
6 WAY supplemental plaque (R1-3P) shall be mounted below each STOP sign. The ALL-WAY plaque  
7 (~~see Figure 2B-1~~) shall have a white legend and border on a red background.

8 ~~The ALL-WAY plaque shall only be used if all intersection approaches are controlled by STOP~~  
9 ~~signs.~~

10 Supplemental plaques with legends such as 2-WAY, 3-WAY, 4-WAY, or other numbers of ways  
11 shall not be used with STOP signs.

12 Support:

13 The use of the CROSS TRAFFIC DOES NOT STOP (W4-4P) plaque (and other plaques with variations  
14 of this word message) is described in Section 2C.5965.

15 Guidance:

16 *Plaques with the appropriate alternative messages of TRAFFIC FROM LEFT (RIGHT) DOES NOT*  
17 *STOP (W4-4aP) or ONCOMING TRAFFIC DOES NOT STOP (W4-4bP) should be used at intersections*  
18 *where STOP signs control all but one approach to the intersection, unless the only non-stopped approach is*  
19 *from a one-way street.*

20 Option:

21 An EXCEPT RIGHT TURN (R1-10P) plaque (~~see Figure 2B-1~~) may be mounted below the STOP sign if  
22 an engineering study determines that a special combination of geometry and traffic volumes is present that  
23 makes it possible for right-turning traffic on the approach to be permitted to enter the intersection without  
24 stopping.

25 Support:

26 The design and application of Stop Beacons are described in Section 4L4S.05.

### 27 **Figure 2B-1. STOP and YIELD Signs and Plaques**

28 ~~Section 2B.06 – STOP Sign Applications~~ Incorporated into new Subchapter: Signing for Right-  
29 ~~of-Way at Intersections~~

30 ~~Section 2B.07 – Multi-Way Stop Applications~~ Incorporated into new Subchapter: Signing for  
31 ~~Right-of-Way at Intersections~~

32 ~~Section 2B.08 – 2B.05 YIELD Sign (R1-2)~~

33 Standard:

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

36 Support:

37 The YIELD sign requires road users to yield the right-of-way to other traffic ~~assigns right-of-way to~~  
38 ~~traffic~~ on certain approaches to an intersection. Vehicles controlled by a YIELD sign need to slow down to a  
39 speed that is reasonable for the existing conditions or stop when necessary to avoid interfering with  
40 conflicting traffic.

41 ~~Section 2B.09 – YIELD Sign Applications~~ Incorporated into new Subchapter: Signing for Right-  
42 ~~of-Way at Intersections~~

1 SIGNING FOR RIGHT-OF-WAY AT INTERSECTIONS

2 Section 2B.06 General Considerations **Contains material relocated from existing Section 2B.04**

3 Support:

4 Unsignalized intersections represent the most common form of intersection right-of-way control.  
5 Selection of control type might be impacted by specific requirements of state law or local ordinances.

6 Roundabouts and traffic circles are intersection designs and are not traffic control devices. The decision to  
7 convert an intersection from a conventional intersection to a circular intersection is an engineering design  
8 decision and not a traffic control device decision. As such, criteria for conversion from a conventional  
9 intersection to a circular intersection are not included in the MUTCD.

10 Guidance:

11 The type of traffic control used at an unsignalized intersection should be the least restrictive that provides  
12 appropriate levels of safety and efficiency.

13 Support:

14 Some types of right-of-way control that can exist at an unsignalized intersection are listed below in order  
15 from the least restrictive to the most restrictive.

- 16 A. No intersection control: There are no right-of-way traffic control devices on any of the approaches to  
17 the intersection (See Section 2B.04c for guidance).
- 18 B. Yield Control: YIELD signs are placed on all approaches (for a roundabout), on opposing approaches  
19 for a 4-leg intersection, on a single approach for a 2-leg intersection, or in the median of a divided  
20 highway. The YIELD signs are placed on the minor road. (See Section 2B.04b for guidance)
- 21 C. Minor road stop control: STOP signs are typically placed on opposing approaches (for a 4-leg  
22 intersection) or on a single approach (for a 3-leg intersection). The STOP signs are normally placed  
23 on the minor road. (See Section 2B.04a for guidance on selecting the minor road.)
- 24 D. All-way stop control: STOP signs are placed on all approaches to the intersection. (See Section  
25 2B.04f for guidance.)

26 Guidance:

27 ~~Engineering judgment should be used to establish intersection control.~~ When selecting a form of  
28 intersection control, the following factors should be considered:

- 29 A. Vehicular, bicycle, and pedestrian traffic volumes on all approaches. Where the term units/day or  
30 units/hour is indicated, it should be the total of vehicular, bicycle, and pedestrian volume.
- 31 B. Driver yielding behavior with regard to bicyclists and pedestrians:
  - 32 B. Number and angle of approaches;
  - 33 C. Approach speeds;
  - 34 D. Sight distance available on each approach; and
  - 35 F. Reported crash experience.
- 36 G. The presence of a grade crossing near the intersection.

37 ~~YIELD or STOP signs should be used at an intersection if one or more of the following conditions exist:~~

- 38 ~~A. An intersection of a less important road with a main road where application of the normal right of~~  
39 ~~way rule would not be expected to provide reasonable compliance with the law;~~
- 40 ~~B. A street entering a designated through highway or street; and/or~~
- 41 ~~C. An unsignalized intersection in a signalized area.~~

42 ~~In addition, the use of YIELD or STOP signs should be considered at the intersection of two minor streets~~  
43 ~~or local roads where the intersection has more than three approaches and where one or more of the following~~  
44 ~~conditions exist:~~

- 45 ~~A. The combined vehicular, bicycle, and pedestrian volume entering the intersection from all approaches~~  
46 ~~averages more than 2,000 units per day;~~
- 47 ~~B. The ability to see conflicting traffic on an approach is not sufficient to allow a road user to stop or~~  
48 ~~yield in compliance with the normal right of way rule if such stopping or yielding is necessary;~~  
49 ~~and/or~~

1 ~~C. Crash records indicate that five or more crashes that involve the failure to yield the right-of-way at~~  
2 ~~the intersection under the normal right-of-way rule have been reported within a 3-year period, or that~~  
3 ~~three or more such crashes have been reported within a 2-year period.~~

4 Support:

5 Appropriate traffic calming or other speed-control measures are available to control vehicle speeds, such  
6 as those that do not have the potential to diminish the effectiveness of traffic control devices when used for  
7 their specified purpose.

8 ~~Guidance:~~ **Standard:** Existing Section 2B.04 paragraph 5 changed to Standard

9 Yield or Stop signs ~~should~~ **shall** not be used for speed control.

10 **Standard:**

11 Because the potential for conflicting commands could create driver confusion, Yield or Stop signs  
12 shall not be used in conjunction with any traffic control signal operation, except in the following cases:

- 13 A. If the signal indication for an approach is a flashing red at all times;  
14 B. If a minor street or driveway is located within or adjacent to the area controlled by the traffic  
15 control signal, but does not require separate traffic signal control because an extremely low  
16 potential for conflict exists; or  
17 C. If a channelized turn lane is separated from the adjacent travel lanes by an island and the  
18 channelized turn lane is not controlled by a traffic control signal.

19 Except as provided in Section 2B. 911, STOP signs and YIELD signs shall not be installed on  
20 different approaches to the same unsignalized intersection if those approaches conflict with or oppose  
21 each other.

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

24 A portable or part-time (folding) STOP sign that is manually placed into view and manually  
25 removed from view shall not be used during a power outage to control a signalized approach unless the  
26 maintaining agency establishes that the signal indication that will first be displayed to that approach  
27 upon restoration of power is a flashing red signal indication and that the portable STOP sign will be  
28 manually removed from view prior to stop-and-go operation of the traffic control signal.

29 Option:

30 A portable or part-time (folding) Stop sign that is electrically or mechanically operated such that it only  
31 displays the Stop message during a power outage and ceases to display the Stop message upon restoration of  
32 power may be used during a power outage to control a signalized approach.

33 Support:

34 The use of STOP signs at grade crossings is described in Sections 8B.04 and 8B.05. **Relocated from**  
35 **existing Section 2B.06 paragraph 3**

36 Section 9B. 0301 contains provisions regarding the assignment of priority at a shared-use path/roadway  
37 intersection.

38 ~~Section 2B.07 contains provisions regarding the application of multi-way STOP control at an intersection.~~  
39 **Deleted, replaced by other text**

40 Section 2B.07 Determining the Minor Road for Unsignalized Intersections **Contains material**  
41 **relocated from existing Section 2B.04**

42 *Guidance:*

43 ~~Once the decision has been made to control an intersection, the decision regarding the appropriate~~  
44 ~~roadway to control should be based on engineering judgment. In most cases, the roadway carrying the lowest~~  
45 ~~volume of traffic should be controlled.~~ **Deleted, replaced by other text**

46 ~~A YIELD or STOP sign should not be installed on the higher volume roadway unless justified by an~~  
47 ~~engineering study.~~ **Deleted, replaced by other text**

48 The selection of the minor road to be controlled by YIELD or STOP signs should be based on one or more  
49 of the following criteria:

- 50 A. A roadway intersecting a designated through or numbered highway.

- 1 [B. A roadway with the lower functional classification.](#)
- 2 [C. A roadway with the lower traffic volume.](#)
- 3 [D. A roadway with the lower speed limit](#)
- 4 [E. A roadway that intersects with a roadway that has a higher priority for one of more modes of travel. -](#)

5 **Support:**

6 ~~The following are considerations that might influence the decision regarding the appropriate roadway~~  
 7 ~~upon which to install a YIELD or STOP sign where~~ [When two roadways ~~with~~that have relatively equal](#)  
 8 [volumes, speeds, and/or characteristics intersect, the following factors should be considered in selecting the](#)  
 9 [minor road for installation of YIELD or STOP signs:](#)

- 10 A. Controlling the direction that conflicts the most with established pedestrian crossing activity or
- 11 school walking routes;
- 12 B. Controlling the direction that has obscured vision, dips, or bumps that already require drivers to use
- 13 lower operating speeds; and
- 14 C. Controlling the direction that has the best sight distance from a controlled position to observe
- 15 conflicting traffic.

16 **Section 2B.08 Right-of-Way Intersection Control Considerations**

17 **Guidance:**

18 [Before converting to a more restrictive form of right-of-way control at an unsignalized intersection,](#)  
 19 [consideration should be given, but not limited, to the following alternative treatments to address safety,](#)  
 20 [operational, or other concerns.](#)

21 **Option: Relocated from existing Section 4B.04 and changed from Option to Guidance**

22 ~~Alternatives that should be considered include, but are not limited to, the following:~~

- 23 [A. Where Yield or Stop controlled, installing Stop Ahead or Yield Ahead signs on the appropriate](#)  
 24 [approaches to the intersection.](#)
- 25 [B. Removing parking on one or more approaches.](#)
- 26 [C. Removing sight distance restrictions.](#)
- 27 ~~A.D.~~ [Installing signs along the major street to warn road users approaching the intersection;](#)
- 28 ~~B.E.~~ [Relocating the stop line\(s\) and making other changes to improve the sight distance at —the](#)  
 29 [intersection;](#)
- 30 ~~C.F.~~ [Installing measures designed to reduce speeds on the approaches;](#)
- 31 ~~D.G.~~ [Installing ~~a flashing~~ an intersection control beacon \(see Section 4S.02\) or stop beacon \(see Section](#)  
 32 [4S.05\) at the intersection to supplement STOP sign control;](#)
- 33 ~~E.H.~~ [Installing ~~flashing~~ a warning beacons \(see Section 4S.03\) on warning signs in advance of a STOP](#)  
 34 [sign controlled intersection on major- and/or minor-street approaches;](#)
- 35 ~~F.I.~~ [Adding one or more lanes on a minor-street approach to reduce the number of vehicles per lane on](#)  
 36 [the approach;](#)
- 37 ~~G.J.~~ [Revising the geometrics at the intersection to channelize vehicular movements and reduce the time](#)  
 38 [required for a vehicle to complete a movement, which could also assist pedestrians;](#)
- 39 ~~H.K.~~ [Revising the geometrics at the intersection to add pedestrian median refuge islands and/or curb](#)  
 40 [extensions;](#)
- 41 ~~I.L.~~ [Installing roadway lighting if a disproportionate number of crashes occur at night;](#)
- 42 ~~J.M.~~ [Restricting one or more turning movements, ~~perhaps on a time of day~~ on a full- or part-time basis if](#)  
 43 [alternate routes are available;](#)
- 44 ~~K.~~ ~~If the warrant is satisfied, installing multi-way STOP sign control;~~
- 45 ~~L.N.~~ [Installing on the major street a pedestrian-actuated device: ~~pedestrian hybrid~~ warning beacon \(see](#)  
 46 [Chapter 4F Section 4S.03\), rectangular rapid-flashing beacon \(see Section 4L.01\), or In-Roadway](#)  
 47 [Warning Lights \(see Chapter 4N U\), if pedestrian safety is the major concern;](#)
- 48 ~~M.O.~~ ~~If the warrant is satisfied, installing multi-way STOP sign control;~~
- 49 ~~N.P.~~ [Installing on the major street a pedestrian hybrid beacon \(see Chapter 4J\) if pedestrian safety is the](#)  
 50 [major concern;](#)
- 51 ~~O.Q.~~ [Installing a roundabout; and](#)
- 52 ~~P.R.~~ [Employing other alternatives, depending on conditions at the intersection.](#)

53 **Section 2B.09 No Intersection Control**

1 **Support:**

2 State or local laws written in accordance with the “Uniform Vehicle Code” (see Section 1A.11) establish  
3 the right of way rule at intersections having no regulatory traffic control signs such that the driver of a vehicle  
4 approaching an intersection must yield the right of way to any vehicle or pedestrian already in the  
5 intersection. When two vehicles approach an intersection from different streets or highways at approximately  
6 the same time, the right of way rule requires the driver of the vehicle on the left to yield the right of way to  
7 the vehicle on the right. The right of way can be modified at through streets or highways by placing YIELD  
8 (R1-2) signs (see Sections 2B.08 and 2B.09) or STOP (R1-1) signs (see Sections 2B.05 through 2B.07) on one  
9 or more approaches. **Paragraph 1 of 2009 MUTCD Section 2B.04 deleted, as it is unneeded**

10 **Guidance:**

11 *The decision not to use intersection control should be based on engineering judgment.*

12 **Option:**

13 The following factors may be considered:

- 14 A. Intersection sight distance is adequate on all approaches.
- 15 B. All approaches to the intersection are a single lane and there are no separate turn lanes.
- 16 C. The combined vehicular, bicycle, and pedestrian volume (existing or projected) entering the  
17 intersection from all approaches averages less than 1,000 units per day or 80 units in the peak hour.
- 18 D. There are no marked crosswalks or bicycle lanes on any approach.
- 19 E. None of the approaches to the intersection are for a through highway, main road, or higher  
20 functional classification.
- 21 F. The angle of intersection is between 90 and 75 degrees.
- 22 G. The functional classification of the intersecting streets is either the intersection of two local streets  
23 or the intersection of a local street with a collector street.

24 **Section 2B.10 Yield Control**

25 **Guidance:**

26 *At intersections where a full stop is not necessary at all times, consideration should first be given to using*  
27 *less restrictive measures such as YIELD signs. **From existing Section 2B.06, Paragraph 01***

28 *Yield control should be considered when engineering judgment indicates that all of the following*  
29 *conditions exist:*

- 30 A. Intersection sight distance is adequate on the approaches to be controlled by YIELD signs.
- 31 B. All approaches to the intersection are a single lane and there are no separate turn lanes.
- 32 C. One of the following crash-related criteria applies:
  - 33 1. For changing from no intersection control to yield control, there have been two or more  
34 reported crashes that are susceptible to correction by installation of a YIELD sign in the  
35 previous 12 months.
  - 36 2. For changing from minor road stop control to yield control, there have been two or fewer  
37 reported crashes in the previous 12 months.
- 38 D. Entering intersection volume of less than 1800 units per day or 140 units in the peak hour.
- 39 E. The angle of intersection is between 90 and 75 degrees.
- 40 F. The functional classification of the intersecting streets is either the intersection of two local streets  
41 or the intersection of a local street with a collector street.

42 **Option:**

43 YIELD signs may be installed at an intersection when any of the following conditions apply: **From**  
44 **existing Section 2B.09, Paragraph 1**

- 45 ~~A. On the approaches to a through street or highway where conditions are such that a full stop is not~~  
46 ~~always required.~~
- 47 ~~B. A. At the second ~~crossroad~~ intersection of a divided highway, highway crossing or median break~~  
48 ~~functioning as two separate intersections (see Figures 2B-12 and 2B-15) where the median width at~~  
49 ~~the intersection is 30 feet or greater. In this case, a YIELD sign may be installed at the entrance to~~  
50 ~~the second roadway intersection.~~
- 51 ~~C. B. For a channelized turn lane that is separated from the adjacent travel lanes by an island, even if the~~  
52 ~~adjacent lanes at the intersection are controlled by a highway traffic control signal or by a Stop sign.~~

1 ~~D.C.~~ At an intersection where a special problem exists and where engineering judgment indicates the  
2 problem to be susceptible to correction by the use of the YIELD sign.

3 ~~E.D.~~ Facing the entering roadway for a merge-type movement if engineering judgment indicates that  
4 control is needed because acceleration geometry and/or sight distance is not adequate for merging  
5 traffic operation.

6 E. On low-volume rural roads if engineering judgment indicates that the YIELD would provide  
7 adequate control. Moved from 2009 MUTCD Part 5

8 F. On an approach to an intersection where the only permissible movement is a right turn movement  
9 with an intersection geometry similar to a channelized right turn lane or an approach to a  
10 roundabout.

11 Guidance:

12 The YIELD signs should be installed on opposing minor street approaches (for a 4-leg intersection) or on  
13 the minor approach (for a 3-leg intersection). (See Section 2B-X3) for information to identify the minor road).  
14 When two intersection roadways have relatively equal volumes, speeds and other characteristics, yield  
15 control should be installed on the approach that conflicts the most with established pedestrian crossing  
16 activity or school walking routes or bicycle crossing activity.

17 **Standard:**

18 A YIELD sign shall be used to require road users to yield the right-of-way to other traffic assign-  
19 right-of-way at the entrance to a roundabout. Yield signs at roundabouts shall be used to control the  
20 approach roadways and shall not be used to control the circulatory roadway. **From existing Section**  
21 **2B.09, Paragraph 2**

22 ~~Other than for all of the approaches to a roundabout,~~ YIELD signs shall not be placed on all of the  
23 approaches to an intersection, except at roundabouts. **From existing Section 2B.09, Paragraph 3**

24 **Section 2B.11 Minor Road Stop Control**

25 Guidance:

26 ~~The use of STOP signs on~~ Stop control on the minor-street road approach or approaches to an intersection  
27 should be considered if when engineering judgment indicates that a stop is always required because of one or  
28 more of the following conditions exist: **From existing Section 2B.06 Paragraph 2**

29 ~~A. The vehicular traffic volumes on the through street or highway exceed 6,000 vehicles per~~  
30 ~~day;~~

31 ~~B. A restricted view exists that requires road users to stop in order to adequately observe conflicting~~  
32 ~~traffic on the through street or highway; and/or~~

33 ~~C. Crash records indicate that:~~

34 1. For a four-leg intersection, there are three or more reported crashes in a 12-month period or  
35 six or more reported crashes in a 36-month period. The crashes should be susceptible to  
36 correction by installation of two-way stop control.

37 2. For a three-leg intersection, there are three or more reported crashes in a 12-month period or  
38 five or more reported crashes in a 36-month period. The crashes should be susceptible to  
39 correction by installation of two-way stop control.

40 C. The intersection is of a lower functional classification road with a higher functional classification  
41 road

42 D. Conditions that previously supported installation of an all-way stop control under all-way stop  
43 control criteria no longer exist.

44 On low-volume rural roads, a STOP sign should be considered at an intersection where engineering  
45 judgment indicates that Item C above is applicable or where the intersection has inadequate sight distance  
46 for the operating vehicle speeds. **Moved from existing MUTCD Part 5**

47 **Section 2B.12 All-Way Stop Control** **Changing the term to all-way rather than multi-way**

48 **Support:** **From existing Section 2B.07 Paragraphs 1 and 2 deleted as unneeded**

49 ~~Multi-way stop control can be useful as a safety measure at intersections if certain traffic conditions exist.~~  
50 ~~Safety concerns associated with multi-way stops include pedestrians, bicyclists, and all road users expecting~~

1 other road users to stop. Multi-way stop control is used where the volume of traffic on the intersecting roads  
2 is approximately equal.

3 The restrictions on the use of STOP signs described in Section 2B.04 also apply to multi-way stop  
4 applications.

5 Guidance:

6 The decision to ~~install~~ establish all-way stop control at an unsignalized intersection should be based on  
7 an engineering study. **From existing Section 2B.07 Paragraph 3**

8 The engineering study for all-way stop control should include an analysis of factors related to the existing  
9 operation and safety at the intersection, the potential to improve these conditions, and the applicable factors  
10 contained in the following all-way stop control warrants:

11 A. All-Way Stop Control Warrant A: Crash Experience (Section 2B.13)

12 B. All-Way Stop Control Warrant B: Sight Distance (Section 2B.14)

13 C. All-Way Stop Control Warrant C: Transition to Signal Control or YIELD Control at a Roundabout  
14 (Section 2B.15)

15 D. All-Way Stop Control Warrant D: Peak Hour Volume (Vehicle, Pedestrians, Bicycles) (Section 2B.16)

16 E. All-Way Stop Control Warrant E: Other Factors (Section 2B.17)

17 Standard:

18 The satisfaction of an all-way stop control warrant or warrants shall not in itself require the  
19 installation of all-way stop control at an unsignalized intersection.

20 Guidance: **Existing Section 2B.07 Paragraph 4 deleted and replaced with new text in new Sections**

21 ~~The following criteria should be considered in the engineering study for a multi-way STOP sign~~  
22 ~~installation:~~

23 ~~A. Where traffic control signals are justified, the multi-way stop is an interim measure that can be~~  
24 ~~installed quickly to control traffic while arrangements are being made for the installation of the traffic~~  
25 ~~control signal.~~

26 ~~B. Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way~~  
27 ~~stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle~~  
28 ~~collisions.~~

29 ~~C. Minimum volumes:~~

30 ~~1. The vehicular volume entering the intersection from the major street approaches (total of both~~  
31 ~~approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and~~

32 ~~2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor~~  
33 ~~street approaches (total of both approaches) averages at least 200 units per hour for the same 8~~  
34 ~~hours, with an average delay to minor street vehicular traffic of at least 30 seconds per vehicle~~  
35 ~~during the highest hour; but~~

36 ~~3. If the 85<sup>th</sup> percentile approach speed of the major street traffic exceeds 40 mph, the minimum~~  
37 ~~vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.~~

38 ~~D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80~~  
39 ~~percent of the minimum values. Criterion C.3 is excluded from this condition.~~

40 Section 2B.13 All-Way Stop Control Warrant A: Crash Experience

41 Option:

42 All-way stop control may be installed at an intersection where an engineering study indicates that:

43 A. For a four-leg intersection, there are five or more reported crashes in a 12-month period or six or  
44 more reported crashes in a 36-month period that were of a type susceptible to correction by the  
45 installation of all-way stop control.

46 B. For a three-leg intersection, there are four or more reported crashes in a 12-month period or  
47 five or more reported crashes in a 36-month period that were of a type susceptible to  
48 correction by the installation of all-way stop control.

49 C. The sight distance on the minor road approaches controlled by a Stop sign is not adequate for a  
50 vehicle to turn onto or cross the major (uncontrolled) road.

51 2B.14 All-Way Stop Control Warrant B: Sight Distance

1 Option:

2 All-way stop control may be installed at an intersection where an engineering study indicates that sight  
3 distance on the minor road approaches controlled by a Stop sign is not adequate for a vehicle to turn onto or  
4 cross the major (uncontrolled) road.

5 Support:

6 At such a location, a road user, after stopping, cannot see conflicting traffic and is not able to negotiate  
7 the intersection unless conflicting cross traffic is also required to stop. **Existing Section 2B.07 Paragraph 5C**

8 **Section 2B.15 All-Way Stop Control Warrant C: Transition to Signal Control or YIELD**  
9 **Control at a Roundabout**

10 Option:

11 All-way stop control may be installed at locations where all-way stop control is an interim measure that  
12 can be installed to control traffic while arrangements are being made for the installation of the traffic control  
13 signals at the intersection or YIELD control at a roundabout. **Similar to Existing Section 2B.07 Paragraph**  
14 **4A**

15 **Section 2B.16 All-Way Stop Control Warrant D: 8-Hour Volume (Vehicle, Pedestrians,**  
16 **Bicycles)**

17 Option: **Similar to existing Section 2B.07 Paragraph 4C**

18 All-way stop control may be installed at an intersection where an engineering study indicates:

- 19 A. The volume entering the intersection from the major street approaches (total of both approaches)  
20 averages at least 300 units per hour for each of any 8 hours of an average day; and  
21 B. The volume entering the intersection from the minor street approaches (total of both approaches)  
22 averages at least 200 units per hour for each of any of the same 8 hours; and  
23 C. If the 85<sup>th</sup> percentile approach speed of the major-street traffic exceeds 40mph, the minimum  
24 vehicular volume warrants are 70 percent of the values in Items A and B.

25 **Section 2B.17 All-Way Stop Control Warrant E: Other Factors**

26 Option:

27 All-way stop control may be installed at an intersection where an engineering study indicates that all-way  
28 stop control is needed due to other factors not addressed in the other all-way stop control warrants. Such other  
29 factors may include, but are not limited to, the following:

- 30 A. The need to control left-turn conflicts; **From existing Section 2B.07 Paragraph 5**  
31 B. An intersection of two residential neighborhood collector (through) streets of similar design and  
32 operating characteristics where all-way stop control would improve traffic operational  
33 characteristics of the intersection; **or From exiting Section 2B.07 Paragraph 5D**  
34 C. Where pedestrian and/or bicycle movements justify the installation of all-way stop control. **Similar**  
35 **to existing Section 2B.07 Paragraph 5B**

36 **Section ~~2B.10~~2B.18 STOP Sign or YIELD Sign Placement**

37 **Standard:**

38 **The STOP or YIELD sign shall be installed on the near side of the intersection on the right-hand**  
39 **side of the approach to which it applies. When the STOP or YIELD sign is installed at this required**  
40 **location and the sign visibility is restricted, a Stop Ahead sign (see Section 2C.3637) shall be installed in**  
41 **advance of the STOP sign or a Yield Ahead sign (see Section 2C.3637) shall be installed in advance of**  
42 **the YIELD sign.**

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

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

46 **~~No items other than inventory stickers, sign installation dates, and bar codes shall be affixed to the~~**  
47 **~~fronts of STOP or YIELD signs, and the placement of these items shall be in the border of the sign.~~**

48 **~~No items other than official traffic control signs, inventory stickers, sign installation dates, anti-~~**  
49 **~~vandalism stickers, and bar codes shall be mounted on the backs of STOP or YIELD signs.~~**

1 ~~No items other than retroreflective strips (see Section 2A.21) or official traffic control signs shall be~~  
2 ~~mounted on the fronts or backs of STOP or YIELD signs supports.~~

3 *Guidance:*

4 *STOP or YIELD signs should not be placed farther than 50 feet from the edge of the pavement of the*  
5 *intersected roadway (see Drawing F in Figure 2A-3).*

6 *A sign that is mounted back-to-back with a STOP or YIELD sign should stay within the edges of the STOP*  
7 *or YIELD sign. If necessary, the size of the STOP or YIELD sign should be increased so that any other sign*  
8 *installed back-to-back with a STOP or YIELD sign remains within the edges of the STOP or YIELD sign*

9 *Supplemental plaques used in conjunction with a STOP or YIELD sign should be limited to those specified*  
10 *for such use in this Manual.*

11 *Option:*

12 Where drivers proceeding straight ahead must yield to traffic approaching from the opposite direction,  
13 such as at a one-lane bridge, a TO ONCOMING TRAFFIC (R1-2aP) plaque may be mounted below the  
14 YIELD sign.

15 Where drivers must yield to traffic in a multi-lane roundabout, a TO TRAFFIC IN CIRCLE (R1-2bP) or  
16 TO ALL LANES (R1-2cP) plaque may be mounted below the YIELD sign.

17 *Support:*

18 Figure 2A-3 shows examples of some typical placements of STOP signs and YIELD signs.

19 Section 2A.4612 contains additional information about separate and combined mounting of other signs  
20 with STOP or YIELD signs.

21 *Guidance:*

22 *Stop lines that are used to supplement a STOP sign should be located as described in Section 3B.4619.*  
23 *Yield lines that are used to supplement a YIELD sign should be located as described in Section 3B.4619.*

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

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

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

30 *If a raised splitter island is available on the left-hand side of a multi-lane roundabout approach, an*  
31 *additional YIELD sign should be placed on the left-hand side of the approach.*

32 *Option:*

33 If a raised splitter island is available on the left-hand side of a single lane roundabout approach, an  
34 additional YIELD sign may be placed on the left-hand side of the approach.

35 At wide-throat intersections or where two or more approach lanes of traffic exist on the signed approach,  
36 observance of the right-of-way control may be improved by the installation of an additional STOP or YIELD  
37 sign on the left-hand side of the road and/or the use of a stop or yield line. At channelized intersections or at  
38 divided roadways separated by a median, the additional STOP or YIELD sign may be placed on a  
39 channelizing island or in the median. An additional STOP or YIELD sign may also be placed overhead facing  
40 the approach at the intersection to improve observance of the right-of-way control.

41 **Standard:**

42 **More than one STOP sign or more than one YIELD sign shall not be placed on the same support**  
43 **facing in the same direction.**

44 *Option:*

45 For a yield-controlled channelized right-turn movement onto a roadway without an acceleration lane and  
46 for an entrance ramp onto a freeway or expressway without an acceleration lane, a NO MERGE AREA (W4-  
47 5P) supplemental plaque (see Section 2C.4047) may be mounted below a Yield Ahead (W3-2) sign and/or  
48 below a YIELD (R1-2) sign when engineering judgment indicates that road users would expect an  
49 acceleration lane to be present.

1 **Section ~~2B.11~~2B.19 Yield Here To Pedestrians Signs and Stop Here For Pedestrians Signs**  
2 **(R1-5 Series)**

3 **Support:**

4 [The R1-5 series signs are intended to mitigate the scenario that can place pedestrians at risk by blocking](#)  
5 [other drivers' view of pedestrians and by blocking the pedestrians' view of the vehicles approaching in the](#)  
6 [adjacent lanes.](#)

7 **Standard:**

8 Yield Here To (Stop Here For) Pedestrians (R1-5, R1-5a, R1-5b, or R1-5c) signs ~~(see Figure 2B-2)~~  
9 shall **only** be used if yield (stop) lines are used in advance of a marked crosswalk that crosses an  
10 uncontrolled multi-lane approach. The Stop Here for Pedestrians signs shall only be used where the  
11 law specifically requires that a driver must stop for a pedestrian in a crosswalk. The legend STATE  
12 LAW ~~may shall not~~ be displayed ~~at the top of on~~ the R1-5, ~~R1-5a, R1-5b, and R1-5e~~ series signs, ~~if~~  
13 ~~applicable.~~

14 [If yield \(stop\) lines and Yield Here To \(Stop Here For\) Pedestrians signs are used in advance of a](#)  
15 [crosswalk that crosses an uncontrolled multi-lane approach, the signs shall be placed 20 to 50 feet in](#)  
16 [advance of the nearest crosswalk line \(see Section 3B.19 and Figure 3B-16\).](#)

17 **Option:**

18 [The R1-5a and R1-5c signs may be used in place of the R1-5 and R1-5b signs provided that the signs are](#)  
19 [only used in advance of a marked crosswalk that crosses an uncontrolled multi-lane approach within school](#)  
20 [zones \(see Part 7\). \*\*Added to reflect Official Interpretation 2\(09\)-40\*\*](#)

21 **Guidance:**

22 *If yield (stop) lines and Yield Here To (Stop Here For) Pedestrians signs are used in advance of a*  
23 *crosswalk that crosses an uncontrolled multi-lane approach, they should be placed 20 to 50 feet in advance of*  
24 *the nearest crosswalk line (see Section 3B.16 and Figure 3B-17), and **Changed to Standard above***

25 [When Yield Here To \(Stop Here For\) Pedestrians signs are provided in advance of a crosswalk across](#)  
26 [an multi-lane approach, parking should be prohibited in the area between the yield \(stop\) line and the](#)  
27 [crosswalk.](#)

28 Yield (stop) lines and Yield Here To (Stop Here For) Pedestrians signs should not be used in advance of  
29 crosswalks that cross an approach to or departure from a roundabout.

30 **Option:**

31 Yield Here To (Stop Here For) Pedestrians signs may be used in [accordance with Paragraphs 2 through 4](#)  
32 [of this Section](#) ~~advance of a crosswalk that crosses an uncontrolled multi-lane approach to indicate to road~~  
33 ~~users where to yield (stop)~~ even if yield (stop) lines are not used.

34 A Pedestrian Crossing (W11-2) warning sign may be placed overhead or may be post-mounted with a  
35 diagonal downward pointing arrow (W16-7P) plaque at the crosswalk location where Yield Here To (Stop  
36 Here For) Pedestrians signs have been installed in advance of the crosswalk.

37 **Standard:**

38 **If a W11-2 sign has been post-mounted at the crosswalk location where a Yield Here To (Stop Here**  
39 **For) Pedestrians sign is used on the approach, the Yield Here To (Stop Here For) Pedestrians sign shall**  
40 **not be placed on the same post as ~~or block the road user's view of~~ the W11-2 sign.**

41 **Option:**

42 An advance Pedestrian Crossing (W11-2) warning sign with an AHEAD or a distance supplemental  
43 plaque may be used in conjunction with a Stop Here For (Yield Here To) Pedestrians sign on the approach to  
44 the same crosswalk.

45 In-Street Pedestrian Crossing signs and Stop Here For (Yield Here To) Pedestrians signs may be used  
46 together at the same crosswalk.

47 **Section ~~2B.12~~2B.20 In-Street and Overhead Pedestrian and Trail Crossing Signs (R1-6 and**  
48 **R1-9 Series, R1-6a, R1-9, and R1-9a)**

49 **Option:**

1 The In-Street Pedestrian Crossing (R1-6 or R1-6a) sign (see Figure 2B-2), In-Street Trail Crossing (R1-6b  
2 or R1-6c) sign (see Figure 2B-2), ~~or~~ the Overhead Pedestrian Crossing (R1-9 or R1-9a) sign (see Figure 2B-  
3 2), or the Overhead Trail Crossing (R1-9d or R1-9e) may be used to remind road users of laws regarding  
4 right-of-way at an unsignalized ~~pedestrian~~-crosswalk. The legend STATE LAW may be displayed at the top  
5 of the R1-6 and R1-9 series signs, R1-6a, R1-9, and R1-9a signs, if applicable. On the R1-6 ~~and R1-6a~~ series  
6 signs, the legends STOP or YIELD may be used instead of the appropriate STOP sign or YIELD sign symbol.

7 Highway agencies may develop and apply criteria for determining the applicability of In-Street Pedestrian  
8 Crossing signs.

9 **Standard:**

10 **If used, the In-Street Pedestrian or Trail Crossing sign shall be placed at one of the following**  
11 **locations:**

12 **A: in the roadway at the crosswalk location on the center line;**

13 **B: on a median island;**

14 **C: or, in the case of a one-way roadway application, on a lane line, ~~or on a median island.~~ Moved**  
15 **above**

16 The In-Street Pedestrian or Trail Crossing sign shall not be post-mounted on the left-hand or right-  
17 hand side of the roadway.

18 If used, the Overhead Pedestrian or Trail Crossing sign shall be placed over the roadway at the  
19 crosswalk location.

20 **If used, the In-Street or Overhead Pedestrian Crossing sign shall be used only as a supplement to a**  
21 **Pedestrian Crossing (W11-2) warning sign with a diagonal downward-pointing arrow (W16-7P) plaque**  
22 **at the crosswalk location. Changed from an Option below and revised**

23 **If used, the In-Street or Overhead Trail Crossing sign shall be used only as a supplement to a Trail**  
24 **Crossing (W11-15) warning sign with a diagonal downward-pointing arrow (W16-7P) plaque at the**  
25 **crosswalk location.**

26 An In-Street or Overhead Pedestrian or Trail Crossing sign shall not be placed in advance of the  
27 crosswalk to educate road users about the State law prior to reaching the crosswalk, nor shall it be  
28 installed as an educational display that is not near any crosswalk.

29 *Guidance:*

30 *If an island (see Chapter 3I) is available, the In-Street Pedestrian or Trail Crossing sign, if used, should*  
31 *be placed on the island.*

32 *Option:*

33 ~~If a Pedestrian Crossing (W11-2) warning sign is used in combination with an In-Street or an Overhead~~  
34 ~~Pedestrian Crossing sign, the W11-2 sign with a diagonal downward-pointing arrow (W16-7P) plaque may be~~  
35 ~~post-mounted on the right hand side of the roadway at the crosswalk location. Changed to a Standard above~~  
36 ~~and revised~~

37 In-Street Pedestrian or Trail Crossing signs may be mounted back to back in the median or on the  
38 centerline of an undivided roadway.

39 **Standard:**

40 The In-Street Pedestrian or Trail Crossing sign and the Overhead Pedestrian Crossing or Trail sign  
41 shall not be used at ~~signalized locations~~ crosswalks on approaches controlled by a traffic control signal,  
42 pedestrian hybrid beacon, or an emergency vehicle hybrid beacon.

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

45 ~~The In-Street Pedestrian Crossing sign shall have a black legend (except for the red STOP or~~  
46 ~~YIELD sign symbols) and border on a white background, surrounded by an outer yellow or fluorescent~~  
47 ~~yellow-green background area (see Figure 2B-2). The Overhead Pedestrian Crossing sign shall have a~~  
48 ~~black legend and border on a yellow or fluorescent yellow-green background at the top of the sign and a~~  
49 ~~black legend and border on a white background at the bottom of the sign (see Figure 2B-2).~~

50 ~~Unless~~ Except where the In-Street ~~Pedestrian~~ Crossing sign is placed on a physical island, the sign  
51 support shall be designed to bend over and then bounce back to its normal vertical position when struck  
52 by a vehicle.

1 Option:

2 The In-Street and Overhead Pedestrian and Trail Crossing sign may be used at intersections or midblock  
3 pedestrian crossings with flashing beacons.

4 Support:

5 The provisions of Section 2A.4814 concerning mounting height are not applicable for the In-Street  
6 Pedestrian Crossing sign. See Section 2A.21 for sign mounting methods.

7 **Standard:**

8 **The top of an In-Street Pedestrian or Trail Crossing sign shall be a maximum of 4 feet above the**  
9 **pavement surface. The top of an In-Street Pedestrian or Trail Crossing sign placed in an island shall be**  
10 **a maximum of 4 feet above the island surface.**

11 Option:

12 The In-Street Pedestrian Crossing or Trail Crossing signs may be used seasonally to prevent damage in  
13 winter because of plowing operations, and may be removed at night if the pedestrian activity at night is  
14 minimal.

15 Both sign mounting types, In-Street -Crossing (R1-6 series) signs and Overhead Crossing (R1-9 series)  
16 signs may be used together at the same crosswalk.

17 ~~In-Street Pedestrian Crossing signs, Overhead Pedestrian Crossing signs, and Yield Here To (Stop Here~~  
18 ~~For) Pedestrians signs may be used together at the same crosswalk.~~

19 **Figure 2B-2. Unsignalized Pedestrian Crosswalk Signs**

20

**SPEED LIMIT SIGNS AND PLAQUES**

**Section ~~2B.13~~2B.21 Speed Limit Sign (R2-1)**

**Standard:**

Speed zones (other than statutory speed limits e.g. established by Federal or state law) shall only be established on the basis of an engineering study that has been performed in accordance with traffic engineering practices. ~~The engineering study shall include an analysis of the current speed distribution of free-flowing vehicles.~~

Guidance:

Among the factors that should be considered when establishing or reevaluating speed limits within speed zones are the following: **Changed from Option to Guidance and relocated and edited from later in this section**

A. Speed distribution of free-flowing vehicles (such as current 85th percentile; the pace; review of past speed studies)

B. Reported crash experience for at least a 12-month period

C. Road characteristics (such as lane widths; shoulder condition; grade; alignment; median type; sight distance)

D. Road context (such as ~~Roadside~~ roadside development and environment (number of driveways, land use); functional classification; parking practices; pedestrian activity; bicycle activity).

When a speed limit within a speed zone is posted on freeways or expressways, it should be within 5 mph of the 85th-percentile speed of free-flowing traffic vehicles.

Except in urbanized locations within rural regions, when a speed limit within a speed zone is posted on a rural highway, it should be within 5 mph of the 85th-percentile speed of free-flowing traffic vehicles.

State and local agencies should conduct engineering studies to reevaluate non-statutory speed limits on segments of their roadways that have undergone significant changes since the last review, (such as the addition or elimination of parking or driveways, changes in the number of travel lanes, changes in the configuration of bicycle lanes, changes to road geometrics, changes to road context, changes in traffic control signal coordination, or significant changes in traffic volumes).

Speed studies for signalized intersection approaches should be taken outside the influence area of the traffic control signal, which is generally considered to be approximately 1/2 mile, to avoid obtaining skewed results for the 85th-percentile speed. If the signal spacing is less than 1 mile, the speed study should be at approximately the middle of the segment.

Support:

In addition to the factors in Paragraph 2, there are other available resources for practitioners that can assist when establishing or reevaluating speed limits within speed zones. The FHWA's Engineering Speed Limits ([https://safety.fhwa.dot.gov/speedmgt/eng\\_spd\\_lmtn/](https://safety.fhwa.dot.gov/speedmgt/eng_spd_lmtn/)) Web page provides information on resources and tools that can be used to help practitioners set speed limits for specific segments of roads.

Standard:

The Speed Limit (R2-1) sign (~~see Figure 2B-3~~) shall display the limit established by law, ordinance, regulation, or as adopted by the authorized agency based on the engineering study. The speed limits displayed shall be in multiples of 5 mph.

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 downstream 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.~~ **Last sentence changed to Guidance**

Speed Limit signs indicating the statutory speed limits shall be installed at entrances to the State and, where appropriate, at jurisdictional boundaries in urban areas.

Guidance:

1 Additional Speed Limit signs should be installed beyond major intersections and at other locations where  
2 it is necessary to remind road users of the speed limit that is applicable. **Relocated and changed to**

3 **Guidance**

4 **Support:**

5 In general, the maximum speed limits applicable to rural and urban roads are established:

- 6 A. Statutorily – a maximum speed limit applicable to a particular class of road, such as freeways or city  
7 streets, that is established by State law; or  
8 B. As altered speed zones – based on engineering studies.

9 State statutory limits might restrict the maximum speed limit that can be established on a particular road,  
10 notwithstanding what an engineering study might indicate.

11 The “Traffic Control Devices Handbook” contains suggested criteria on the spacing of speed limit signs.

12 **Option:**

13 If a jurisdiction has a policy of installing Speed Limit signs in accordance with statutory requirements  
14 only on the streets that enter a city, neighborhood, or residential area to indicate the speed limit that is  
15 applicable to the entire city, neighborhood, or residential area unless otherwise posted, a CITYWIDE (R2-  
16 5aP), NEIGHBORHOOD (R2-5bP), or RESIDENTIAL (R2-5cP) plaque may be mounted above the Speed  
17 Limit sign and an UNLESS OTHERWISE POSTED (R2-5P) plaque may be mounted below the Speed Limit  
18 sign (see Figure 2B-3).

19 **Guidance:**

20 A Reduced Speed Limit (W3-5 or W3-5a), Variable Speed Zone (W3-5b), or Truck Speed Zone (W3-5c)  
21 Ahead (~~W3-5 or W3-5a~~) sign (see Section 2C.3841) should be used to inform road users of a reduced speed  
22 zone where the speed limit is being reduced by more than 10 mph, or where engineering judgment indicates  
23 the need for advance notice to comply with the posted speed limit ahead.

24 **Option:**

25 If a W3-5b sign is posted to provide notice of a variable speed zone, an END VARIABLE SPEED  
26 LIMIT (R2-13) sign (see Figure 2B-3) may be installed at the downstream end of the zone to provide notice to  
27 road users of the termination of the speed zone.

28 **Standard:**

29 If a W3-5c sign is posted to provide notice of a truck speed zone, an END TRUCK SPEED LIMIT  
30 (R2-14) sign (see Figure 2B-3) shall be installed at the downstream end of the zone to provide notice to  
31 road users of the termination of the speed zone.

32 ~~States and local agencies should conduct engineering studies to reevaluate non-statutory speed limits on~~  
33 ~~segments of their roadways that have undergone significant changes since the last review, such as the~~  
34 ~~addition or elimination of parking or driveways, changes in the number of travel lanes, changes in the~~  
35 ~~configuration of bicycle lanes, changes in traffic control signal coordination, or significant changes in traffic~~  
36 ~~volumes.~~ **Moved to earlier in this section.**

37 ~~No more than three speed limits should be displayed on any one Speed Limit sign or assembly.~~ **Moved to**  
38 **later in this section**

39 ~~When a speed limit within a speed zone is posted, it should be within 5 mph of the 85<sup>th</sup> percentile speed of~~  
40 ~~free-flowing traffic.~~ **Moved to earlier in this section**

41 ~~Speed studies for signalized intersection approaches should be taken outside the influence area of the~~  
42 ~~traffic control signal, which is generally considered to be approximately 1/2 mile, to avoid obtaining skewed~~  
43 ~~results for the 85<sup>th</sup> percentile speed.~~ **Moved to earlier in this section**

44 **Support:**

45 ~~Advance warning signs and other traffic control devices to attract the motorist’s attention to a signalized~~  
46 ~~intersection are usually more effective than a reduced speed limit zone.~~ **Moved to later in this section**

47 **Guidance:**

48 ~~An advisory speed plaque (see Section 2C.0859) mounted below a warning sign should be used to warn~~  
49 ~~road users of an advisory speed for a roadway condition. A Speed Limit sign should not be used for this~~  
50 ~~situation.~~

1 Advance traffic control warning signs (see Section 2C.36), advance intersection warning signs (see  
2 Section 2C.46), and/or other traffic control devices ~~to attract motorists' attention~~ are appropriate warning  
3 ~~prior to a signalized intersection~~ ~~are usually more effective than a reduced speed zone~~. A speed limit should  
4 ~~not be used for this purpose~~. **Changed from Support to Guidance and moved and revised from earlier in**  
5 **this Section**

6 Option:

7 ~~Other factors that may be considered when establishing or reevaluating speed limits are the following:~~

8 ~~A. Road characteristics, shoulder condition, grade, alignment, and sight distance;~~ **Moved to earlier in**

9 **this section**

10 ~~B. The pace;~~

11 ~~C. Roadside development and environment;~~

12 ~~D. Parking practices and pedestrian activity; and~~

13 ~~E. Reported crash experience for at least a 12-month period.~~

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

17 Guidance:

18 ~~No more than three speed limits should be displayed on any one Speed Limit sign or assembly.~~ **Moved**  
19 **from earlier in this section**

20 Option:

21 A ~~changeable message sign~~ variable speed limit sign that changes the speed limit for traffic and ambient  
22 conditions may be installed provided that the appropriate speed limit is displayed at the proper times and  
23 locations in accordance with paragraphs 3, 4, and 6 of this section.

24 Standard:

25 The variable speed limit sign legend "SPEED LIMIT" shall be a black legend on a white  
26 retroreflective background.

27 The variable speed limit legend shall be displayed in white LEDs on an opaque black  
28 background.

29 Option:

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

32 Guidance:

33 ~~If a changeable message sign displaying approach speeds is installed, the legend YOUR SPEED XX MPH~~  
34 ~~or such similar legend should be displayed. The color of the changeable message legend should be a yellow~~  
35 ~~legend on a black background or the reverse of these colors.~~

36 Support:

37 See Section 2C.14 for the provisions for the use of a Vehicle Speed Feedback plaque mounted below a  
38 Speed Limit Sign that displays to approaching drivers the speed at which they are traveling.

39 Advisory Speed signs and plaques are discussed in Sections 2C.0859 and 2C.1412. Temporary Traffic  
40 Control Zone Speed signs are discussed in Part 6. The WORK ZONE (G20-5aP) plaque intended for  
41 installation above a Speed Limit sign is discussed in Section 6F.126G.08. School Speed Limit signs are  
42 discussed in Section 7B.1505.

### 43 **Figure 2B-3. Speed Limit and Photo Enforcement**

#### 44 **Section 2B.142B.22 Truck Vehicle Speed Limit Plaques (R2-2P Series)**

45 Standard:

46 Where a special speed limit applies to ~~trucks or other~~ certain classes of vehicles, the ~~legend~~  
47 TRUCKS XX (R2-2P) plaque, BUSES XX (R2-2aP) plaque, TRUCKS BUSES XX (R2-2bP) plaque, or  
48 VEHICLES OVER X TONS XX (R2-2cP) plaque or such similar legend shall be displayed below the  
49 ~~legend~~ Speed Limit (R2-1) SPEED LIMIT XX on the same sign or on a separate R2-2P plaque (see  
50 Figure 2B-3) below the standard legend, except as provided in Paragraph 2 of this Section.

1 Option:

2 The legend of a Vehicle Speed Limit (R2-2P series) plaque may be combined in a single sign and  
3 displayed below the SPEED LIMIT XX legend, similar to the Combined Maximum and Minimum Speed  
4 Limits (R2-4a) sign (see Section 2B.25).

5 A different vehicle class legend may be substituted on the R2-2P series plaque -for other classes of  
6 vehicles not included in Paragraph 1 of this Section.

7 **Section ~~2B.15~~2B.23 Night Speed Limit Plaque (R2-3P)**

8 **Standard:**

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

10 *Guidance:*

11 *A Night Speed Limit (R2-3P) plaque (see Figure 2B-3) should be reversed using a white ~~retroreflectorized~~*  
12 *retroreflective legend and border on a black background.*

13 *Option:*

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

16 **Section ~~2B.16~~2B.24 Minimum Speed Limit Plaque (R2-4P) and Combined Maximum and**  
17 **Minimum Speed Limits (R2-4a) Sign**

18 **Standard:**

19 **A Minimum Speed Limit (R2-4P) plaque (see Figure 2B-3) shall be displayed only in combination**  
20 **with a Speed Limit sign. Where used, the R2-4P plaque shall be mounted below a Speed Limit (R2-1)**  
21 **sign.**

22 *Option:*

23 *Where engineering judgment determines that slow speeds on a highway might impede the normal and*  
24 *reasonable movement of traffic, the Minimum Speed Limit plaque may be installed below a Speed Limit (R2-*  
25 *1) sign to indicate the minimum legal speed. ~~If desired~~In lieu of a sign assembly with the R2-1 sign and R2-*  
26 *4P plaque, the Combined Maximum and Minimum Speed Limits (R2-4a) sign may be usedand the ~~Minimum~~*  
27 *~~Speed Limit plaque may be combined on the R2-4a sign (see Figure 2B-3).~~*

28 **Section ~~2B.17~~2B.25 Higher Fines Signs and Plaque (R2-6P, R2-10, and R2-11)**

29 **Standard Guidance:**

30 *If increased fines are imposed for traffic violations within a designated zone of a roadway, a BEGIN*  
31 *HIGHER FINES ZONE (R2-10) sign (see Figure 2B-3) or a FINES HIGHER (R2-6P) plaque (~~see Figure 2B-~~*  
32 *~~3) shall should be used to provide notice to road users. ~~If used, the FINES HIGHER plaque shall be~~~~*  
33 *~~mounted below an applicable regulatory or warning sign in a temporary traffic control zone, a school~~*  
34 *~~zone, or other applicable designated zone. **Last sentence retained as Standard and moved to later in**~~*  
35 ***this section***

36 *If an R2-10 sign or an R2-6P plaque is posted to provide notice of increased fines for traffic violations, an*  
37 *END HIGHER FINES ZONE (R2-11) sign (~~see Figure 2B-3) shall should be installed at the downstream end~~*  
38 *of the zone to provide notice to road users of the termination of the increased fines zone.*

39 *Guidance:*

40 *~~If used, +~~The BEGIN HIGHER FINES ZONE sign or FINES HIGHER plaque should be located at the*  
41 *beginning of the temporary traffic control zone, school zone, or other applicable designated zone and just*  
42 *beyond any interchanges, major intersections, or other major traffic generators.*

43 *Agencies should limit the use of the Higher Fines signs and plaque to locations where work is actually*  
44 *underway, or to locations where the roadway, shoulder, or other conditions, including the presence of a*  
45 *school zone and/or a reduced school speed limit zone, require a speed reduction or extra caution on the part*  
46 *of the road user. **This paragraph was moved up from later in the section in order to group all Guidance***  
47 ***paragraphs together***

48 **Standard:**

1       **The Higher Fines signs and plaque shall have a black legend and border on a white rectangular**  
2 **background. All supplemental plaques mounted below the Higher Fines signs and plaque shall have a**  
3 **black legend and border on a white rectangular background.**

4       **If used, the FINES HIGHER plaque shall be mounted below an applicable regulatory or warning**  
5 **sign in a temporary traffic control zone, a school zone, or other applicable designated zone. Moved from**  
6 **earlier in this section**

7 Option:

8       Alternate legends such as BEGIN (or END) DOUBLE FINES ZONE may also be used for the R2-10 and  
9 R2-11 signs.

10       The legend FINES HIGHER on the R2-6P plaque may be replaced by FINES DOUBLE (R2-6aP), \$XX  
11 FINE (R2-6bP), or another legend appropriate to the specific regulation (see Figure 2B-3).

12       The following may be mounted below an R2-10 sign or R2-6P plaque:

- 13       A. A supplemental plaque specifying the times that the higher fines are in effect (similar to the S4-1P  
14       plaque shown in Figure 7B-1), or
- 15       B. A supplemental plaque WHEN CHILDREN (WORKERS) ARE PRESENT, or
- 16       C. A supplemental plaque WHEN FLASHING (similar to the S4-4P plaque shown in Figure 7B-1) if  
17       used in conjunction with a yellow flashing beacon.

18 Support:

19       Section ~~6F-12~~6G.08 contains information regarding other signs and plaques associated with increased  
20 fines for traffic violations in temporary traffic control zones. ~~Section 7B-10 contains information regarding~~  
21 ~~other signs and plaques associated with increased fines for traffic violations in designated school zones.~~

1 **MOVEMENT AND LANE CONTROL SIGNS**

2 **Section ~~2B.18~~2B.26 Movement Prohibition Signs (R3-1 through R3-4, R3-18, and R3-27)**

3 **Standard:**

4 ~~Except as provided in Paragraphs 11 and 13, where specific movements are prohibited, Movement~~  
5 ~~Prohibition signs shall be installed. Movement Prohibition signs shall be installed where specific~~  
6 ~~movements are prohibited at an intersection approach except as provided in Paragraphs 13 and 17 of~~  
7 ~~this Section.~~

8 *Guidance:*

9 Movement Prohibition signs should only be used to prohibit a turn or through movement from an entire  
10 approach and should not be used to designate movements that are required or permitted from a specific lane  
11 or lanes on a multi-lane approach.

12 *Movement Prohibition signs should be placed where they will be most easily seen by road users who*  
13 *might be intending to make the movement.*

14 *If No Right Turn (R3-1) signs (see Figure 2B-4) are used, at least one should be placed either over the*  
15 *roadway or at a right-hand corner of the intersection.*

16 *If No Left Turn (R3-2) signs (see Figure 2B-4) are used, at least one should be placed over the roadway,*  
17 *at the far left-hand corner of the intersection, on a median, or in conjunction with the STOP sign or YIELD*  
18 *sign located on the near right-hand corner.*

19 *Except as provided in Item C of Paragraph 9 for signalized locations, if NO TURNS (R3-3) signs (see*  
20 *Figure 2B-4) are used, two signs should be used, one at a location specified for a No Right Turn sign and one*  
21 *at a location specified for a No Left Turn sign.*

22 *If No U-Turn (R3-4) signs (see Figure 2B-4) or combination No U-Turn/No Left Turn (R3-18) signs (see*  
23 *Figure 2B-4) are used, at least one should be used at a location specified for No Left Turn signs.*

24 **Option:**

25 *If both left turns and U-turns are prohibited, the combination No U-Turn/No Left Turn (R3-18) sign (see*  
26 *Figure 2B-4) may be used instead of separate R3-2 and R3-4 signs.*

27 **Support:**

28 Sections 2B.19, 2B.20, 2B.21 and 2B.22 contain information regarding lane control signs that indicate the  
29 required or permitted movements from individual lanes.

30 *Guidance:*

31 *If No Straight Through (R3-27) signs (see Figure 2B-4) are used, at least one should be placed either over*  
32 *the roadway or at a location where it can be seen by road users who might be intending to travel straight*  
33 *through the intersection.*

34 *If turn prohibition signs are installed in conjunction with traffic control signals:*

- 35 *A. The No Right Turn sign should be installed adjacent to a signal face viewed by road users in the*  
36 *right-hand lane.*
- 37 *B. The No Left Turn (or No U-Turn or combination No U-Turn/No Left Turn) sign should be installed*  
38 *adjacent to a signal face viewed by road users in the left-hand lane.*
- 39 *C. A NO TURNS sign should be placed adjacent to a signal face viewed by all road users on that*  
40 *approach, or two signs should be used.*

41 **Option:**

42 *If turn prohibition signs are installed in conjunction with traffic control signals, an additional Movement*  
43 *Prohibition sign may be post-mounted to supplement the sign mounted overhead.*

44 *Where ONE WAY signs are used (see Section 2B.4051), No Left Turn and No Right Turn signs may be*  
45 *omitted.*

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

- 48 *A. ~~Changeable message signs~~ A blank-out part-time display regulatory sign that displays the prohibited*  
49 *movement only during the time that the movement prohibition is applicable, especially at signalized*  
50 *intersections.*

- 1 B. Permanently mounted signs incorporating a supplementary legend showing the hours and days during  
2 which the prohibition is applicable. [\(See Figure 2B-4\)](#)  
3 C. Portable signs, installed by proper authority, located off the roadway at each corner of the  
4 intersection. The portable signs are only to be used during the time that the movement prohibition is  
5 applicable.

6 [Where the movement restriction applies to certain vehicle classes, permanently mounted signs](#)  
7 [incorporating a supplementary legend showing the vehicle class restriction \(R3-1b through R3-1d\) or](#)  
8 [exception \(R3-1e and R3-1f\) may be used \(See Figure 2B-4\).](#)

9 **Standard:**

10 **The blank-out part-time electronic-display Movement Prohibition sign shall consist of a red circle**  
11 **and diagonal with a white prohibited movement on an opaque black background.**

12 **Option:**

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

16 **Standard:**

17 **The No Left Turn (R3-2) sign, the No U-Turn (R3-4) sign, and the combination No U-Turn/No Left**  
18 **Turn (R3-18) sign shall not be used at approaches to roundabouts to prohibit drivers from turning left**  
19 **onto the circulatory roadway of a roundabout.**

20 **Support:**

21 At roundabouts, the use of R3-2, R3-4, or R3-18 signs to prohibit left turns onto the circulatory roadway  
22 might confuse drivers about the possible legal turning movements around the roundabout. ~~Roundabout~~  
23 ~~Directional Arrow (R6-4 series) signs (see Section 2B.4354) and/or~~ ONE WAY (R6-1R or R6-2R) ~~and/or~~  
24 [One-Direction Large Arrow \(See Section 2C.10\)](#) signs are the appropriate signs to indicate the travel direction  
25 within a roundabout.

26 **Figure 2B-4. Movement Prohibition and Lane Control Signs and Plaques**

27 **Section ~~2B.19~~2B.27 Intersection Lane Control Signs (R3-5 through R3-8)**

28 **Standard:**

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

33 **Support: Changed from Standard to Support**

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

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

38 **Guidance:**

39 *When Intersection Lane Control signs are mounted overhead, each sign [used](#) should be placed over the*  
40 *lane or a projection of the lane to which it applies. **Modified to correspond with change in Standard below***  
41 **to a Guidance**

42 *On signalized approaches where through lanes that become mandatory turn lanes, multiple-lane turns*  
43 *that include shared lanes for through and turning movements, or other lane-use regulations are present that*  
44 *would be unexpected by unfamiliar road users, overhead lane control signs should be installed at the*  
45 *signalized location over the appropriate lanes or projections thereof and in advance of the intersection over*  
46 *the appropriate lanes.*

47 *Where overhead mounting on the approach is impractical for the advance and/or intersection lane-use*  
48 *signs, one of the following alternatives should be employed:*

- 49 A. *At locations where through lanes become mandatory turn lanes, a mandatory movement lane control*  
50 *(R3-7) sign should be post-mounted on the left-hand side of the roadway where a through lane is*  
51 *becoming a mandatory left-turn lane on a one-way street or where a median of sufficient width for the*

1 signs is available, or on the right-hand side of the roadway where a through lane is becoming a  
2 mandatory right-turn lane.

- 3 B. At locations where a through lane is becoming a mandatory left-turn lane on a two-way street where  
4 a median of sufficient width for the signs is not available, and at locations where multiple-lane turns  
5 that include shared lanes for through and turning movements are present, an Advance Intersection  
6 Lane Control (R3-8 series) sign should be post-mounted in a prominent location in advance of the  
7 intersection, and consideration should be given to the use of an oversized version in accordance with  
8 Table 2B-1.

9 **Standard:** **Changed to a Guidance to allow more flexibility**

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

12 Option:

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

15 Intersection Lane Control signs may be omitted where:

- 16 A. A turn bay has been provided by physical construction or pavement markings, and  
17 B. Only the road users using such turn bays are permitted to make a turn in that direction.

18 At roundabouts, Intersection Lane Control (R3-5, R3-6, and R3-8 series) signs may display any of the  
19 arrow symbol options shown in Figure 2B-51.

20 **Figure 2B-5. Intersection Lane Control Sign Arrow Options for Roundabouts**

21 **Section ~~2B.20~~2B.28 Mandatory Movement Lane Control Signs (R3-5, R3-5a, R3-7, R3-19**  
22 **Series, and R3-20)**

23 **Standard:**

24 ~~If used, the~~ Mandatory Movement Lane Control (R3-5, R3-5a, and R3-7) signs, if used, sign (see  
25 Figure 2B-4) shall indicate only the single vehicle movement that is required from the lane. ~~If used, the~~  
26 ~~Mandatory Movement Lane Control sign shall be located in advance of the intersection, such as near~~  
27 ~~the upstream end of the mandatory movement lane, and/or at the intersection where the regulation~~  
28 ~~applies.~~ When the mandatory movement applies to lanes exclusively designated for HOV traffic, the  
29 R3-5cP supplemental plaque shall be used. When the mandatory movement applies to lanes that are  
30 not HOV facilities, but are lanes exclusively designated for buses and/or taxis, the word message R3-  
31 5dP and/or R3-5gP supplemental plaques shall be used. **Changed 2<sup>nd</sup> sentence to a Guidance, since it**  
32 **provides flexibility as to where to place the Mandatory Movement Lane Control sign**

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

36 The R3-7 ~~word message~~ sign shall be for post-mounting only. The R3-7 sign shall not be mounted  
37 at the far side of the intersection.

38 ~~Where the number of lanes available to through traffic on an approach is three or more,~~  
39 Mandatory Movement Lane Control (R3-5 and R3-5a) symbol signs, if used, shall be mounted overhead  
40 over the specific lanes to which they apply (see Section 2B.1929).

41 **Guidance:**

42 *If used, the Mandatory Movement Lane Control sign ~~shall~~ should be located in advance of the*  
43 *intersection, such as near the upstream end of the mandatory movement lane, and/or at the intersection where*  
44 *the regulation applies.* **This sentence was changed from a Standard (in paragraph 1) to a Guidance,**  
45 **since it provides flexibility as to where to place the Mandatory Movement Lane Control sign**

46 ~~If the R3-5 or R3-5a sign is post-mounted on an approach with two or fewer through lanes, a~~  
47 ~~supplemental plaque (see Figure 2B-4), such as LEFT LANE (R3-5bP), HOV 2+ (R3-5cP), TAXI LANE (R3-~~  
48 ~~5dP), CENTER LANE (R3-5eP), RIGHT LANE (R3-5fP), BUS LANE (R3-5gP), ) or BOTH LANES, should be~~  
49 ~~added above the sign to indicate the specific lane to which the mandatory movement applies. If Mandatory~~  
50 ~~Lane Movement Control (R3-5) symbol signs with supplemental R3-5bP or R3-5fP plaques are used, they~~  
51 ~~should be mounted adjacent to and along only the full-width portion of the turn lane.~~

1 The use of the Mandatory Movement Lane Control (R3-7) word message sign should be limited to only  
2 locations that are adjacent to the full-width portion of a mandatory turn lane. The R3-7 sign should not be  
3 installed adjacent to a through lane in advance of a turn bay taper or adjacent to a turn bay taper.

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

7 Where the restriction does not apply to buses or bicycles an EXCEPT BUSES (R3-7aP) or EXCEPT  
8 BICYCLES (R3-7bP) plaque should be used.

9 Option:

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

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

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

16 A LANE FOR LEFT TURN ONLY (R3-19) sign may be used where a mandatory left turn lane is added  
17 at a median location and may be post-mounted on the median at the beginning of the taper. Where a U turn is  
18 also allowed from a LANE FOR U AND LEFT TURNS ONLY (R3-19a) may be used. Where a R3-19 series  
19 sign is used, Mandatory Movement Lane Control signs along the turn lane in the median may be omitted.

20 The R3-19 series signs may be used where the added median turn lane is separated from the through lanes  
21 by a channelizing or divisional island.

22 ~~The~~On a conventional road where a shoulder that is open to part-time travel (see Chapter 2G) becomes a  
23 mandatory turn lane, the BEGIN RIGHT TURN LANE (R3-20R) sign (see Figure 2B-4) may be post-  
24 mounted on the right-hand side of the roadway at the upstream end of the turn lane taper of a mandatory right-  
25 turn lane. Where the shoulder is on the left-hand side of the roadway, the BEGIN LEFT TURN LANE (R3-  
26 20L) sign (see Figure 2B-4) may be post-mounted on a median (or on the left-hand side of the roadway for a  
27 one-way street) at the upstream end of the turn lane taper of a mandatory left-turn lane.

28 Guidance:

29 Where the transition from a paved shoulder to a mandatory turn lane might not be apparent and traffic  
30 regularly enters the shoulder to access the turn lane, a DO NOT DRIVE ON SHOULDER (R4-17) sign (see  
31 Section 2B.36) should be used to supplement the standard Mandatory Movement Lane Control (R3-5 series  
32 and/or R3-7) signs.

### 33 Section 2B.21~~2B.29~~ Optional Movement Lane Control Sign (R3-6 Series)

34 Standard:

35 ~~If used, the~~Optional Movement Lane Control (R3-6, R3-6a and R3-6ab) signs, ~~if used,~~ (see Figure  
36 ~~2B-4~~) shall be used for two or more movements from a specific lane or to emphasize permitted  
37 movements. The Optional Movement Lane Control sign shall be mounted overhead over the specific  
38 lane to which it applies. Relocated from below ~~If used, the Optional Movement Lane Control sign shall~~  
39 ~~be located in advance of the intersection, such as near the upstream end of an adjacent mandatory~~  
40 ~~movement lane, and/or at the intersection where the regulation applies.~~ Changed 2nd sentence to a  
41 Guidance, since it provides flexibility as to where to place the Optional Movement Lane Control sign

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

44 Because more than one movement is permitted from the lane, the word message ONLY shall not be  
45 used on an Optional Movement Lane Control sign. Relocated from below

46 Optional Movement Lane Control signs shall be used for two or more movements from a specific  
47 lane where a movement, not ~~normally~~ allowed by State statute or local ordinance, is permitted.

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

49 ~~Where the number of lanes available to through traffic on an approach is three or more, an~~  
50 ~~Optional Movement Lane Control (R3-6) sign, if used, shall be mounted overhead over the specific lane~~  
51 ~~to which it applies (see Section 2B.19).~~ Moved above and revised

1 Guidance:

2 If used, the Optional Movement Lane Control sign ~~shall~~ should be located overhead in advance of the  
3 intersection, such as near the upstream end of an adjacent mandatory movement lane, and/or overhead at the  
4 intersection where the regulation applies. **This sentence was changed from a Standard (in paragraph 1) to**  
5 **a Guidance, since it provides flexibility as to where to place the Optional Movement Lane Control sign**

6 *If the Optional Movement Lane Control sign is post-mounted on an approach with two or fewer through*  
7 *lanes, a supplemental plaque (see Figure 2B-4), such as LEFT LANE (R3-5bP), HOV 2+ (R3-5cP), TAXI*  
8 *LANE (R3-5dP), CENTER LANE (R3-5eP), RIGHT LANE (R3-5fP), or BUS LANE (R3-5gP), should be*  
9 *added above the R3-6 sign to indicate the specific lane from which the optional movements can be made.*

10 Option:

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

13 **Standard:** **Relocated to above**

14 ~~Because more than one movement is permitted from the lane, the word message ONLY shall not be~~  
15 ~~used on an Optional Movement Lane Control sign.~~

### 16 Section ~~2B.22~~2B.30 **Advance Intersection Lane Control Signs (R3-8 Series)**

17 Option:

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

20 The word messages ONLY, ~~OK~~, THRU, ~~ALL~~, or HOV 2+, TAXI, BUS, or BIKE, or the bicycle symbol,  
21 may be used within the border in combination with the arrow symbols of the R3-8 sign series. The HOV 2+  
22 (~~R3-5cP, R3-5dP and R3-5gP~~)-supplemental plaques may be installed at the top outside border of the R3-8  
23 sign over the applicable lane designation on the sign. The diamond symbol may be used instead of the word  
24 message HOV. The minimum allowable vehicle occupancy requirement may vary based on the level  
25 established for a particular facility.

26 Where a bicycle lane is between two general purpose lanes the R3-8 series signs may be modified to show  
27 the bicycle lane with a white legend on a black background in accordance with designs of the R3-8x series  
28 signs. (See Figure 2B-4).

29 Guidance:

30 ~~If used~~When used, an Advance Intersection Lane Control sign should be placed at an adequate distance in  
31 advance of the intersection, either along the lane tapers or at the beginning of the turn lane so that road users  
32 can select the appropriate lane (see Figures 2A-4 and 2A-5 a and b). ~~If used, the Advance Intersection Lane~~  
33 ~~Control sign should be installed either in advance of the tapers or at the beginning of the turn lane.~~

34 Option:

35 An Advance Intersection Lane Control sign may be repeated closer to the intersection along the approach  
36 for additional emphasis.

37 **Standard:**

38 An Advance Intersection Lane Control (R3-8 series) sign shall not be mounted at the far side of an  
39 intersection to which it applies.

40 Where three or more approach lanes are available to traffic, Advance Intersection Lane Control  
41 (R3-8 series) signs, if used, shall be post-mounted in advance of the intersection and shall not be  
42 mounted overhead (see Section 2B.1929).

43 When only the two outermost lanes of the roadway are shown on a R3-8 sign, the R3-5bP and R3-  
44 5fP shall be mounted above.

### 45 Section ~~2B.23~~2B.31 **RIGHT (LEFT) LANE MUST EXIT Signs (R3-33, R3-33a)**

46 Option:

47 A RIGHT (LEFT) LANE MUST EXIT (R3-33) sign (see Figure 2B-4) may be used to supplement an  
48 overhead EXIT ONLY guide sign to inform road users that traffic in the right-hand (left-hand) lane of a  
49 roadway that is approaching a grade-separated interchange is required to depart the roadway on the exit ramp  
50 at the next interchange.

1 [The R3-33a sign may be used in place of the R3-33 sign where the roadside width is limited and will not](#)  
2 [accommodate the R3-33 sign.](#)

3 Support:

4 Section 2C.4350 contains information regarding a warning sign that can be used in advance of lane drops  
5 at grade-separated interchanges.

### 6 Section ~~2B.24~~[2B.32](#) **Two-Way Left Turn Only Signs (R3-9a, R3-9b)**

7 *Guidance:*

8 *Two-Way Left Turn Only (R3-9a or R3-9b) signs (see Figure 2B-6) should be used in conjunction with the*  
9 *required pavement markings where a non-reversible lane is reserved for the exclusive use of left-turning*  
10 *vehicles in either direction and is not used for passing, overtaking, or through travel.*

11 Option:

12 The post-mounted R3-9b sign may be used as an alternate to or a supplement to the overhead R3-9a sign.  
13 The legend BEGIN or END may be used within the border of the main sign itself, or on an R3-9cP or R3-9dP  
14 plaque (~~see Figure 2B-6~~) mounted immediately above it.

15 Support:

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

### 20 Section ~~2B.25~~[2B.33](#) **BEGIN and END Plaques (R3-9cP, R3-9dP)**

21 Option:

22 The BEGIN (R3-9cP) or END (R3-9dP) plaque (see Figure 2B-6), [mounted directly above a regulatory](#)  
23 [sign](#), may be used ~~to supplement a regulatory sign~~ to inform road users of the location where a regulatory  
24 condition begins or ends.

25 **Standard:**

26 ~~If used, the BEGIN or END plaque shall be mounted directly above a regulatory sign.~~ **Incorporated**  
27 **into Option statement, because it does not warrant a Standard**

### 28 Section ~~2B.26~~[2B.34](#) **Reversible Lane Control Signs (R3-9e through R3-9i)**

29 Option:

30 A reversible lane may be used for through traffic (with left turns either permitted or prohibited) in  
31 alternating directions during different periods of the day, and the lane may be used for exclusive left turns in  
32 one or both directions during other periods of the day as well. Reversible Lane Control (R3-9e through R3-9i)  
33 signs (see Figure 2B-6) may be either static type or changeable message type. ([See Chapter 4T for lane use](#)  
34 [control signals for reversible lanes](#)). These signs may be either post-mounted or overhead.

#### 35 **Figure 2B-6. Center and Reversible Lane Control Signs and Plaques**

36 **Standard:** **Order of paragraphs reversed**

37 [Where it is determined by an engineering study that lane-use control signals or physical barriers](#)  
38 [are not necessary, the lane shall be controlled by overhead Reversible Lane Control signs \(see Figure](#)  
39 [2B-3\).](#)

40 Post-mounted Reversible Lane Control signs shall be used only as a supplement to overhead signs  
41 or signals. Post-mounted signs shall be identical in design to the overhead signs and an additional  
42 legend such as CENTER LANE shall be added to the [top of the sign \(R3-9f\)](#) to indicate which lane is  
43 controlled. ~~For both word messages and symbols, this legend shall be at the top of the sign.~~ **Edited for**  
44 **clarity**

45 ~~Where it is determined by an engineering study that lane-use control signals or physical barriers~~  
46 ~~are not necessary, the lane shall be controlled by overhead Reversible Lane Control signs (see Figure~~  
47 ~~2B-7).~~

#### 48 **Figure 2B-7. Location of Reversible Two-Way Left-Turn Signs**

1 Option:

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

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

8 **Standard:**

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

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

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

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

- 19 A. The prohibition or restriction message is the primary legend and shall be on the top for word  
20 message signs and to the far left for symbol signs,
- 21 B. The permissive use message shall be displayed as the second legend, and
- 22 C. The OTHER TIMES message shall be displayed at the bottom for word message signs and to  
23 the far right for symbol signs.

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

25 Option:

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

28 **Standard:**

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

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

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

39 Option:

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

42 Where longitudinal barriers separate opposing directions of traffic, the R3-9g or R3-9h signs may be  
43 omitted.

44 **Standard:**

45 **Flashing beacons, if used to ~~accentuate~~ supplement the overhead Reversible Lane Control signs,  
46 shall comply with the applicable requirements for flashing beacons in Chapter ~~4L4S~~.**

47 **When used in conjunction with Reversible Lane Control signs, the Turn Prohibition signs (R3-1 to  
48 R3-4, R3-18) shall be mounted overhead and separate from the Reversible Lane Control signs. The  
49 Turn Prohibition signs shall be designed and installed in accordance with Section 2B. ~~1828~~.**

50 *Guidance:*

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

4 If used, overhead signs should be located at intervals not greater than 1/4 mile. The bottom of the  
5 overhead Reversible Lane Control signs should not be more than 19 feet above the pavement grade.

6 Where more than one sign is used at the termination of a reversible lane, they should be at least 250 feet  
7 apart. Longer distances between signs are appropriate for streets with speeds over 35 mph, but the  
8 separation should not exceed 1,000 feet.

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

13 Reversible Lane Control signs and parking signs should be consistent in message during the same  
14 operational periods.

## 15 Section ~~2B.27~~2B.35 **Jughandle Signs (R3-23, R3-24, R3-25, and R3-26 Series)**

16 Support:

17 A jughandle turn is a left-turn or U-turn that because of special geometry is made by initially making a  
18 right turn. This type of turn can increase the operational efficiency of a roadway by eliminating the need for  
19 exclusive left-turn lanes and can increase the operational efficiency of a traffic control signal by eliminating  
20 the need for protected left-turn phases. A jughandle turn can also provide an opportunity for trucks and  
21 commercial vehicles to make a U-turn where the median and roadway are not of sufficient width to  
22 accommodate a traditional U-turn by these vehicles.

23 Figure 2B-8 shows the various signs that can be used for signing jughandle turns. Figure 2B-9 shows  
24 examples of regulatory and destination guide signing for various types of jughandle turns.

25 **Standard:**

26 **On multi-lane roadways, since road users generally anticipate that they need to be in the left-hand**  
27 **lane when approaching a location where they desire to turn left or make a U-turn, an ALL TURNS**  
28 **FROM RIGHT LANE (R3-23) or a U TURN FROM RIGHT LANE (R3-23a) sign (see Figure 2B-9<sup>5</sup>)**  
29 **shall be installed in advance of the location to inform drivers that left turns and/or U-turns will be made**  
30 **from the right-hand lane.**

31 Option:

32 Where a median of sufficient width is available, supplemental regulatory or guide signs may also be  
33 placed on the left-hand side of the roadway.

34 **Standard:**

35 **An R3-24 series sign with an upward diagonal arrow pointing to the right if the jughandle entrance**  
36 **is designed as an exit ramp (see Drawings A and B of Figure 2B-9) or an R3-25 series sign with a**  
37 **horizontal arrow pointing to the right if the jughandle entrance is designed as an intersection shall be**  
38 **installed on the right-hand side of the roadway at the entrance to the jughandle. The legend on the sign**  
39 **shall be ALL TURNS, U TURN, or U AND LEFT TURNS, as appropriate.**

40 **If the jughandle is designed such that the jughandle entrance is downstream of the location where**  
41 **the turn would normally have been made (see Drawing C of Figure 2B-9), an R3-26 series sign with an**  
42 **arrow pointing straight upward shall be installed on the right-hand side of the roadway at the**  
43 **intersection to inform road users that they need to proceed straight through the intersection in order to**  
44 **make a left turn or U-turn. The legend on the sign shall be U TURN or U AND LEFT TURNS, as**  
45 **appropriate.**

46 Support:

47 The R3-24, R3-25, and R3-26 series of signs are designed to be mounted below conventional guide signs.

48 Section 2C.~~4~~12 contains information regarding the use of advisory exit and ramp speed signs for exit  
49 ramps.

50 Section 2D.39 contains information regarding the use of guide signs for jughandles.

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**Figure 2B-8. Jughandle Regulatory Signs**

**Figure 2B-9. Examples of Applications of Jughandle Regulatory and Guide Signing**

1 **PASSING, KEEP RIGHT AND SLOW TRAFFIC SIGNS**

2 **Section ~~2B.28~~2B.36 DO NOT PASS Sign (R4-1)**

3 Option:

4 The DO NOT PASS (R4-1) sign (see Figure 2B-10) may be used in addition to pavement markings (see  
5 Section 3B.0203) to emphasize the restriction on passing. The DO NOT PASS sign may be used at the  
6 beginning of, and at intervals within, a zone through which sight distance is restricted or where other  
7 conditions make overtaking and passing inappropriate.

8 If signing is needed on the left-hand side of the roadway for additional emphasis, NO PASSING ZONE  
9 (W14-3) signs may be used (see Section 2C.45)53.

10 Support:

11 Standards for determining the location and extent of no-passing zone pavement markings are set forth in  
12 Section 3B.0203.

13 **Section ~~2B.29~~2B.37 PASS WITH CARE Sign (R4-2)**

14 *Guidance:*

15 *The PASS WITH CARE (R4-2) sign (see Figure 2B-10) should be installed at the downstream end of a no-*  
16 *passing zone if a DO NOT PASS sign has been installed at the upstream end of the zone.*

17 **Section ~~2B.30~~2B.38 KEEP RIGHT EXCEPT TO PASS Sign (R4-16) and SLOWER TRAFFIC**  
18 **KEEP RIGHT Sign (R4-3)**

19 Option:

20 The KEEP RIGHT EXCEPT TO PASS (R4-16) sign (see Figure 2B-10) may be used on ~~multi-lane~~  
21 roadways where there are two lanes in one direction of travel to direct drivers to stay in the right-hand lane  
22 except when they are passing another vehicle.

23 *Guidance:*

24 *If used, the KEEP RIGHT EXCEPT TO PASS sign should be installed just beyond the beginning of a*  
25 *~~multi~~two-lane section of roadway and at selected locations along ~~multi~~two-lane roadways for additional*  
26 *emphasis.*

27 Option:

28 The SLOWER TRAFFIC KEEP RIGHT (R4-3) sign (see Figure 2B-10) may be used on multi-lane  
29 roadways to reduce unnecessary lane changing.

30 *Guidance:*

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

35 **Section ~~2B.31~~2B.39 TRUCKS USE RIGHT LANE Sign (R4-5)**

36 *Guidance:*

37 *If an extra lane has been provided for trucks and other slow-moving traffic, a SLOWER TRAFFIC KEEP*  
38 *RIGHT (R4-3) sign (see Figure 2B-10), TRUCKS USE RIGHT LANE (R4-5) sign (see Figure 2B-10), or other*  
39 *appropriate sign should be installed at the beginning of the lane.*

40 Option:

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

44 The TRUCKS USE RIGHT LANE (R4-5) sign may be used on multi-lane roadways to reduce  
45 unnecessary lane changing.

46 *Guidance:*

47 *If an extra lane has been provided for trucks and other slow-moving traffic, a Lane Ends sign (see Section*  
48 *2C.4249) should be installed in advance of the point where the extra lane ends. Appropriate pavement*

1 markings should be installed at both the upstream and downstream ends of the extra lane (see Section  
2 3B.0912 and Figure 3B-13).

3 Support:

4 Section 2D.51 contains information regarding advance information signs for extra lanes that have been  
5 provided for trucks and other slow-moving traffic.

### 6 Section **2B.322B.40** Keep Right and Keep Left Signs (R4-7 Series, R4-8 Series)

7 Option:

8 The Keep Right (R4-7) sign (see Figure 2B-10) may be used at locations where it is necessary for traffic  
9 to pass only to the right-hand side of a roadway feature or obstruction. The Keep Left (R4-8) sign (see Figure  
10 2B-10) may be used at locations where it is necessary for traffic to pass only to the left-hand side of a roadway  
11 feature or obstruction.

12 *Guidance:*

13 *At locations where it is not readily apparent that traffic is required to keep to the right, a Keep Right sign*  
14 *should be used.*

15 *If used, the Keep Right sign should be installed as close as practical to approach ends of raised medians,*  
16 *parkways, islands, and underpass piers. The sign should be mounted on the face of or just in front of a pier or*  
17 *other obstruction separating opposite directions of traffic in the center of the highway such that traffic will*  
18 *have to pass to the right-hand side of the sign.*

19 Where the approach end of the island channelizes traffic away from the approach direction, such as on a  
20 loop ramp, the word legend (R4-7a, R4-7b, R4-8a, or R4-8b) signs should be used instead of the symbol (R4-7  
21 or R4-8) signs to emphasize the degree of curvature away from the approach direction (see Figure 2B-11).

#### 22 **Figure 2B-10. Passing, Keep Right, and Slow Traffic Signs**

#### 23 **Figure 2B-11. Examples of Keep Right and Keep Left Sign Placement**

24 **Standard:**

25 **The Keep Right (Left) sign shall not be installed on the right-hand (left-hand) side of the roadway in**  
26 **a position where traffic must pass to the left-hand (right-hand) side of the sign.**

27 Option:

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

29 Word message KEEP RIGHT (LEFT) with an arrow (R4-7a or R4-7b) signs (see Figure 2B-10) may be  
30 used instead of the R4-7 or R4-8 symbol signs.

31 ~~Where the obstruction obscures the Keep Right sign, the minimum placement height may be increased for~~  
32 ~~better sign visibility.~~ **Unnecessary, already addressed in Chapter 2A**

33 A narrow Keep Right (R4-7c) sign (see Figure 2B-10) may be installed on the approach end of a median  
34 island that is less than 4 feet wide at the point where the sign is to be located.

35 **Standard:**

36 **A narrow Keep Right (R4-7c) sign shall not be installed on a median island that has a width of 4 feet**  
37 **or more at the point where the sign is to be located.**

38 Option:

39 The Keep Right sign may be installed in the median of a divided highway crossing that functions as a  
40 single intersection such that it is visible to traffic on the divided highway and angled as needed toward the  
41 applicable crossroad approach as shown in Figure 2B-18.

42 Support:

43 Section 2B.40 provides more information about the use of the Keep Right sign in combination with or in  
44 lieu of ONE-WAY signs at divided highway crossings.

45 **Standard:**

46 **If Keep Right signs are installed, they shall be placed as close as practical to the approach ends of**  
47 **the medians and shall be visible to traffic on the divided highway and angled toward the applicable**  
48 **crossroad approach as shown in Figure 2B-18.**

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**Section ~~2B.33~~2B.41 STAY IN LANE Sign (R4-9)**

Option:

A STAY IN LANE (R4-9) sign (see Figure 2B-10) may be used on multi-lane highways to direct road users to stay in their lane until conditions permit shifting to another lane.

Guidance:

*If a STAY IN LANE sign is used, it should be accompanied by a solid double white lane line(s) to prohibit lane changing.*

**Section ~~2B.34~~2B.42 RUNAWAY VEHICLES ONLY Sign (R4-10)**

Guidance:

*A RUNAWAY VEHICLES ONLY (R4-10) sign (see Figure 2B-10) should be installed near a truck escape (or runaway truck) ramp entrance to discourage other road users from entering the ramp.*

**Section ~~2B.35~~2B.43 Slow Vehicle Turn-Out Signs (R4-12, R4-13, and R4-14)**

Support:

On two-lane highways in areas where traffic volumes and/or vertical or horizontal curvature make passing difficult, turn-out areas are sometimes provided for the purpose of giving a group of faster vehicles an opportunity to pass a slow-moving vehicle.

Option:

A SLOW VEHICLES WITH XX OR MORE FOLLOWING VEHICLES MUST USE TURN-OUT (R4-12) sign (see Figure 2B-10) may be installed in advance of a turn-out area to inform drivers who are driving so slow that they have accumulated a specific number of vehicles behind them that they are required by the traffic laws of that State to use the turn-out to allow the vehicles following them to pass.

Support:

The specific number of vehicles displayed on the R4-12 sign provides law enforcement personnel with the information they need to enforce this regulation.

Option:

If an R4-12 sign has been installed in advance of a turn-out area, a SLOW VEHICLES MUST USE TURN-OUT AHEAD (R4-13) sign (see Figure 2B-10) may also be installed downstream from the R4-12 sign, but upstream from the turn-out area, to remind slow drivers that they are required to use a turn-out that is a short distance ahead.

**Standard:**

**If an R4-12 sign has been installed in advance of a turn-out area, a SLOW VEHICLES MUST TURN OUT (with arrow) (R4-14) sign (see Figure 2B-10) shall be installed at the entry point of the turn-out area.**

Support:

Section 2D.52 contains information regarding advance information signs for slow vehicle turn-out areas.

**Section ~~2B.36~~2B.44 DO NOT DRIVE ON SHOULDER Sign (R4-17) and DO NOT PASS ON SHOULDER Sign (R4-18)**

Option:

The DO NOT DRIVE ON SHOULDER (R4-17) sign (see Figure 2B-10) may be installed to inform road users that using the shoulder of a roadway as a travel lane is prohibited.

The DO NOT PASS ON SHOULDER (R4-18) sign (see Figure 2B-10) may be installed to inform road users that using the shoulder of a roadway to pass other vehicles is prohibited.

**Section 2B.45 ALL TRAFFIC Sign (R4-20) and RIGHT (LEFT) TURN ONLY Sign (R4-21)**

Option:

1        The ALL TRAFFIC (R4-20) sign may be used at an intersection where all traffic on the approach to the  
2 intersection must turn in the direction indicated and the Movement Prohibition (see Section 2B.28) and/or One  
3 Way (see Section 2B.51) signs do not adequately convey the allowable direction of travel.

4        The RIGHT (LEFT) TURN ONLY (R4-21) sign may be used at or on an approach to an intersection  
5 where all traffic on that approach must turn in the direction indicated.

6        Guidance:

7        The RIGHT (LEFT) TURN ONLY sign should not be used for a channelized turn lane separated from the  
8 adjacent travel lanes by an island.

9        **Standard:**

10       **The ALL TRAFFIC sign shall not be used to substitute for the Keep Right (R4-7 series) or Keep**  
11 **Left (R4-8 series) signs.**

12       **The RIGHT (LEFT) TURN ONLY sign shall not be used to substitute for the Mandatory**  
13 **Movement Lane Control signs (see Sections 2B.29 and 2B.30).**

14

## SELECTIVE EXCLUSION SIGNS

### Section ~~2B.39~~ 2B.46 Selective Exclusion Signs

Support:

Selective Exclusion signs (see Figure 2B-~~41~~12) 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. NO COMMERCIAL VEHICLES (R5-4),
- D. NO TRUCKS (VEHICLES) WITH LUGS (R5-5),
- E. No Bicycles (R5-6),
- F. NO NON-MOTORIZED TRAFFIC (R5-7),
- G. NO MOTOR-DRIVEN CYCLES (R5-8),
- H. No Pedestrians (R9-3),
- I. No Skaters (R9-13),
- J. No Equestrians (R9-14),
- K. No Snowmobiles (R9-15), and
- ~~K.L.~~ No Hazardous Material (R14-3) (see Section ~~2B.62~~2B.72).
- M. NO THRU TRAFFIC (R5-12),
- N. NO THRU TRUCKS (R5-2b), and
- O. EXCEPT LOCAL DELIVERIES plaque (R5-2aP)

Option:

Appropriate combinations or groupings of these legends into a single sign, such as NO PEDESTRIANS BICYCLES MOTOR-DRIVEN CYCLES (R5-10 and R5-10a), or NO PEDESTRIANS OR BICYCLES (R5-10b) may be used.

*Guidance:*

*If an exclusion is governed by vehicle weight, a Weight Limit sign (see Section ~~2B.59~~2B.69) should be used instead of a Selective Exclusion sign.*

*If used on a ~~freeway or expressway~~ ramp to a freeway or expressway where pedestrian and bicycle travel are prohibited by law or regulation, the NO PEDESTRIANS OR BICYCLES (R5-10b) sign should be installed in a location where it is clearly visible to any pedestrian or bicyclist attempting to enter the limited access facility from a street intersecting the ~~exit~~ ramp. In locations where a freeway or expressway is accessed from a ramp from a roadway parallel to the freeway or expressway, the sign should be placed in a location that clearly indicates the prohibition applies only to the freeway or expressway or to the ramp. Edited to improve consistency*

*The Selective Exclusion sign should be placed on the right-hand 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 NO PEDESTRIANS (R5-10c) or No Pedestrian Crossing (R9-3) sign (see Section ~~2B.51~~2B.61) should be installed so as to be clearly visible to pedestrians who are at a location where an alternative route is available.*

Option:

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

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

1 The NO THRU TRAFFIC (R5-12) or NO THRU TRUCKS (R5-2b) signs may be used at locations to  
2 prohibit through traffic from using a particular roadway or facility.

3 The EXCEPT LOCAL DELIVERIES (R5-2aP) plaque may be mounted below the R5-2 or R5-2b sign.  
4

5 The No Snowmobiles Symbol sign (R9-15) may be used where snowmobiles are prohibited on roadways  
6 or shared-use paths.

7 The AUTHORIZED VEHICLES ONLY (R5-11) sign may be used at median openings and other  
8 locations to prohibit vehicles from using the median opening or facility unless they have special permission  
9 (such as law enforcement vehicles or emergency vehicles) or are performing official business (such as  
10 highway agency vehicles).

11 **Figure 2B-12. Selective Exclusion Signs**  
12

1 [DO NOT ENTER, WRONG WAY, ONE-WAY and Related Signs and Plaques](#)

2 **Section ~~2B.37~~2B.47 DO NOT ENTER Sign (R5-1)**

3 **Standard:**

4 The DO NOT ENTER (R5-1) sign (see Figure ~~2B-13~~2B-11) shall be used where traffic is prohibited  
5 from entering a restricted roadway.

6 The DO NOT ENTER (R5-1) sign shall be used where a two-way roadway becomes a one-way  
7 roadway as shown in Figure 2B-15, and near the downstream end of an interchange exit ramp as shown  
8 in Figure 2B-19 (see Section 2B.49).

9 Except as noted in paragraph 4, a DO NOT ENTER (R5-1) sign shall be installed at an intersection  
10 with a divided highway where the crossing functions as two separate intersections, as shown in Figure  
11 2B-16.

12 Option:

13 A DO NOT ENTER (R5-1) sign may be installed at an intersection with a divided highway where the  
14 crossing functions as a single intersection as shown in Figure 2B-18.

15 A DO NOT ENTER (R5-1) sign may be omitted on a low speed urban street that is a divided highway at a  
16 crossing that functions as two separate intersections.

17 Guidance:

18 *The DO NOT ENTER sign, if used, should be placed directly in view of a road user at the point where a*  
19 *road user could wrongly enter a divided highway, one-way roadway, or ramp (~~see Figure 2B-12~~). The sign*  
20 *should be mounted ~~on the right-hand side of the roadway~~, facing traffic that might enter the roadway or ramp*  
21 *in the wrong direction.*

22 At a crossing with a divided highway that functions as a single intersection; the sign, if used, should be  
23 placed on the outside edge side of the roadway facing traffic that might enter the roadway in the wrong  
24 direction.

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

27 Option:

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

30 A second DO NOT ENTER sign ~~on the left-hand side of the roadway~~ may be used, particularly where  
31 traffic approaches from an intersecting roadway (see Figure 2B-~~12~~16).

32 White or red LEDs may be installed within the border of the DO NOT ENTER sign to enhance the  
33 conspicuity of the sign. The LEDs may be vehicle actuated to flash at the rates as shown in Section 2A.20.

34 Support:

35 Section ~~2B.41~~2B.49 contains information regarding an optional lower mounting height for DO NOT  
36 ENTER signs that are located along an exit ramp facing a road user who is traveling in the wrong direction.

37 **Figure 2B-13. DO NOT ENTER, WRONG WAY, ONE WAY and Related Signs and Plaques**

38 **Section ~~2B.38~~2B.48 WRONG WAY Sign (R5-1a)**

39 Option:

40 The WRONG WAY (R5-1a) sign (see Figure ~~2B-11~~2B-13) may be used as a supplement to the DO NOT  
41 ENTER sign where ~~an exit ramp intersects a crossroad or~~ a crossroad intersects a one-way roadway in a  
42 manner that does not physically discourage or prevent wrong-way entry (see Figure 2B-~~12~~16).

43 Guidance:

44 *If used, the WRONG WAY sign should be placed at a location along the exit ramp or the one-way*  
45 *roadway farther from the crossroad than the DO NOT ENTER sign (see Section 2B.~~41~~50).*

46 The WRONG WAY sign should be placed on the same side of the road as the DO NOT ENTER sign.

47 Support:

1 Section ~~2B.41~~2B.49 contains information regarding an optional lower mounting height for WRONG  
2 WAY signs [mounted below DO NOT ENTER signs](#) that are located along an exit ramp facing a road user  
3 who is traveling in the wrong direction.

4 Option:

5 [White or red LEDs may be installed within the border of the WRONG WAY sign to enhance the](#)  
6 [conspicuity of the sign. The LEDs may be vehicle actuated to flash at the rates as shown in Section 2A.20.](#)

7 **Section ~~2B.41~~ 2B.49 Wrong-Way Traffic Control at Interchange Ramps**

8 **Standard:**

9 **At interchange exit ramp terminals where the ramp intersects a crossroad in such a manner that**  
10 **wrong-way entry could inadvertently be made, the following signs shall be used (see Figure ~~2B-18~~2B-**  
11 **19):**

- 12 **A. At least one ONE WAY sign for each direction of travel on the crossroad shall be placed where**  
13 **the exit ramp intersects the crossroad.**
- 14 **B. At least one DO NOT ENTER sign shall be conspicuously placed near the downstream end of**  
15 **the exit ramp in positions appropriate for full view of a road user starting to enter wrongly from**  
16 **the crossroad.**
- 17 **C. At least one WRONG WAY sign shall be placed on the exit ramp facing a road user traveling in**  
18 **the wrong direction.**

19 *Guidance:*

20 *In addition, the following pavement markings should be used (see Figure ~~2B-18~~2B-19):*

- 21 *A. On two-lane paved crossroads at interchanges, solid double yellow lines should be used as a center*  
22 *line for an adequate distance on both sides approaching the ramp intersections.*
- 23 *B. Where crossroad channelization or ramp geometrics do not make wrong-way movements difficult, a*  
24 *lane-use arrow should be placed in each lane of an exit ramp near the crossroad terminal where it*  
25 *will be clearly visible to a potential wrong-way road user.*

26 Option:

27 The following traffic control devices may be used to supplement the signs and pavement markings  
28 described in Paragraphs 1 and 2:

- 29 A. Additional ONE WAY signs may be placed, especially on two-lane rural crossroads, appropriately in  
30 advance of the ramp intersection to supplement the required ONE WAY sign(s).
- 31 B. Additional WRONG WAY signs may be used.
- 32 C. Slender, elongated wrong-way arrow pavement markings (see Figure 3B-24) intended primarily to  
33 warn wrong-way road users that they are traveling in the wrong direction may be placed upstream  
34 from the ramp terminus (see Figure ~~2B-18~~2B-19) to indicate the correct direction of traffic flow.  
35 Wrong-way arrow pavement markings may also be placed on the exit ramp at appropriate locations  
36 near the crossroad junction to indicate wrong-way movement. The wrong-way arrow markings may  
37 consist of pavement markings or bidirectional red-and-white raised pavement markers or other units  
38 that show red to wrong-way road users and white to other road users (see Figure ~~3B-24~~3B-21).
- 39 D. Lane-use arrow pavement markings may be placed on the exit ramp and crossroad near their  
40 intersection to indicate the permissive direction of flow.
- 41 E. Freeway entrance signs (see Section 2D.~~46~~49) may be used.
- 42 [F. Lane control signs or movement prohibition signs may be used on the approaches to the exit ramp.](#)
- 43 [G. A Keep Right \(R4-7 or R4-7c\) may be used on a ramp median nose for wrong-way traffic control.](#)

44 *Guidance:*

45 *On interchange entrance ramps where the ramp merges with the through roadway and the design of the*  
46 *interchange does not clearly make evident the direction of traffic on the separate roadways or ramps, a ONE*  
47 *WAY sign visible to traffic on the entrance ramp and through roadway should be placed on each side of the*  
48 *through roadway near the entrance ramp merging point as illustrated in Figure ~~2B-19~~2B-20.*

49 Option:

50 [On interchange entrance ramps where the ramp merges with the through roadway and the design of the](#)  
51 [interchange does not clearly make evident the direction of traffic on the separate roadways or ramps a NO](#)

1 [LEFT TURN \(R3-2\) sign may be located on the left side of the entrance ramp at the gore. If a NO LEFT](#)  
2 [TURN \(R3-2\) sign is located on the left a supplemental R3-2 sign may be installed right side of the entrance](#)  
3 [ramp.](#)

4 [On interchange entrance ramps where the ramp merges with the through roadway and the design clearly](#)  
5 [indicates the direction of flow, a ONE WAY sign may be placed visible to traffic on the entrance ramp and/or](#)  
6 [a NO TURNS \(R3-3\) sign may be placed visible to traffic on the entrance ramp and through roadway at the](#)  
7 [gore area as illustrated in Figure 2B-20.](#)

8 ~~At locations where engineering judgment determines that a special need exists, other standard warning or~~  
9 ~~prohibitive methods and devices may be used as a deterrent to the wrong-way movement.~~

10 Where there are no parked cars, pedestrian activity or other obstructions such as snow or vegetation, and  
11 if an engineering study indicates that a lower mounting height would address wrong-way movements on  
12 freeway or expressway exit ramps, a DO NOT ENTER sign(s) and/or a WRONG WAY sign(s) that is located  
13 along the exit ramp [at a location downstream from the intersection with the crossroad](#) facing a road user who  
14 is traveling in the wrong direction may be installed at a minimum mounting height of 3 feet, measured  
15 vertically from the bottom of the sign to the elevation of the near edge of the pavement. [At the intersection](#)  
16 [with the crossroad, a WRONG WAY sign may be mounted at a minimum height of 3 feet on the same support](#)  
17 [on which a DO NOT ENTER sign is mounted at a height that complies with the provisions of Section 2A.18.](#)  
18 [\(See Figure 2B-14\)](#)

19 Support:

20 Sections 2B.3748, 2B.3849, and 2B.4253 contains further information on signing to avoid wrong-way  
21 movements at at-grade intersections on expressways.

## 22 **Section 2B.402B.50 ONE WAY Signs (R6-1, R6-2)**

23 Standard:

24 Except as provided in Paragraph 6, the ONE WAY (R6-1 or R6-2) sign (see Figure 2B-1315) shall  
25 be used to indicate streets or roadways upon which vehicular traffic is allowed to travel in one direction  
26 only.

27 ONE WAY signs shall be placed parallel to the one-way street at all alleys and roadways that  
28 intersect one-way roadways as shown in Figure 2B-142B-16.

29 At the crossing of a roadway with a divided highway that functions as two separate intersections, ~~At~~  
30 ~~an intersection with a divided highway that has a median width at the intersection itself of 30 feet or~~  
31 ~~more~~, ONE WAY signs shall be placed, visible to each crossroad approach, on the near right and far  
32 left corners of each intersection with the directional roadways (see Figure 2B-152B-17).

33 At the crossing of a roadway with a divided highway that functions as a single intersection ~~At an~~  
34 ~~intersection with a divided highway that has a median width at the intersection itself of less than 30 feet,~~  
35 Keep Right (R4-7) (see Section 2B.42) signs and/or ONE WAY signs shall be installed (see Figures 2B-  
36 162B-10 and 2B-172B-11). If Keep Right signs are installed, they shall be placed as close as practical to  
37 the approach ends of the medians and shall be visible to traffic on the divided highway and angled (as  
38 needed) toward the applicable ~~each~~ crossroad approach as shown in Figure 2B-1618. If ONE WAY  
39 signs are installed, they shall be placed on the near right and far left corners of the intersection and  
40 shall be visible to each crossroad approach.

41 Option:

42 At the crossing of a roadway with a divided highway, regardless of function as a single or separate  
43 intersections, ~~At an intersection with a divided highway that has a median width at the intersection itself of~~  
44 ~~less than 30 feet,~~ ONE WAY signs may also be placed on the far right corner of the intersection as shown in  
45 Figures 2B-17 and 2B-162B-18 and 2B-17.

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

48 Support:

49 [See Section 2B.49 for the placement of ONE WAY signs at a crossroad with an interchange.](#)

50 Standard:

51 If used at unsignalized intersections with one-way streets, ONE WAY signs shall be placed on the  
52 near right and the far left corners of the intersection facing traffic entering or crossing the one-way  
53 street (see Figure 2B-142B-16).

1 If used at signalized intersections with one-way streets, ONE WAY signs shall be placed near the  
2 appropriate signal faces, on the poles holding the traffic signals, on the mast arm or span wire holding  
3 the signals, or at the locations specified for unsignalized intersections.

4 At unsignalized T-intersections where the roadway at the top of the T-intersection is a one-way  
5 roadway, ONE WAY signs shall be placed on the near right and the far side of the intersection facing  
6 traffic on the stem approach (see Figure ~~2B-14~~2B-16).

7 ~~At signalized T-intersections where the roadway at the top of the T-intersection is a one-way roadway,  
8 ONE WAY signs shall be placed near the appropriate signal faces, on the poles holding the traffic signals, on  
9 the mast arm or span wire holding the signals, or at the locations specified for unsignalized intersections.~~

10 Option:

11 Where the central island of a roundabout allows for the installation of signs, ONE WAY signs may be  
12 used instead of or in addition to ~~Roundabout Directional Arrow (R6-4 series) signs~~ a One-Direction -Large  
13 Arrow Sign (see Section ~~2B.4354~~2C.10) to direct traffic counter-clockwise around the central island.

14 **Standard:**

15 When a One-Direction Large Arrow sign is used without a ONE WAY sign, the R6-5P plaque shall  
16 be mounted below the Yield sign on the approach to a roundabout.

17 Guidance:

18 *Where used on the central island of a roundabout, the mounting height of a ONE WAY sign should be at*  
19 *least 4 feet, measured vertically from the bottom of the sign to the elevation of the near edge of the traveled*  
20 *way.*

21 Support:

22 Examples of Regulatory and Warning signs for roundabouts are shown in Figures 2B-21 through 2B-23.

23 ~~Using ONE WAY signs on the central island of a roundabout might result in some drivers incorrectly~~  
24 ~~concluding that the cross street is a one-way street. Using Roundabout Directional Arrow signs might reduce~~  
25 ~~this confusion. However, using ONE WAY signs might be necessary in States that have defined a roundabout~~  
26 ~~as a series of T-intersections.~~

27 Option:

28 The BEGIN ONE WAY (R6-6) sign (see Figure 2B-13) may be used to notify road users of the beginning  
29 point of a one direction of travel restriction on the street or roadway. The END ONE WAY (R6-7) sign (see  
30 Figure 2B-13) may be used to notify road users of the ending point of a one direction of travel restriction on  
31 the street or roadway.

## 32 **Section 2B.4251 Divided Highway Crossing Signs (R6-3, R6-3a)**

33 **Standard:**

34 On unsignalized minor-street approaches from which both left turns and right turns are permitted  
35 onto a divided highway ~~that has a median width at the intersection itself of 30 feet or more~~ at a crossing  
36 that functions as two separate intersections (see Section 2A.23), except as provided in Paragraph 2, a  
37 Divided Highway Crossing (R6-3 or R6-3a) sign (see Figure 2B-13) shall be used to advise road users  
38 that they are approaching an intersection with a divided highway (see Figure 2B-~~15~~17).

39 **Option:**

40 If the divided highway ~~that has a median width at the intersection itself of 30 feet or more~~ has a traffic  
41 volume of less than 400 AADT and a speed limit of 25 mph or less, at a crossing that functions as two  
42 separate intersections, the Divided Highway Crossing signs facing the unsignalized minor-street approaches  
43 may be omitted.

44 A Divided Highway Crossing sign may be used on signalized minor-street approaches from which both  
45 left turns and right turns are permitted onto a divided highway to advise road users that they are approaching  
46 an intersection with a divided highway.

47 **Standard:**

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

50 The Divided Highway Crossing sign shall be located on the near right corner of the intersection,  
51 mounted beneath a STOP or YIELD sign or on a separate support.

52 Option:

1 An additional Divided Highway Crossing sign may be installed on the left-hand side of the approach to  
2 supplement the Divided Highway Crossing sign on the near right corner of the intersection.

3 **Figure 2B-14. Examples of Low-Mounted Wrong-Way Signs with Do Not Enter Signs for**  
4 **Wrong Way Traffic Control**

5 **Figure 2B-15. Locations of ONE WAY Signs**

6 **Figure 2B-16. Locations of Do Not Enter and Wrong-Way Signing for Divided Highway**  
7 **Crossings that Function as Two Separate Intersections**

8 **Figure 2B-17. ONE WAY Signing for Divided Highway Crossings that Function as Two**  
9 **Separate Intersections**

10 **Figure 2B-18. ONE WAY, DO NOT ENTER, and WRONG WAY Signing for Divided**  
11 **Highway Crossings that Function as a Single Intersection**

12 **Figure 2B-19. Example of Application of Regulatory Signing and Pavement Markings at**  
13 **an Exit Ramp Termination to Deter Wrong-Way Entry**

14 **Figure 2B-20. Example of Application of Regulatory Signing and Pavement Markings at an**  
15 **Entrance Ramp Terminal**

16 ~~Section 2B.43 Roundabout Directional Arrow Signs (R6-4, R6-4a, and R6-4b)~~ Section deleted,  
17 see Section 2B.50 for the use of ONE WAY sign and Section 2C.10 for the use of a LARGE  
18 ARROW sign at a roundabout

19 Section ~~2B.44-2B.52~~ Roundabout Circulation Plaque (R6-5P) This text was relocated from  
20 existing Section 2B.44 and revised

21 *Guidance:*

22 *Where the central island of a roundabout does not provide a reasonable place to install a sign,*  
23 *Roundabout Circulation (R6-5P) plaques should be placed below the YIELD signs on each approach.*

24 *Option:*

25 At roundabouts where ~~Roundabout Directional Arrow signs and/or~~ ONE WAY and/or One-Direction  
26 Large Arrow signs have been installed in the central island, Roundabout Circulation plaques may be placed  
27 below the YIELD signs on approaches to roundabouts to supplement the central island signs.

28 The Roundabout Circulation plaque may be used at any type of circular intersection.

29 **Figure 2B-21. Example of Regulatory and Warning Signs for a Mini-Roundabout**

30 **Figure 2B-22. Example of Regulatory and Warning Signs for a One-Lane Roundabout**

31 **Figure 2B-23. Example of Regulatory and Warning Signs for a Two-lane Roundabout with**  
32 **Consecutive Double Lefts**

33 ~~Section 2B.45 Examples of Roundabout Signing~~ Figures retained in Chapter 2B; a separate  
34 section dedicated to examples is not needed

35  
36 **PARKING, STANDING, STOPPING, AND EMERGENCY SIGNS**

37 **Section ~~2B.46-2B.53~~ Parking, Standing, and Stopping Signs (R7 and R8 Series)**

38 Support:

39 ~~Signs governing~~ Parking signs pertain to the parking, stopping, and standing of vehicles along the roadway  
40 and in designated parking areas. They cover a wide variety of regulations, and only general guidance can be  
41 provided here. The word “standing” when used on the R7 and R8 series of signs refers to the practice of a  
42 driver keeping the vehicle in a stationary position while continuing to occupy the vehicle.

43 Parking signs are categorized as either (1) prohibiting parking or (2) permitting parking with restrictions  
44 on how parking is allowed. They are further categorized as either parking (R7 series) signs or emergency  
45 parking (R8 series) signs.

46 The types of parking prohibitions that might be encountered include, but are not limited to:

47 1. Parking, standing, or stopping is prohibited at all times.

2. Parking, standing, or stopping is prohibited only certain times of the day and/or days of the week.
3. Parking, standing, or stopping is prohibited with exceptions, such as for bus stops, loading/unloading zones, persons with disabilities, or electric vehicle charging stations.
4. Parking, standing, or stopping is prohibited under certain conditions, such as Snow Emergency Routes.

Permissive parking signs allowing parking with restrictions include, but are not limited to:

1. Parking only allowed for limited time duration, such as 30 minutes, 1 hour, etc.
2. Metered parking requiring payment at an individual or a multi-space parking meter, or through electronic means such as by telephone or mobile application
3. Reserved parking for persons with disabilities or patrons or employees of a business
4. Angled or back-in angled parking when it is not commonly utilized in the area.
5. Parking programs such as neighborhood/residential permits, school areas, or special events.

~~Typical examples of parking, stopping, and standing signs and plaques (see Figures 2B-24 and 2B-25) are as follows:~~

- ~~1. NO PARKING ANY TIME (R7-1);~~
- ~~2. NO PARKING X:XX AM TO X:XX PM (R7-2, R7-2a);~~
- ~~3. NO PARKING EXCEPT SUNDAYS AND HOLIDAYS (R7-3);~~
- ~~4. NO STANDING ANY TIME (R7-4);~~
- ~~5. XX HOUR PARKING X:XX AM — X:XX PM (R7-5);~~
- ~~6. NO PARKING LOADING ZONE (R7-6);~~
- ~~7. NO PARKING BUS STOP (R7-7, R7-107, R7-107a, R7-107b);~~
- ~~8. RESERVED PARKING for persons with disabilities (R7-8);~~
- ~~9. VAN ACCESSIBLE (R7-8P);~~
10. Pay Station (R7-20);
11. Pay Parking (R7-21, R7-21a, R7-22);
12. Parking Permitted X:XX AM TO X:XX PM (R7-23);
13. Parking Permitted XX HOUR(S) XX AM — XX PM (R7-23a);
14. XX HR PARKING X:XX AM TO X:XX PM (R7-108);

**Figure 2B-24. Parking and Standing Signs and Plaques (R7 Series)**

**Figure 2B-25. Parking And Stopping Signs and Plaques (R8 Series)**

**Section ~~2B.47~~ 2B.54 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:**

Parking, Standing, or Stopping signs shall be rectangular or square.

Public agencies shall follow established law (state law, local ordinance, or regulation) as adopted by the authorized agency regarding what messages are allowed on parking signs.

The legend on parking signs shall state applicable regulations. Parking signs (see Figures 2B-24 and 2B-25) shall comply with the standards of shape, color, and location.

Prohibitive Parking signs (See Figure 2B-24 for some commonly used examples) shall be used where parking is prohibited at all times or at specific times. ~~Where parking is prohibited at all times or at specific times, the basic design for~~ Except as otherwise provided in this Section, Prohibitive ~~p~~ Parking signs shall have a red legend and border on a white background ~~(Parking Prohibition signs), except that the R8-4 and R8-7 signs and the alternate design for the R7-201P plaque shall have a black legend and border on a white background, and the R8-3 sign shall have a black legend and border and a red circle and slash on a white background, and, when the parking prohibition symbol is used, the symbol “P” shall be black.~~

1 Permissive Parking signs shall be used ~~Where only limited-time-limited~~ parking or parking in a  
2 particular manner ~~are is permitted allowed,~~ the Permissive Parking signs shall have a green legend and  
3 border on a white background ~~(Permissive Parking signs).~~

4 *Guidance:*

5 Parking signs information, should be displayed the following information from top to bottom of the sign,  
6 as applicable, in the order listed:

- 7 A. The restriction or prohibition;
- 8 B. The times of the day that it is applicable, if not at all hours; ~~and~~
- 9 C. The days of the week that it is applicable, if not every day;
- 10 D. Qualifying or supplementary information;
- 11 E. Exemptions to the restriction of prohibition; and;
- 12 F. Any tow-away message or symbol.

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

19 ~~Where special parking restrictions are imposed during heavy snowfall, Emergency Snow Route (R7-203)~~  
20 ~~signs (see Figure 2B-24) should be installed. The legend will vary according to the regulations, but the signs~~  
21 ~~should be vertical rectangles, having a white background with the upper part of the plate a red background.~~

22 **Relocated to below**

23 **Standard:**

24 The times and days for which the parking regulations are in effect shall be posted if they are not in  
25 effect at all times of day or all days of the week.

26 ~~Where parking spaces that are reserved for persons with disabilities are designated to~~  
27 ~~accommodate wheelchair vans, a VAN ACCESSIBLE (R7-8P) plaque shall be mounted below the R7-8~~  
28 ~~sign. The R7-8 sign (see Figure 2B-24) shall have a green legend and border and a white wheelchair~~  
29 ~~symbol on a blue square, all on a white background. The R7-8P plaque (see Figure 2B-24) shall have a~~  
30 ~~green legend and border on a white background.~~ **Relocated to below and revised**

31 **Option:**

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

35 If the sign is at an intermediate point in a zone, there may be a double-headed arrow pointing both ways.

36 ~~To minimize the number of parking signs, blanket regulations that apply to a given district may, if legal,~~  
37 ~~be posted at district boundary lines.~~ **Relocated to Section 2B.56 below**

38 ~~In rural areas (see Figure 2B-25), the legends NO PARKING ON PAVEMENT (R8-1) or NO STOPPING~~  
39 ~~ON PAVEMENT (R8-5) are generally suitable and may be used. If a roadway has an adjacent paved~~  
40 ~~shoulders, the legend NO PARKING EXCEPT ON SHOULDER sign (R8-2) or the NO STOPPING EXCEPT~~  
41 ~~ON SHOULDER sign (R8-6) may be used as these signs would be less likely to cause confusion. The R8-3~~  
42 ~~symbol sign or the word message NO PARKING (R3-8a) sign may be used to prohibit any parking along a~~  
43 ~~given highway roadway. Word message supplemental plaques may be mounted below the R8-3 or R8-3a NO~~  
44 ~~PARKING signs. The R8-3 series sign may seinclude word message legends supplemental plaques may~~  
45 ~~include but are not limited to legends such as EXCEPT SUNDAYS AND HOLIDAYS (R8-3bP), ON~~  
46 ~~PAVEMENT (R8-3cP), ON BRIDGE (R8-3dP), ON TRACKS (R8-3eP), and EXCEPT ON SHOULDERS~~  
47 ~~(R8-3fP), LOADING ZONE (R8-3gP), and X:XX AM to X:XX PM. (with arrow) (R8-3hP).~~ **Relocated from**  
48 **below and revised**

49 *Guidance:*

50 *Where special parking restrictions are imposed during heavy snowfall* or a declared snow emergency,  
51 ~~Emergency Snow~~ Emergency Route (R7-203) signs (see Figure 2B-24) should be installed. The legend ~~will~~  
52 ~~should be modified to display the specific~~ vary according to the regulations, ~~but the signs should be vertical~~

1 ~~rectangles, having a white background with the upper part of the plate. The upper section of the sign should~~  
2 ~~display the designation as a snow emergency route in a white legend and border on a red background.~~

3 **Relocated from above and revised**

4 If a fee is charged for on-street parking and payments are made at a ~~midblock pay station~~ multi-space  
5 parking meter, ~~is used~~ instead of individual parking meters for each parking space, ~~pay parking signs should~~  
6 ~~be used.~~ Pay Metered Parking (R7-21 through R7-22) signs (see Figure 2B-24) should be used to define the  
7 area where the ~~pay station parking~~ multi-space parking meter applies. The ~~Pay Station~~ Multi-Space Parking  
8 Meter (R7-20) signs (see Figure 2B-24) should be used at the ~~pay station meter location~~ ~~or~~ to direct road  
9 users to the ~~pay station meter.~~ Relocated from below

10 Option:

11 Where payments can be made electronically, such as by telephone or mobile application, the Mobile  
12 Parking Payment (R7-21aP) plaque may be installed below a Metered Parking sign.

13 **Standard: Relocated from below**

14 If the metered pay parking is subject to a maximum time limit, the appropriate time limit (number  
15 of hours or minutes) shall be displayed on the Pay Metered Parking (R7-21 ~~or R7-21a~~) signs and, except  
16 as provided in Paragraph 16 of this Section, on the Multi-space Parking Meter ~~Pay Station~~ (R7-20)  
17 signs.

18 Option:

19 Where the maximum time limit varies by the time of the day or day of the week, the display of the time  
20 limits may be omitted from the R7-20 sign and, instead, be displayed on the multi-space parking meter so that  
21 they are visible to pedestrians as they make payments.

22 **Standard:**

23 Where parking spaces are reserved for persons with disabilities, the Accessible Parking (R7-8) sign  
24 shall be used to designate the space and shall display the official International Symbol of Accessibility.

25 Where parking spaces that are reserved for persons with disabilities are designed to accommodate  
26 wheelchair vans, a VAN ACCESSIBLE (R7-8aP) plaque shall be mounted below the R7-8 sign. ~~The R7-~~  
27 ~~8 sign (see Figure 2B-24) shall have a green legend and border and a white wheelchair symbol on a blue~~  
28 ~~square, all on a white background. The R7-8P plaque (see Figure 2B-24) shall have a green legend and~~  
29 ~~border on a white background.~~ Relocated from above and revised

30 Guidance: Based on 6/17/2013 FHWA Memorandum

31 Where parking spaces are designated for parking of electric vehicles, an Electric Vehicle Parking (R7-  
32 111 series, R7-112 series, and R7-113) sign (see Figure 2B-24) should be installed adjacent to the designated  
33 spaces. Where there is no time limit, a R7-111 series sign should be used. Where parking is subject to a time  
34 limit, a R7-112 series sign should be used. Where electric vehicles are only allowed to park in a space while  
35 charging, a R7-113 sign should be used.

36 Where parking spaces are designated for charging of electric vehicles, a R7-113 sign or R7-114 series  
37 sign (see Figure 2B-24) should be installed adjacent to the designated spaces.

38 Where additional restrictions apply while a vehicle occupies the designated space, the R7-113P series  
39 plaques should be installed below the R7-113 sign or the R7-114 series signs.

40 Option:

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

- 44 A. Two 12 x 18-inch parking signs may be used with the red Parking Prohibition sign (R7-1) installed  
45 above or to the left of the green Permissive Parking sign (R7-108); or  
46 B. A single sign (R7-200 or R7-200a) may be used ~~The red Parking Prohibition sign and the green~~  
47 ~~Permissive Parking sign may be combined (see Figure 2B-24) to form an R7-200 sign on a single 24 x~~  
48 ~~18-inch sign, or an R7-200a sign on a single 12 x 30-inch sign.~~

49 At the transition point between two parking zones, a single sign (R7-200 or R7-200a) or two signs  
50 mounted ~~side~~ side-by-side may be used.

51 The words NO PARKING may be used as an alternative to the No Parking symbol (see R7-2 sign in  
52 Figure 2B-24). ~~The supplemental educational plaque, NO PARKING, with a red legend and border on a~~  
53 ~~white background, may be used above signs incorporating the No Parking symbol.~~ **Text unnecessary**

1 The R7-201P plaque may have a black or red symbol and border on a white background.

2 Alternate designs for the R7-107 sign may be developed such as the R7-107a sign (see Figure 2B-24).  
3 Alternate designs may include, on a single sign, a transit logo, an approved bus symbol, a parking prohibition,  
4 the words BUS STOP, and an arrow. ~~The preferred bus symbol color is black, but other dark colors may be~~  
5 ~~used. Additionally, the transit logo may be displayed on the bus face in the appropriate colors instead of~~  
6 ~~placing the logo separately.~~ The reverse side of the R7-107 series signs may ~~contain~~ display bus routing  
7 information for pedestrians.

8 ~~To make the parking regulations more effective and to improve public relations by giving a definite~~  
9 ~~warning, a TOW AWAY ZONE Tow-Away Zone (R7-201 or R7-201aP) plaque (see Figure 2B-24) may be~~  
10 ~~mounted below~~ appended to, or incorporated in, any parking prohibition sign. ~~The Tow-Away Zone (R7-~~  
11 ~~201P) symbol plaque may be used instead of the R7-201aP word message plaque. The R7-201P plaque may~~  
12 ~~have either a black or red legend and border on a white background. The word legend TOW-AWAY ZONE~~  
13 ~~may be incorporated into the parking prohibition sign in lieu of using a separate plaque.~~

14 **Guidance:** Relocated to above

15 ~~If a fee is charged for parking and a midblock pay parking fee station is used instead of individual~~  
16 ~~parking meters for each parking space, pay parking signs should be used. Pay Parking (R7-21 through R7-~~  
17 ~~22) signs (see Figure 2B-24) should be used to define the area where the pay parking fee station parking~~  
18 ~~applies. Pay Station (R7-20) signs (see Figure 2B-24) should be used at the pay station or to direct road~~  
19 ~~users to the location of the pay station.~~

20 **Standard:** Relocated to above

21 ~~If the pay parking is subject to a maximum time limit, the appropriate time limit (number of hours~~  
22 ~~or minutes) shall be displayed on the Pay Parking (R7-21 or R7-21a) and Pay Station (R7-20) signs.~~

23 **Option:** Relocated to above

24 In rural areas (see Figure 2B-25B-15), the legends NO PARKING ON PAVEMENT (R8-1) or NO  
25 STOPPING ON PAVEMENT (R8-5) are generally suitable and may be used. ~~If a roadway has paved~~  
26 ~~shoulders, the NO PARKING EXCEPT ON SHOULDER sign (R8-2) or the NO STOPPING EXCEPT ON~~  
27 ~~SHOULDER sign (R8-6) may be used as these signs would be less likely to cause confusion. The R8-3~~  
28 ~~symbol sign or the word message NO PARKING (R8-3a) sign may be used to prohibit any parking along a~~  
29 ~~given highway. Word message supplemental plaques may be mounted below the R8-3 or R8-3a sign. These~~  
30 ~~word message supplemental plaques may include legends such as EXCEPT SUNDAYS AND HOLIDAYS~~  
31 ~~(R8-3bP), ON PAVEMENT (R8-3cP), ON BRIDGE (R8-3dP), ON TRACKS (R8-3eP), EXCEPT ON~~  
32 ~~SHOULDER (R8-3fP), LOADING ZONE (with arrow) (R8-3gP), and X:XX AM TO X:XX PM (with~~  
33 ~~arrow) (R8-3hP).~~

34 Colors that are in compliance with the provisions of Section 2A.10 may be used for color coding of  
35 parking time limits.

36 **Guidance:**

37 ~~If colors are used for color coding of parking time limits, the colors green, red, and black should be the~~  
38 ~~only colors that are used.~~

39 When a legend other than that on the standard parking signs is necessary, letter height, symbol size, and  
40 basic sign layout should be consistent with those shown on the standard parking signs as detailed in the  
41 “Standard Highway Signs and Markings” publication.

42 In general, the letter height of the principal legend on parking signs sized for urbanized applications  
43 should be at least 2 inches.

## 44 **Section 2B.482B.55 Placement of Parking, Stopping, and Standing Signs**

45 **Support:**

46 The efficacy of Parking, Stopping, and Standing signs, when used on conventional roads in urbanized or  
47 developed environments, depends on their visibility and consistent placement along a street or within a  
48 particular block. It is often not practicable for the entire legend to be legible from similar distances as for  
49 other types of signs. Therefore, it is important that their conventional form be recognizable from an adequate  
50 distance such that the road user can obtain the information upon closer inspection.

51 **Guidance:**

1 When signs with arrows are used to indicate the extent of the restricted zones, the signs should be set at  
2 an angle of not less than 30 degrees or more than 45 degrees with the line of traffic flow in order to be visible  
3 to approaching traffic.

4 When signs are placed at the head of perpendicular parking stalls, the signs should be parallel to the  
5 roadway facing the parking stall.

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

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

9 **Standard:** **Standard changed to Guidance**

10 If the signs are mounted at an angle of 90 degrees to the curb line, two signs ~~shall~~ should be mounted  
11 back to back at the transition point between two parking zones, each with an appended THIS SIDE OF SIGN  
12 (R7-202P) supplemental plaque.

13 **Guidance:**

14 If the signs are mounted at an angle of 90 degrees to the curb line, signs without any arrows or appended  
15 plaques should be used at intermediate points within a parking zone, facing in the direction of approaching  
16 traffic. Otherwise, the standards of placement should be the same as for signs using directional arrows.

17 **Option:** **Moved from previous section and revised**

18 ~~To minimize the number of parking signs, blanket~~ Blanket regulations that apply to ~~a given district an~~  
19 entire jurisdiction may, if legal, be posted ~~at district~~ in the vicinity of the jurisdictional boundary lines.  
20 Blanket regulations that apply to a posted zone or district may be posted at the entry points to the zone or  
21 district.

## 22 **Section ~~2B.49~~ 2B.56 Emergency Restriction Signs (R8-4, R8-7, R8-8)**

23 **Standard:**

24 **Emergency Restriction signs shall be rectangular and shall have a ~~red or~~ black legend and border**  
25 **on a white background.** **Relocated from later in Section**

26 **Option:**

27 The EMERGENCY PARKING ONLY (R8-4) sign (see Figure 2B-25) or the EMERGENCY STOPPING  
28 ONLY (R8-7) sign (see Figure 2B-25) may be used to discourage or prohibit shoulder parking, particularly  
29 where scenic or other attractions create a tendency for road users to stop temporarily.

30 The DO NOT STOP ON TRACKS (R8-8) sign (see Figure 8B-1) may be used to discourage or prohibit  
31 parking or stopping on railroad or light rail transit tracks (see Section 8B.~~0907~~).

32 **Standard:**

33 **Emergency Restriction signs shall be rectangular and shall have a red or black legend and border**  
34 **on a white background.** **Relocated to beginning of Section and revised**

35  
36

1 PEDESTRIAN SIGNS

2 **Section 2B.50-2B.57 WALK ON LEFT FACING TRAFFIC and No Hitchhiking Signs (R9-1,**  
3 **R9-4, R9-4a)**

4 Option:

5 The WALK ON LEFT FACING TRAFFIC (R9-1) sign (see Figure 2B-26) may be used on highways  
6 where no sidewalks are provided.

7 **Standard:***Guidance:*

8 *If used, the WALK ON LEFT FACING TRAFFIC sign ~~shall~~ should be installed on the right-hand side of*  
9 *the road where pedestrians walk on the pavement or shoulder in the absence of pedestrian pathways or*  
10 *sidewalks.*

11 Option:

12 The No Hitchhiking (R9-4) sign (see Figure 2B-26) may be used to prohibit standing in or adjacent to the  
13 roadway for the purpose of soliciting a ride. The R9-4a word message sign (see Figure 2B-26) may be used as  
14 an alternate to the R9-4 symbol sign.

15 **Section 2B.51-2B.58 Pedestrian Crossing Signs (R9-2, R9-3)**

16 Option:

17 Pedestrian Crossing signs (see Figure 2B-26) may be used to limit pedestrian crossing to specific  
18 locations.

19 **Standard:**

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

21 Option:

22 Where crosswalks are clearly defined, the CROSS ONLY AT CROSSWALKS (R9-2) sign may be used  
23 to prohibit pedestrians from crossing at locations away from crosswalks.

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

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

29 Support:

30 One of the most frequent uses of the Pedestrian Crossing signs is at signalized intersections that have  
31 three crossings that can be used and one leg that cannot be crossed. Pedestrians with low-vision capabilities  
32 might need additional features other than traffic control devices to communicate the prohibition of pedestrian  
33 crossing.

34 *Guidance:*

35 *The R9-3bP plaque should not be installed in combination with educational plaques.*

36 **Section 2B.52-2B.59 Traffic Signal Pedestrian and Bicycle Actuation Signs (R10-1 through**  
37 **R10-4, and R10-24 through R10-26)**

38 **Standard:**

39 Where manual actuation of a traffic signal is required for pedestrians or bicyclists to call a signal  
40 phase to cross the roadway, ~~Traffic-traffic Signal-signal~~ signs applicable to pedestrian actuation (see  
41 Figure 2B-26) or bicyclist actuation (see Figure 9B-12) shall be mounted immediately above or  
42 incorporated into the pushbutton detector units (see Section ~~4E.0841.06~~).

43 Support:

44 Traffic Signal signs applicable to pedestrians include:

- 45 A. CROSS ONLY ON GREEN (symbolic circular green) (R10-1);
- 46 B. CROSS ONLY ON (symbolic walk indication) SIGNAL (R10-2);
- 47 C. Push Button for Walk Signal (R10-3 series); and
- 48 D. Push Button for Green Signal (R10-4 series).

1 Option:

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

3 A. Push Button to Cross Street Wait for Walk Signal (R10-3a); or

4 B. Push Button to Cross Street Wait for Green Signal (R10-4a).

5 The name of the street to be crossed may be substituted for the word STREET in the legends on the R10-  
6 3a and R10-4a signs.

7 *Guidance:*

8 *The finger in the pushbutton symbol on the R10-3, R10-3a, R10-4, and R10-4a signs should point in the*  
9 *same direction as the arrow on the sign.*

10 Option:

11 Where symbol-type pedestrian signal indications are used, an educational sign (R10-3b) may be used  
12 instead of the R10-3 sign to improve pedestrian understanding of pedestrian indications at signalized  
13 intersections. Where word-type pedestrian signal indications are being retained for the remainder of their  
14 useful service life, the legends WALK/DONT WALK may be substituted for the symbols on the educational  
15 sign R10-3b, thus creating educational sign R10-3c. The R10-3d educational sign may be used to inform  
16 pedestrians that the pedestrian clearance time is sufficient only for the pedestrian to cross to the median at  
17 locations where pedestrians cross in two stages using a median refuge island. The R10-3e educational sign  
18 may be used where countdown pedestrian signals have been provided. In order to assist the pedestrian in  
19 understanding which pushbutton to push, the R10-3f to R10-3i educational signs that provide the name of the  
20 street to be crossed may be used instead of the R10-3b to R10-3e educational signs. [The R10-3j sign may be](#)  
21 [used where a pedestrian pushbutton is only to activate the accessible pedestrian signals. The R10-3k sign may](#)  
22 [be used where a pedestrian pushbutton has sensors to allow for touch-free activation.](#)

23 The R10-24 or R10-26 sign (see Section 9B.11) may be used where a pushbutton detector has been  
24 installed exclusively to actuate a green phase for bicyclists.

25 The R10-25 sign (see Figure 2B-26) may be used where a pushbutton detector has been installed for  
26 pedestrians to activate In-Roadway Warning Lights (see Chapter ~~4N~~4U) or flashing beacons that have been  
27 added to the pedestrian warning signs.

28 Support:

29 Section ~~4E.08~~[4I.06](#) contains information regarding the application of the R10-32P plaque.

30 **Figure 2B-26. Pedestrian Signs and Plaques**

31

1 TRAFFIC SIGNAL SIGNS

2 **Section ~~2B.53~~2B.60 Traffic Signal Signs (R10-5 through R10-30)**

3 Option:

4 To supplement traffic signal control, Traffic Signal signs R10-5 through R10-30 may be used to regulate  
5 road users.

6 Traffic Signal signs (see Figure 2B-27) may be installed at certain locations to clarify signal control.  
7 Among the legends that may be used for this purpose are LEFT ON GREEN ARROW ONLY (R10-5), STOP  
8 HERE ON RED (R10-6 or R10-6a) for observance of stop lines, DO NOT BLOCK INTERSECTION (R10-7)  
9 for avoidance of traffic obstructions, USE LANE(S) WITH GREEN ARROW (R10-8) for obedience to lane-  
10 use control signals (see Chapter ~~4M.4T~~), LEFT TURN YIELD ON GREEN (symbolic circular green) (R10-  
11 12), LEFT TURN YIELD ON FLASHING YELLOW ARROW (R10-12a), and LEFT TURN YIELD ON  
12 FLASHING RED ARROW AFTER STOP (R10-27).

13 *Guidance:*

14 *If used, the LEFT ON GREEN ARROW ONLY (R10-5) sign, the LEFT TURN YIELD ON GREEN*  
15 *(symbolic circular green) (R10-12) sign, the LEFT TURN YIELD ON FLASHING YELLOW ARROW (R10-*  
16 *12a), or the LEFT TURN YIELD ON FLASHING RED ARROW AFTER STOP (R10-27) sign should be*  
17 *located adjacent to the left-turn signal face.*

18 Option:

19 If needed for additional emphasis, an additional LEFT TURN YIELD ON GREEN (symbolic circular  
20 green) (R10-12) sign with an AT SIGNAL (R10-31P) supplemental plaque (see Figure 2B-27) may be  
21 installed in advance of the intersection.

22 In situations where traffic control signals are coordinated for progressive timing, the Traffic Signal Speed  
23 (I1-1) sign may be used (see Section 2H.03).

24 **Standard:**

25 **The LEFT TURN YIELD TO Bicycles (R10-12b) sign shall be limited to applications where the**  
26 **conflicting bicycle movement would be unexpected in direction, location, or some other quality that**  
27 **would run counter to the expectation of a turning motorist.**

28 **The LEFT TURN YIELD TO Bicycles sign shall not be installed for motor vehicle traffic subjected**  
29 **to a counter-flow bicycle operation when the opposing bicycle movement is controlled by a bicycle**  
30 **signal face (see Chapter 4H).**

31 **Support:**

32 **Situations where the LEFT TURN YIELD TO Bicycles sign may be appropriate include, but are not**  
33 **limited to, where drivers are turning across a separated bicycle lane or a buffer-separated bicycle lane.**

34 **Guidance:**

35 **The LEFT TURN YIELD TO Bicycles sign should be located adjacent to the left-turn signal face.**

36 **Option:**

37 **If needed for additional emphasis, an additional LEFT TURN YIELD TO Bicycles sign with an AT**  
38 **SIGNAL (R10-31P) supplemental plaque (see Figure 2B-27) may be installed in advance of the intersection**  
39 **for motor vehicles.**

40  
41 **Standard:**

42 **The CROSSWALK—STOP ON RED (symbolic circular red) (R10-23) and WAIT ON STEADY**  
43 **RED- YIELD ON FLASHING RED AFTER STOP (R10-23a) signs (see Figure 2B-27) shall only be**  
44 **used in conjunction with pedestrian hybrid beacons (see Section ~~4F.024J.02~~).**

45 **The EMERGENCY SIGNAL (R10-13) sign (see Figure 2B-27) shall be used in conjunction with**  
46 **emergency-vehicle traffic control signals (see Section ~~4G.024M.02~~).**

47 **The EMERGENCY SIGNAL—STOP ON FLASHING RED (R10-14 or R10-14a) sign (see Figure**  
48 **2B-27) shall be used in conjunction with emergency-vehicle hybrid beacons (see Section ~~4G.044N.02~~).**

49 Option:

1 [If needed for extra emphasis, a STOP HERE ON FLASHING RED \(R10-14b\) sign may be installed with](#)  
2 [an emergency-vehicle hybrid beacon.](#)

3 [Where conditions may warrant additional emphasis to drivers turning at a signalized intersection where](#)  
4 [potential pedestrian conflicts may not be readily apparent,](#) a Turning Vehicles Yield to [\(Stop For\) Pedestrians](#)  
5 [\(R10-15, R10-15a\), sign \(see Figure 2B-27\) may be used.](#)

6 **Standard:**

7 [The Turning Vehicles Stop for Pedestrians \(R10-15a\) sign shall only be used in jurisdictions where](#)  
8 [laws, ordinances or resolutions specifically require that a driver must stop for a pedestrian.](#)

9 **Option:**

10 A U-TURN YIELD TO RIGHT TURN (R10-16) sign (see Figure 2B-27) may be installed near the left-  
11 turn signal face if U-turns are allowed on a protected left-turn movement on an approach from which a right-  
12 turn GREEN ARROW signal indication is simultaneously being displayed to drivers making a right turn from  
13 the conflicting approach to their left.

14 [A U TURN SIGNAL \(R10-10a\) sign \(see Figure 2B-27\) may be installed adjacent to the signal face that](#)  
15 [exclusively controls a U-turn movement.](#)

16 **Figure 2B-27. Traffic Signal Signs and Plaques**

17 **Section [2B.54-2B.61](#) No Turn on Red Signs (R10-11 Series, R10-17a, and R10-30)**

18 **Standard:**

19 **Where a right turn on red (or a left turn on red from a one-way street to a one-way street) is to be**  
20 **prohibited, a ~~symbolic~~ NO TURN ON RED ([R10-11, R10-11a](#)) ~~word message sign (symbolic circular~~**  
21 **~~red) (R10-11) sign~~ (see Figure 2B-27) or a NO TURN ON RED ([symbolic circular red](#)) ([R10-11b](#)) ~~sign~~**  
22 **([R10-11a, R10-11b](#)) ~~word message sign~~ (see Figure 2B-27) shall be used.**

23 **Guidance:**

24 *If used, the No Turn on Red sign should be installed near the appropriate signal head.*

25 *A No Turn on Red sign should be considered when an engineering study finds that one or more of the*  
26 *following conditions exists:*

- 27 A. *Inadequate sight distance to vehicles approaching from the left (or right, if applicable);*  
28 B. *Geometrics or operational characteristics of the intersection that might result in unexpected conflicts;*  
29 C. *An exclusive pedestrian phase;*  
30 D. *An unacceptable number of pedestrian conflicts with right-turn-on-red maneuvers, especially*  
31 *involving children, older pedestrians, or persons with disabilities;*  
32 E. *More than three right-turn-on-red accidents reported in a 12-month period for the particular*  
33 *approach; or*  
34 F. *The skew angle of the intersecting roadways creates difficulty for drivers to see traffic approaching*  
35 *from their left.*

36 **Option:**

37 ~~A supplemental R10-20aP plaque (see Figure 2B-27) showing times of day (similar to the S4-1P plaque~~  
38 ~~shown in Figure 7B-1) with a black legend and border on a white background may be mounted below a No~~  
39 ~~Turn on Red sign to indicate that the restriction is in place only during certain times.~~ **Moved down to follow**  
40 **the next paragraph**

41 ~~Alternatively, a~~ **A** blank-out [part-time restriction prohibited movement \(R3-1, R3-2, R3-4, R3-18, and R3-](#)  
42 [27\) sign \(See Section 2B.28\) sign](#) may be used instead of a static NO TURN ON RED sign, to display either  
43 the NO TURN ON RED legend or the No Right Turn symbol or word message, as appropriate, only at certain  
44 times during the day or during one or more portion(s) of a particular cycle of the traffic signal.

45 ~~Alternatively, a~~ **A** supplemental R10-20aP plaque (see Figure 2B-27) showing times of day (similar to the  
46 S4-1P plaque shown in Figure 7B-1) with a black legend and border on a white background may be mounted  
47 below a No Turn on Red sign to indicate that the restriction is in place only during certain times.

48 [White LEDs may be used in the border and activated during periods of turn prohibition to enhance the](#)  
49 [sign conspicuity.](#)

50 On signalized approaches with more than one right-turn lane, a NO TURN ON RED EXCEPT FROM  
51 RIGHT LANE (R10-11c) sign (see Figure 2B-27) may be post-mounted at the intersection or a NO TURN

1 ON RED FROM THIS LANE (with down arrow) (R10-11d) sign (see Figure 2B-27) may be mounted ~~directly~~  
2 over the approximate center of the lane from which turns on red are prohibited.

3 *Guidance:*

4 *Where turns on red are permitted and the signal indication is a steady RED ARROW, the RIGHT (LEFT)*  
5 *ON RED ARROW AFTER STOP (R10-17a) sign (see Figure 2B-27) should be installed adjacent to the RED*  
6 *ARROW signal indication.*

7 Option:

8 A RIGHT TURN ON RED MUST YIELD TO U-TURN (R10-30) sign (see Figure 2B-27) may be  
9 installed to remind road users that they must yield to conflicting U-turn traffic on the street or highway onto  
10 which they are turning right on a red signal after stopping.

11 **Section ~~2B.55~~2B.62 Photo Enforced Signs and Plaques (R10-18, R10-19P, R10-19aP, R10-18a)**

12 Option:

13 A TRAFFIC LAWS PHOTO ENFORCED (R10-18) sign (see Figure 2B-3) may be installed at a  
14 jurisdictional boundary to advise road users that some of the traffic regulations within that jurisdiction are  
15 being enforced by photographic equipment.

16 A Traffic Signal Photo Enforced (R10-18a) sign may be installed on an approach to a signalized location  
17 where red-light cameras are present on any approach to the signalized location. A Signal Ahead (W3-3) sign  
18 and a Traffic Signal Photo Enforced (R10-18a) sign may be used on the same approach provided that they are  
19 on separate supports.

20 A Photo Enforced (R10-19P) plaque or a PHOTO ENFORCED (R10-19aP) word message plaque (see  
21 Figure 2B-3) may be mounted below a regulatory sign to advise road users that the regulation is being  
22 enforced by photographic equipment.

23 A Traffic Signal PHOTO ENFORCED Sign (R10-18a sign may be installed in advance of or at a traffic  
24 signal to advise road users that signal compliance is being enforced by photographic equipment.

25 **Standard:**

26 The Traffic Signal Photo Enforced (R10-18a) sign shall not be installed on approaches to signalized  
27 locations where red-light cameras are not present on any of the approaches to the signalized location.

28 A Traffic Signal Photo Enforced (R10-18a) sign shall not be installed on the same support in  
29 combination with a Signal Ahead (W3-3) sign.

30 **If used below a regulatory sign, the Photo Enforced (R10-19P or R10-19aP) plaque shall be a**  
31 **rectangle with a black legend and border on a white background.**

32 **Section ~~2B.56~~2B.63 Ramp Metering Signs (R10-28 and R10-29)**

33 Option:

34 When ramp control signals (see Chapter-~~44P~~) are used to meter traffic on a freeway or expressway  
35 entrance ramp, regulatory signs with legends appropriate to the control may be installed adjacent to the ramp  
36 control signal faces.

37 For entrance ramps with only one controlled lane, an XX VEHICLE(S) PER GREEN (R10-28) sign (see  
38 Figure 2B-28) may be used to inform road users of the number of vehicles that are permitted to proceed  
39 during each short display of the green signal indication. For entrance ramps with more than one controlled  
40 lane, an XX VEHICLE(S) PER GREEN EACH LANE (R10-29) (see Figure 2B-28) sign may be used to  
41 inform road users of the number of vehicles that are permitted to proceed from each lane during each short  
42 display of the green signal indication.

43 **Figure 2B-28. Ramp Metering Signs**

1 ROAD CLOSED AND WEIGHT LIMIT SIGNS

2 **Section ~~2B.57~~ 2B.64 KEEP OFF MEDIAN Sign (R11-1)**

3 Option:

4 The KEEP OFF MEDIAN (R11-1) sign (see Figure 2B-29) may be used to prohibit driving into or  
5 parking on the median.

6 *Guidance:*

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

9 **Section ~~2B.58~~ 2B.65 ROAD CLOSED Sign (R11-2) and LOCAL TRAFFIC ONLY Signs**  
10 **(R11-3 Series, R11-4)**

11 *Guidance:*

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

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

17 **Standard:**

18 **The Road Closed (R11-2, R11-3 series, and R11-4) signs (see Figure 2B-29) shall be designed as**  
19 **horizontal rectangles. These signs shall be preceded by the applicable Advance Road Closed warning**  
20 **sign with the secondary legend AHEAD and, if applicable, an Advance Detour warning sign (see Section**  
21 **~~6F.19~~ 6H.04).**

22 Option:

23 An intersecting street name or a well-known destination may be substituted for the XX MILES AHEAD  
24 legend in urban areas.

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

26 **Section ~~2B.59~~ 2B.66 Weight Limit Signs (R12-1 through R12-~~5~~7)**

27 *Guidance:*

28 *Weight limit signs (see Figure 2B-29 for some commonly used examples) should be used to indicate a*  
29 *structure has a vehicle weight restriction.*

30 Option:

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

33 *Guidance:*

34 *The units shown on any weight limit sign should be consistent within a state or region with respect to*  
35 *pounds or tons.*

36 *Vehicle weight restrictions should be depicted using gross vehicle weight. Vehicle weight restrictions*  
37 *using weight per axle or empty vehicle weight should not be used unless local laws require the signs to depict*  
38 *weight restrictions in that manner.*

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

41 ~~To restrict trucks of certain sizes by reference to empty weight in residential areas, the legend may be NO~~  
42 ~~TRUCKS OVER XX TONS EMPTY WT or NO TRUCKS OVER XX LBS EMPTY WT (R12-3).~~

43 ~~In areas where multiple regulations of the type described in Paragraphs 1 through 3 are applicable, a sign~~  
44 ~~combining the necessary messages on a single sign may be used, such as WEIGHT LIMIT XX TONS PER~~  
45 ~~AXLE, XX TONS GROSS (R12-4).~~

46 *Option:*

47 Posting of specific load limits may be accomplished by use of the Weight Limit symbol sign (R12-5). A  
48 sign containing the legend WEIGHT LIMIT on the top two lines, and showing up to three different truck

1 symbols and their respective weight limits for which restrictions apply may be used, with the weight limits  
2 displayed to the right of each symbol as XX T. A bottom line of legend stating GROSS WT may be included  
3 if needed for enforcement purposes.

4 Support:

5 Specialized Hauling Vehicles (SHVs) are closely spaced multi-axle single unit trucks. Examples include  
6 dump trucks, construction vehicles, solid waste trucks and other hauling trucks. SHVs typically have 4 to 7  
7 axles.

8 Option:

9 The Weight Limit (R12-6) sign displaying the legend WEIGHT LIMIT SINGLE 2-3 AXLES XX TONS,  
10 4-5 AXLES XX TONS, 6+ AXLES XX TONS, and COMBINATION XX TONS may be used to indicate  
11 vehicle weight restrictions for Specialized Hauling Vehicles.

12 Standard:

13 The symbols shown on the R12-5 and R12-6 Weight Limit sign shall apply to all trucks of that  
14 configuration (single-unit, single-trailer or multi-trailer) regardless of the shape of the vehicle. Symbolic  
15 representations of other vehicle shapes or modifications of standard symbols shall not be used.

16 Option:

17 The facility type (i.e. "BRIDGE") may be added or omitted if the posting applies to a different facility  
18 type.

19 Guidance:

20 Only trucks and axle configurations with weight limits should be shown.

21 Standard:

22 If the R12-5 sign depicts only one single-unit vehicle symbol, the weight limit associated with that  
23 single-unit vehicle symbol shall apply to all single-unit vehicles, regardless of number of axles.

24 The weight limit associated with the single-trailer vehicle symbol shall apply to all single-trailer  
25 vehicles, regardless of number of axles or vehicle shape.

26 The weight limit associated with the multi-trailer vehicle symbol shall apply to all multi-trailer  
27 vehicles with two or more trailers, regardless of number of axles or vehicle shape.

28 Guidance:

29 The R12-5 and R12-6 Weight Limit sign should not show more than 3 symbols so as to not  
30 decrease comprehension of the sign by drivers.

31 Standard:

32 If used, the Weight Limit sign (see Figure 2B-29), with an advisory distance ahead legend, shall be  
33 located in advance of the applicable section of highway or structure so that prohibited vehicles can  
34 detour or turn around prior to the limit zone. **Revised to incorporate Guidance below**

35 Guidance:

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

38 **Standard above**

39 Support:

40 An emergency vehicle is designed to be used under emergency conditions to transport personnel and  
41 equipment to support the suppression of fires and mitigation of other hazardous situations. Emergency  
42 vehicles are typically operated by fire departments and are primarily equipped for firefighting, but are also  
43 used to respond to and mitigate other hazardous situations in an emergency. They can create higher load  
44 effects compared to legal loads.

45 Option:

46 The Emergency Vehicle Weight Limit (R12-7) sign carrying the legend EMERGENCY VEHICLE  
47 WEIGHT LIMIT SINGLE AXLE XX TONS, TANDEM XX TONS, and GROSS XX TONS may be used to  
48 indicate vehicle weight restrictions for emergency vehicles.

49 Standard:

1 When mounted below a primary Weight Limit sign the Emergency Vehicle Weight Limit plaque  
2 (R12-7ap) shall be used.

3 **Figure 2B-29. Road Closed and Weight Limit Signs**

4 **Section ~~2B.60~~ 2B.67 Weigh-Vehicle Inspection Area Station Signs (R13-1 Series)**

5 *Guidance:*

6 *An R13-1 sign with the legend TRUCKS OVER XX TONS MUST ENTER WEIGH STATION NEXT*  
7 *RIGHT* ~~(see Figure 2B-30)~~ *should be used to direct appropriate traffic into a weigh station.*

8 *The R13-1 sign should be supplemented by the D8 series of guide signs (see Section 2D.4950).*

9 *Option:*

10 ~~The reverse color combination, a white legend and border on a black background, may be used for the~~  
11 ~~R13-1 sign.~~ **Option deleted to support uniformity**

12 The R13-1 legend may be modified to match the specific type of inspection conducted at the station.

13 **Section ~~2B.61~~ 2B.68 TRUCK ROUTE Sign (R14-1)**

14 *Guidance:*

15 *The TRUCK ROUTE (R14-1) sign* ~~(see Figure 2B-30)~~ *should be used to mark a route that has been*  
16 *designated to allow truck traffic.*

17 *Option/Support:*

18 ~~On a numbered highway,~~ See Section 2D.20 regarding the use of the TRUCK (M4-4) auxiliary sign ~~may~~  
19 ~~be used~~ ~~(see Section 2D.20)~~ on a designated numbered alternative route.

20 **Section ~~2B.62~~ 2B.69 Hazardous Material Signs (R14-2, R14-3)**

21 *Option:*

22 *The Hazardous Material Route (R14-2) sign (see Figure 2B-30) may be used to identify routes that have*  
23 *been designated by proper authority for vehicles transporting hazardous material.*

24 *On routes where the transporting of hazardous material is prohibited, the Hazardous Material Prohibition*  
25 *(R14-3) sign (see Figure 2B-30) may be used.*

26 *Guidance:*

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

29 **Section ~~2B.63~~ 2B.70 National Network Signs (R14-4, R14-5)**

30 *Support:*

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

32 **Standard:**

33 **When a National Network route is signed, the National Network (R14-4) sign (see Figure 2B-30)**  
34 **shall be used.**

35 *Option:*

36 *The National Network Prohibition (R14-5) sign (see Figure 2B-30) may be used to identify routes,*  
37 *portions of routes, and ramps where trucks are prohibited. The R14-5 sign may also be used to mark the ends*  
38 *of designated routes.*

39 **Figure 2B-30: Truck Signs**

## OTHER REGULATORY SIGNS

### Section ~~2B.65~~2B.71 ~~FENDER-BENDER~~ MINOR CRASHES MOVE VEHICLES FROM TRAVEL LANES (R16-4) Sign

Option:

A ~~FENDER-BENDER~~ STATE LAW MINOR CRASHES MOVE VEHICLES FROM TRAVEL LANES (R16-4) sign (see Figure 2B-~~32~~31) may be installed in accordance with the provisions of Section 2A.01 to require motorists to move their vehicle out of the travel lanes if they have been involved in a crash. **Legend of sign changed**

### Section 2B.72 Move Over or Reduce Speed Sign

Option:

A STATE LAW MOVE OVER OR REDUCE SPEED FOR VEHICLES STOPPED ON SHOULDER (R16-3) sign (see Figure 2B-31) may be installed in accordance with the provisions of Section 2A.01 to require motorists to change lanes and/or reduce speed when passing stopped emergency vehicles on the shoulder.

### Section 2B.73 No Hand-Held Phones by Driver Signs (R16-15, R16-15a)

Option:

A STATE LAW NO HAND-HELD PHONES BY DRIVER (R16-15, R16-15a) sign (see Figure 2B-31) may be installed in accordance with the provisions of Section 2A.01 to notify drivers that they are prohibited from using hand-held telephones while driving.

## **Figure 2B-31. Other Regulatory Signs and Symbols**

### Section ~~2B.64~~2B.74 Headlight Use Signs (R16-5 through R16-11)

Support:

Some States require road users to turn on their vehicle headlights under certain weather conditions, as a safety improvement measure on roadways experiencing high crash rates, or in special situations such as when driving through a tunnel.

Figure ~~2B-31~~2B-32 shows the various signs that can be used for informing motorists of these requirements.

Option:

A LIGHTS ON WHEN USING WIPERS (R16-5) sign or a LIGHTS ON WHEN RAINING (R16-6) sign may be installed in accordance with the provisions of Section 2A.01 to inform road users of State laws regarding headlight use. Although these signs are typically installed facing traffic entering the State just inside the State border, they also may be installed at other locations within the State.

Guidance:

*If a particular section of roadway has been designated as a safety improvement zone within which headlight use is required, a TURN ON HEADLIGHTS NEXT XX MILES (R16-7) sign or a BEGIN DAYTIME HEADLIGHT SECTION (R16-10) sign should be installed at the upstream end of the section, and a END DAYTIME HEADLIGHT SECTION (R16-11) sign should be installed at the downstream end of the section.*

Option:

A TURN ON HEADLIGHTS (R16-8) sign may be installed to require road users to turn on their headlights in special situations such as when driving through a tunnel. A CHECK HEADLIGHTS (R16-9) sign may be installed downstream from the special situation to inform drivers that the using their headlights is no longer required.

## **Figure 2B-32. Headlight Use Signs**

### Section ~~2B.66~~2B.75 Seat Belt Symbol

**Standard:**

**When a seat belt symbol is used, the symbol shown in Figure 2B-32 shall be used. Not needed, since the design of symbols is covered in Section 2A.06**

1 *Guidance:*

2 *The seat belt symbol should not be used alone. If used, the seat belt symbol should be incorporated into*  
3 *regulatory sign messages for mandatory seat belt use.*

## 4 **BARRICADES AND GATES**

### 5 **Section ~~2B.67~~ 2B.76 Barricades**

6 Option:

7 Barricades may be used to mark any of the following conditions:

- 8 A. A roadway ends,
- 9 B. A ramp or lane closed for operational purposes, or
- 10 C. The permanent or semi-permanent closure or termination of a roadway.

11 **Standard:**

12 **When used to warn and alert road users of the terminus of a roadway in other than temporary**  
13 **traffic control zones, barricades shall meet the design criteria of Section ~~6F.68~~ 6K.07 for a Type 3**  
14 **Barricade, except that the colors of the stripes shall be retroreflective white and retroreflective red.**

15 Option:

16 An end-of-roadway marker or markers may be used as described in Section 2C.~~66~~72.

17 *Guidance:*

18 *Appropriate advance warning signs (see Chapter 2C) should be used.*

### 19 **Section ~~2B.68~~ 2B.77 Gates**

20 Support:

21 Gates described in this section used for weather or other emergency conditions are typically permanently  
22 installed to enable the gate to be immediately deployed as needed to prohibit the entry of traffic to the  
23 highway segment(s).

24 ~~A gate typically features a gate arm that is moved from a vertical to a horizontal position or is rotated in a~~  
25 ~~horizontal plane from parallel to traffic to perpendicular to traffic. Traffic is obstructed and required to stop~~  
26 ~~when the gate arm is placed in a horizontal position perpendicular to traffic. Another type of gate consists of a~~  
27 ~~segment of fence (usually on rollers) that swings open and closed, or that is retracted to open and then~~  
28 ~~extended to close.~~

29 ~~Gates are sometimes used to enforce a required stop. Some examples of such uses are the following:~~

- 30 ~~A. Parking facility entrances and exits,~~
- 31 ~~B. Private community entrances and exits,~~
- 32 ~~C. Military base entrances and exits,~~
- 33 ~~D. Toll plaza lanes,~~
- 34 ~~E. Movable bridges (see Chapter 4J),~~
- 35 ~~F. Automated Flagger Assistance Devices (see Chapter 6E), and~~
- 36 ~~G. Grade crossings (see Part 8).~~

37 ~~Gates are sometimes used to periodically close a roadway or a ramp. Some examples of such uses are the~~  
38 ~~following:~~

- 39 ~~A. Closing ramps to implement counter-flow operations for evacuations,~~
- 40 ~~B. Closing ramps that lead to reversible lanes, and~~
- 41 ~~C. Closing roadways for weather events such as snow, ice, or flooding, or for other emergencies.~~

42 **needed – does not provide added value to the MUTCD**

43 **Standard:**

44 **Except as provided in Paragraph 6, gate arms, if used, shall be fully ~~retroreflectorized~~**  
45 **retroreflective on both sides, have vertical stripes alternately red and white at 16-inch intervals**  
46 **measured horizontally as shown in Figure 8C-1. The width (which becomes the height of the**  
47 **retroreflective sheeting when the gate is in the down position) of the retroreflective sheeting on the front**  
48 **of the gate arm shall be at least 4 inches.**

49 Option:

1 If used on a one-way roadway or ramp, the ~~retroreflectorization~~ retroreflective sheeting may be omitted on  
2 the side of the gate (or rolling fence) facing away from approaching traffic. **Incorporates last Option**  
3 **statement**

4 Where gate arms are used to block off ramps into reversible lanes or to redirect approaching traffic, the  
5 red and white striping may be angled such that the stripes slope downward at an angle of 45 degrees toward  
6 the side of the gate arm on which traffic is to pass.

7 **Standard:**

8 The gate arm shall extend across the approaching lane or lanes of traffic to effectively block motor  
9 vehicle and/or pedestrian travel as appropriate.

10 ~~When gate arms are in the vertical position or rotated to an open position, the closest part of the~~  
11 ~~gate arm and support shall have a lateral offset of at least 2 feet from the face of the curb or the edge of~~  
12 ~~the traveled way.~~

13 ~~When gate arms that are located in the median or on an island are in the horizontal position or~~  
14 ~~rotated to a closed position, the closest part of the counterweight or its supports shall have a lateral~~  
15 ~~offset of at least 2 feet from the face of the curb or the edge of the traveled way of the open roadway on~~  
16 ~~the opposite side of the median or island.~~

17 *Guidance:*

18 *When a gate that is rotated in a horizontal plane is in the position where it is parallel to traffic (indicating*  
19 *that the roadway is open), the outer end of the gate arm should be rotated to the downstream direction (from*  
20 *the perspective of traffic in the lane adjacent to the gate support) to prevent spearing if the gate is struck by*  
21 *an errant vehicle.*

22 ~~*If a pedestrian route is present and if it is not intended that pedestrian traffic be controlled by the gate, a*~~  
23 ~~*minimum of 2 feet of lateral offset from supports, posts, counterweights, and gate mechanisms should be*~~  
24 ~~*provided when the gate arm is in the open position and when the gate arm is in the closed position such that*~~  
25 ~~*pedestrian travel is not impeded.*~~

26 **Option:**

27 ~~Red lights may be attached to traffic gates.~~

28 **Standard:**

29 If red lights are attached to a traffic gate, the red lights shall be steadily illuminated or flashed only  
30 during the period when the gate is in the horizontal or closed position and when the gate is in the  
31 process of being opened or closed.

32 Except as provided in Paragraph 163, rolling sections of fence, if used, shall include either a  
33 horizontal strip of ~~retroreflectorized~~ retroreflective sheeting on both sides of the fence with vertical  
34 stripes alternately red and white at 16-inch intervals measured horizontally to simulate the appearance  
35 of a gate arm in the horizontal position, or one or more Type 4 object markers (see Section 2C.6672), or  
36 both. If a horizontal strip of ~~retroreflectorized~~ retroreflective sheeting is used, the bottom of the  
37 sheeting shall be located 3.5 to 4.5 feet above the roadway surface.

38 **Option:**

39 ~~If used on a one-way roadway or ramp, the retroreflectorization may be omitted on the side of the fence~~  
40 ~~facing away from approaching traffic.~~ **Incorporated into similar paragraph for gates**

# CHAPTER 2C. WARNING SIGNS AND OBJECT MARKERS

## Chapter 2C Subchapter and Section Organization

### General

- 2C.01 Function and Application of Warning Signs
- 2C.02 Design of Warning Signs
- 2C.03 Size of Warning Signs
- 2C.04 Placement of Warning Signs

### Horizontal Alignment Warning Signs

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- 2C.06 Device Selection for Changes in Horizontal Alignment
- 2C.07 Horizontal Alignment Signs (W1-1 through W1-5, W1-11, W1-15)
- 2C.08 Chevron Alignment Sign (W1-8)
- 2C.09 Combination Horizontal Alignment/Intersection Signs (W1-10 Series)
- 2C.10 One-Direction Large Arrow Sign (W1-6)
- 2C.11 Truck Rollover Sign (W1-13)
- 2C.12 Advisory Exit and Ramp Speed Signs (W13-2 and W13-3) and Combination Horizontal Alignment/Advisory Exit and Ramp Speed Signs (W13-6 through W13-11)
- 2C.13 Vehicle Speed Feedback Sign (W13-20, W13-20aP)

### Vertical Grade Warning Signs and Plaques

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- 2C.17 ROAD NARROWS Sign (W5-1)
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- 2C.19 ONE LANE BRIDGE and ONE LANE UNDERPASS Signs (W5-3, W5-3a)
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### Roadway and Weather Condition Signs and Plaques

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- 2C.30 Shoulder Signs (W8-4, W8-9, W8-17, W8-23, W8-25)
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- 2C.32 Warning Signs and Plaques for Motorcyclists (W8-15, W8-15P, and W8-16)
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### Traffic Control and Intersection Signs and Plaques

- 2C.36 Advance Traffic Control Signs (W3-1, W3-2, W3-3, W3-4)
- 2C.37 Actuated Advance Intersection Signs (W2-10 through W2-12))
- 2C.38 Advance Ramp Control Signal Signs (W3-7 and W3-8)
- 2C.39 NEW TRAFFIC PATTERN and SIGNAL OPERATION AHEAD Signs (W23-2, W23-2a)
- 2C.40 Reduced Speed Limit Ahead Signs (W3-5, W3-5a, W3-5b, W3-5c)
- 2C.41 WATCH FOR STOPPED TRAFFIC Sign (W23-3)
- 2C.42 Intersection Warning Signs (W2-1 through W2-8)

1	<a href="#"><u>2C.43</u></a>	<a href="#"><u>Two-Direction Large Arrow Sign (W1-7)</u></a>
2	<a href="#"><u>2C.44</u></a>	<a href="#"><u>Traffic Signal Oncoming Extended Green Signs (W25-1, W25-2)</u></a>
3	<a href="#"><u>Merging and Passing Signs and Plaques</u></a>	
4	<a href="#"><u>2C.45</u></a>	<a href="#"><u>Merge Signs (W4-1, W4-5)</u></a>
5	<a href="#"><u>2C.46</u></a>	<a href="#"><u>Added Lane Signs (W4-3, W4-6)</u></a>
6	<a href="#"><u>2C.47</u></a>	<a href="#"><u>Lane Ends Signs (W4-2, W9-1)</u></a>
7	<a href="#"><u>2C.48</u></a>	<a href="#"><u>Lanes Merge Signs (W9-4, W4-8)</u></a>
8	<a href="#"><u>2C.49</u></a>	<a href="#"><u>HEAVY MERGE FROM LEFT (RIGHT) Sign (W4-7)</u></a>
9	<a href="#"><u>2C.50</u></a>	<a href="#"><u>RIGHT (LEFT) LANE FOR EXIT ONLY Sign (W9-7)</u></a>
10	<a href="#"><u>2C.51</u></a>	<a href="#"><u>Two-Way Traffic Sign (W6-3)</u></a>
11	<a href="#"><u>2C.52</u></a>	<a href="#"><u>Two-Way Traffic on a Three-Lane Roadway Sign (W6-5, W6-5a)</u></a>
12	<a href="#"><u>2C.53</u></a>	<a href="#"><u>NO PASSING ZONE Sign (W14-3)</u></a>
13	<a href="#"><u>Miscellaneous Warning Signs</u></a>	
14	<a href="#"><u>2C.54</u></a>	<a href="#"><u>Vehicular Traffic Warning Signs (W8-6, W11-1, W11-5, W11-5a, W11-8, W11-10, W11-11, W11-12P, W11-14, W11-15, and W11-15a)</u></a>
15		
16	<a href="#"><u>2C.55</u></a>	<a href="#"><u>Non-Vehicular Warning Signs (W11-2, W11-3, W11-4, W11-6, W11-7, W11-9, and W11-16 through W11-22)</u></a>
17		
18	<a href="#"><u>2C.56</u></a>	<a href="#"><u>Playground Sign (W15-1)</u></a>
19	<a href="#"><u>Supplemental Plaques</u></a>	
20	<a href="#"><u>2C.57</u></a>	<a href="#"><u>Use of Supplemental Warning Plaques</u></a>
21	<a href="#"><u>2C.58</u></a>	<a href="#"><u>Design of Supplemental Warning Plaques</u></a>
22	<a href="#"><u>2C.59</u></a>	<a href="#"><u>Advisory Speed Plaque (W13-1P) and Confirmation Advisory Speed Plaque (W13-1aP)</u></a>
23	<a href="#"><u>2C.60</u></a>	<a href="#"><u>NEW Plaque (W16-15P)</u></a>
24	<a href="#"><u>2C.61</u></a>	<a href="#"><u>Distance Plaques (W16-2 Series, W16-3 Series, W16-4P, W7-3aP)</u></a>
25	<a href="#"><u>2C.62</u></a>	<a href="#"><u>Supplemental Arrow Plaques (W16-5P, W16-6P)</u></a>
26	<a href="#"><u>2C.63</u></a>	<a href="#"><u>Hill-Related Plaques (W7-2 Series, W7-3 Series)</u></a>
27	<a href="#"><u>2C.64</u></a>	<a href="#"><u>Advance Street Name Plaque (W16-8P, W16-8aP)</u></a>
28	<a href="#"><u>2C.65</u></a>	<a href="#"><u>CROSS TRAFFIC DOES NOT STOP Plaque (W4-4P)</u></a>
29	<a href="#"><u>2C.66</u></a>	<a href="#"><u>IN ROAD and IN STREET Plaques (W16-1P, W16-1aP)</u></a>
30	<a href="#"><u>2C.67</u></a>	<a href="#"><u>Except Bicycles Plaque (W16-20P)</u></a>
31	<a href="#"><u>2C.68</u></a>	<a href="#"><u>Photo Enforced Plaque (W16-10P)</u></a>
32	<a href="#"><u>Object Markers</u></a>	
33	<a href="#"><u>2C.69</u></a>	<a href="#"><u>Object Marker Design and Placement Height</u></a>
34	<a href="#"><u>2C.70</u></a>	<a href="#"><u>Object Markers for Obstructions Within the Roadway</u></a>
35	<a href="#"><u>2C.71</u></a>	<a href="#"><u>Object Markers for Obstructions Adjacent to the Roadway</u></a>
36	<a href="#"><u>2C.72</u></a>	<a href="#"><u>Object Markers for Ends of Roadways</u></a>
37		
38		

GENERAL

~~Section 2C.01~~ Function of Warning Signs **Not needed, this information is elsewhere in MUTCD**

~~Support:~~

~~Warning signs call attention to unexpected conditions on or adjacent to a highway, street, or private roads open to public travel 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~~ 2C.01 Function and Application of Warning Signs

**Standard:**

The use of warning signs shall be based on an engineering study or on engineering judgment.

Warning signs shall be retroreflective or illuminated (see Section 2A.20). **Added to be consistent with Chapter 2B**

*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.*

**Option:**

~~Consistent with the provisions of Chapter 2L, changeable message signs may be used to display a warning message.~~

~~Consistent with the provisions of Chapter 4L, a Warning Beacon may be used in combination with a standard warning sign.~~

**Support:**

~~The categories of warning signs are shown in Table 2C-1.~~

~~Warning signs provided in this Manual 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, grade crossings, and bicycle facilities are discussed in Parts 5 through 9, respectively.~~ **Not needed**

~~Section 1A.09 contains information regarding the assistance that is available to jurisdictions that do not have engineers on their staffs who are trained and/or experienced in traffic control devices.~~ **Not needed, this is covered in 1D.05**

~~Section 2C.03~~ 2C.02 Design of Warning Signs

**Standard:**

Except as provided in Paragraph 2 or unless specifically designated otherwise, all warning signs shall be diamond-shaped (square with one diagonal vertical) with a black legend and border on a yellow background. Warning signs shall be designed in accordance with the sizes, shapes, colors, and legends contained in the “Standard Highway Signs and Markings” **book publication** (see Section 1A.1105).

**Option:**

A warning sign that is larger than the size shown in the Oversized column in Table ~~2C-2~~ 2C-1 for that particular sign may be diamond-shaped or may be rectangular or square in shape.

Support:

The use of a shape other than diamond-shaped is typically for overhead installations.

Section 2A.05 contains information on allowable methods to accommodate a diamond-shaped warning sign where the lateral space available in which to install a diamond-shaped warning sign is constrained, such as in urban locations, when mounting on a narrow median barrier or adjacent to a retaining wall, including the display of the standard legend in a vertically oriented rectangle.

Option:

Except for symbols on warning signs, minor modifications may be made to the design provided that the essential appearance characteristics are met. Modifications may be made to the symbols shown on combined

1 horizontal alignment/intersection signs (see Section ~~2C.11~~2C.09) and intersection warning signs (see Section  
2 ~~2C.46~~2C.44~~2~~) in order to approximate the geometric configuration of the intersecting roadway(s).

3 Word message warning signs other than those provided in this Manual may be developed and installed by  
4 State and local highway agencies for conditions otherwise not addressed by standard signs (see Section  
5 2A.04).

6 Warning signs regarding conditions associated with pedestrians, bicyclists, and playgrounds may have a  
7 black legend and border on a yellow or fluorescent yellow-green background.

8 Warning signs may be enhanced with LEDs that illuminate steadily or flash at acceptable rates (See  
9 Section 2A.20) in the sign border matching the background color of the sign.

10 **Standard:**

11 **Warning signs regarding conditions associated with school buses and schools and their related**  
12 **supplemental plaques shall have a black legend and border on a fluorescent yellow-green background-**  
13 **(see Section 7B.~~07~~01).**

14 **Table 2C-1. Warning Signs and Plaque Sizes**

15 **Section ~~2C.04~~2C.03 Size of Warning Signs**

16 **Standard:**

17 **Except as provided in Section 2A.~~11~~07, the sizes for warning signs shall be as shown in Table ~~2C-2~~2C-1.**

18 **Support:**

19 Section 2A.~~11~~07 contains information regarding the applicability of the various columns in Table ~~2C-2~~2C-1.

20 **Standard:**

21 **Except as provided in Paragraph 5, the minimum size for all diamond-shaped warning signs facing**  
22 **traffic on a multi-lane conventional road where the posted speed limit is higher than 35 mph shall be 36**  
23 **x 36 inches.**

24 **The minimum size for supplemental warning plaques that are not included in Table ~~2C-2~~2C-1 shall**  
25 **be as shown in Table ~~2C-3~~2C-2.**

26 **Table 2C-2. Minimum Size of Supplemental Warning Plaques**

27 **Option:**

28 If a diamond-shaped warning sign is placed on the left-hand side of a multi-lane roadway to supplement  
29 the installation of the same warning sign on the right-hand side of the roadway, the minimum size identified in  
30 the Single Lane column in Table ~~2C-2~~2C-1 may be used.

31 Signs and plaques larger than those shown in Tables ~~2C-2~~2C-1 and ~~2C-3~~2C-2 may be used (see Section  
32 2A.11).

33 *Guidance:*

34 *The minimum size for all diamond-shaped warning signs facing traffic on exit and entrance ramps at*  
35 *major interchanges connecting an Expressway or Freeway with an Expressway or Freeway (see Section*  
36 *2E.11) should be the size identified in Table ~~2C-2~~2C-1 for the mainline roadway classification (Expressway*  
37 *or Freeway). If a minimum size is not provided in the Freeway Column, the Expressway size should be used.*  
38 *If a minimum size is not provided in the Freeway or the Expressway Column, the Oversized size should be*  
39 *used.*

40 *The minimum size for all diamond-shaped warning signs facing traffic on exit and entrance ramps at all*  
41 *other interchanges (see Section 2E.11) should be 36" by 36".*

42 *The typical size of warning signs used on low-volume rural roads with operating speeds of 30 mph or less*  
43 *should be in accordance with the minimum column of Table 2C-1.*

44 **Section ~~2C.05~~2C.04 Placement of Warning Signs**

45 **Support:**

46 For information on placement of warning signs, see Sections 2A.~~16~~12 to 2A.~~21~~17.

1 The time needed for detection, recognition, decision, and reaction is called the Perception-Response Time  
2 (PRT). Table ~~2C-4~~2C-3 is provided as an aid for determining warning sign location. The distances shown in  
3 Table ~~2C-4~~2C-3 can be adjusted for roadway features, other signing, and to improve visibility.

4 *Guidance:*

5 *Warning signs should be placed so that they provide an adequate PRT. The distances contained in Table*  
6 ~~2C-4~~2C-3 *are for guidance purposes and should be applied with engineering judgment. ~~Warning signs~~*  
7 ~~*should not be placed too far in advance of the condition, such that drivers might tend to forget the warning*~~  
8 ~~*because of other driving distractions, especially in urban areas.*~~ **Not needed**

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

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

### 13 **Table 2C-3. Guidelines for Advanced Placement of Warning Signs**

14 *Option:*

15 ~~*Warning signs that advise road users about conditions that are not related to a specific location, such as*~~  
16 ~~*Deer Crossing or SOFT SHOULDER, may be installed in an appropriate location, based on engineering*~~  
17 ~~*judgment, since they are not covered in Table 2C-4.*~~ **This information is in Table 2C-3, not needed in the**  
18 **text**

## HORIZONTAL ALIGNMENT WARNING SIGNS

### **Section ~~2C.06~~ 2C.05 Horizontal Alignment Warning Signs - General**

Support:

A variety of horizontal alignment warning signs (see Figure 2C-1), pavement markings (see Chapter 3B), and delineation (see Chapter ~~3E~~3G) can be used to advise motorists of a change in the roadway alignment. Uniform application of these traffic control devices with respect to the amount of change in the roadway alignment conveys a consistent message establishing driver expectancy and promoting effective roadway operations. The design and application of horizontal alignment warning signs to meet those requirements are addressed in Sections ~~2C.06~~2C.05 through ~~2C.15~~2C.13.

~~In advance of horizontal curves on freeways, on expressways, and on roadways with more than 1,000 AADT that are functionally classified as arterials or collectors, horizontal alignment warning signs shall be used in accordance with Table 2C-5 based on the speed differential between the roadway's posted or statutory speed limit or 85<sup>th</sup> percentile speed, whichever is higher, or the prevailing speed on the approach to the curve, and the horizontal curve's advisory speed.~~ **First portion of paragraph deleted; second phrase relocated to Section 2C.06**

Option:

~~Horizontal Alignment Warning signs may also be used on other roadways or on arterial and collector roadways with less than 1,00 AADT based on engineering judgment.~~

The following list identifies treatments that might be used in advance of or within a change in horizontal alignment.

- A. Horizontal alignment signs (Turn (W1-1), Curve (W1-2, W1-10 series, W1-11, W1-13, W1-15), Reverse Turn (W1-3), Reverse Curve (W1-4), Winding Road (W1-5), Exit Speed (W13-2), Ramp Speed (W13-3), Combination Horizontal Alignment (Advisory Exit or Ramp Speed W13-6 through W13-11) signs.
- B. Advisory Speed Plaque (W13-1P)
- C. Chevrons (W1-8)
- D. Delineators (Chapter 3G)
- E. One Direction Large Arrow (W1-6) sign
- F. Raised Retroreflective Pavement Markers (Section 3B.15 through 3B.16).
- G. Sign or marking conspicuity enhancements (See Section 2A.11)
- H. Wide Edge Lines.
- I. Pavement Word, Symbol and Arrow markings (symbol or words) (Section 3B.20 through 3B.22)
- J. Rumble Strips
- K. Vehicle Speed Feedback Sign (Section 2C.13)
- L. Speed reduction markings (Section 3B.28)

In addition, considerations other than traffic control devices such as improved surface friction (high friction surface treatments), pavement edge treatments, lighting improvements, increased super elevation, and rumble strips might be used in advance of or within a change in horizontal alignment.

Guidance:

Except as provided in Section 2C.06, the selection of traffic control devices used to warn road users of a change in horizontal alignment or to provide guidance in navigating the change in horizontal alignment should be based on consideration of one or more of the following factors:

- A. The speed of traffic on the approach to the change in horizontal alignment.
- B. The recommended advisory speed for the change in horizontal alignment
- C. The difference between the speed limit and the advisory speed or the speed differential, for the change in horizontal alignment.
- D. Daily traffic volumes on the roadway.
- E. The typical mix of vehicle types on the roadway
- F. Sight distance throughout the change in horizontal alignment.
- G. Other types of traffic control devices that are used in advance of and within the change in horizontal alignment on the same roadway segment.
- H. The crash history of the change in horizontal alignment.
- I. The presence of driveways or intersections within the curve radius

**Figure 2C-1. Horizontal Alignment Signs and Plaques**

1 **Section 2C.06 Device Selection for Changes in Horizontal Alignment**

2 **Standard:**

3 **Horizontal alignment warning signs, as indicated in Table 2C-4b, shall be used in advance of**  
4 **horizontal curves in accordance with the criteria shown in Table 2C-4a, except as provided in**  
5 **paragraphs 3, 5, and 6 of this section. The speed differential shall be the difference between the**  
6 **horizontal curve’s advisory speed and the roadway’s posted or statutory speed limit or 85<sup>th</sup> percentile**  
7 **speed, whichever is higher, or the prevailing speed on the approach to the curve.** **Second sentence**  
8 **relocated from new Section 2C.05 and revised**

9 **Support:**

10 Table 2C-4a represents existing AADT, type of roadway, and whether or not there are existing markings.

11 **Option:**

12 A One Direction Large Arrow (W1-6) sign may be used in place of or to supplement delineators (see  
13 Section 3G.03) or Chevrons (W1-8) when geometric conditions limit the number of delineators or chevrons  
14 that are visible or when the number of delineators or chevrons that can be installed within the change in  
15 horizontal alignment is less than the spacing specified in Sections 2C.08 or 3F.04.

16 Additional or supplemental devices may be used for a change in horizontal alignment on the basis of  
17 engineering judgment.

18 Devices for changes in horizontal alignment may be omitted when the speed limit on the approach to an  
19 alignment change is 20 mph or less.

20 Devices for changes in horizontal alignment may be omitted on urban streets with an AADT of 1000  
21 vehicles per day or less on the basis of engineering judgment.

22 **Support:**

23 For purposes of selecting traffic control devices for changes in horizontal alignment, an arterial or  
24 collector is considered to have pavement markings when either a centerline, edge lines, or both are present.  
25 See Sections 3B.02 and 3B.09 for centerline and edge line provisions.

26 **Section 2C.07 Horizontal Alignment Signs (W1-1 through W1-5, W1-11, W1-15)**

27 **Standard:**

28 **If Table 2C-54a indicates that a horizontal alignment sign (see Figure 2C-1) is required,**  
29 **recommended, or allowed, the sign installed in advance of the curve shall be a Curve (W1-2) sign unless**  
30 **a different sign is recommended or allowed by the provisions of this Section.**

31 ~~**A Turn (W1-1) sign shall be used instead of a Curve sign in advance of curves that have advisory**~~  
32 ~~**speeds of 30 mph or less (see Figure 2C-2).**~~ **Relocated to Guidance below.**

33 **Guidance:**

34 A Turn sign (W1-1) should be used instead of a Curve sign (W1-2) in advance of curves when the advisory  
35 speed is half or less of the posted speed or a speed differential of 25 MPH or more. **Revised and relocated**  
36 **from Standard above.**

37 Where there are two changes in roadway alignment in opposite directions that are separated by a tangent  
38 distance of less than 600 feet, the Reverse Turn (W1-3) sign should be used instead of multiple Turn (W1-1)  
39 signs or the Reverse Curve (W1-4) sign should be used instead of multiple Curve (W1-2) signs.

40 **Support:**

41 Figure 2C-2 provides an example of warning signs used for a turn.

42 **Option:**

43 A Winding Road (W1-5) sign may be used instead of multiple Turn (W1-1) or Curve (W1-2) signs where  
44 there are three or more changes in roadway alignment each separated by a tangent distance of less than 600  
45 feet.

46 A NEXT XX MILES (W7-3aP) supplemental distance plaque (see Section ~~2C.55~~ 2C.60) may be installed  
47 below the Winding Road sign where continuous roadway curves exist for a specific distance.

48 If the curve has a change in horizontal alignment of 135 degrees or more, the Hairpin Curve (W1-11) sign  
49 may be used instead of a Curve or Turn sign.

1 If the curve has a change of direction of approximately 270 degrees, such as on a cloverleaf interchange  
2 ramp, the 270-degree Loop (W1-15) sign may be used instead of a Curve or Turn sign.

3 *Guidance:*

4 *When the Hairpin Curve sign or the 270-degree Loop sign is installed, either a One-Direction Large*  
5 *Arrow (W1-6) sign or Chevron Alignment (W1-8) signs should be installed on the outside of the turn or curve.*

6 **Figure 2C-2. Example of Warning Signs for a Turn**

7 **NEW Table 2C-4a. Applications for the Selection of Devices for Changes in Horizontal**  
8 **Alignment**

9 **NEW Table 2C-4b. Selection of Devices for Changes in Horizontal Alignment**

10 **Section ~~2C.09~~2C.08 Chevron Alignment Sign (W1-8)**

11 **Standard:**

12 The use of the Chevron Alignment (W1-8) sign (see Figures 2C-1 and 2C-2) to provide additional  
13 emphasis and guidance for a change in horizontal alignment shall be in accordance with the  
14 information shown in Table ~~2C-5~~2C-4b.

15 *Option:*

16 ~~When used,~~ Chevron Alignment signs may be used instead of or in addition to standard delineators.

17 **Standard:**

18 The Chevron Alignment sign shall be a vertical rectangle. No border shall be used on the Chevron  
19 Alignment sign.

20 If used, Chevron Alignment signs shall be installed on the outside of a turn or curve, in line with  
21 and at approximately a right angle to approaching traffic. Chevron Alignment signs shall be installed  
22 at a minimum height of 4 feet, measured vertically from the bottom of the sign to the elevation of the  
23 near edge of the traveled way.

24 *Guidance:*

25 *The approximate spacing of Chevron Alignment signs on the turn or curve measured from the point of*  
26 *curvature (PC) should be as shown in Table ~~2C-6~~2C-5.*

27 ~~If used,~~The Chevron Alignment signs should be visible for a sufficient distance to provide the road user  
28 with adequate time to react to the change in alignment.

29 *Option:*

30 LEDs may be used to enhance the conspicuity of Chevron Alignment signs (See Section 2A.11) and if  
31 vehicle activated, the LEDs may be flashed on all signs concurrently.

32 **Standard:**

33 LEDs shall not be flashed from one sign to the next along the curve or turn.

34 The LEDs used in the Chevron Alignment sign shall consist of yellow LEDs outlining the chevron  
35 symbol.

36 Chevron Alignment signs shall not be placed on the far side of a T-intersection facing traffic on the  
37 stem approach to warn drivers that a through movement is not physically possible, as this is the  
38 function of a Two-Direction (or One-Direction) Large Arrow sign.

39 Chevron Alignment signs shall not be used to mark obstructions within or adjacent to the roadway,  
40 including the beginning of guardrails or barriers, as this is the function of an object marker (see Section  
41 ~~2C.63~~2C.69).

42 ~~Section 2C.10 Combination Supplemental Horizontal Alignment/Advisory Speed Signs (W1-~~  
43 ~~1a, W1-2a)~~ **Section deleted**

44 **Table 2C-5. Typical Spacing of Chevron Alignment Signs on Horizontal Curves**

45 **Section ~~2C.11~~2C.09 Combination Horizontal Alignment/Intersection Signs (W1-10 Series)**

46 *Option:*

1 The Turn (W1-1) sign, the Curve (W1-2) sign, and the Reverse Curve (W1-4) may be combined with the  
2 Cross Road (W2-1) sign or the Side Road (W2-2 or W2-3) sign to create a combination Horizontal  
3 Alignment/Intersection (W1-10 series) sign (see Figure 2C-1) that depicts the condition where an intersection  
4 occurs within or immediately adjacent to a turn or curve.

5 *Guidance:*

6 *Elements of the combination Horizontal Alignment/Intersection sign related to horizontal alignment*  
7 *should comply with the provisions of Section 2C.07, and elements related to intersection configuration should*  
8 *comply with the provisions of Section ~~2C.46~~ 2C.42. The symbol design should approximate the configuration*  
9 *of the intersecting roadway(s). No more than one Cross Road or two Side Road symbols should be displayed*  
10 *on any one combination Horizontal Alignment/Intersection sign.*

11 **Standard:**

12 **The use of the combination Horizontal Alignment/Intersection sign shall be in accordance with the**  
13 **provisions of Section 2C.07 for the appropriate Turn or Curve sign ~~information shown in Table 2C-5.~~**

### 14 **Section ~~2C.12~~ 2C.10 One-Direction Large Arrow Sign (W1-6)**

15 *Option:*

16 A One-Direction Large Arrow (W1-6) sign (see Figure 2C-1) may be used either as a supplement or  
17 alternative to Chevron Alignment signs or delineators in order to delineate a change in horizontal alignment  
18 (see Figure 2C-2).

19 A One-Direction Large Arrow (W1-6) sign may be used to supplement a Turn or Reverse Turn sign (see  
20 Figure 2C-2) to emphasize the abrupt curvature.

21 **Standard:**

22 **The One-Direction Large Arrow sign shall be a horizontal rectangle with an arrow pointing to the**  
23 **left or right.**

24 **If used, the One-Direction Large Arrow sign shall be installed on the outside of a turn or curve in**  
25 **line with and at approximately a right angle to approaching traffic.**

26 **The One-Direction Large Arrow sign shall not be used where there is no alignment change in the**  
27 **direction of travel, such as at the beginnings and ends of medians or at center piers.**

28 ~~**The One-Direction Large Arrow sign directing traffic to the right shall not be used in the central**~~  
29 ~~**island of a roundabout.**~~

30 Option

31 The One-Direction Large Arrow sign directing traffic to the right may be used in the central island of a  
32 roundabout.

33 Support:

34 Examples of regulatory and warning signs for roundabouts are shown in Figures 2B-21 through 2B-23.

35 *Guidance:*

36 ~~*If used,*~~ *The One-Direction Large Arrow sign should be visible for a sufficient distance to provide the*  
37 *road user with adequate time to react to the change in alignment.*

### 38 **Section ~~2C.13~~ 2C.11 Truck Rollover ~~Warning~~ Sign (W1-13)**

39 *Option:*

40 A Truck Rollover ~~Warning~~ (W1-13) sign (see Figure 2C-1) may be used in lieu of a horizontal alignment  
41 warning sign to warn drivers of vehicles with a high center of gravity, such as trucks, tankers, and recreational  
42 vehicles, of a curve or turn where ~~geometric conditions might contribute to a loss of control and a rollover as~~  
43 ~~determined by an engineering study.~~ there are:

44 A. Past incidents of truck rollovers at the specific location;

45 B. High volumes of trucks;

46 C. Or where the differential (See Section 2C.06) might pose a greater risk for vehicles with high centers  
47 of gravity.

48 *Guidance:*

49 Where engineering judgement determines the need for the installation of a Truck Rollover (W1-13) sign, it  
50 should be located in advance of the curve where the horizontal alignment warning sign would otherwise be  
51 located.

1 **Support:**

2 ~~Among the established engineering practices that are appropriate for the determination of the truck~~  
3 ~~rollover potential of a horizontal curve are the following:~~

- 4 ~~A. An accelerometer that provides a direct determination of side friction factors~~  
5 ~~B. A design speed equation~~  
6 ~~C. A traditional ball bank indicator using 10 degrees of ball bank~~

7 **Standard:**

8 **If a Truck Rollover ~~Warning~~ (W1-13) sign is used, it shall be accompanied by an Advisory Speed**  
9 **(W13-1P) plaque indicating the recommended speed for vehicles with a higher center of gravity.**

10 **Option:**

11 The Truck Rollover ~~Warning~~ sign may be displayed as a static sign, as a static sign supplemented by a  
12 ~~flashing~~ warning beacon, or as a ~~changeable message~~ blank-out sign activated by the detection of an  
13 approaching vehicle with a high center of gravity that is traveling in excess of the recommended speed for the  
14 condition.

15 A Vehicle Speed Feedback (W13-20) sign (see Section 2C.13) may be used in conjunction with a Truck  
16 Rollover Warning sign.

17 **Support:**

18 The curved arrow on the Truck Rollover ~~Warning~~ sign shows the direction of roadway curvature. The  
19 truck tips in the opposite direction.

20 **Section ~~2C.14~~ 2C.12 **Advisory Exit and Ramp Speed Signs (W13-2 and W13-3) and**  
21 **Combination Horizontal Alignment/Advisory Exit and Ramp Speed Signs (W13-6 through**  
22 **W13-13)****

23 **Standard:**

24 ~~The use of~~ Advisory Exit Speed (W13-2) sign in advance of a freeway and expressway exit and the  
25 Advisory Ramp Speed (W13-3) sign in advance of a conventional road ramp to another roadway or  
26 roadside facility signs on freeway and expressway ramps shall be used in accordance with the  
27 information shown in Table ~~2C-52C-4b~~.

28 **Option:**

29 The Combination Horizontal Alignment/Advisory Exit Speed (W13-6, W13-8, W13-10, W13-12) signs  
30 may be use in lieu of the Advisory Exit Speed (W13-2) sign and the combination Horizontal  
31 Alignment/Advisory Ramp Speed (W13-7, W13-9, W13-11, W13-13) signs may be use in lieu of the W13-3  
32 sign.

33 **Standard:**

34 Geometries represented on the Advisory Exit Speed, Advisory Ramp Speed, Combination  
35 Horizontal Alignment/Advisory Exit and Combination Horizontal Alignment/Advisory Ramp Speed  
36 signs (See Figure 2C-1) shall be limited to the standard signs shown in this manual.

37 The Advisory Exit Speed and Advisory Ramp Speed signs on turning roadways, exits and ramps  
38 shall be used when the difference between the mainline roadway speed limit and the exit or ramp  
39 advisory speed in the vicinity of the departure is 20 mph or greater.

40 **Guidance:**

41 The Advisory Exit Speed and Advisory Ramp Speed signs on turning roadway ramps should be used when  
42 the difference between the mainline roadway speed limit and the exit or ramp advisory speed in the vicinity of  
43 the departure is 15 mph or greater.

44 ~~If used, the Advisory Exit Speed sign and the Combination Horizontal Alignment/Advisory Exit Speed sign~~  
45 ~~should be installed along the deceleration lane. See Section 2C.08 for the determination of the displayed~~  
46 ~~advisory speed. and the advisory speed displayed should be based on an engineering study. When a Truck~~  
47 ~~Rollover (W1-13) sign (see Section 2C.13) is also installed for the ramp, the advisory exit speed should be~~  
48 ~~based on the truck advisory speed for the horizontal alignment using recommended engineering practices.~~

49 ~~If used, ~~†~~The Advisory Exit Speed and the Combination Horizontal Alignment/Advisory Exit signs~~ should  
50 be visible in time for the road user to decelerate and make an exiting maneuver.

51 Regulatory Speed Limit signs (see Section 2B.22) should not be located in the vicinity of exit ramps or  
52 deceleration lanes, particularly where they will conflict with the advisory speed displayed on the Advisory

1 Exit or Ramp Speed signs.

2 Support:

3 Table ~~2C-4~~2C-3 lists recommended advance sign placement distances for deceleration to various advisory  
4 speeds.

5 Option:

6 Where there is a need to remind road users of the recommended advisory speed, a horizontal alignment  
7 warning sign with an advisory speed plaque displaying the same advisory speed may be installed at a  
8 downstream location along the ramp.

9 Guidance:

10 If the ramp curvature changes to the extent that it warrants a lower advisory speed, a horizontal  
11 alignment warning sign with the new advisory speed should be displayed in advance of the change in  
12 curvature.

13 Option:

14 The One-Direction Large Arrow (W1-6) sign may be installed beyond the exit gore on the outside of the  
15 curve to provide additional warning of an immediate change in curvature. When used in conjunction with the  
16 exit speed, the One-Direction Large Arrow (W1-6) sign may be supplemented with a Confirmation Advisory  
17 Speed Plaque (W13-1aP) when the plaque is not used with the Exit Gore (E5-1 series) sign.

18 Guidance:

19 The horizontal alignment symbol displayed on the Combination Horizontal Alignment/Advisory Exit and  
20 Ramp Speed signs should be consistent with the horizontal geometry of the ramp.

21 ~~If used, the Advisory Ramp Speed sign should be installed on the ramp to confirm the ramp advisory~~  
22 ~~speed.~~

23 ~~If used, Chevron Alignment (W1-8) signs and/or One-Direction Large Arrow (W1-6) signs should be~~  
24 ~~installed on the outside of the exit curve as described in Sections 2C.09 and 2C.12C.10.~~

25 Option:

26 ~~Where there is a need to remind road users of the recommended advisory speed, a horizontal alignment~~  
27 ~~warning sign with an advisory speed plaque may be installed at or beyond the beginning of the exit curve or~~  
28 ~~on the outside of the curve, provided that it is apparent that the sign applies only to exiting traffic. These signs~~  
29 ~~may also be used at intermediate points along the ramp, especially if the ramp curvature changes and the~~  
30 ~~subsequent curves on the ramp have a different advisory speed than the initial ramp curve.~~

31 Support:

32 Figure 2C-3 shows an example of advisory speed signing for an exit ramp.

33 **Figure 2C-3. Example of Advisory Speed Signing for an Exit Ramp**

34 ~~Section 2C.15—Combination Horizontal Alignment/Advisory Exit and Ramp Speed Signs~~  
35 ~~(W13-6 Series and W13-7) Combined with Section 2C.12 above~~

36 Section 2C.13 Vehicle Speed Feedback Sign (W13-20, W13-20aP)

37 Option:

38 A Vehicle Speed Feedback (W13-20) sign or (W13-20aP) plaque (see Figure 2C-4) that displays the  
39 speed of an approaching vehicle back to the vehicle operator may be used to provide warning to drivers of  
40 their speed in relation to either a speed limit or horizontal alignment warning advisory speed sign.

41 Standard:

42 When used as a warning to motorist of their speed in relation to the posted speed limit, the Vehicle  
43 Speed Feedback Plaque (W13-20P) shall be mounted below a Speed Limit (R2-1) sign (see Section  
44 2B.23).

45 When used to supplement a horizontal alignment warning sign advisory speed, the Vehicle Speed  
46 Feedback Sign (W13-20) shall be an independent installation near the point of curvature of a horizontal  
47 curve (see Section 2C.06).

48 The legend YOUR SPEED shall be a black legend on a yellow retroreflective background. The  
49 changeable legend displaying the speed of the approaching vehicle shall be a yellow luminous legend on  
50 a black opaque background.

1 The vehicle speed displayed on the changeable portion of the sign shall not flash or change color.  
2 The Vehicle Speed Feedback sign and plaque shall not flash, strobe or use other dynamic elements  
3 integrated into the changeable legend display. When no vehicles are approaching, the changeable  
4 display shall not display a legend.

5 Guidance:

6 The changeable portion of the Vehicle Speed Feedback legend should be approximately the same height,  
7 width, and stroke of those on the Speed Limit sign it supplements or is mounted below.

8 When a W13-20P is used with a Speed Limit sign it should be approximately the same width of the Speed  
9 Limit sign it is mounted below.

10 **Figure 2C-4. Vehicle Speed Feedback Signs**  
11  
12

**VERTICAL GRADE WARNING SIGNS AND PLAQUES**

**Section ~~2C.16~~ 2C.14 Hill Signs (W7-1, W7-1a)**

Guidance:

The Hill (W7-1) sign (see Figure ~~2C-4~~ 2C-5) should be used in advance of a downgrade on a freeway, expressway, or a conventional road 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 (W7-3P) plaque (see Section ~~2C.57~~ 2C.63) used in combination, or the W7-1a sign used alone, should be installed in advance of downgrades for the following conditions:

- A. 5% grade that is more than 3,000 feet in length,
- B. 6% grade that is more than 2,000 feet in length,
- C. 7% grade that is more than 1,000 feet in length,
- D. 8% grade that is more than 750 feet in length, or
- E. 9% grade that is more than 500 feet 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.57~~ 2C.63) 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 (W7-3aP) plaque or the combination distance/grade (W7-3bP) plaque at periodic intervals of approximately 1-mile spacing should be considered.

**Standard Deleted, redundant; covered in Section 2C.57**

~~If the percent grade is displayed on a supplemental plaque, the plaque shall be placed below the Hill (W7-1) sign.~~

Option:

A USE LOW GEAR (W7-2P) or TRUCKS USE LOWER GEAR (W7-2bP) supplemental plaque (see Figure ~~2C-4~~ 2C-5) may be used to indicate a situation where downshifting as well as braking might be advisable.

**Section ~~2C.17~~ 2C.15 Truck Escape Ramp Signs (W7-4 Series)**

Guidance:

Where applicable, truck escape (or runaway truck) ramp advance warning signs (see Figure ~~2C-4~~ 2C-5) should be located approximately 1 mile, and 1/2 mile in advance of the grade, and of the ramp. An additional W7-4b or W7-4c A sign also should be placed at the gore.

A RUNAWAY VEHICLES ONLY (R4-10) sign (see Section ~~2B.35~~ 2B.43) should be installed near the ramp entrance to discourage other road users from entering the ramp. 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 (W7-4dP), GRAVEL (W7-4eP), or PAVED (W7-4fP) supplemental plaque (see Figure ~~2C-4~~ 2C-5) may be used to describe the ramp surface. State and local highway agencies may develop appropriate word message signs for the specific situation.

**Figure 2C-5. Vertical Grade Signs and Plaques**

**Section ~~2C.18~~ 2C.16 HILL BLOCKS VIEW Sign (W7-6)**

Option:

A HILL BLOCKS VIEW (W7-6) sign ~~(see Figure 2C-45)~~ may be used ~~in advance of~~ on the approach to a crest vertical curve where the vertical curvature provides inadequate stopping sight distance at the posted speed limit. ~~to advise road users to reduce speed as they approach and traverse the hill as only limited stopping sight distance is available.~~

Guidance:

1 When a vertical curve results in a sight distance obstruction to a specific condition beyond the crest of the  
2 vertical curve, the sign for the specific condition beyond the vertical crest should be used rather than the  
3 HILL BLOCKS VIEW (W7-6) sign.

4 When a HILL BLOCKS VIEW sign is used, it should be supplemented by an Advisory Speed (W13-1P)  
5 plaque indicating the recommended speed for traveling over the hillcrest based on available stopping sight  
6 distance.

7

1 ROADWAY GEOMETRY WARNING SIGNS

2 **Section ~~2C.19~~2C.17 ROAD NARROWS Sign (W5-1)**

3 *Guidance:*

4 *Except as provided in Paragraph 2, a ROAD NARROWS (W5-1) sign (see Figure 2C-65) should be used*  
5 *in advance of a transition on two-lane roads where the pavement width is reduced abruptly to a width such*  
6 *that vehicles traveling in opposite directions cannot simultaneously travel through the narrow portion of the*  
7 *roadway without reducing speed.*

8 *Option:*

9 The ROAD NARROWS (W5-1) sign may be omitted on low-volume local streets that have speed limits  
10 of 30 mph or less.

11 Additional emphasis may be provided by the use of object markers and delineators (see Sections ~~2C.63-~~  
12 ~~2C.69~~ through ~~2C.65~~2C.72 and Chapter ~~3F~~3G). The Advisory Speed (W13-1P) plaque (see Section  
13 ~~2C.08~~2C.59) may be used to indicate the recommended speed.

14 **Section ~~2C.20~~2C.18 NARROW BRIDGE and NARROW UNDERPASS Signs (W5-2, W5-2a)**

15 *Guidance:*

16 *A NARROW BRIDGE (W5-2) sign (see Figure 2C-65) should be used in advance of any bridge or culvert*  
17 *having a two-way roadway clearance width of 16 to 18 feet, or any bridge or culvert having a roadway*  
18 *clearance less than the width of the approach travel lanes. Where these conditions exist for an underpass, a*  
19 *NARROW UNDERPASS (W5-2a) sign should be used.*

20 *Additional emphasis should be provided by the use of object markers, delineators, and/or pavement*  
21 *markings.*

22 *Option:*

23 A NARROW BRIDGE sign may be used in advance of a bridge or culvert on which the approach  
24 shoulders are narrowed or eliminated. Where these conditions exist for an underpass, a NARROW  
25 UNDERPASS (W5-2a) sign may be used.

26 The NARROW BRIDGE or NARROW UNDERPASS sign may be omitted on low-volume rural roads.

27 **Figure 2C-6. Example of Signing at Narrow or One Lane Underpass**

28 **Section ~~2C.21~~2C.19 ONE LANE BRIDGE and ONE LANE UNDERPASS Signs (W5-3, W5-**  
29 **3a)**

30 *Guidance:*

31 *A ONE LANE BRIDGE (W5-3) sign (see Figure 2C-65) should be used on two-way roadways in advance*  
32 *of any bridge or culvert:*

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

38 Where these conditions exist for an underpass, a ONE LANE UNDERPASS (W5-3a) sign should be used.

39 *Additional emphasis should be provided by the use of object markers, delineators, and/or pavement*  
40 *markings.*

41 *Option:*

42 The ONE LANE BRIDGE or ONE LANE UNDERPASS sign may be omitted on low-volume rural roads  
43 where there is adequate sight distance to the bridge from either approach .

44 **Section ~~2C.22~~2C.20 Divided Highway Sign (W6-1)**

45 *Guidance:*

46 *A Divided Highway (W6-1) sign (see Figure 2C-795) should be used on the approaches to a section of*  
47 *highway (not an intersection or junction) where the opposing flows of traffic are separated by a median or*  
48 *other physical barrier.*

49 **Standard:**

1       **The Divided Highway (W6-1) sign shall not be used instead of a Keep Right (R4-7 series) sign on the**  
2 **approach end of a median island.**

3 **Section ~~2C.23~~ 2C.21 Divided Highway Ends Sign (W6-2)**

4 *Guidance:*

5       A Divided Highway Ends (W6-2) sign (see Figure ~~2C-5~~2C-7) should be used in advance of the end of a  
6 section of physically divided highway (not an intersection or junction) as a warning of two-way traffic ahead.

7       The Two-Way Traffic (W6-3) sign (see Section ~~2C.44~~2C.51) should be used to give warning and notice of  
8 the transition to a two-lane, two-way section.

9 **Section ~~2C.24~~ 2C.22 Freeway or Expressway Ends Signs (W19 Series)**

10 Option:

11       A FREEWAY ENDS XX MILES (W19-1) sign or a FREEWAY ENDS (W19-3) sign (see Figure ~~2C-~~  
12 ~~5~~2C-7) may be used in advance of the end of a freeway.

13       An EXPRESSWAY ENDS XX MILES (W19-2) sign or an EXPRESSWAY ENDS (W19-4) sign (see  
14 Figure ~~2C-5~~2C-7) may be used in advance of the end of an expressway.

15       The rectangular W19-1 and W19-2 signs may be post-mounted or may be mounted overhead for increased  
16 emphasis.

17 *Guidance:*

18       If the reason that the freeway is ending is that the next portion of the freeway is not yet constructed and as  
19 a result all traffic must use an exit ramp to leave the freeway, an ALL TRAFFIC MUST EXIT (W19-5) sign  
20 (see Figure ~~2C-5~~2C-7) should be used in addition to the Freeway Ends signs in advance of the downstream  
21 end of the freeway.

22 **Figure 2C-7. Miscellaneous Warning Signs**

23 **Section ~~2C.25~~ 2C.23 Double Arrow Sign (W12-1)**

24 Option:

25       The Double Arrow (W12-1) sign (~~see Figure 2C-5~~) may be used to advise road users that traffic is  
26 permitted to pass on either side of an island, obstruction, or gore in the roadway. Traffic separated by this  
27 sign may either rejoin or change directions.

28 *Guidance:*

29       If used on an island, the Double Arrow sign should be mounted near the approach end.

30       If used in front of a pier or obstruction, the Double Arrow sign should be mounted on the face of, or just  
31 in front of, the obstruction. Where stripe markings are used on the obstruction, they should be discontinued to  
32 leave a 3-inch space around the outside of the sign.

33 **Section ~~2C.26~~ 2C.24 DEAD END, NO OUTLET, and ROAD ENDS Signs (W14-1, W14-1a,  
34 W14-2, W14-2a, W8-26, W8-26a)**

35 Option:

36       The DEAD END (W14-1) sign (see Figure ~~2C-5~~2C-7) may be used at the entrance of a single road or  
37 street that terminates in a dead end or ~~eul-de-sae~~turn-around. The NO OUTLET (W14-2) sign (see Figure ~~2C-~~  
38 ~~5~~2C-7) may be used at the entrance to a road or road network from which there is no other exit.

39       DEAD END (W14-1a) or NO OUTLET (W14-2a) signs (see Figure ~~2C-5~~2C-7) may be used in  
40 combination with Street Name (D3-1) signs (see Section ~~2D.43~~2D.45) to warn turning traffic that the cross  
41 street ends in the direction indicated by the arrow.

42       At locations where the cross street does not have a name, the W14-1a or W14-2a signs may be used alone  
43 in place of a street name sign.

44 *Standard Guidance:*

45       ~~The DEAD END (W14-1a) and NO OUTLET (W14-2a) signs shall be horizontal rectangles with an arrow~~  
46 ~~pointing to the left or right.~~

1 When the W14-1 or W14-2 sign is used, the sign ~~shall~~ should be posted as near as practical to the entry  
2 point or at a sufficient advance distance to permit the road user to avoid the dead end or no outlet condition  
3 by turning at the nearest intersecting street.

4 **Standard:**

5 The DEAD END (W14-1a) or NO OUTLET (W14-2a) signs shall not be used instead of the W14-1  
6 or W14-2 signs where traffic can proceed straight through the intersection into the dead end street or  
7 no outlet area.

8 **Option:**

9 The ROAD ENDS XX FT (W8-26) or STREET ENDS XX FT (W8-26a) sign (see Figure 2C-128) may  
10 be used on the approach to the end of a conventional road or street that terminates in a dead end or turn-  
11 around.

12 **Guidance:**

13 If a W8-26 series sign is used on the approach to the end of a road or street, then Type 4 object markers  
14 (see Section 2C.72) should be used to mark the end of the road or street.

15 **Standard:**

16 The W8-26 and W8-26a signs shall not be used in place of the W14-1 series or W14-2 series signs at  
17 the entrance to such a road or street.

18 **Support:**

19 Section 2C.XX contains information on signs for use on the approach to the end of a freeway or  
20 expressway.

21 **Section ~~2C.27~~ 2C.25 Low Clearance Signs (W12-2, ~~and~~ W12-2a, W12-2b)**

22 **Standard:**

23 The Low Clearance Advance (W12-2) sign (see Figure ~~2C-52C-78~~) shall be used to warn road users  
24 of clearances less than 12 inches above the statutory maximum vehicle height.

25 **Guidance:**

26 The actual clearance should be displayed on the Low Clearance (W12-2, W12-2a, and W12-2b) sign to  
27 the nearest 1 inch not exceeding the actual clearance. However, in areas that experience changes in  
28 temperature causing frost action, a reduction, not exceeding 3 inches, should be used for this condition.

29 Clearances should be evaluated periodically, particularly when resurfacing operations have occurred.

30 **Relocated from below**

31 ~~Where the clearance is less than the legal maximum vehicle height, the~~ The W12-2 sign with a  
32 supplemental distance plaque should also be placed at the nearest intersecting road or wide point in the road  
33 at which a vehicle can detour or turn around.

34 **Option:** **Relocated from below and revised; second sentence deleted because sign is standardized**

35 The Low Clearance Overhead (W12-2a or W12-2b) sign may be installed on ~~or in advance of~~ the  
36 structure to supplement the advance warning sign. ~~If a sign is placed on the structure, it may be a rectangular~~  
37 ~~shape (W12-2a) with the appropriate legend (see Figure 2C-5).~~

38 **Guidance:**

39 In the case of an arch or other structure under which the clearance varies greatly, two or more Low  
40 Clearance Overhead (W12-2a or 12-2b) signs should be ~~used as necessary~~ installed on the structure itself to  
41 give information as to the clearances over ~~the entire~~ the low clearance portions of the roadway.

42 **Standard:**

43 If used, the Low Clearance Overhead (W12-2b) sign shall indicate the portion of the structure with  
44 low clearance if the posted clearance does not apply to the entire structure.

45 **Guidance:** **Relocated to above**

46 ~~Clearances should be evaluated periodically, particularly when resurfacing operations have occurred.~~

47 **Option:** **Relocated to above**

48 ~~The Low Clearance sign may be installed on or in advance of the structure to supplement the advance-~~  
49 ~~warning sign. If a sign is placed on the structure, it may be a rectangular shape (W12-2a) with the appropriate~~  
50 ~~legend (see Figure 2C-5).~~

1 **ROADWAY AND WEATHER CONDITION SIGNS AND PLAQUES**

2 **Section ~~2C.28~~ 2C.26 BUMP and DIP Signs (W8-1, W8-2)**

3 *Guidance:*

4 *BUMP (W8-1) and DIP (W8-2) signs (~~see Figure 2C-6~~) should be used to give warning of a sharp rise or*  
5 *depression in the profile of the road.*

6 *Option:*

7 These signs may be supplemented with an Advisory Speed plaque (see Section ~~2C.08~~2C.59).

8 **Standard***Guidance:* **Changed from Standard to Guidance**

9 *The DIP sign ~~shall~~ should not be used at a short stretch of depressed alignment that might momentarily*  
10 *hide a vehicle.*

11 *Guidance:*

12 *A short stretch of depressed alignment that might momentarily hide a vehicle should be treated as a no-*  
13 *passing zone when center line striping is provided on a two-lane or three-lane road (see Section 3B.02).*

14 **Section ~~2C.29~~ 2C.27 SPEED HUMP Sign (W17-1)**

15 *Guidance:*

16 *The SPEED HUMP (W17-1) sign (~~see Figure 2C-6~~) should be used to give warning of a vertical*  
17 *deflection in the roadway that is designed to limit the speed of traffic.*

18 *If used, the SPEED HUMP sign should be supplemented by an Advisory Speed plaque (see Section*  
19 *~~2C.08~~2C.59).*

20 *Option:*

21 *If a series of speed humps exists in close proximity, an Advisory Speed plaque may be eliminated on all*  
22 *but the first SPEED HUMP sign in the series.*

23 *The legend SPEED BUMP may be used instead of the legend SPEED HUMP on the W17-1 sign.*

24 *Support:*

25 *Speed humps generally provide more gradual vertical deflection than speed bumps. Speed bumps limit*  
26 *the speed of traffic more severely than speed humps. Other forms of speed humps include speed tables and*  
27 *raised intersections. However, these differences in engineering terminology are not well known by the public,*  
28 *so for signing purposes these terms are interchangeable.*

29 **Section ~~2C.39~~ 2C.28 DRAW BRIDGE Sign (W3-6)**

30 **Standard:**

31 **A DRAW BRIDGE (W3-6) sign (~~see Figure 2C-6~~) shall be used in advance of movable bridge**  
32 **signals and gates (see Section ~~4J.02~~4Q.02) to give warning to road users, ~~except in urban conditions~~**  
33 **~~where such signing would not be practical.~~ **Not needed****

34 **Section ~~2C.30~~2C.29 PAVEMENT ENDS Sign (W8-3)**

35 *Guidance:*

36 *A PAVEMENT ENDS (W8-3) ~~word message~~ sign (~~see Figure 2C-6~~) should be used where a paved surface*  
37 *changes to either a gravel treated surface or an earth road surface.*

38 *Option:*

39 *An Advisory Speed plaque (see Section ~~2C.08~~2C.59) may be used when the change in roadway condition*  
40 *requires a reduced speed.*

41 **Section ~~2C.31~~2C.30 Shoulder Signs (W8-4, W8-9, W8-17, W8-23, ~~and~~ W8-25)**

42 *Option:*

43 *The SOFT SHOULDER (W8-4) sign (see Figure ~~2C-6~~2C-8) may be used to warn of a soft shoulder*  
44 *condition.*

45 *The LOW SHOULDER (W8-9) sign (see Figure ~~2C-6~~2C-8) may be used to warn of a shoulder condition*  
46 *where there is an elevation difference of less than 3 inches between the shoulder and the travel lane.*

47 *Guidance:*

1 The Shoulder Drop Off (W8-17) sign (see Figure 2C-62C-8) should be used where an unprotected  
2 shoulder drop-off, adjacent to the travel lane, exceeds 3 inches in depth for a significant continuous length  
3 along the roadway, based on engineering judgment.

4 Option:

5 A SHOULDER DROP-OFF (W8-17P) supplemental plaque (see Figure 2C-62C-8) may be mounted  
6 below the W8-17 sign.

7 The NO SHOULDER (W8-23) sign (see Figure 2C-62C-8) may be used to warn road users that a  
8 shoulder does not exist along a portion of the roadway.

9 The SHOULDER ENDS (W8-25) sign (see Figure 2C-62C-8) may be used to warn road users that a  
10 shoulder is ending.

11 **Standard:**

12 ~~When used, shoulder signs shall be placed in advance of the condition (see Table 2C-4).~~ **Not needed**

13 *Guidance:*

14 *Additional shoulder signs should be placed at appropriate intervals along the road where the condition*  
15 *continually exists.*

16 **Figure 2C-8. Roadway and Weather Condition Signs and Plaques**

17 **Section 2C.32C.31 Surface Condition Signs (W8-5, W8-7, W8-8, W8-11, W8-13, and W8-14)**

18 Option:

19 The Slippery When Wet (W8-5) sign (see Figure 2C-62C-8) may be used to warn of unexpected slippery  
20 conditions. Supplemental plaques with legends such as ICE, WHEN WET, STEEL DECK, or EXCESS OIL  
21 may be used with the W8-5 sign to indicate the reason that the slippery conditions might be present.

22 The LOOSE GRAVEL (W8-7) sign (see Figure 2C-62C-8) may be used to warn of loose gravel on the  
23 roadway surface.

24 The ROUGH ROAD (W8-8) sign (see Figure 2C-62C-8) may be used to warn of a rough roadway  
25 surface.

26 An UNEVEN LANES (W8-11) sign (see Figure 2C-62C-8) may be used to warn of a difference in  
27 elevation between travel lanes.

28 The BRIDGE ICES BEFORE ROAD (W8-13) sign (see Figure 2C-62C-8) may be used in advance of  
29 bridges to advise bridge users of winter weather conditions. The BRIDGE ICES BEFORE ROAD sign may  
30 be removed or covered during seasons of the year when its message is not relevant.

31 The FALLEN ROCKS (W8-14) sign (see Figure 2C-62C-8) may be used in advance of an area that is  
32 adjacent to a hillside, mountain, or cliff where rocks frequently fall onto the roadway.

33 *Guidance:*

34 *When used, Surface Condition signs should be placed in advance of the beginning of the affected section*  
35 *(see Table 2C-42C-3), and additional signs should be placed at appropriate intervals along the road where*  
36 *the condition exists.*

37 **Section 2C.33C.32 Warning Signs and Plaques for Motorcyclists (W8-15, W8-15P, and W8-  
38 16)**

39 Support:

40 The signs and plaques described in this Section are intended to give motorcyclists advance notice of  
41 surface conditions that might adversely affect their ability to maintain control of their motorcycle under wet or  
42 dry conditions. The use of some of the advance surface condition warning signs described in Section 2C.32,  
43 such as Slippery When Wet, LOOSE GRAVEL, or ROUGH ROAD, can also be helpful to motorcyclists if  
44 those conditions exist.

45 Option:

46 If a portion of a street or highway features a roadway pavement surface that is grooved or textured instead  
47 of smooth, such as a grooved skid resistance treatment for a horizontal curve or a brick pavement surface, a  
48 GROOVED PAVEMENT (W8-15) sign (see Figure 2C-62C-8) may be used to provide advance warning of  
49 this condition to motorcyclists, bicyclists, and other road users. Alternate legends such as TEXTURED  
50 PAVEMENT or BRICK PAVEMENT may also be used on the W8-15 sign.

1 If a bridge or a portion of a bridge includes a metal or grated surface, a METAL BRIDGE DECK (W8-16)  
2 sign (see Figure ~~2C-6~~2C-8) may be used to provide advance warning of this condition to motorcyclists,  
3 bicyclists, and other road users.

4 A Motorcycle (W8-15P) plaque (see Figure ~~2C-6~~2C-8) may be mounted below or above a W8-15 or W8-  
5 16 sign if the warning is intended to be directed primarily to motorcyclists.

6 **Section ~~2C.34~~2C.33 NO CENTER LINE Sign (W8-12)**

7 Option:

8 The NO CENTER LINE (W8-12) sign (see Figure ~~2C-6~~2C-8) may be used to warn of a roadway without  
9 center line pavement markings.

10 **Section 2C.34 NO TRAFFIC SIGNS Sign (W18-1)**

11 Option

12 A W18-1 warning sign with the legend NO TRAFFIC SIGNS may be used only on low-volume rural  
13 roads to advise road users that no signs are installed along the distance of the road. The sign may be installed  
14 at the point where road users would enter the low volume road or where, based on engineering judgment, the  
15 road user might need this information.

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

18 **Section 2C.35 Weather Condition Signs (W8-18, W8-19, W8-21, and W8-22)**

19 Option:

20 The ROAD MAY FLOOD (W8-18) sign (see Figure ~~2C-6~~2C-8) may be used to warn road users that a  
21 section of roadway is subject to frequent flooding. A Depth Gauge (W8-19) sign (see Figure ~~2C-6~~2C-8) may  
22 also be installed within a roadway section that frequently floods.

23 **Standard Guidance:** **Changed from Standard to Guidance**

24 *If used, the Depth Gauge sign ~~shall~~ should be in addition to the ROAD MAY FLOOD sign and ~~shall~~*  
25 *should be mounted at the appropriate height to indicate the depth of the water at the deepest point on the*  
26 *roadway.*

27 Option:

28 The GUSTY WINDS AREA (W8-21) sign (see Figure ~~2C-6~~2C-8) may be used to warn road users that  
29 wind gusts frequently occur along a section of highway that are strong enough to impact the stability of trucks,  
30 recreational vehicles, and other vehicles with high centers of gravity. A NEXT XX MILES (W7-3a)  
31 supplemental plaque (see Figure 2C-5) may be mounted below the W8-21 sign to inform road users of the  
32 length of roadway that frequently experiences strong wind gusts.

33 The FOG AREA (W8-22) sign (see Figure ~~2C-6~~2C-8) may be used to warn road users that foggy  
34 conditions frequently reduce visibility along a section of highway. A NEXT XX MILES (W7-3a)  
35 supplemental plaque (see Figure 2C-5) may be mounted below the W8-22 sign to inform road users of the  
36 length of roadway that frequently experiences foggy conditions.

1 **TRAFFIC CONTROL AND INTERSECTION SIGNS AND PLAQUES**

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

3 **Standard:**

4 The Advance Traffic Control symbol signs (see Figure ~~2C-6~~2C-9) including the Stop Ahead (W3-1),  
5 Yield Ahead (W3-2), and Signal Ahead (W3-3) signs. ~~These signs shall be installed on an approach to a~~  
6 ~~primary traffic control device that is not visible for a sufficient distance to permit the road user to~~  
7 ~~respond to the device (see Table 2C-4~~2C-3). ~~The visibility criteria for a traffic control signal shall be~~  
8 ~~based on having a continuous view of at least two signal faces for the distance specified in Table 4D-2.~~  
9 **Moved to Guidance below**

10 **Support:**

11 Figures 2A-4 and 2A-5a and b shows the typical placement of an Advance Traffic Control sign.

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

14 **Guidance:**

15 *The visibility criteria for a traffic control signal should be based on having a continuous view of at least*  
16 *two signal faces for the distance specified in Table 4D-2.* **Changed to Guidance and relocated from**  
17 **Standard above**

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

20 **Option:**

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

23 **Support:**

24 See Section 2C.64 for the use of an advance street name plaque to identify an intersecting road.

25 ~~An advance street name plaque (see Section 2C.58) may be installed above or below an Advance Traffic~~  
26 ~~Control sign.~~ **Deleted; reference to Section added in Support**

27 ~~A warning beacon may be used with an Advance Traffic Control sign.~~ **Combined with existing Options**  
28 **below**

29 **Option:**

30 A BE PREPARED TO STOP (W3-4) sign (see Figure ~~2C-6~~2C-9) may be used to warn of stopped traffic  
31 caused by a traffic control signal or in advance of a section of roadway that regularly experiences traffic  
32 congestion.

33 A warning beacon (see Section 4S.03) or yellow LEDs within the border of the sign may be used with an  
34 Advance Traffic Control or BE PREPARED TO STOP sign. **Existing Options combined and edited**

35 **Standard:**

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

38 **Option:**

39 ~~The BE PREPARED TO STOP sign may be supplemented with a warning beacon (see Section 4L.03).~~  
40 **Combined with existing Options above**

41 **Guidance:**

42 *When the warning beacon or sign border LEDs are ~~is~~ interconnected with a traffic control signal or*  
43 *queue detection system, the BE PREPARED TO STOP sign should be supplemented with a WHEN*  
44 *FLASHING (W16-13P) plaque (see Figure 2C-12).*

45 **Support:**

46 Section ~~2C.40~~2C.47 contains information regarding the use of a NO MERGE AREA (W4-5P)  
47 supplemental plaque in conjunction with a Yield Ahead sign.

48 **Figure 2C-9. Advance Traffic Control Signs**

49 **Section 2C.37 Actuated Advance Intersection Signs (W2-10 through W2-12)**

1 Support:

2 Actuated Advance Intersection Signs are typically associated with restricted sight distance and gap  
3 selection at stop controlled intersections.

4 Option:

5 The TRAFFIC ENTERING WHEN FLASHING (W2-10) sign or a WATCH FOR ENTERING  
6 TRAFFIC (W2-11) sign (See Figure 2C-11) may be used on the through roadway approach to a side or cross  
7 road stop controlled intersection to warn of entering traffic from the side or cross road.

8 The sign may be in diamond or rectangular shape.

9 The TRAFFIC APPROACHING WHEN FLASHING (W2-12) sign (See Figure 2C-11) may be used on  
10 the side road stop controlled approach to warn of traffic approaching on the through road.

11 Standard:

12 When used, the TRAFFIC ENTERING WHEN FLASHING sign, the WATCH FOR ENTERING  
13 TRAFFIC sign, and the TRAFFIC APPROACHING WHEN FLASHING sign shall be supplemented  
14 with an actuated warning system that activates when an approaching vehicle is detected.

15  
16 **Section 2C.37-2C.38 Advance Ramp Control Signal Signs (W3-7 and W3-8)**

17 Option:

18 A RAMP METER AHEAD (W3-7) sign (see Figure ~~2C-6~~2C-9) may be used to warn road users that a  
19 freeway entrance ramp is metered and that they will encounter a ramp control signal (see Chapter ~~4H~~4P).

20 Guidance:

21 *When the ramp control signals are operated only during certain periods of the day, a RAMP METERED*  
22 *WHEN FLASHING (W3-8) sign (see Figure ~~2C-6~~2C-9) should be installed in advance of the ramp control*  
23 *signal near the entrance to the ramp, or on the arterial on the approach to the ramp, to alert road users to the*  
24 *presence and operation of ramp meters.*

25 Standard:

26 The RAMP METERED WHEN FLASHING sign shall be supplemented with a warning beacon (see  
27 Section ~~4L-03~~4S.03) that flashes when the ramp control signal is in operation.

28 **Section 2C.52-2C.39 NEW TRAFFIC PATTERN and SIGNAL OPERATION AHEAD Signs**  
29 **(W23-2, W23-2a)**

30 Option:

31 A NEW TRAFFIC PATTERN AHEAD (W23-2) sign (see Figure ~~2C-6~~2C-9) may be used on the  
32 approach to an intersection or along a section of roadway to provide advance warning of a change in traffic  
33 patterns, such as revised lane usage, ~~roadway geometry, or signal phasing, or roadway geometry.~~

34 A NEW SIGNAL OPERATION AHEAD (W23-2a) sign (see Figure 2C-9) may be used on the approach  
35 to a signalized intersection to provide advance warning of a change in signal phasing.

36 Guidance:

37 *The NEW TRAFFIC PATTERN or SIGNAL OPERATION AHEAD sign should be removed when the*  
38 *traffic pattern returns to normal, when the changed pattern is no longer considered to be new, or within six*  
39 *months.*

40 **Section 2C.38-2C.40 Reduced Speed Limit Ahead Signs (W3-5, W3-5a, W3-5b, W3-5c)**

41 Guidance:

42 *A Reduced Speed Limit Ahead (W3-5 or W3-5a), Variable Speed Zone (W3-5b), or Truck Speed Zone*  
43 *(W3-5c) Ahead sign (see Figure ~~2C-7~~2C-10) should be used to inform road users of a reduced speed zone*  
44 *where the speed limit is being reduced by more than 10 mph, or where engineering judgment indicates the*  
45 *need for advance notice to comply with the posted speed limit ahead.*

46 Standard:

47 **If used, Reduced Speed Limit, Variable Speed Zone, or Truck Speed Zone Ahead signs shall be**  
48 **followed by a Speed Limit (R2-1) sign installed at the beginning of the zone where the speed limit**  
49 **applies.**

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

3 **Figure 2C-10. Reduced Speed Limit Ahead Signs**

4 **Section 2C.41 WATCH FOR STOPPED TRAFFIC Sign (W23-3)**

5 **Option:**

6 The WATCH FOR STOPPED TRAFFIC (W23-3) sign (see Figure 2C-08) may be used to warn road  
7 users of the possibility of vehicles stopping abruptly in the travel lane due to recurring or expected congested  
8 conditions.

9 **Section ~~2C.46~~ 2C.42 Intersection Warning Signs (W2-1 through W2-8)**

10 **Option:**

11 A Cross Road (W2-1) ~~symbol~~, Side Road (W2-2, ~~or~~ W2-3, or W2-3a) ~~symbol~~, T-~~Symbol~~ Intersection  
12 (W2-4), or Y-~~Symbol~~ Intersection (W2-5) sign (see Figure ~~2C-9~~ 2C-11) may be used in advance of an  
13 intersection to indicate the presence of an intersection and the possibility of turning or entering traffic.

14 The Circular Intersection (W2-6) ~~symbol~~ sign (see Figure ~~2C-9~~ 2C-11) may be installed in advance of a  
15 circular intersection (see Figures 2B-21 through 2B-23).

16 **Guidance:**

17 *If an approach to a ~~roundabout~~ circular intersection has a statutory or posted speed limit of 40 mph or*  
18 *higher, the Circular Intersection (W2-6) ~~symbol~~ sign should be installed in advance of the circular*  
19 *intersection.*

20 **Figure 2C-11. Intersection Warning Signs and Plaques**

21 **Option:**

22 An educational plaque (see Figure ~~2C-9~~ 2C-11) with a legend such as ROUNDABOUT (W16-12a7P) or  
23 TRAFFIC CIRCLE (W16-12P) may be mounted below a Circular Intersection ~~symbol~~ sign.

24 ~~The relative importance of the intersecting roadways may be shown by different widths of lines in the~~  
25 ~~symbol.~~

26 **Support:**

27 See Section 2C.64 for the use of An an advance street name plaque to identify an intersecting road (see  
28 Section 2C.58) may be installed above or below an Intersection Warning sign.

29 **Guidance:**

30 *The Intersection Warning sign should illustrate and depict the general configuration of the intersecting*  
31 *roadway, such as cross road, side road, T-intersection, or Y-intersection.*

32 *Intersection Warning signs, other than the Circular Intersection (W2-6) ~~symbol~~ sign, and the T-*  
33 *intersection (W2-4) ~~symbol~~ sign, and the Grade Crossing and Intersection Advance Warning (W10-2 and,*  
34 *W10-3, W10-4, W10-11, and W10-12) signs should not be used on approaches controlled by STOP signs,*  
35 *YIELD signs, or signals.*

36 *If an Intersection Warning sign is used where the side roads are not opposite of each other, the Offset*  
37 *Side Roads (W2-7) ~~symbol~~ sign (see Figure ~~2C-9~~ 2C-11) should be used instead of the Cross Road ~~symbol~~*  
38 *sign.*

39 *If an Intersection Warning sign is used where two closely-spaced side roads are on the same side of the*  
40 *highway, the Double Side Roads (W2-8) ~~symbol~~ sign (see Figure ~~2C-9~~ 2C-11) should be used instead of the*  
41 *Side Road ~~symbol~~ sign.*

42 *No more than two side road symbols should be displayed on the same side of the highway on a W2-7 or*  
43 *W2-8 ~~symbol~~ sign, and no more than three side road symbols should be displayed on a W2-7 or W2-8 ~~symbol~~*  
44 *sign.*

45 **Support:**

46 Figure 2A-4 shows the typical placement of an Intersection Warning sign.

47 **Section ~~2C.47~~ 2C.43 Two-Direction Large Arrow Sign (W1-7)**

48 **Standard:**

1 The Two-Direction Large Arrow (W1-7) sign ~~(see Figure 2C-9)~~ (see Figure 2C-11) shall be a  
2 horizontal rectangle.

3 If used, it shall be installed on the far side of a T-intersection in line with, and at approximately a  
4 right angle to, traffic approaching from the stem of the T-intersection.

5 The Two-Direction Large Arrow sign shall not be used where there is no change in the direction of  
6 travel such as at the beginnings and ends of medians or at center piers.

7 ~~The Two-Direction Large Arrow sign directing traffic to the left and right shall not be used in the~~  
8 ~~central island of a roundabout.~~

9 *Guidance:*

10 *The Two-Direction Large Arrow sign should be visible for a sufficient distance to provide the road user*  
11 *with adequate time to react to the intersection configuration.*

12 **Section ~~2C.48~~ 2C.44 Traffic Signal Oncoming Extended Green Signs (W25-1, W25-2)**

13 **Standard:**

14 At locations where either a W25-1 or a W25-2 sign is required based on the provisions in  
15 Section ~~4D.054F.01~~, the W25-1 or W25-2 sign ~~(see Figure 2C-9)~~ (see Figure 2C-11) shall be  
16 installed near the left-most signal head. ~~The W25-1 and W25-2 signs shall be vertical~~  
17 ~~rectangles.~~

1 **MERGING AND PASSING SIGNS AND PLAQUES**

2 **Section ~~2C.40~~ 2C.45 Merge Signs (W4-1, W4-5)**

3 Option:

4 A Merge (W4-1) sign ~~(see Figure 2C-8)~~ (see Figure 2C-12) may be used to warn road users on the major  
5 roadway that merging movements might be encountered in advance of a point where lanes from two separate  
6 roadways converge as a single traffic lane and no turning conflict occurs.

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

9 *Guidance:*

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

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

14 *When a Merge (W4-1) sign is installed on an entering roadway, the symbol should be oriented right or*  
15 *left as appropriate to depict the side from which the merge occurs, with the arrow representing the entering*  
16 *roadway and the curved stem representing the major roadway (see Figure 2C-12~~11~~). The sign should be*  
17 *located on the side of the entering roadway from which the merge occurs.*

18 **Figure 2C-12. Merging and Passing Signs and Plaques**

19 **Figure 2C-13. Example Sequences for Lane Ends and Lanes Merge Signs**

20 **Figure 2C-14. Examples of Merge and Added Lane Sign Placement for Entering and**  
21 **Converging Roadways**

22 *When a Merge sign is to be installed on an entering roadway that curves before merging with the major*  
23 *roadway, such as a ramp with a curving horizontal alignment as it approaches the major roadway, the*  
24 *Entering Roadway Merge (W4-5) sign (see Figure ~~2C-8~~2C-12) should be used to better portray the actual*  
25 *geometric conditions to road users on the entering roadway.*

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

28 **Standard: Changed from Guidance to Standard**

29 **The Merge sign ~~should~~ shall not be used in place of a Lane Ends sign (see Section ~~2C.42~~2C.47)**  
30 **where lanes of traffic moving on a single roadway must merge because of a reduction in the actual or**  
31 **usable pavement width.**

32 Option:

33 An Entering Roadway Merge (W4-5) sign with a NO MERGE AREA (W4-5P) supplemental plaque (see  
34 Figure ~~2C-8~~2C-12) mounted below it may be used to warn road users on an entering roadway that they will  
35 encounter an abrupt merging situation without an acceleration lane at the downstream end of the ramp.

36 A Merge (W4-1) sign with a NO MERGE AREA (W4-5P) supplemental plaque mounted below it may be  
37 used to warn road users on the major roadway that traffic on an entering roadway will encounter an abrupt  
38 merging situation without an acceleration lane at the downstream end of the ramp.

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

43 **Section ~~2C.41~~ 2C.46 Added Lane Signs (W4-3, W4-6)**

44 *Guidance:*

45 *The Added Lane (W4-3) sign (see Figure ~~2C-8~~2C-12) should be installed in advance of a point where two*  
46 *roadways converge and merging movements are not required. When possible, the Added Lane sign should be*  
47 *placed such that it is visible from both roadways; if this is not possible, an Added Lane sign should be placed*  
48 *on the side of each roadway.*

49 *When an Added Lane (W4-3) sign is installed on an entering roadway, the symbol should be oriented*  
50 *right or left as appropriate to depict the side from which the major roadway converges, with the straight*

1 arrow representing the entering roadway and the curved arrow representing the major roadway. The sign  
2 should be located on the side of the entering roadway from which the major roadway converges.

3 When an Added Lane sign is to be installed on a roadway that curves before converging with another  
4 roadway that has a tangent alignment at the point of convergence, the Entering Roadway Added Lane (W4-6)  
5 sign (see Figure ~~2C-8~~2C-12) should be used to better portray the actual geometric conditions to road users on  
6 the curving roadway.

## 7 **Section ~~2C.42-2C.47~~ Lane Ends Signs (W4-2, W9-1, ~~W9-2~~)**

8 **Guidance- Support:**

9 The LANE ENDS MERGE LEFT (RIGHT) (W9-2) sign or the Lane Ends (W4-2) and RIGHT (LEFT)  
10 LANE ENDS (W9-1) signs should be are used to warn of the reduction in the number of traffic lanes in the  
11 direction of travel on a multi-lane highway (see Figure 2C-12).

12 The sequence of the W4-2 and W9-1 signs is illustrated in Figure 2C-13.

13 **Guidance:**

14 The Lane Ends (W4-2) sign should be installed at the approximate location of the start of the lane taper.

15 **Option:**

16 The RIGHT (LEFT) LANE ENDS (W9-1) sign (see Figure 2C-12) (see ~~Figure 2C-8~~) may should be used  
17 in advance of the LANE ENDS (W4-2) sign or the LANE ENDS MERGE LEFT (RIGHT) (W9-2) sign as  
18 additional warning or to emphasize to warn that the traffic a lane is ending and that a merging maneuver will  
19 be required. The W9-1 sign should be installed in accordance with Table 2C-3.

20 ~~If used, the RIGHT (LEFT) LANE ENDS (W9-1) sign should be installed adjacent to the Lane Reduction~~  
21 ~~Arrow pavement markings.~~

22 **Option:**

23 On low-speed roads in urban environments where space is limited at a signalized intersection, the W9-1  
24 sign may be located at the far-side of the intersection to indicate the end of an auxiliary lane that is added for  
25 intersection capacity, but ends a short distance beyond the intersection and does not accommodate the advance  
26 placement distance indicated in Table 2C-3.

27 Supplemental RIGHT (LEFT) LANE ENDS (W9-1) signs may be installed upstream of the W9-1 that is  
28 installed at the advanced placement distance.

29 **Guidance:**

30 If supplemental W9-1 signs are installed, a Distance (W16-2P series or W16-3P series) plaque should be  
31 installed below the W9-1 sign.

32 **Option:**

33 On one-way streets or on divided highways where the left-hand lane is ending and the width of the median  
34 will permit, two the Lane Ends signs may should be placed facing approaching traffic, one on the right hand  
35 side and the other on the left-hand side or median.

36 **Support:**

37 Section ~~3B.09~~3B.12 contains information regarding the use of pavement markings in conjunction with a  
38 lane reduction.

39 **Guidance:**

40 ~~Where an extra lane has been provided for slower moving traffic (see Section 2B.31), a Lane Ends word~~  
41 ~~sign or a Lane Ends (W4-2) symbol sign should be installed in advance of the downstream end of the extra~~  
42 ~~lane.~~

43 Lane Ends signs should not be installed in advance of the downstream end of an acceleration lane.

44 **Standard:**

45 The W4-2 and W9-1 signs shall not be used in dropped lane situations. In dropped lane situations  
46 on conventional roads at intersections, regulatory signs (see Section ~~2B.20~~2B.30) shall be used to inform  
47 road users that a through lane is becoming a mandatory turn lane. The W4-2, W9-1, and W9-2 signs  
48 shall not be used in dropped lane situations. **Reversed order of sentences**

## 49 **Section 2C.48 Lanes Merge Signs (W9-4, W4-8)**

50 **Support:**

1 The LANES MERGE (W9-4) and Single-Lane Transition (W4-8) signs are used to warn of the reduction  
2 of two lanes to one in the same direction of travel (See Figure 2C-12).

3 Guidance

4 The Lanes Merge (W9-4) sign should be used warn that the traffic lane is merging with the adjacent lane  
5 and a merging maneuver will be required for each lane. The W9-4 sign should be installed in accordance  
6 with Table 2C-3.

7 The Single-Lane Transition (W4-8) sign should be used to indicate the approximate location of the start of  
8 the lane taper.

9 **Section 2C.49 HEAVY MERGE FROM LEFT (RIGHT) Sign (W4-7)**

10 Option:

11 The HEAVY MERGE FROM LEFT (RIGHT) XX FT (W4-7) sign may be used to supplement a W4-1  
12 sign at multilane approaches to congested areas to inform road users that it is desirable for through traffic to  
13 move out of a lane that will be occupied by large volumes of entering traffic.

14 **Standard:**

15 **If used, the W4-7 sign shall be installed at a location upstream from the location of the W4-1 sign.**

16 **Section ~~2C.43~~ 2C.50 RIGHT (LEFT) LANE FOR EXIT ONLY ~~AHEAD~~ Sign (W9-7)**

17 Option:

18 The RIGHT (LEFT) LANE FOR EXIT ONLY ~~AHEAD~~ (W9-7) sign (see Figure ~~2C-8~~ 2C-12) may be  
19 used to provide advance warning to road users that traffic in the right-hand (left-hand) lane of a roadway ~~that~~  
20 ~~is approaching a grade-separated interchange~~ will be required to depart the roadway on an ~~exit~~ ramp at the  
21 next interchange or intersection.

22 **Standard:**

23 **The W9-7 sign shall be a horizontal rectangle with a black legend and border on a yellow**  
24 **background.**

25 Guidance:

26 If used, the W9-7 sign should be installed upstream from the first overhead guide sign that contains an  
27 EXIT ONLY sign panel or upstream from the first RIGHT (LEFT) LANE MUST EXIT (R3-33) regulatory  
28 sign, if used, whichever is farther upstream from the exit.

29 Option:

30 A legend displaying the distance may be added to the W9-7 sign where the distance along the dropped  
31 lane between the sign and the exit ramp is 1 mile or greater.

32 Support:

33 Section ~~2B.23~~ 2B.32 contains information regarding a regulatory sign that can also be used for lane drops  
34 at grade-separated interchanges.

35 **Section ~~2C.44~~ 2C.51 Two-Way Traffic Sign (W6-3)**

36 Guidance:

37 A Two-Way Traffic (W6-3) sign (see Figure ~~2C-8~~ 2C-12) should be used to warn road users of a transition  
38 from a multi-lane divided section of roadway to a two-lane, two-way section of roadway.

39 A Two-Way Traffic (W6-3) sign with an AHEAD (W16-9P) plaque (see Figure ~~2C-12~~ 2C-17) should be  
40 used to warn road users of a transition from a one-way street to a two-lane, two-way section of roadway (see  
41 Figure 2B-14).

42 Option:

43 The Two-Way Traffic sign may be used at intervals along a two-lane, two-way roadway and may be used  
44 to supplement the Divided Highway (Road) Ends (W6-2) sign discussed in Section ~~2C.23~~ 2C.21.

45 Support:

46 Section 6H.17 contains information on a Opposing Lane Traffic Divider Sign (W6-4) for use in temporary  
47 traffic control situations.

48 **Section 2C.52 Two-Way Traffic on a Three-Lane Roadway Sign (W6-5, W6-5a)**

1 Option:

2 The Two-way Traffic on a Three-Lane Roadway (W6-5 and W6-5a) signs may be installed along three-  
3 lane roadways with two lanes in one direction and one in the opposing direction.

4 Standard:

5 The W6-5 series signs shall match the lane configuration of the roadway.

6 **Section ~~2C.45~~2C.53 NO PASSING ZONE Sign (W14-3)**

7 **Standard:**

8 The NO PASSING ZONE (W14-3) sign (see Figure ~~2C-8~~2C-12) shall be a pennant-shaped isosceles  
9 triangle with its longer axis horizontal and pointing to the right. When used, the NO PASSING ZONE  
10 sign shall be installed on the left-hand side of the roadway at the beginning of no-passing zones  
11 identified by pavement markings or DO NOT PASS signs or both (see Sections ~~2B.28~~2B.37 and  
12 ~~3B.02~~3B.03).

## MISCELLANEOUS WARNING SIGNS

### Section ~~2C.49~~ 2C.54 Vehicular Traffic Warning Signs (W8-6, W11-1, W11-5, ~~W11-5a~~, W11-8, W11-10, W11-11, W11-12P, W11-14, W11-15, ~~and~~ W11-15a)

Option:

Vehicular Traffic Warning (W8-6, W11-1, W11-5, ~~W11-5a~~, W11-8, W11-10, W11-11, W11-12P, W11-14, W11-15, and W11-15a) signs (see Figure ~~2C-10~~ 2C-15) 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 (W11-10) ~~symbol~~ sign.

Support:

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

*Guidance:*

*Vehicular Traffic Warning 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 Warning sign should be removed or covered when the condition or activity does not exist.*

### **Figure 2C-15. Vehicular Traffic Warning Signs and Plaques**

Option:

The combined Bicycle/Pedestrian (W11-15) sign may be used where both bicyclists and pedestrians might be crossing the roadway, such as at an intersection with a shared-use path. A TRAIL X-ING (W11-15P) supplemental plaque (see Figure ~~2C-10~~ 2C-15) may be mounted below the W11-15 sign. The TRAIL CROSSING (W11-15a) sign may be used to warn of shared-use path crossings where pedestrians, bicyclists, and other user groups might be crossing the roadway.

The W11-1, W11-15, and W11-15a signs and their related supplemental plaques may have a fluorescent yellow-green background with a black legend and border.

Supplemental plaques (see Section ~~2C.53~~ 2C.57) with legends such as AHEAD, XX FEET, NEXT XX MILES, IN STREET, or IN ROAD ~~or SHARE THE ROAD~~ may be mounted below Vehicular Traffic Warning signs to provide advance notice to road users of unexpected entries.

*Guidance:*

*If used in advance of a pedestrian and bicycle crossing, a W11-15 or W11-15a sign should be supplemented with an AHEAD or XX FEET plaque to inform road users that they are approaching a point where crossing activity might occur.*

**Standard:**

**If a post-mounted W11-1, W11-11, W11-15, or W11-15a sign is placed at the location of the crossing point where golf carts, pedestrians, bicyclists, or other shared-use path users might be crossing the roadway, a diagonal downward pointing arrow (W16-7P) plaque (~~see Figure 2C-12~~) shall be mounted below the sign. If the W11-1, W11-11, W11-15, or W11-15a sign is mounted overhead, the W16-7P supplemental plaque shall not be used.**

Option:

The crossing location identified by a W11-1, W11-11, W11-15, or W11-15a sign may be defined with crosswalk markings (see ~~Section 3B.18~~ Chapter 3C).

**Standard:**

**The Emergency Vehicle (W11-8) sign (see Figure ~~2C-10~~ 2C-15) with the EMERGENCY SIGNAL AHEAD (W11-12P) supplemental plaque (see Figure ~~2C-10~~ 2C-15) shall be placed in advance of all emergency-vehicle traffic control signals (see Chapter ~~4G4M~~).**

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.

1 A Warning Beacon (see Section ~~4L.034S.03~~) may be used with any Vehicular Traffic Warning sign to  
2 indicate specific periods when the condition or activity is present or is likely to be present, or to provide  
3 enhanced sign conspicuity.

4 A supplemental WHEN FLASHING (W16-13P) plaque (~~see Figure 2C-12~~) may be used with any  
5 Vehicular Traffic Warning sign that is supplemented with a Warning Beacon to indicate specific periods when  
6 the condition or activity is present or is likely to be present.

7 **Section ~~2C.50-2C.55~~ Non-Vehicular Warning Signs (W11-2, W11-3, W11-4, W11-6, W11-7,**  
8 **W11-9, and W11-16 through W11-22)**

9 Option:

10 Non-Vehicular Warning (W11-2, W11-3, W11-4, W11-6, W11-7, W11-9, and W11-16 through W11-22)  
11 signs (see Figure ~~2C-12~~2C-16) may be used to alert road users in advance of locations where unexpected  
12 entries into the roadway might occur or where shared use of the roadway by pedestrians, animals, or  
13 equestrians might occur.

14 Support:

15 These conflicts might be relatively confined, or might occur randomly over a segment of roadway.

16 *Guidance:*

17 *If used in advance of a pedestrian, snowmobile, or equestrian crossing, the W11-2, W11-6, W11-7, and*  
18 *W11-9 signs should be supplemented with plaques (see Section ~~2C.55~~2C.61) with the legend AHEAD or XX*  
19 *FEET to inform road users that they are approaching a point where crossing activity might occur.*

20 **Standard:**

21 **If a post-mounted W11-2, W11-6, W11-7, or W11-9 sign is placed at the location of the crossing**  
22 **point where pedestrians, snowmobilers, or equestrians might be crossing the roadway, a diagonal**  
23 **downward pointing arrow (W16-7P) plaque (see Figure ~~2C-12~~2C-17) shall be mounted below the sign.**  
24 **If the W11-2, W11-6, W11-7, or W11-9 sign is mounted overhead, the W16-7P plaque shall not be used.**

25 **Figure 2C-16. Non-Vehicular Warning Signs**

26 Option:

27 A Pedestrian Crossing (W11-2) sign may be placed overhead or may be post-mounted with a diagonal  
28 downward pointing arrow (W16-7P) plaque at the crosswalk location where Yield Here To (Stop Here For)  
29 Pedestrians signs (see Section ~~2B.11~~2B.20) have been installed in advance of the crosswalk.

30 **Standard:**

31 **If a W11-2 sign has been post-mounted at the crosswalk location where a Yield Here To (Stop Here**  
32 **For) Pedestrians sign is used on the approach, the Yield Here To (Stop Here For) Pedestrians sign shall**  
33 **not be placed on the same post as ~~or block the road user's view of~~ the W11-2 sign.**

34 Option:

35 An advance Pedestrian Crossing (W11-2) sign with an AHEAD or a distance supplemental plaque may be  
36 used in conjunction with a Yield Here To (Stop Here For) Pedestrians sign on the approach to the same  
37 crosswalk.

38 The crossing location identified by a W11-2, W11-6, W11-7, or W11-9 sign may be defined with  
39 crosswalk markings (see ~~Section 3B.18~~Chapter 3C).

40 The W11-2 and W11-9 signs and their related supplemental plaques may have a fluorescent yellow-green  
41 background with a black legend and border.

42 *Guidance:*

43 *When a fluorescent yellow-green background is used, a systematic approach featuring one background*  
44 *color within a zone or area should be used. The mixing of standard yellow and fluorescent yellow-green*  
45 *backgrounds within a selected site area should be avoided.*

46 Option:

47 A Warning Beacon (see Section ~~4L.034S.03~~) may be used with any Non-Vehicular Warning sign to  
48 indicate specific periods when the condition or activity is present or is likely to be present, or to provide  
49 enhanced sign conspicuity.

1 A supplemental WHEN FLASHING (W16-13P) plaque (see Figure ~~2C-12~~[2C-17](#)) may be used with any  
2 Non-Vehicular Warning sign that is supplemented with a Warning Beacon to indicate specific periods when  
3 the condition or activity is present or is likely to be present.

4 **Section ~~2C.51~~[2C.56](#) Playground Sign (W15-1)**

5 Option:

6 The Playground (W15-1) sign (see Figure ~~2C-11~~[2C-16](#)) may be used to give advance warning of a  
7 designated children’s playground that is located adjacent to the road.

8 The Playground sign may have a fluorescent yellow-green background with a black legend and border.

9 *Guidance:*

10 *If the access to the playground area requires a roadway crossing, the application of crosswalk pavement*  
11 *markings (see ~~Section 3B.18~~[Chapter 3C](#)) and Non-Vehicular Warning signs (see Section ~~2C.50~~[2C.55](#)) should*  
12 *be considered.*

13

## SUPPLEMENTAL PLAQUES

### **Section ~~2C.53~~ 2C.57 Use of Supplemental Warning Plaques**

Option:

A supplemental warning plaque (see Figure ~~2C-12~~ 2C-17) may be displayed with a warning or regulatory sign when engineering judgment indicates that road users require additional warning information beyond that contained in the main message of the warning or regulatory sign.

**Standard:**

Supplemental warning plaques shall be used only in combination with and installed on the same post(s) as warning or regulatory signs. They shall not be mounted alone or displayed alone. ~~If used, a supplemental warning plaque shall be installed on the same post(s) as the warning or regulatory sign that it supplements.~~ **Edited for clarity**

Unless otherwise provided in this Manual for a particular plaque, supplemental warning plaques shall be mounted below the sign they supplement.

### **Figure 2C-17. Supplemental Warning Signs and Plaques**

### **Section ~~2C.54~~ 2C.58 Design of Supplemental Warning Plaques**

**Standard:**

A supplemental warning plaque used with a warning sign shall have the same legend, border, and background color as the warning sign with which it is displayed. A supplemental warning plaque used with a regulatory sign shall have a black legend and border on a yellow background.

Supplemental warning plaques shall be square or rectangular.

### **Section ~~2C.08~~ 2C.59 Advisory Speed Plaque (W13-1P) and Confirmation Advisory Speed Plaque (W13-1aP)**

Option:

The Advisory Speed (W13-1P) plaque (see Figure 2C-1) may be used to supplement any advance warning sign to indicate the advisory speed for a condition.

The Confirmation Advisory Speed (W13-1aP) may be used to supplement a One-Direction Large Arrow Sign (W1-6) on the outside of a turn or curve in line with and at approximately a right angle to approaching traffic.

**Standard:**

The use of the Advisory ~~Speed~~ and Confirmation Advisory Speed plaques for horizontal curves shall be in accordance with Section 2C.06 and Table 2C-4b ~~the information shown in Table 2C-5~~. The Advisory Speed plaque shall also be used where an engineering study indicates a need to advise road users of the advisory speed for other roadway conditions.

~~If used, the speed displayed on the Advisory and Confirmation Advisory Speed plaques shall carry the message XX MPH. The speed displayed shall be a multiple of 5 mph.~~

Except in emergencies or when the condition is temporary, an Advisory or Confirmation Advisory Speed plaque shall not be installed until the advisory speed has been determined by an engineering study.

The Advisory Speed plaque shall only be used to supplement an advance warning sign and shall not be installed as a separate sign installation.

The Confirmation Advisory Speed plaque shall only be used to supplement a One-Direction Large Arrow (W1-6) sign or an Exit Gore (E5-1 series) sign and shall not be installed as a separate sign installation.

The advisory speed shall be determined by an engineering study that follows established engineering practices.

Support:

The "Traffic Control Devices Handbook" (see Section 1A.05) contains information on established engineering practices for determining advisory speeds.

1 Among the established engineering practices that are appropriate for the determination of the  
2 recommended advisory speed for a horizontal curve are the following:

3 [A. Compass method](#)

4 [B. Safety-based method](#)

5 [C. Ball-bank method](#)

6 [D. Design equation method](#)

7 [E. Accelerometer method](#)

8 ~~A. An accelerometer that provides a direct determination of side friction factors~~

9 ~~B. A design speed equation~~

10 ~~C. A traditional ball bank indicator using the following criteria:~~

11 ~~1. 16 degrees of ball bank for speeds of 20 mph or less~~

12 ~~2. 14 degrees of ball bank for speeds of 25 to 30 mph~~

13 ~~3. 12 degrees of ball bank for speeds of 35 mph and higher~~

14 ~~The 16, 14, and 12 degrees of ball bank criteria are comparable to the current AASHTO horizontal curve~~  
15 ~~design guidance. Research has shown that drivers often exceed existing posted advisory curve speeds by 7 to~~  
16 ~~10 mph.~~

17 *Guidance:*

18 *The advisory speed should be determined based on free-flowing traffic conditions.*

19 *Because changes in conditions, such as roadway geometrics, surface characteristics, or sight distance,*  
20 *might affect the advisory speed, each location should be evaluated periodically or when conditions change.*

## 21 **Section ~~2C.62~~ [2C.60](#) NEW Plaque (W16-15P)**

22 Option:

23 A NEW (W16-15P) plaque ~~(see Figure 2C-12)~~ may be mounted above a regulatory sign when a new  
24 regulation takes effect in order to alert road users to the new traffic regulation. A NEW plaque may also be  
25 mounted above an advance warning sign (such as a Signal Ahead sign for a newly-installed traffic control  
26 signal) for a new traffic regulation.

27 **Standard:**

28 ~~The NEW plaque shall not be used alone.~~ **Not needed – redundant with Section 2C.57**

29 *Guidance:* **Changed from Standard to Guidance**

30 *The NEW plaque shall should be removed no later than 6 months after ~~the regulation has been in effect it~~*  
31 *was installed.*

## 32 **Section ~~2C.55~~ [2C.61](#) Distance Plaques (W16-2 Series, W16-3 Series, W16-4P, W7-3aP)**

33 Option:

34 The Distance Ahead (W16-2 series and W16-3 series) plaques (see Figure ~~2C-12~~ [2C-17](#)) may be used to  
35 inform the road user of the distance to the condition indicated by the warning sign.

36 The Next Distance (W7-3aP and W16-4P) plaques (see [also](#) Figures ~~2C-4~~ [2C-5](#) and ~~2C-12~~ [2C-17](#)) may be  
37 used to inform road users of the length of roadway over which the condition indicated by the warning sign  
38 exists.

## 39 **Section ~~2C.56~~ [2C.62](#) Supplemental Arrow Plaques (W16-5P, W16-6P)**

40 *Guidance:*

41 *If the condition indicated by a warning sign is located on an intersecting road and the distance between*  
42 *the intersection and condition is not sufficient to provide adequate advance placement of the warning sign, a*  
43 *Supplemental Arrow (W16-5P or W16-6P) plaque (see Figure ~~2C-12~~ [2C-17](#)) should be used below the*  
44 *warning sign.*

45 **Standard:**

46 **Supplemental Arrow plaques shall have the same legend design as the Advance Turn Arrow and**  
47 **Directional Arrow auxiliary signs (see Sections 2D.26 and 2D.28) except that they shall have a black**  
48 **legend and border on a yellow or fluorescent yellow-green background, as appropriate.**

## 49 **Section ~~2C.57~~ [2C.63](#) Hill-Related Plaques (W7-2 Series, W7-3 Series)**

1 *Guidance:*

2 *Hill-Related (W7-2 series, W7-3 series) plaques (see Figure ~~2C-4~~2C-5) or other appropriate legends and*  
3 *larger signs should be used for emphasis or where special hill characteristics exist.*

4 *On longer grades, the use of the distance plaque (W7-3aP or W7-3bP) at periodic intervals of*  
5 *approximately 1-mile spacing should be considered.*

6 **Section ~~2C.58~~ 2C.64 Advance Street Name Plaque (W16-8P, W16-8aP)**

7 Option:

8 An Advance Street Name (W16-8P or W16-8aP) plaque (~~see Figure 2C-12~~) may be used with any  
9 Intersection ~~sign~~ (W2 series, W10-2, W10-3, or W10-4) or Advance Traffic Control (W3 series) sign to  
10 identify the name of the intersecting street.

11 Support:

12 See Section 2D.46 for the use of an Advance Street Name sign posted at a separate location in cases  
13 where there is a need to provide advance notice of an intersecting street where warning signs other than those  
14 listed in Paragraph 1 are used, such as a Combination Horizontal Alignment/Intersection (W1-10 Series) sign.

15 **Standard:**

16 **The lettering on Advance Street Name plaques shall be composed of a combination of lower-case**  
17 **letters with initial upper-case letters.**

18 **If two street names are used on the Advance Street Name plaque, a directional arrow pointing in**  
19 **the direction of the street shall be placed next to each street name. Arrows pointing to the left shall be**  
20 **placed to the left of the street name, and arrows pointing to the right shall be placed to the right of the**  
21 **street name.**

22 *Guidance:*

23 *If two street names are used on the Advance Street Name plaque, the street names and associated arrows*  
24 *should be displayed in the following order:*

- 25 A. *For a single intersection, the name of the street to the left should be displayed above the name of the*  
26 *street to the right; or*  
27 B. *For two sequential intersections, such as where the plaque is used with an Offset Side Roads (W2-7)*  
28 *or a Double Side Road (W2-8) ~~symbol~~ sign, the name of the first street encountered should be*  
29 *displayed above the name of the second street encountered, and the arrow associated with the second*  
30 *street encountered should be an advance arrow, such as the arrow shown on the W16-6P arrow*  
31 *plaque (see Figure ~~2C-12~~2C-17).*

32 **Section ~~2C.59~~ 2C.65 ~~CROSS TRAFFIC DOES NOT STOP~~ Plaque-Traffic Does Not Stop**  
33 **Plaques (W4-4P Series)**

34 Option:

35 The CROSS TRAFFIC DOES NOT STOP (W4-4P) plaque (~~see Figure 2C-9~~) may be used in  
36 combination with a STOP sign when engineering judgment indicates that conditions are present that are  
37 causing or could cause drivers to misinterpret the intersection as an all-way stop.

38 Alternative messages (see Figure ~~2C-9~~2C-11) such as TRAFFIC FROM LEFT (RIGHT) DOES NOT  
39 STOP (W4-4aP) or ONCOMING TRAFFIC DOES NOT STOP (W4-4bP) may be used when such messages  
40 more accurately describe the traffic controls established at the intersection.

41 *Guidance:*

42 *Plaques with the appropriate alternative messages of TRAFFIC FROM LEFT (RIGHT) DOES NOT*  
43 *STOP or ONCOMING TRAFFIC DOES NOT STOP should be used at intersections where STOP signs*  
44 *control all but one approach to the intersection, unless the only non-stopped approach is from a one-way*  
45 *street.*

46 **Standard:**

47 **If a W4-4P plaque or a plaque with an alternative message is used, it shall be mounted below the**  
48 **STOP sign.**

49 ~~Section 2C.60~~ ~~SHARE THE ROAD Plaque (W16-1P)~~ **Sign removed from MUTCD**

50 **Section 2C.66 IN ROAD and IN STREET Plaques (W16-1P, W16-1aP)**

1 Option:

2 In situations where there is a need to warn drivers to watch for other slower forms of transportation  
3 traveling along the highway, such as bicycles, golf carts, horse-drawn vehicles, or farm machinery, an IN  
4 ROAD (W16-1P) or IN STREET (W16-1aP) plaque may be used.

5 Standard:

6 The background color of the W16-1P or W16-1aP plaque shall match the background color of the  
7 warning sign with which it is displayed. If a W16-1P or W16-1aP plaque is used, it shall be mounted  
8 below either a Vehicular Traffic Warning sign (see Section 2C.54) or a Non-Vehicular Warning sign  
9 (see Section 2C.55), and shall not be mounted alone.

10 Option:

11 In situations where there is a need to warn drivers of the presence of bicycles entering the roadway or  
12 where bicyclists are expected or preferred to use the full lane a Bicycles May Use Full Lane (R4-11) sign (See  
13 Section 9B.14) may be used.

14 **Section 2C.67 Except Bicycles Plaque (W16-20P)**

15 Option:

16 Where it is desired to notify bicyclists that the conditions depicted by a warning sign are not applicable to  
17 bicycles, the Except Bicycles supplemental warning plaque (W16-20P) may be mounted below the warning  
18 sign.

19 Support:

20 Examples of warning signs with which an Except Bicycles (W16-20P) plaque can be mounted include  
21 DEAD END (W14-1) or NO OUTLET (W14-2) signs.

22 Standard:

23 If used with a warning sign, The Except Bicycles (W16-20P) plaque shall be a rectangle with a black  
24 legend and border on a yellow background.

25 **Section ~~2C.61~~ 2C.68 Photo Enforced Plaque (W16-10P)**

26 Option:

27 A Photo Enforced (W16-10P) plaque or a PHOTO ENFORCED (W16-10aP) word message plaque (~~see~~  
28 Figure 2C-12) may be mounted below a warning sign to advise road users that the regulations associated with  
29 the condition being warned about (such as a traffic control signal or a toll plaza) are being enforced by  
30 photographic equipment.

31 Standard:

32 If used below a warning sign, the Photo Enforced (W16-10P or W16-10aP) plaque shall be a  
33 rectangle with a black legend and border on a yellow background.

## OBJECT MARKERS

### **Section ~~2C.63~~ 2C.69 Object Marker Design and Placement Height**

Support:

Type 1, 2, and 3 object markers are used to mark obstructions within or adjacent to the roadway. Type 4 object markers are used to mark the end of a roadway.

**Standard:**

When used, object markers (see Figure ~~2C-13~~ 2C-18) shall not have a border and shall consist of an arrangement of one or more of the following types:

**Type 1**—a diamond-shaped sign, at least 18 inches on a side, consisting of either a yellow (OM1-1) or black (OM1-2) sign with nine yellow retroreflective devices, each with a minimum diameter of 3 inches, mounted symmetrically on the sign, or an all-yellow retroreflective sign (OM1-3).

**Type 2**—either a marker (OM2-1V or OM2-1H) consisting of three yellow retroreflective devices, each with a minimum diameter of 3 inches, arranged either horizontally or vertically on a white sign measuring at least 6 x 12 inches; or an all-yellow horizontal or vertical retroreflective sign (OM2-2V or OM2-2H), measuring at least 6 x 12 inches.

**Type 3**—a striped marker, 12 x 36 inches, 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 3 inches.

**Type 4**—a diamond-shaped sign, at least 18 inches on a side, consisting of either a red (OM4-1) or black (OM4-2) sign with nine red retroreflective devices, each with a minimum diameter of 3 inches, mounted symmetrically on the sign, or an all-red retroreflective sign (OM4-3).

#### **Figure 2C-18. Object Markers**

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 (OM3-R). 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 (OM3-L).

*Guidance:*

*When used for marking obstructions within the roadway or obstructions that are 8 feet or less from the shoulder or curb, the minimum mounting height, measured from the bottom of the object marker to the elevation of the near edge of the traveled way, should be 4 feet.*

*When used to mark obstructions more than 8 feet from the shoulder or curb, the clearance from the ground to the bottom of the object marker should be at least 4 feet.*

*Object markers should not present a vertical or horizontal clearance obstacle for pedestrians.*

Option:

When object markers or markings are applied to an obstruction that by its nature requires a lower or higher mounting, the vertical mounting height may vary according to need.

Support:

Section ~~9B.26~~ 9C.09 contains information regarding the use of object markers on shared-use paths.

### **Section ~~2C.64~~ 2C.70 Object Markers for Obstructions Within 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~~ 3B.13).**

Option:

To provide additional emphasis, a Type 1 or Type 3 object marker may be installed at or near the approach end of a median island.

1 To provide additional emphasis, large surfaces such as bridge piers may be painted with diagonal stripes,  
2 12 inches or greater in width, similar in design to the Type 3 object marker.

3 **Standard:**

4 **The alternating black and retroreflective yellow stripes (OM3-L, OM3-R) shall be sloped down at**  
5 **an angle of 45 degrees toward the side on which traffic is to pass the obstruction. If traffic can pass to**  
6 **either side of the obstruction, the alternating black and retroreflective yellow stripes (OM3-C) shall**  
7 **form chevrons that point upwards.**

8 **Option:**

9 Appropriate signs (see Sections 2B.32 and ~~2C.25~~[2C.23](#)) directing traffic to one or both sides of the  
10 obstruction may be used instead of the object marker.

11 **Section ~~2C.65~~[2C.71](#) Object Markers for Obstructions Adjacent to the Roadway**

12 **Support:**

13 Obstructions not actually within the roadway are sometimes so close to the edge of the road that they need  
14 a marker. These include underpass piers, bridge abutments, handrails, ends of traffic barriers, utility poles,  
15 and culvert headwalls. In other cases there might not be a physical object involved, but other roadside  
16 conditions exist, such as narrow shoulders, drop-offs, gores, small islands, and abrupt changes in the roadway  
17 alignment, that might make it undesirable for a road user to leave the roadway, and therefore would create a  
18 need for a marker.

19 **Option:**

20 [Type 2 or Type 3 object markers may be used to mark an obstruction adjacent to the roadway.](#)

21 **Standard**[Guidance:](#) **Changed from Standard to Guidance**

22 *If a Type 2 or Type 3 object marker is used to mark an obstruction adjacent to the roadway, the edge of*  
23 *the object marker that is closest to the road user ~~shall~~ should be installed in line with the closest edge of the*  
24 *obstruction.*

25 ~~*Where*~~ *When a marker is Type 3 object markers are applied to the approach ends of guardrail or crash*  
26 *cushion terminals it should have the appearance of a Type 3 object marker and should be ~~and other roadside~~*  
27 *appurtenances, ~~sheeting without a substrate shall be~~ directly affixed, without a substrate, to the approach end*  
28 *of the guardrail or crash cushion and generally conform in a rectangular shape conforming to the size and*  
29 *shape of the approach end of the guardrail or crash cushion ~~with alternating black and retroreflective yellow~~*  
30 *stripes sloping downward at a angle of 45 degrees toward the side of the obstruction on which traffic is to*  
31 *pass.*

32 **Standard:**

33 **Type 1 and Type 4 object markers shall not be used to mark obstructions adjacent to the roadway.**

34 **Guidance:**

35 *Standard warning signs in this Chapter should also be used where applicable.*

36 **Section ~~2C.66~~[2C.72](#) Object Markers for Ends of Roadways**

37 **Support:**

38 The Type 4 object marker is used to warn and alert road users of the end of a roadway in other than  
39 construction or maintenance areas.

40 **Standard:**

41 **If an object marker is used to mark the end of a roadway, a Type 4 object marker shall be used.**

42 **Option:**

43 The Type 4 object marker may be used in instances where there are no alternate vehicular paths.

44 Where conditions warrant, more than one marker, or a larger marker with or without a Type 3 Barricade  
45 (see Section ~~2B.67~~[2B.76](#)), may be used at the end of the roadway.

46 **Standard:**

47 **The minimum mounting height, measured vertically from the bottom of a Type 4 object marker to**  
48 **the elevation of the near edge of the traveled way, shall be 4 feet.**

49 **Guidance:**

50 *Appropriate advance warning signs in this Chapter should be used.*

1 **CHAPTER 2D. GUIDE SIGNS—CONVENTIONAL ROADS**

2  
3 **Chapter 2D Subchapter and Section Organization**

4 **General Design**

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13 **Route Signs and Auxiliary Plaques**

- 14 [2D.09 Numbered Highway Systems](#)  
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16 [2D.11 Design of Route Signs](#)  
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18 [2D.13 Junction Auxiliary Plaque \(M2-1P\)](#)  
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21 [2D.16 Auxiliary Plaque for Alternative Routes \(M4-1P through M4-4P\)](#)  
22 [2D.17 ALTERNATE Auxiliary Plaques \(M4-1P, M4-1aP\)](#)  
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24 [2D.19 BUSINESS Auxiliary Plaque \(M4-3P\)](#)  
25 [2D.20 TRUCK Auxiliary Plaque \(M4-4P\)](#)  
26 [2D.21 TO Auxiliary Plaque \(M4-5P\)](#)  
27 [2D.22 END Auxiliary Plaque \(M4-6P\)](#)  
28 [2D.23 BEGIN Auxiliary Plaque \(M4-14P\)](#)  
29 [2D.24 TEMPORARY Auxiliary Plaques \(M4-7P, M4-7aP\)](#)  
30 [2D.25 Temporary Detour Signs and Auxiliary Plaques](#)  
31 [2D.26 Advance Turn Arrow Auxiliary Plaques \(M5-1P, M5-2P, M5-3P\)](#)  
32 [2D.27 Lane Designation Auxiliary Plaques \(M5-4P, M5-5P, M5-6P\)](#)  
33 [2D.28 Directional Arrow Auxiliary Plaques \(M6 Series\)](#)

34 **Sign Assemblies**

- 35 [2D.29 Route Sign Assemblies](#)  
36 [2D.30 Junction Assembly](#)  
37 [2D.31 Advance Route Turn Assembly](#)  
38 [2D.32 Directional Assembly](#)  
39 [2D.33 Confirming or Reassurance Assemblies](#)  
40 [2D.34 Trailblazer Assembly](#)

41 **Destination and Distance Signs**

- 42 [2D.35 Destination and Distance Signs](#)  
43 [2D.36 Destination Signs \(D1 Series\)](#)  
44 [2D.37 Overhead Arrow-Per-Lane Destination Guide Signs](#)  
45 [2D.38 Combination Lane-Use/Destination Overhead Guide Sign \(D15-1\)](#)  
46 [2D.39 Destination Signs at Circular Intersections](#)  
47 [2D.40 Destination Signs at Jughandles](#)  
48 [2D.41 Destination Signs at Intersections with Indirect Turning Movements](#)  
49 [2D.42 Location of Destination Signs](#)  
50 [2D.43 Distance Signs \(D2 Series\)](#)  
51 [2D.44 Location of Distance Signs](#)

52 **Street Name and Parking Signs**

1	<a href="#"><u>2D.45 Street Name Signs (D3-1, D3-1a)</u></a>
2	<a href="#"><u>2D.46 Advance Street Name Signs (D3-2 Series)</u></a>
3	<a href="#"><u>2D.47 Parking Area Guide Sign (D4-1)</u></a>
4	<a href="#"><u>2D.48 PARK - RIDE Sign (D4-2)</u></a>
5	<a href="#"><u>Freeway Entrance Signs</u></a>
6	<a href="#"><u>2D.49 Signing on Conventional Roads on Approaches to Interchanges</u></a>
7	<a href="#"><u>2D.50 Freeway Entrance Signs (D13-3, D13-3a)</u></a>
8	<a href="#"><u>Lane, Passing Lane, Crossover and Emergency and Slow Vehicle Turn-Out Signs</u></a>
9	<a href="#"><u>2D.51 WEIGH STATION Signing (D8 Series)</u></a>
10	<a href="#"><u>2D.52 Crossover Signs (D13-1, D13-2)</u></a>
11	<a href="#"><u>2D.53 Truck and Passing Lane Signs (D17-1, D17-2, D17-3, D17-4)</u></a>
12	<a href="#"><u>2D.54 Emergency and Slow Vehicle Turn-Out Signs (D17-5 through D17-7)</u></a>
13	<a href="#"><u>Other Guide Signs</u></a>
14	<a href="#"><u>2D.55 Community Wayfinding Signs</u></a>
15	<a href="#"><u>2D.56 Signing of Named Highways for Mapping and Address Purposes</u></a>
16	<a href="#"><u>2D.57 National Scenic Byways Sign and Plaque (D6-4, D6-4aP)</u></a>
17	<a href="#"><u>2D.58 State-Designated Scenic Byway, Historic Trail, and Auto Tour Route Signs</u></a>
18	<a href="#"><u>2D.59 EMERGENCY ROUTE and EMERGENCY ROUTE TO Signs and Plaques</u></a>
19	

1 CHAPTER 2D. GUIDE SIGNS—CONVENTIONAL ROADS

2 GENERAL DESIGN

3 **Section 2D.01 Scope of Conventional Road Guide Sign Standards and Application** Existing  
4 Sections 2D.01 and 2D.02 combined into one section

5 **Standard:**

6 The provisions of this Chapter shall apply to any road or street other than ~~low-volume roads (as~~  
7 ~~defined in Section 5A.01),~~ expressways, and freeways, except as stated elsewhere in this Manual. Moved  
8 from existing Section 2D.01

9 **Support:**

10 ~~Guide signs are essential to direct road users along streets and highways, to inform them of intersecting~~  
11 ~~routes, to direct them to cities, towns, villages, or other important destinations, to identify nearby rivers and~~  
12 ~~streams, parks, forests, and historical sites, and generally to give such information as will help them along~~  
13 ~~their way in the most simple, direct manner possible.~~

14 ~~Chapter 2A addresses placement, location, and other general criteria for signs.~~ Moved to later in this  
15 combined new Section 2D.01

16 **Guidance:**

17 The selection of primary or control destinations (those displayed consistently over longer distances along  
18 a route) displayed on guide signs should be meaningful to road users in navigation and orientation. The  
19 destinations selected should be identifiable on official maps.

20 **The following 4 paragraphs moved from existing Section 5D.01**

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

23 **Support:**

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

28 **Guidance:**

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

32 **Option:**

33 Guide signs may be used on low-volume roads at intersections to provide information for road users  
34 returning to a higher class of roads.

35 **Support:** Moved from earlier in existing Section 2D.02

36 Guide signs are essential to direct road users along streets and highways, to inform them of intersecting  
37 routes, to direct them to cities, towns, villages, or other important destinations, to identify nearby rivers and  
38 streams, parks, forests, and historical sites, and generally to give such information as will help them along  
39 their way in the most simple, direct manner possible.

40 Chapter 2A addresses placement, location, and other general criteria for signs.

41 Guide signs, other than Street Name signs, generally are not used on low-volume rural roads except as  
42 needed to guide road users back to the major roadways.

43 Many roadways within airport facilities (including terminal curbside roadways) would be considered  
44 conventional roads because they typically have frequent driveways and at-grade intersections and might have  
45 pedestrian activity along and/or across them.

46 Some airport roadways have full or partial control of access and operating speeds higher than 45 mph and  
47 thus would be classified as freeways or expressways for signing purposes (see Chapter 2E). Freeway or  
48 expressway conditions typically exist on the approaches to the airport from other highways, on the approaches  
49 to access points to terminals, parking, and other patron facilities, and on roadways that provide exits from the  
50 airport facility to connect with the local or regional highway network.

1 [Roadways within airports and other similarly contained roadway networks with multiple closely-spaced](#)  
2 [access points to multiple destinations \(such as terminals, parking facilities, rental car facilities, and other](#)  
3 [airport services\) often present challenges for the application of guide signing. Closely spaced signs, excessive](#)  
4 [sign messaging either co-located or in succession, and the resulting excessive informational load imposed on](#)  
5 [the road user are of particular concern for such roadways.](#)

6 [An example of major guide signing within an airport facility roadway network is shown in Figure 2D-1.](#)

### 7 **Figure 2D-1. Example of Guide Signing Within an Airport Facility Roadway Network**

8 *Guidance:*

9 [If adequate sign spacing cannot be provided due to the site and roadway characteristics of an airport or](#)  
10 [similar facility, then the speeds of vehicles on the roadway should be reduced to provide road users with](#)  
11 [adequate time to comprehend and respond, or sign letter heights should be increased, or both. Where a single](#)  
12 [terminal serves a large number of airlines, the airline information should be displayed on separate signs that](#)  
13 [appear in sequence to limit the number of airlines displayed on a single sign or at a single location.](#)  
14 [Changeable message signs \(see Chapter 2L\) should not be used to rotate the display airlines to an](#)  
15 [approaching road user.](#)

## 16 **Section ~~2D.03~~ 2D.02 Color, Retroreflection, and Illumination**

17 Support:

18 Requirements for illumination, retroreflection, and color are stated under the specific headings for  
19 individual guide signs or groups of signs. General provisions are given in Sections 2A.07, 2A.08, and 2A.10.

20 **Standard:**

21 **Except where otherwise provided in this Manual for individual signs or groups of signs, guide signs**  
22 **on streets and highways shall have a white message and border on a green background. All messages,**  
23 **borders, and legends shall be retroreflective and all backgrounds shall be retroreflective or illuminated.**

24 Support:

25 Color coding is sometimes used to help road users distinguish between multiple potentially confusing  
26 destinations. Examples of valuable uses of color coding include guide signs for roadways approaching or  
27 inside an airport property with multiple terminals serving multiple airlines, and community wayfinding guide  
28 signs for various traffic generator destinations within a community or area.

29 **Standard:**

30 **Except where otherwise provided in this Manual, different color sign backgrounds shall not be used**  
31 **to provide color coding of destinations. The color coding shall be accomplished by the use of different**  
32 **colored square or rectangular sign panels on the face of the guide signs.**

33 Option:

34 The different colored sign panels [on the face of a sign](#) may include a black or white (whichever provides  
35 the better contrast with the panel color) letter, numeral, or other appropriate designation to identify an airport  
36 terminal or other destination.

37 Support:

38 ~~Two e~~Examples of color-coded signs ~~assemblies~~ are shown in Figure ~~2D-1~~2D-2. Section 2D.~~50~~55  
39 contains specific provisions regarding Community Wayfinding guide signs.

### 40 **Figure 2D-2. Examples of Color-Coded Destination Guide Signs**

## 41 **Section ~~2D.04~~ 2D.03 Size of Signs**

42 **Standard:**

43 **Except as provided in Section 2A.11, the sizes of conventional road guide signs that have**  
44 **standardized designs shall be as shown in Table 2D-1.**

45 Support:

46 Section 2A.11 contains information regarding the applicability of the various columns in Table 2D-1.

47 Option:

48 Signs larger than those shown in Table 2D-1 may be used (see Section 2A.11).

## Table 2D-1. Conventional Road Guide Sign Sizes

Support:

For other guide signs, the legends are so variable that a standardized design or 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.

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.*

### Section ~~2D.05~~ 2D.04 Lettering Style

Standard:

The design of upper-case letters, lower-case letters, numerals, route shields, and spacing shall be as provided in the “Standard Highway Signs ~~and Markings~~” ~~book~~ publication (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 (see Section 2A.13). The nominal loop height of the lower-case letters shall be 3/4 the height of the initial upper-case letter. When a mixed-case legend letter height is specified referring only to the initial upper-case letter, the height of the lower-case letters that follow shall be determined by this proportion. When the height of a lower-case letter is referenced, the reference is made to the nominal loop height ~~and~~ the height of the initial upper-case letter shall also be determined by this proportion.

All other word legends on conventional road guide signs shall be in upper-case letters.

The unique letter forms for each of the Standard Alphabet series shall not be stretched, compressed, warped, or otherwise manipulated. Modifications to the length of a word for a given letter height and series shall be accomplished only by the methods described in Section ~~2D.04~~ 2D.03

### Section ~~2D.06~~ 2D.05 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 takes into account factors such as 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 ~~and Markings~~” ~~book~~ publication (see Section 1A.11).

Except as otherwise provided in this Manual, the principal legend on post-mounted guide signs shall be in letters and numerals at least 6 inches in height for all upper-case letters, or a combination of 6 inches in height for upper-case letters and 4.5 inches in height (see Section 2D.04) for lower-case letters. On low-volume roads (~~as defined in Section 5A.01~~) with speeds of 25 mph or less, and on urban streets with speeds of 25 mph or less, the principal legend on post-mounted guide signs shall be in letters at least 4 inches in height for all upper-case letters, or a combination of 4 inches in height for upper-case letters and 3 inches in height for lower-case letters.

1 The principal legend on overhead guide signs shall be in letters and numerals at least 12 inches in  
2 height for all upper-case letters, or a combination of 12 inches in height for upper-case letters and 9  
3 inches in height (see Section 2D.04) for lower-case letters.

4 Option:

5 On conventional roadways with speed limits of 40 miles per hour or less, overhead guides sign  
6 destinations may use an upper-case letter at least 10.67 inches in height followed by lower-case letters 8  
7 inches in height.

8 *Guidance:*

9 *Lettering sizes should be consistent on any particular class of highway.*

10 *The minimum lettering and numeral sizes provided in this Manual (see Table 2D-2) should be exceeded*  
11 *where conditions indicate a need for greater legibility.*

12 **Table 2D-2. Minimum Letter and Numeral Sizes for Conventional Road Guide Signs by**  
13 **Roadway Type**

14 **Section 2D.07 2D.06 Amount of Legend**

15 *Support:*

16 The longer the legend on a guide sign, the longer it will take road users to recognize and comprehend it,  
17 regardless of letter size.

18 *Guidance:*

19 *Except where otherwise provided in this Manual, guide signs should be limited to no more than three lines*  
20 *of destinations, which include place names, route numbers, street names, and cardinal directions. Where two*  
21 *or more signs are included in the same overhead display, the amount of legend should be further minimized.*  
22 *Where appropriate, a distance message or action information, such as an exit number, NEXT RIGHT, or*  
23 *directional arrows, should be provided on guide signs in addition to the destinations.*

24 **Section 2D.07 Abbreviations** Section relocated and edited from existing Section 2E.17

25 *Support:*

26 The use of commonly recognized abbreviations for certain words can be useful in reducing the apparent  
27 complexity of a sign message. Descriptors and directional or quadrant orientations for street names and  
28 destinations, such as Boulevard (Blvd), North (N), and Southwest (SW), are some examples of commonly  
29 recognized abbreviations. Examples of the use of abbreviations are shown in Figure 2D-3.

30 **Figure 2D-3. Examples of the Use of Abbreviations**

31 *Standard:*

32 **The words NORTH, SOUTH, EAST, and WEST shall not be abbreviated when used to indicate**  
33 **cardinal directions of numbered or named highways on guide signs.**

34 *Guidance:*

35 *Abbreviations should be kept to a minimum; however, they are useful when complete destination*  
36 *messages produce excessively long signs. If used, abbreviations should be unmistakably recognized by road*  
37 *users (see Section 1A.15). Longer commonly used words that are not part of a proper name and are readily*  
38 *recognizable, such as street name descriptors (Street, Boulevard, ~~and~~ Avenue, etc.), should be abbreviated as*  
39 *provided in Table 2D-3 to expedite recognition of the sign legend by reducing the amount and complexity of*  
40 *the legend. Shorter street name descriptors should not be abbreviated (see Table 2D-4*

41 *Periods, apostrophes, question marks, ampersands, or other punctuation or characters that are not*  
42 *letters, numerals, or hyphens should not be used in abbreviations, unless necessary to avoid confusion.*

43 *The solidus (~~slanted line or forward slash~~) is intended to be used for fractions only and should not be used*  
44 *to separate words on the same line of legend. Instead, a hyphen should be used for this purpose, such as*  
45 *“~~CARS—TRUCKS~~TRUCKS – BUSES”.*

46 **Table 2D-3. Acceptable Abbreviations for Street Name Descriptors**

47 **Table 2D-4. Street Name Descriptors Not Acceptable for Abbreviation**

48 **Section 2D.08 Arrows**

1 Support:

2 Arrows are used for lane assignment and to indicate the direction toward designated routes or destinations.  
3 Figure ~~2D-2-2D-4~~ shows the various standard arrow designs that have been approved for use on guide signs.  
4 Detailed drawings and standardized sizes based on ranges of letter heights are shown for these arrows in the  
5 “Standard Highway Signs ~~and Markings~~” ~~book~~ publication (see Section 1A.11).

6 **Standard:**

7 **On overhead signs where it is desirable to indicate a lane to be followed, a down arrow shall be**  
8 **positioned ~~approximately~~ over the approximate center of the lane and shall point vertically downward**  
9 **toward the approximate center of that lane. Down arrows shall be used only on overhead guide signs**  
10 **that restrict the use of specific lanes to traffic bound for the destination(s) and/or route(s) indicated by**  
11 **these arrows. Down arrows shall not be used unless an arrow can be located over and pointed to the**  
12 **approximate center of each lane that can be used to reach the destination displayed on the sign.**

13 **If down arrows are used, having more than one down arrow pointing to the same lane on a single**  
14 **overhead sign (or on multiple signs on the same overhead sign structure) shall not be permitted.**

15 **Where a roadway is leaving the through lanes, a directional arrow shall point upward at an angle**  
16 **that approximates the alignment of the exit roadway in the vicinity of the point of departure.**

17 **Option:**

18 ~~Curved stem arrows (see Figure 2D-8) that represent the intended driver paths to destinations involving~~  
19 ~~left turn movements may be used on guide signs on approaches to circular intersections.~~

20 **Standard:**

21 ~~Curved stem~~ **The Type E directional arrows for circular intersections shall not be used on any sign**  
22 **that is not associated with a circular intersection.**

23 **Figure 2D-4. Arrows for Use on Guide Signs**

24 **Guidance:**

25 ~~If curved stem arrows are used, the principles set forth in Sections 2D.26 through 2D.29 should be~~  
26 ~~followed.~~ **Relocated to below**

27 *The Type A directional arrow should be used on guide signs on freeways, expressways, and conventional*  
28 *roads to indicate the direction to a specific destination or group of destinations, except as otherwise provided*  
29 *in this Section and in Section 2E.19.*

30 *When a directional arrow in a vertical, upward-pointing orientation is placed to the side of a group of*  
31 *destinations to indicate a through movement, the Type A directional arrow should be used. When a*  
32 *directional arrow in a vertical, upward-pointing orientation is placed to the side of a single destination or*  
33 *under a destination or group of destinations, the Type B directional arrow should be used.*

34 *The Type B directional arrow should be used on guide signs on conventional roads when placed at any*  
35 *angle to the side of a single destination or when placed in a horizontal orientation to the side of a group of*  
36 *destinations.*

37 *The Type C advance turn directional arrow should be used on conventional road guide signs placed in*  
38 *advance of an intersection where a turn must be made to reach a posted destination or group of destinations.*

39 *The Type D directional arrow should be used primarily for sign applications other than guide signs,*  
40 *except as provided in Paragraph ~~16.15~~ of this Section.*

41 ~~If curved stem arrows are used~~ **If the Type E directional arrow is used, the principles set forth in Sections**  
42 **2D.26 through 2D.29 should be followed.** **Relocated from above**

43 **Option:**

44 The Type A-Extended directional arrow may be used on guide signs where additional emphasis regarding  
45 the direction is needed relative to the amount of legend on the sign.

46 The Type C directional arrow may be used to the side of the legend of an overhead guide sign to  
47 accentuate a sharp turn exit maneuver from a mainline roadway (see Section 2E.36 for additional information  
48 regarding Exit Direction signs for low advisory ramp speeds).

49 On conventional roads on the approach to an intersection where the Combination Lane-Use/Destination  
50 overhead guide sign (see Section 2D. ~~3338~~) is not used, the Type C advance turn directional arrow may be

1 used beneath the legend of an overhead guide sign to indicate the fact that a turn must be made from a  
2 mandatory movement lane over which the sign is placed to reach the destination or destinations displayed on  
3 the sign.

4 The Type D directional arrow may be used on post-mounted guide signs on conventional roads with lower  
5 operating speeds if the height of the text on the sign is 8 inches or less.

6 The Type E directional arrow (see Figure 2D-4) may be used on guide signs on approaches to circular  
7 intersections to represent the intended driver paths to destinations involving left-turn movements around the  
8 circulatory island.

9 The directional and down arrows shown in Figure ~~2D-2~~ 2D-4 may be used on signs other than guide signs  
10 for the purposes of providing directional guidance and lane assignment.

11 *Guidance:*

12 *Arrows used on guide signs to indicate the directions toward designated routes or destinations should be*  
13 *pointed at the appropriate angle to clearly convey the direction to be taken. A horizontally oriented*  
14 *directional arrow design should be used at right-angle intersections.*

15 *On a post-mounted guide sign, a directional arrow for a straight-through movement should point upward.*  
16 *Except as provided in Section 2D.4650, for a turn, the arrow on a guide sign should point horizontally or at*  
17 *an upward angle that approximates the sharpness of the turn.*

18 *At an exit, an arrow should be placed at the side of the sign that will reinforce the movement of exiting*  
19 *traffic. The directional arrow design should be used.*

20 *Option:*

21 Arrows may be placed below the principal sign legend or on the appropriate side of the legend that is  
22 consistent with the direction of the movement.

23 On a post-mounted sign at an exit where placement of the arrow to the side of the legend farthest from the  
24 roadway would create an unusually wide sign that limits the road user's view of the arrow, the directional  
25 arrow may be placed at the bottom portion of the sign, centered under the legend.

26 *Guidance:*

27 *The width across the arrowhead for the Types A, B, and C directional arrows should be between 1.5 and*  
28 *1.75 times the height of the upper-case letters of the principal legend on the sign. The width across the*  
29 *arrowhead for the Type D directional arrow should be at least equal to the height of the upper-case letters of*  
30 *the principal legend on the sign. For down arrows used on overhead signs, the width across the arrowhead*  
31 *should be approximately two times the height of the upper-case letters of the principal legend on the sign.*

32 *Arrows used in Overhead Arrow-per-Lane and Diagrammatic guide signing, if used on conventional*  
33 *roads, except for signs on approaches to roundabouts, should ~~follow~~ comply with the ~~principles set forth in~~*  
34 *provisions of Section 2E.19. Arrows used in Diagrammatic guide signing on approaches to roundabouts*  
35 *should follow the principles set forth in Section 2D.389.*

36 *Support:*

37 The “Standard Highway Signs ~~and Markings~~” ~~book~~ publication (see Section 1A.11) contains design  
38 details and standardized sizes of the various arrows based on ranges of letter heights of principal legends.  
39

**ROUTE SIGNS AND AUXILIARY PLAQUES**

**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 Interstate and U.S. 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 highway systems described in Paragraph 2 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~~ route number on the top or the left of the sign, except as provided in Paragraph 7.**

**Interstate route numbering shall be approved by FHWA.**

Option:

The prioritization of route systems may be modified when a different prioritization would better accommodate the expectancy of the road user and provide more effective direction, such as for separate decision points for routes that are encountered in a particular order.

Support:

Section 2D.~~53~~56 contains information regarding the signing of unnumbered highways to enhance route guidance and facilitate travel.

**Section 2D.10 Route Signs and Auxiliary ~~Signs~~Plaques**

**Standard:**

**Except as provided in Paragraph 9 of Section 2D.29, ~~All~~ all numbered highway routes shall be identified by route signs and auxiliary ~~signs~~plaques.**

**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.**

Option:

Route signs and auxiliary ~~signs~~plaques may be proportionally enlarged where greater conspicuity or legibility is needed.

Support:

Route signs are typically mounted in assemblies with auxiliary ~~signs~~plaques.

Section 2D.~~57~~55 contains information regarding the signing for National Scenic Byways.

Section 2H.07 contains information regarding the signing for State-designated scenic byways, historic trails, and ~~Auto- auto Four- tour Routes~~ routes.

**Section 2D.11 Design of Route Signs**

**Standard:**

1 The design of standard route signs shall conform to the designs provided in the “Standard Highway  
2 Signs and Markings” book publication (see Section 1A.11) ~~shall be used for designing route signs.~~ The  
3 design of Other route signs designs shall be established by the authority having jurisdiction and shall  
4 also be in general conformance with the designs provided in the “Standard Highway Signs” publication.

5 Interstate Route (M1-1 and M1-1a) signs (see Figure ~~2D-3~~2D-5) shall consist of a cutout shield, with  
6 the route number in white letters on a blue background, the word INTERSTATE in white upper-case  
7 letters on a red background, and a white border. This sign shall be used on all Interstate routes and in  
8 connection with route sign assemblies on intersecting highways.

9 Except as otherwise provided in this Manual, A a 24 x 24-inch minimum sign size shall be used for  
10 Interstate route numbers with one or two digits, and a 30 x 24-inch minimum sign size shall be used for  
11 Interstate route numbers having three digits.

### 12 **Figure 2D-5. Route Signs**

13 Option:

14 When the Interstate Route sign is used in a Route Sign assembly (see Section 2D.29), the M1-1a Interstate  
15 ~~Route signs, may containing~~ the State name in white upper-case letters on a blue background as detailed in the  
16 “Standard Highway Signs” publication, may be used in place of the M1-1 sign.

17 **Standard:**

18 Use of the M1-1a sign shall be limited to Route Sign assemblies.

19 Off-Interstate Business Route (M1-2 and M1-3) signs (see Figure ~~2D-3~~2D-5) shall consist of a cutout  
20 shield ~~carrying displaying~~ the number of the connecting Interstate route and the words BUSINESS and  
21 either LOOP (when the route rejoins the same Interstate route) or SPUR (when the route leaves the  
22 corresponding Interstate route and does not rejoin) in upper-case letters. The legend and border shall  
23 be white on a green background, and the shield shall be the same shape and dimensions as the  
24 Interstate Route sign. In no instance shall the word INTERSTATE appear on the Off-Interstate  
25 Business Route sign.

26 Option:

27 The Off-Interstate Business Route sign may be used on a major highway that is not a part of the Interstate  
28 system, but one that serves the business area of a city from an interchange on the system.

29 ~~When used on a green guide sign, a white square or rectangle may be placed behind the shield to improve~~  
30 ~~contrast.~~

31 **Standard:**

32 U.S. Route signs (see Figure ~~2D-3~~2D-5) shall consist of black numerals on a white shield surrounded  
33 by a rectangular black background without a border. This sign shall be used on all U.S. routes and in  
34 connection with route sign assemblies on intersecting highways.

35 A 24 x 24-inch minimum sign size shall be used for U.S. route numbers with one or two digits, and a  
36 30 x 24-inch minimum sign size shall be used for U.S. route numbers having three digits.

37 State Route signs shall be designed by the individual State highway agencies.

38 The legend on State Route signs shall conform to the Standard Alphabets contained in the  
39 “Standard Highway Signs” publication.

40 *Guidance:*

41 *State Route signs (see Figure ~~2D-3~~2D-5) should be rectangular and should be approximately the same*  
42 *size as the U.S. Route sign. State Route signs should also be similar to the U.S. Route sign by containing*  
43 *approximately the same size black numerals on a white area surrounded by a rectangular black background*  
44 *without a border, and should be devoid of complex graphics. The shape of the white area should be circular*  
45 *in the absence of any determination to the contrary by the individual State concerned.*

46 *Where U.S. or State Route signs are used as components of guide signs, only the distinctive shape of the*  
47 *shield itself and the route numerals within should be used. The rectangular background upon which the*  
48 *distinctive shape of the shield is mounted, such as the black area around the outside of the shields on the M1-4*  
49 *and standard M1-5 signs, should not be included on the guide sign. Where U.S. or State Route signs are used*  
50 *as components of other signs of non-contrasting background colors, the rectangular background should be*  
51 *used to so that recognition of the distinctive shape of the shield can be maintained.*

1 **Standard:**

2 If county road authorities elect to establish and identify a special system of important county roads,  
3 a statewide policy for such signing shall be established that includes a uniform numbering system to  
4 uniquely identify each route. The County Route (M1-6) sign (see Figure ~~2D-3~~2D-5) shall consist of a  
5 pentagon shape with a yellow county name and route number and border on a blue background.  
6 County Route signs ~~displaying two digits or the equivalent (letter and numeral, or two letters) shall be a~~  
7 ~~minimum size of 18 x 18 inches; those carrying three digits or the equivalent shall be a minimum size of~~  
8 ~~24 x 24 inches.~~

9 If a jurisdiction uses letters instead of numbers to identify routes, all references to numbered routes  
10 in this Chapter shall be interpreted to also include lettered routes.

11 *Guidance:*

12 *If used with other route signs in common assemblies, the County Route sign should be of a size compatible*  
13 *with that of the other route signs.*

14 **Option:**

15 ~~When used on a green guide sign, a yellow square or rectangle may be placed behind the County Route sign to~~  
16 ~~improve cont~~

17 **Standard:**

18 The design of the National Forest Route (M1-7) sign (see Figure 2D-5) shall be as detailed in the  
19 “Standard Highway Signs” publication. Route signs (see Figure 2D-3) for other park and forest roads  
20 shall be designed with adequate an appropriate level of distinctiveness and adequate legibility, but in  
21 general compliance with the design principles for route signs and of a size compatible with other route  
22 signs used in common assemblies.

23 **Section 2D.12 Design of Route Sign ~~Auxiliaries~~Auxiliary Plaques**

24 **Standard:**

25 Route sign auxiliaries ~~carrying~~displaying word legends, except the JCT ~~sign~~auxiliary plaque, shall  
26 have a minimum standard size of 24 x 12 inches. The JCT auxiliary plaque and ~~Those those carrying~~  
27 auxiliary plaques displaying arrows~~symbols, or the JCT sign,~~ shall have a minimum standard size of  
28 21 x 15 inches. All route sign ~~auxiliaries~~auxiliary plaques shall match the color combination of the  
29 route sign that they supplement.

30 *Guidance:*

31 ~~With route signs of larger heights, auxiliary signs should be suitably enlarged, but not such that they~~  
32 ~~exceed the width of the route sign.~~

33 *The background, legend, and border of a route sign auxiliary plaque should have the same colors as those*  
34 *of the route sign with which the auxiliary plaque is mounted in a route sign assembly (see Section 2D.29).*  
35 *For a route sign design that uses multiple background colors, such as the Interstate route sign, the*  
36 *background color of the corresponding auxiliary plaque should be that of the background area on which the*  
37 *route number is placed on the route sign.*

38 **Option:**

39 A route sign and any auxiliary ~~signs~~plaques used with it may be combined on a single sign as a guide  
40 sign.

41 *Guidance:*

42 ~~If a route sign and its auxiliary signs are combined to form a single guide sign, the background color of~~  
43 ~~the sign should be green and the design should comply with the basic principles for the design of guide signs.~~

44 **Guidance changed to Standard in the following paragraph**

45 **Standard:**

46 If a route sign and its auxiliary ~~signs~~plaques are combined to form a signal guide sign, the  
47 background color of the sign ~~should~~shall be green and the design ~~should~~shall comply with the basic  
48 principles for the design of guide signs. ~~If a route sign and its auxiliary signs are combined on a~~  
49 ~~single sign with a green background, t~~The auxiliary messages shall be white legends placed

1 directly on the green background. Auxiliary **signs-plaques** shall not be mounted directly to a  
2 guide sign or other type of sign.

3 Support:

4 Chapter 2F contains information regarding auxiliary **signs-plaques** for toll highways.

### 5 **Section 2D.13 Junction Auxiliary Sign-Plaque (M2-1P)**

6 Standard:

7 The Junction (M2-1) auxiliary **sign-plaque** (see Figure **2D-42D-6**) shall **carry-display** the  
8 abbreviated legend JCT and shall be mounted at the top of an assembly (see Section 2D.30) directly  
9 above the route sign, the sign for an alternative route (see Section 2D.17) that is part of the route  
10 designation, or the Cardinal Direction auxiliary **sign-plaque** where access is available only to one  
11 direction of the intersected route. The minimum size of the Junction auxiliary **sign-plaque** shall be 21 x  
12 15 inches for compatibility with auxiliary **signs-plaques** **carrying-displaying** arrow symbols.

#### 13 **Figure 2D-6. Route Sign Auxiliaries**

### 14 **Section 2D.14 Combination Junction Sign (M2-2)**

15 Option:

16 As an alternative to the standard Junction assembly where more than one route is to be intersected or  
17 joined, a rectangular guide sign may be used **carrying-displaying** the word JUNCTION above the route  
18 numbers.

19 Standard:

20 The Combination Junction (M2-2) sign (see Figure **2D-42D-6**) shall have a green background with  
21 white border and lettering for the word JUNCTION.

22 *Guidance:*

23 *The Combination Junction sign should comply with the specific provisions of Section 2D.11 regarding the*  
24 *incorporation of the route signs as components of guide signs.*

25 *Although the size of the Combination Junction sign will depend on the number of routes involved, the*  
26 *numerals should be large enough for clear legibility and should be of a size comparable with those in the*  
27 *individual route signs.*

### 28 **Section 2D.15 Cardinal Direction Auxiliary Signs-Plaques (M3-1P through M3-4P)**

29 *Guidance:*

30 *Cardinal Direction auxiliary signs-plaques (see Figure 2D-42D-6) carrying-displaying the legend*  
31 *NORTH, EAST, SOUTH, or WEST should be used to indicate the general direction of the entire route.*

32 Standard:

33 To improve the readability and recognition of the cardinal directions, the first letter of the cardinal  
34 direction words shall be ten percent larger, rounded up to the nearest whole number size.

35 If used, the Cardinal Direction auxiliary **sign-plaque** shall be mounted directly above a route sign  
36 or, if used, an auxiliary **sign-plaque** for an alternative route.

### 37 **Section 2D.16 Auxiliary Signs-Plaque for Alternative Routes (M4-1P through M4-4P Series)**

38 Option:

39 Auxiliary **signs-plaques**, **carrying-displaying** legends such as ALTERNATE, BY-PASS, BUSINESS, or  
40 TRUCK, may be used to indicate an alternate route of the same number between two points on that route.

41 Standard:

42 If used, the auxiliary **signs-plaques** for alternative routes shall be mounted directly above a route  
43 sign.

### 44 **Section 2D.17 ALTERNATE Auxiliary Signs-Plaques (M4-1P, M4-1aP)**

45 Option:

1 The ALTERNATE (M4-1P) or the ALT (M4-1aP) auxiliary [sign-plaque](#) (see Figure [2D-42D-6](#)) may be  
2 used to indicate an officially designated alternate routing of a numbered route between two points on that  
3 route.

4 **Standard:**

5 **If used, the ALTERNATE or ALT auxiliary [sign-plaque](#) shall be mounted directly above a route  
6 sign.**

7 **The M4-1P Series plaques shall not be used to sign an alternative routing that is not officially  
8 designated and incorporated into the numbered highway system, such as alternative routings for  
9 incident management or emergency detours.**

10 *Guidance:*

11 *The shorter (time or distance) or better-constructed route should retain the regular route number, and the  
12 longer or worse-constructed route should be designated as the alternate route.*

13 **Section 2D.18 BY-PASS Auxiliary Sign-Plaque (M4-2P)**

14 **Option:**

15 The BY-PASS (M4-2P) auxiliary [sign-plaque](#) (see Figure [2D-42D-6](#)) may be used to designate a route  
16 that branches from the numbered route through a city, bypasses a part of the city or congested area, and  
17 rejoins the numbered route beyond the city.

18 **Standard:**

19 **If used, the BY-PASS auxiliary [sign-plaque](#) shall be mounted directly above a route sign.**

20 **Section 2D.19 BUSINESS Auxiliary Sign-Plaque (M4-3P)**

21 **Option:**

22 The BUSINESS (M4-3P) auxiliary [sign-plaque](#) (see Figure [2D-42D-6](#)) may be used to designate an  
23 alternate route that branches from a numbered route, passes through the business portion of a city, and rejoins  
24 the numbered route beyond that area.

25 **Standard:**

26 **If used, the BUSINESS auxiliary [sign-plaque](#) shall be mounted directly above a route sign.**

27 **Section 2D.20 TRUCK Auxiliary Sign-Plaque (M4-4P)**

28 **Option:**

29 The TRUCK (M4-4P) auxiliary [sign-plaque](#) (see Figure [2D-42D-6](#)) may be used to designate an alternate  
30 route that branches from a numbered route, when it is desirable to encourage or require commercial vehicles  
31 to use the alternate route.

32 **Standard:**

33 **If used, the TRUCK auxiliary [sign-plaque](#) shall be mounted directly above a route sign.**

34 **Section 2D.21 TO Auxiliary Sign-Plaque (M4-5P)**

35 **Option:**

36 The TO (M4-5P) auxiliary [sign-plaque](#) (see Figure [2D-42D-6](#)) may be used to provide directional  
37 guidance to a particular road facility from other highways in the vicinity (see Section 2D.[3534](#)).

38 **Standard:**

39 **If used, the TO auxiliary [sign-plaque](#) shall be mounted directly above a route sign or an auxiliary  
40 [sign-plaque](#) for an alternative route. If a Cardinal Direction auxiliary [sign-plaque](#) is also included in the  
41 assembly, the TO auxiliary [sign-plaque](#) shall be mounted directly above the Cardinal Direction  
42 auxiliary [sign-plaque](#).**

43 **Section 2D.22 END Auxiliary Sign-Plaque (M4-6P)**

44 *Guidance:*

45 *The END (M4-6P) auxiliary [sign-plaque](#) (see Figure [2D-42D-6](#)) should be used where the route being  
46 traveled ends, usually at a junction with another route.*

1 **Standard:**

2 If used, the END auxiliary [sign-plaque](#) shall be mounted either directly above a route sign or above  
3 a sign for an alternative route that is part of the designation of the route being terminated.

4 **Section 2D.23 BEGIN Auxiliary Sign-Plaque (M4-14P)**

5 Option:

6 The BEGIN (M4-14P) auxiliary [sign-plaque](#) (see Figure ~~2D-4~~2D-6) may be used where a route begins,  
7 usually at a junction with another route.

8 **Standard:**

9 If used, the BEGIN auxiliary [sign-plaque](#) shall be mounted at the top of the first Confirming  
10 assembly (see Section 2D.343) for the route that is beginning.

11 *Guidance:*

12 *If a BEGIN auxiliary [sign-plaque](#) is included in the first Confirming assembly, a Cardinal Direction*  
13 *auxiliary [sign-plaque](#) should also be included in the assembly.*

14 **Standard:**

15 If a Cardinal Direction auxiliary [sign-plaque](#) is also included in the assembly, the BEGIN auxiliary  
16 [sign-plaque](#) shall be mounted directly above the Cardinal Direction auxiliary [sign-plaque](#).

17 **Section 2D.24 TEMPORARY Auxiliary Signs Plaques (M4-7P, M4-7aP)**

18 Option:

19 The TEMPORARY (M4-7P) or the TEMP (M4-7aP) auxiliary [sign-plaque](#) (see Figure ~~2D-4~~2D-6) may be  
20 used for an interim period to designate a section of highway that is not planned as a permanent part of a  
21 numbered route, but that connects completed portions of that route.

22 **Standard:**

23 If used, the TEMPORARY or TEMP auxiliary [sign-plaque](#) shall be mounted directly above the  
24 route sign, above a Cardinal Direction [sign-~~auxiliary~~ plaque](#), or above an [sign-~~auxiliary~~ plaque](#) for an  
25 alternate route that is a part of the route designation.

26 TEMPORARY or TEMP auxiliary [signs-plaques](#) shall be promptly removed when the temporary  
27 route is abandoned.

28 **Section 2D.25 Temporary Detour Signs and Auxiliary Signs Plaques**

29 Support:

30 Chapter 6F contains information regarding Temporary Detour [signs](#) and Auxiliary [signs-plaques](#).

31 **Section 2D.26 Advance Turn Arrow Auxiliary Signs Plaques (M5-1P, M5-2P, and M5-3P)**

32 **Standard:**

33 If used, the Advance Turn Arrow auxiliary [sign-plaque](#) (see Figure ~~2D-5~~2D-7) shall be mounted  
34 directly below the route sign in Advance Route Turn assemblies, and [shall](#) displays a right or left arrow,  
35 the shaft of which is bent at a 90-degree angle (M5-1) or at a 45-degree angle (M5-2).

36 If used, the ~~curved-stem~~[Circular Intersection](#) Advance Turn Arrow auxiliary (M5-3P) [sign-plaque](#)  
37 shall be used only on the approach to a circular intersection to depict a movement along the circulatory  
38 roadway around the central island and to the left, relative to the approach roadway and entry into the  
39 intersection.

40 *Guidance:*

41 *If the M5-3P [sign-plaque](#) is used, then this arrow type should also be used consistently on any regulatory*  
42 *lane-use signs (see Chapter 2B), Destination signs (see Section 2D.3736), and pavement markings (see Part*  
43 *3) for a particular destination or movement.*

44 **Figure 2D-7. Advance Turn and Directional Arrow Auxiliary Signs**

45 **Section 2D.27 Lane Designation Auxiliary Signs Plaques (M5-4P, M5-5P, and M5-6P)**

46 Option:

1 A Lane Designation (M5-4P, M5-5P, or M5-6P) auxiliary [sign-plaque](#) (see Figure [2D-52D-7](#)) may be  
2 mounted directly below the route sign in an Advance Route Turn assembly on multi-lane roadways to allow  
3 road users to move into the appropriate lane prior to reaching the intersection or interchange.

4 **Standard:**

5 If used, the Lane Designation auxiliary [signs-plaques](#) shall be used only where the designated lane is  
6 a mandatory movement lane and shall be located adjacent to the full-width portion of the mandatory  
7 movement lane. The Lane Designation auxiliary [signs-plaques](#) shall not be installed adjacent to a  
8 through lane in advance of a lane that is being added or along the taper for a lane that is being added.

9 **Section 2D.28 Directional Arrow Auxiliary Signs-Plaques (M6 Series)**

10 **Standard:**

11 If used, the Directional Arrow auxiliary [sign-plaque](#) (see Figure [2D-52D-7](#)) shall be mounted below  
12 the route sign and any other auxiliary [signs-plaques](#) in Directional assemblies (see Section 2D.32), and  
13 [shall displays](#) a single- or double-headed arrow pointing in the general direction that the route follows.

14 A Directional Arrow auxiliary [sign-plaque](#) that displays a double-headed arrow shall not be  
15 mounted in any Directional assembly in advance of or at a circular intersection.

16 **Option:**

17 The downward pointing diagonal arrow auxiliary (M6-2aP) [sign-plaque](#) may be used in a Directional  
18 assembly at the far corner of an intersection to indicate the immediate entry point to a freeway or expressway  
19 entrance ramp (see Section 2D.[4650](#)).

20 **Standard:**

21 The M6-2aP [sign-plaque](#) shall not be used on the approach to or on the near side of an intersection,  
22 such as to designate an approach lane.

23

[SIGN ASSEMBLIES](#)

**Section 2D.29 Route Sign Assemblies**

**Standard:**

A Route Sign assembly shall consist of a route sign and auxiliary ~~signs~~ plaques that further identify the route and indicate the direction. Except as provided in Paragraph 9, 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 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.*

Where more than four Route signs would be needed in a single Advance Route Turn or Directional assembly, the Route signs should instead be mounted in a Guide sign to minimize the need for repetition of the same information on multiple Cardinal Direction and Directional Arrow auxiliary plaques (see Figure 2D-8).

**Figure 2D-8. Example of Consolidation of Directional Assembly into Direction Guide Sign**

**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.

The diagrammatic route guide sign format, such as the D1-5 and D1-5a signs shown in Figure ~~2D-8~~2D-12, may be used on approaches to ~~roundabouts~~circular intersections.

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.

Route Sign assemblies may be omitted for routes that are part of an agency's internal numbering system, such as for maintenance or other purposes, and are not publicly mapped or intended to be used for navigational purposes by the general public.

**Support:**

Figure ~~2D-6~~2D-9 shows typical placements of route signs.

**Figure 2D-9. Illustration of Directional Assemblies and Other Route Signs (Sheets 1-4)**

**Section 2D.30 Junction Assembly**

**Standard:**

A Junction assembly shall consist of a Junction auxiliary ~~sign~~ plaque (see Section 2D.13) and a route sign. The route sign shall ~~carry~~ display 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.

*Guidance:*

*In urban areas, the Junction assembly should be installed in the block preceding the intersection. In urban areas where speeds are low, the Junction assembly should not be installed more than 300 feet in advance of the intersection.*

1 *In rural areas, the Junction assembly should be installed at least 400 feet in advance of the intersection.*  
2 *In rural areas, the minimum distance between a Junction assembly and either a Destination sign or an*  
3 *Advance Route Turn assembly should be 200 feet.*

4 *Where speeds are high, greater spacings should be used.*

5 Option:

6 Where two or more routes are to be indicated, a single Junction auxiliary [sign-plaque](#) may be used for the  
7 assembly and all route signs grouped in a single mounting, or a Combination Junction (M2-2) sign (see  
8 Section 2D.14) may be used.

### 9 **Section 2D.31 Advance Route Turn Assembly**

10 **Standard:**

11 An Advance Route Turn assembly shall consist of a route sign, an Advance Turn Arrow or word  
12 message auxiliary [signplaque](#), and a Cardinal Direction auxiliary [signplaque](#), if needed. It shall be  
13 installed in advance of an intersection where a turn must be made to remain on the indicated route.

14 Option:

15 The Advance Route Turn assembly may be used to supplement the required Junction assembly in advance  
16 of intersecting routes.

17 *Guidance:*

18 *Where a ~~multiple~~-lane highway approaches an interchange or intersection with a numbered route, the*  
19 *Advance Route Turn assembly should be used to ~~pre-position~~[provide advance notice so that](#) turning vehicles*  
20 *in the correct lanes from which to make their turn.*

21 Option:

22 Lane Designation auxiliary [signs-plaques](#) (see Section 2D.27) may be used in Advance Route Turn  
23 Assemblies in place of the Advance Turn Arrow auxiliary [signs-plaques](#) where engineering judgment  
24 indicates that specific lane information associated with each route is needed and overhead signing is not  
25 practical and the designated lane is a mandatory movement lane. An assembly with the Lane Designation  
26 auxiliary [signs-plaques](#) may supplement or substitute for an assembly with Advance Turn Arrow auxiliary  
27 [signsplaques](#).

28 *Guidance:*

29 *In low-speed areas, the Advance Route Turn assembly should be installed not less than 200 feet in*  
30 *advance of the turn. In high-speed areas, the Advance Route Turn assembly should be installed not less than*  
31 *300 feet in advance of the turn. In rural areas, the minimum distance between an Advance Route Turn*  
32 *assembly and either a Destination sign or a Junction assembly should be 200 feet.*

33 **Standard:**

34 An assembly that includes an Advance Turn Arrow auxiliary [sign-plaque](#) shall not be placed where  
35 there is an intersection between it and the designated turn.

36 *Guidance:*

37 *Sufficient distance should be allowed between the assembly and any preceding intersection that could be*  
38 *mistaken for the indicated turn.*

### 39 **Section 2D.32 Directional Assembly**

40 **Standard:**

41 A Directional assembly shall consist of a Cardinal Direction auxiliary [signplaque](#), if needed; a route  
42 sign; and a Directional Arrow auxiliary [signplaque](#). The various uses of Directional assemblies shall be  
43 as provided in Items A through D:

44 A. Turn movements (indicated in advance by an Advance Route Turn assembly) shall be marked  
45 by a Directional assembly with a route sign displaying the number of the turning route and a  
46 single-headed arrow pointing in the direction of the turn.

47 B. The beginning of a route (indicated in advance by a Junction assembly) shall be marked by a  
48 Directional assembly with a route sign displaying the number of that route and a single-headed  
49 arrow pointing in the direction of the route.

- 1 C. An intersected route (indicated in advance by a Junction assembly) on a crossroad where the  
 2 route is designated on both legs shall be designated by:
- 3 1. Two Directional assemblies, each with a route sign displaying the number of the intersected  
 4 route, a Cardinal Direction auxiliary [signplaque](#), and a single-headed arrow pointing in the  
 5 direction of movement on that route; or
  - 6 2. A Directional assembly with a route sign displaying the number of the intersected route and  
 7 a double-headed arrow, pointing at appropriate angles to the left, right, or ahead.
- 8 D. An intersected route (indicated in advance by a Junction assembly) on a side road or on a  
 9 crossroad where the route is designated only on one of the legs shall be designated by a  
 10 Directional assembly with a route sign displaying the number of the intersected route, a  
 11 Cardinal Direction auxiliary [signplaque](#), and a single-headed arrow pointing in the direction of  
 12 movement on that route.

13 *Guidance:*

14 *Straight-through movements should be indicated by a Directional assembly with a route sign displaying*  
 15 *the number of the continuing route and a vertical arrow. A Directional assembly should not be used for a*  
 16 *straight-through movement in the absence of other assemblies indicating right or left turns, as the Confirming*  
 17 *assembly sign beyond the intersection normally provides adequate guidance.*

18 *Directional assemblies should be located on the near right corner of the intersection. At major*  
 19 *intersections and at Y or offset intersections, additional Directional assemblies should be installed on the far*  
 20 *right or left corner to confirm the near-side assemblies. When the near-corner position is not practical for*  
 21 *Directional assemblies, the far right corner should be the preferred alternative, with oversized signs, if*  
 22 *necessary, for legibility. Where unusual conditions exist, the location of a Directional assembly should be*  
 23 *determined by engineering judgment with the goal being to provide the best possible combination of view and*  
 24 *safety.*

25 *Support:*

26 It is more important that guide signs be readable, and that the information and direction displayed thereon  
 27 be readily understood, at the appropriate time and place than to be located with absolute uniformity.

28 Figure ~~2D-6~~[2D-9](#) shows typical placements of Directional assemblies.

29 **~~Section 2D.33 Combination Lane Use/Destination Overhead Guide Sign (D15-1)~~ This section**  
 30 **was relocated to new Section 2D.38**

31 **Section ~~2D.34~~ [2D.33](#) Confirming or Reassurance Assemblies**

32 **Standard:**

33 **If used, Confirming or Reassurance assemblies shall consist of a Cardinal Direction auxiliary ~~sign-~~**  
 34 **[plaque](#) and a route sign. Where the Confirming or Reassurance assembly is for an alternative route,**  
 35 **the appropriate auxiliary ~~sign-~~[plaque](#) for an alternative route (see Section 2D.16) shall also be included**  
 36 **in the assembly.**

37 *Guidance:*

38 *A Confirming assembly should be installed just beyond intersections of numbered routes. It should be*  
 39 *placed 25 to 200 feet beyond the far shoulder or curb line of the intersected highway.*

40 *If used, Reassurance assemblies should be installed between intersections in urban areas as needed, and*  
 41 *beyond the built-up area of any incorporated city or town.*

42 *Route signs for either confirming or reassurance purposes should be spaced at such intervals as*  
 43 *necessary to keep road users informed of their routes.*

44 **Section ~~2D.35~~ [2D.34](#) Trailblazer Assembly**

45 **Support:**

46 Trailblazer assemblies provide directional guidance to a particular road facility from other highways in the  
 47 vicinity. This guidance is accomplished by installing Trailblazer assemblies at strategic locations to indicate  
 48 the direction to the nearest or most convenient point of access. The use of the word TO indicates that the road

1 or street where the sign is posted is not a part of the indicated route, and that a road user is merely being  
2 directed progressively to the route.

3 **Standard:**

4 A Trailblazer assembly shall consist of a TO auxiliary ~~sign-plaque~~ (M4-5, see Section 2D.21), a route  
5 sign for a numbered or named highway (see Section 2D.5356) or an identification sign for a byway,  
6 historic trail, or Auto-auto Four-tour Route-route sign (see Section ~~2H.07~~2D.57 and 2D.58), and a  
7 single-headed Directional Arrow auxiliary ~~sign-plaque~~ pointing in the direction leading to the route.  
8 Where the Trailblazer assembly is for an alternative route, the appropriate auxiliary ~~sign-plaque~~ for an  
9 alternative route (see Section 2D.16) shall also be included in the assembly.

10 Option:

11 A Cardinal Direction auxiliary ~~sign-plaque~~ (see Section 2D.15) may be used ~~with-in~~ a Trailblazer  
12 assembly where the direction leading to the route provides access only to one direction of travel for that route.

13 *Guidance:*

14 *The TO auxiliary ~~signplaque~~, Cardinal Direction auxiliary ~~signplaque~~, and Directional Arrow auxiliary*  
15 *~~sign-plaque~~ should be of the standard size provided for auxiliary ~~signs-plaques~~ of their respective type. The*  
16 *route sign should be the size provided in Section 2D.11.*

17 Option:

18 Trailblazer assemblies may be installed with other Route Sign assemblies, or alone, in the immediate  
19 vicinity of the designated facilities.

20

[DESTINATION AND DISTANCE SIGNS](#)

**Section ~~2D.36~~ [2D.35](#) 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 shields and cardinal directions may be included on the Destination sign with the destinations and arrows.

Guidance:

*If Route shields and cardinal directions are included on a Destination sign, the height of the Route shields should be at least two times the height of the upper-case letters of the principal legend and not less than 18 inches, and the [letter height](#) cardinal directions should be ~~in all upper case letters that are~~ at least the minimum [letter](#) height specified for these signs.*

*If used, destination names [on low-volume rural roads](#) should be as specific and descriptive as possible. Destinations such as campgrounds, ranger stations, [and](#) recreational areas, ~~and the like~~ should be clearly indicated so that they are not interpreted to be communities or locations with road user services. **Paragraph relocated from existing Section 5D.01***

**Section ~~2D.37~~ [2D.36](#) Destination Signs (D1 Series)**

Standard:

**Except on approaches to interchanges (see Section [2D.4549](#)), the Destination (D1-1 through D1-3) sign (see Figure ~~2D-7~~[2D-10](#)), if used, shall be a horizontal rectangle displaying the name of a city, town, village, or other traffic generator, and a directional arrow.**

Option:

The distance (see Section [2D.4443](#)) to the place named may also be displayed on the Destination (D1-1a through D1-3a) sign (see Figure [2D-710](#)). If several destinations are to be displayed at a single point, the several names may be placed on a single sign with an arrow (and the distance, if desired) for each name. If more than one destination lies in the same direction, a single arrow may be used for 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 sign, or separate signs.*

**Figure 2D-10. Destination and Distance Signs**

Support:

Separation of destinations by direction by the use of a horizontal separator line can enhance the readability of a Destination sign by relating an arrow and its corresponding destination(s) and by eliminating the need for multiple arrows that point in the same direction and excessive space between lines of legend.

Standard:

**Except as otherwise provided in this Manual, 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 numerals, if used, shall be placed to the right of the destination names.**

Option:

An arrow pointing up may be placed at the extreme right of the sign when the sign is mounted to the left of the traffic to which it applies.

Guidance:

*Unless a sloping arrow will convey a clearer indication of the direction to be followed, the directional arrows should be horizontal or vertical.*

1 If several individual name signs are assembled into a group, all signs in the assembly should be of the  
2 same horizontal width.

3 Destination signs should be used:

- 4 A. At the intersections of U.S. or State numbered routes with Interstate, U.S., or State numbered routes;  
5 and  
6 B. At points where they serve to direct traffic from U.S. or State numbered routes to the business section  
7 of towns, or to other destinations reached by unnumbered routes.

8 **Standard:**

9 Where a total of three or ~~less fewer~~ destinations are ~~provided~~ displayed on the Advance ~~G~~guide (see  
10 Section 2E.33) and Supplemental ~~G~~guide (see Section 2E.35) signs, no more than three destination  
11 names shall be ~~used~~ displayed on a Destination sign. Where four destinations are ~~provided~~ displayed by  
12 on the Advance ~~G~~guide and Supplemental ~~G~~guide signs, no more than four destination names shall be  
13 ~~used~~ displayed on a Destination sign.

14 *Guidance:*

15 If space permits, four destinations should be displayed ~~on~~<sup>as</sup> two separate signs at two separate locations.

16 *Option:*

17 Where space does not permit, or where all four destinations are in one direction, a single sign may be  
18 used. Where a single sign is used and all destinations are in the same direction, the arrow may be placed  
19 below the destinations for the purpose of enhancing the conspicuity of the arrow.

20 **Standard:**

21 Where a single four-name sign assembly is used, a heavy line approximating the width of the sign  
22 border entirely across the sign or separate signs shall be used to separate destinations by direction.

23 *Guidance:*

24 The closest destination lying straight ahead should be at the top of the sign or assembly, and below it the  
25 closest destinations to the left and to the right, in that order. The destination displayed for each direction  
26 should ordinarily be the next county seat or the next principal city, rather than a more distant destination. In  
27 the case of overlapping routes, only one destination should be displayed in each direction for each route.

28 **Standard:**

29 If more than one destination is displayed in the same direction, the name of a nearer destination  
30 shall be displayed above the name of a destination that is ~~further~~ further away.

31 Support:

32 Overhead destination guide signs are sometimes helpful on multi-lane conventional roadways with  
33 complex or unusual roadway alignments or geometrics at intersecting highways to provide positive direction  
34 to destinations and to assign lanes to be used for destinations.

35 Option:

36 Overhead signs using the Arrow-Per-Lane sign design configuration (See Figure 2E-3) may be  
37 used to provide lane assignments for some or all lane destinations at the approach to a multi-lane  
38 intersection (See Section 2D.37).

39 **Section 2D.37 Overhead Arrow-Per-Lane Destination Guide Signs**

40 Support:

41 Overhead Arrow-Per-Lane destination guide signs are sometimes used on multi-lane conventional  
42 roadways to provide positive direction to destinations and to indicated lanes to be used for those destinations.  
43 These locations typically include complex or unusual roadway alignments or geometrics, such as those found  
44 at Diverging Diamond Interchanges. Unlike the Combined Lane-Use/Destination (D15-1) sign Overhead  
45 Arrow-Per-Lane signs can be used to provide lane assignments where the designated lane is not a mandatory  
46 movement lane.

47 Option:

1 At complex intersection approaches involving multiple lanes and destinations, an Overhead Arrow-Per-  
2 Lane guide sign may be used to provide destination information for some or all of the lanes. Destination  
3 information may include cardinal direction, route numbers, street names, and/or place names.

4 As opposed to the Combination Lane-Use/Destination sign, the Overhead Arrow-Per-Lane signs may be  
5 used to provide lane assignments where the designated lane is not a mandatory movement lane.

6 Guidance:

7 Destination information should be kept to a minimum necessary to provide positive guidance without  
8 overloading the road user.

9 Option:

10 Overhead Arrow-Per-Lane signs may be used on conventional roads to indicate lane assignments for turns  
11 that do not include an option lane (See Figure 2D-11).

12 **Standard:**

13 **The height of the straight arrow on an Overhead Arrow-Per-Lane sign use on a conventional road**  
14 **shall be a minimum of 36 inches.**

15 Guidance:

16 Arrow heights greater than 36 inches should be use on high speed approaches to provide adequate time  
17 for road user enter the proper lane for their destination.

18 **Figure 2D-11. Overhead Arrow-Per-Lane Guide Sign for a Multi-Lane Exit with an Option**  
19 **Lane**

20 **Section ~~2D.33~~2D.38 Combination Lane-Use/Destination Overhead Guide Sign (D15-1) This**  
21 **section was relocated from existing Section 2D.33**

22 Option:

23 At complex intersection approaches involving multiple turn lanes and destinations, a Combination Lane-  
24 Use/Destination (D15-1) overhead guide sign that combines a lane-use regulatory sign with destination  
25 information such as a cardinal direction, a route number, a street name, and/or a place name may be used.

26 Support:

27 At such locations, the combined information on the D15-1 signs can be even more effective than separate  
28 lane-use and guide signs for conveying to unfamiliar drivers which lane or lanes to use for a particular  
29 destination.

30 Figure 2D-~~7~~10 shows an example of a D15-1 sign that combines lane-use and route number information  
31 and an example of a D15-1 sign that combines lane-use and street name information. Figure 2A-5 shows an  
32 example of the use of the D15-1 sign.

33 **Standard:**

34 **The Combination Lane-Use/Destination (D15-1) overhead guide sign shall be used only where the**  
35 **designated lane is a mandatory movement lane. The D15-1 sign shall not be used for lanes with optional**  
36 **movements.**

37 **The D15-1 sign shall have a green background with a white border. As shown in Figure 2D-~~7~~10, the**  
38 **lane-use sign (see Chapter 2B) shall be placed near the bottom of the sign and the destination**  
39 **information shall be placed near the top of the sign. The D15-1 sign shall be located ~~approximately~~ over**  
40 **the approximate center of the lane to which it applies.**

41 **Section 2D.389 Destination Signs at Circular Intersections**

42 **Standard:**

43 **Destination signs that are used at circular intersections shall comply with the provisions of Section**  
44 **2D.376, except as provided in this Section.**

45 Option:

46 Exit destination (D1-1d, D1-1e) signs (see Figure 2D-~~8~~12) with diagonal upward-pointing arrows or  
47 Directional assemblies (see Section 2D.32) may be used to designate a particular exit from a circular  
48 intersection.

1 ~~Exit~~ Destination (D1-2d, D1-3d) signs (see Figure 2D-812) with curved-stem arrows may be used on  
2 approaches to circular intersections to represent the left-turn movements.

3 Curved-stem arrows on circular intersection destination signs may point in diagonal directions to depict  
4 the location of an exit relative to the approach roadway and entry into the intersection.

5 ~~Exit~~ Destination (D1-5 or D1-5a) signs (see Figure 2D-812) with a diagram of the circular intersection  
6 may be used on approaches to circular intersections.

### 7 **Figure 2D-12. Destination Signs for Circular Intersections**

8 *Guidance:*

9 *If curved-stem arrows are used on destination signs, then this arrow type should also be used consistently*  
10 *on any regulatory lane-use signs (see Chapter 2B), Directional assemblies (see Section 2D.32), and pavement*  
11 *markings (see Part 3) for a particular destination or movement.*

12 *Support:*

13 Figure 2D-913 illustrates ~~two~~ examples of guide signing for circular intersections.

14 Diagrammatic guide signs (D1-5 or D1-5a) might be preferable where space is available and where the  
15 geometry of the circular intersection is non-typical, such as where more than four legs are present or where the  
16 legs are not at approximately 90-degree angles to each other. In such cases, minimizing the amount of legend  
17 for each destination and designing the sign so that the arrows for each destination clearly align with the  
18 roadway geometry will aid road user understanding of the sign and navigation through the area.

19 **Standard:**

20 **If used, diagrammatic guide signs for circular intersections shall not depict the number of lanes**  
21 **within the intersection’s circulatory roadway, or on its approaches or exits, through the use of lane**  
22 **lines, multiple arrow shafts for the same movement, or other methods.**

23 *Support:*

24 Chapter 2B contains information regarding regulatory signs at circular intersections, Chapter 2C contains  
25 information regarding warning signs at circular intersections, and Chapter 3C contains information regarding  
26 pavement markings at circular intersections.

### 27 **Figure 2D-13. Examples of Guide Signs for Roundabouts**

## 28 **Section 2D.3940 Destination Signs at Jughandles**

29 **Standard:**

30 **Destination signs that are used at jughandles shall comply with the provisions of Section 2D.3736,**  
31 **~~except as provided in this Section.~~**

32 **Option:**

33 ~~If engineering judgment indicates that standard destination signs alone are insufficient to direct road users~~  
34 ~~to their destinations at a jughandle, a diagrammatic guide sign depicting the appropriate geometry may be~~  
35 ~~used to supplement the normal destination signs.~~

36 *Support:*

37 Section 2B.2736 contains information regarding regulatory signs for jughandle turns. Figure 2B-95  
38 shows examples of regulatory and destination guide signing for various types of jughandle turns.

## 39 **Section 2D.41 Destination Signs at Intersections with Indirect Turning Movements**

40 *Guidance:*

41 A system of guides signs along with associated lane markings should be used to direct traffic through  
42 intersections with indirect turning movements.

43 *Support:*

44 Figures 2D-14 shows examples of destination guide signing for intersections with indirect turning  
45 movements.

### 46 **Figure 2D-14. Example of Signing for Intercepted Crossroad with left Turn Prohibited**

1 **Section ~~2D.40~~2D.42 Location of Destination Signs**

2 *Guidance:*

3 *When used in high-speed areas, Destination signs should be located 200 feet or more in advance of the*  
4 *intersection, and following any Junction or Advance Route Turn assemblies that might be required. In rural*  
5 *areas, the minimum distance between a Destination sign and either an Advance Route Turn assembly or a*  
6 *Junction assembly should be 200 feet.*

7 *Option:*

8 In urban areas, shorter advance distances may be used.

9 Because the Destination sign is of lesser importance than the Junction, Advance Route Turn, or  
10 Directional assemblies, the Destination sign may be eliminated when sign spacing is critical.

11 *Support:*

12 Figure ~~2D-6~~2D-9 shows typical placements of Destination signs.

13 **Section ~~2D.41~~2D.43 Distance Signs (D2 Series)**

14 **Standard:**

15 **If used, the Distance (D2-1 through D2-3) sign (see Figure ~~2D-7~~2D-10) shall be a horizontal**  
16 **rectangle of a size appropriate for the required legend, ~~carrying~~displaying the names of no more than**  
17 **three cities, towns, junctions, or other traffic generators, and the distance (to the nearest mile) to those**  
18 **places.**

19 **The distance numerals shall be placed to the right of the destination names as shown in Figure ~~2D-~~**  
20 **~~7~~2D-10.**

21 *Guidance:*

22 *The distance displayed should be selected on a case-by-case basis by the jurisdiction that owns the road*  
23 *or by statewide policy. A well-defined central area or central business district should be used where one*  
24 *exists. In other cases, the layout of the community should be considered in relation to the highway being*  
25 *signed and the decision based on where it appears that most drivers would feel that they are in the center of*  
26 *the community in question.*

27 *The top name on the Distance sign should be that of the next place on the route having a post office or a*  
28 *railroad station, a route number or name of an intersected highway, or any other significant geographical*  
29 *identity. The bottom name on the sign should be that of the next major destination or control city. If three*  
30 *destinations are displayed, the middle line should be used to indicate communities of general interest along*  
31 *the route or important route junctions.*

32 *Option:*

33 The choice of names for the middle line may be varied on successive Distance signs to give road users  
34 additional information concerning communities served by the route.

35 *Guidance:*

36 *The control city should remain the same on all successive Distance signs throughout the length of the*  
37 *route until that city is reached.*

38 *Option:*

39 If more than one distant point may properly be designated, such as where the route divides at some  
40 distance ahead to serve two destinations of similar importance, and if these two destinations cannot appear on  
41 the same sign, the two names may be alternated on successive signs.

42 On a route continuing into another State, destinations in the adjacent State may be displayed.

43 **Section ~~2D.42~~2D.44 Location of Distance Signs**

44 *Guidance:*

45 *If used, Distance signs should be installed on important routes leaving municipalities and just beyond*  
46 *intersections of numbered routes in rural areas. If used, they should be placed just outside the municipal*  
47 *limits or at the edge of the built-up area if it extends beyond the limits.*

1        *Where overlapping routes separate a short distance from the municipal limits, the Distance sign at the*  
2 *municipal limits should be omitted. The Distance sign should be installed approximately 300 feet beyond the*  
3 *separation of the two routes.*

4        *Where, just outside of an incorporated municipality, two routes are concurrent and continue concurrently*  
5 *to the next incorporated municipality, the top name on the Distance sign should be that of the place where the*  
6 *routes separate; the bottom name should be that of the city to which the greater part of the through traffic is*  
7 *destined.*

8        Support:

9        Figure ~~2D-6~~[2D-9](#) shows typical placements of Distance signs.

10

1 **STREET NAME AND PARKING SIGNS**

2 **Section ~~2D-43~~2D.45 Street Name Signs (D3-1, ~~or~~ D3-1a)**

3 *Guidance:*

4 *Street Name (D3-1 or D3-1a) signs (see Figure ~~2D-10~~2D-15) should be installed in urban areas at all*  
5 *street intersections regardless of other route signs that might be present and should be installed in rural areas*  
6 *to identify important roads that are not otherwise signed.*

7 *To minimize wrong-way movements onto freeway or expressway exit ramps, Street Name signs should not*  
8 *be used at the intersection of a freeway or expressway exit ramp with the crossroad to display the name of the*  
9 *freeway or expressway to traffic on the crossroad.*

10 *Option:*

11 For streets that are part of a U.S., State, or county numbered route, a D3-1a Street Name sign (see Figure  
12 ~~2D-10~~2D-15) that incorporates a route shield may be used to assist road users who might not otherwise be  
13 able to associate the name of the street with the route number.

14 **Figure 2D-15. Street Name and Parking Signs**

15 **Standard:**

16 **The lettering for names of streets and highways on Street Name signs shall be composed of a**  
17 **combination of lower-case letters with initial upper-case letters (see Section 2A.13).**

18 *Guidance:*

19 *The determination of letter heights to be used on Street Name signs should be based on, but not limited to*  
20 *the following considerations:*

21 *A. Use of Advance Street Name signs (see Section 2D.46);*

22 *B. Number of lanes on the intersection approach;*

23 *C. Length of turn lanes;*

24 *D. Distance the Street Name sign is located across the intersection (if a sign is not provided on the near*  
25 *side of the intersection).*

26 *Lettering on post-mounted Street Name signs should be composed of initial upper-case letters at least 6*  
27 *inches in height and lower-case letters at least 4.5 inches in height.*

28 *On multi-lane streets with speed limits greater than 40 mph, the lettering on post-mounted Street Name*  
29 *signs should be composed of initial upper-case letters at least 8 inches in height and lower-case letters at*  
30 *least 6 inches in height.*

31 *Option:*

32 For two-lane local roadways with speed limits of 25 mph or less, the lettering on post-mounted Street  
33 Name signs may be composed of initial upper-case letters at least 4 inches in height and lower-case letters at  
34 least 3 inches in height.

35 *Guidance:*

36 *If overhead Street Name signs are used, the lettering should be composed of initial upper-case letters at*  
37 *least 12 inches in height and lower-case letters at least 9 inches in height.*

38 *Support:*

39 The recommended minimum letter heights for Street Name signs are summarized in Table 2D-25. The  
40 speed limits specified and the recommended minimum letter heights provided in this Section apply to the  
41 roadway that each Street Name sign faces rather than to the street that has its name displayed on the Street  
42 Name sign.

43 **Table 2D-5. Minimum Letter Heights for Street Name Signs**

44 *Option:*

45 Each Street Name sign in a sign assembly may use different letter heights determined by the speed limit of  
46 the street that each sign faces.

47 The letter height of the street name descriptor ~~Supplementary lettering to indicate the type of street~~ (such  
48 as ~~Street~~, Avenue, or Road), ~~or the section of the city directional legend~~ (such as NW) or any other  
49 supplemental legend such as block or house numbers (see Paragraph 15) on the D3-1 and D3-1a signs may be

1 ~~in smaller lettering, than that of the street name itself. composed of initial upper-case letters at least 3 inches~~  
2 ~~in height and lower case letters at least 2.25 inches in height. Conventional abbreviations (see Section 1A.15)~~  
3 ~~may be used except for the street name itself.~~ **Remainder of first sentence and second sentence changed to**

4 **Guidance below**

5 Guidance:

6 *The letter height of the street name descriptor, the directional legend, or any other supplemental legend*  
7 *on the D3-1 and D3-1a signs should be at least two-thirds of the letter height of the street name itself, but not*  
8 *less than 3 inches for the initial upper-case letters and not less than 2.25 inches for the lower-case letters.*

9 Conventional abbreviations (see Section 1A.15) ~~may~~ should be used except for the street name itself.  
10 Acceptable abbreviations for street name descriptors such as “Ave” for Avenue and “Blvd” for Boulevard  
11 should be as provided in Table 2D-3 (see Section 2D.07). Table 2D-4 provides street name descriptors that  
12 should not be abbreviated (see Section 2D.07).

13 Option:

14 Block or house numbers may be displayed as a supplemental legend on a Street Name sign to aid  
15 emergency responders and road users in locating addresses.

16 Guidance:

17 *If block or house numbers are displayed on a Street Name sign where only a single Street Name sign is*  
18 *provided for the cross street, the block or house numbers for the left and right blocks should be positioned at*  
19 *the left and right sides of the sign, respectively.*

20 *If block or house numbers are displayed on a Street Name sign where two Street Name signs are provided*  
21 *for the cross street, such as on diagonally opposite corners of an intersection, each Street Name sign should*  
22 *display only the block or house numbers associated with that block of the cross street.*

23 Option:

24 A pictograph (see definition in Section 1A.13) representing the municipality may be used on a D3-1 sign.

25 **Standard:**

26 **Pictographs shall not be displayed on D3-1a or Advance Street Name (D3-2) signs (see Section**  
27 **2D.4446).**

28 **If a pictograph is used on a D3-1 sign, the height and width of the pictograph shall not exceed the**  
29 **upper-case letter height of the principal legend of the sign.**

30 Guidance:

31 *The pictograph should be positioned to the left of the street name.*

32 **Standard:**

33 **The Street Name sign shall be retroreflective or illuminated in accordance with the provisions of**  
34 **Section 2A.07to show the same shape and similar color both day and night. ~~The color of the legend~~**  
35 **~~(and border, if used) shall contrast with the background color of the sign.~~**

36 Option:

37 The border may be omitted from a post-mounted Street Name sign.

38 Guidance:

39 *The decision to omit the border from a post-mounted Street Name sign should be based on such factors as*  
40 *the visual complexity of the environment and the degree of conspicuity needed to provide for adequate*  
41 *recognition of the sign by the road user.*

42 Option:

43 An alternative background color (see Paragraph 27) other than the ~~normal standard~~ guide sign color of  
44 green may be used for Street Name (D3-1 or D3-1a) signs where the highway agency determines this is  
45 necessary to assist road users in determining jurisdictional authority for roads.

46 **Standard:**

47 **Alternative background colors shall not be used for Advance Street Name (D3-2) signs (see Section**  
48 **2D.4446).**

49 **The only acceptable alternative background colors for Street Name (D3-1 or D3-1a) signs shall be**  
50 **blue, brown, or white. Regardless of whether green, blue, or brown is used as the background color for**

1 **Street Name (D3-1 or D3-1a) signs, the legend (and border, if used) shall be white. For Street Name**  
2 **signs that use a white background, the legend (and border, if used) shall be black.**

3 *Guidance:*

4 *An alternative background color for Street Name signs, if used, should be applied to the Street Name (D3-*  
5 *1 or D3-1a) signs on all roadways under the jurisdiction of a particular highway agency.*

6 *In business or commercial areas and on principal arterials, Street Name signs should be placed at least*  
7 *on diagonally opposite corners. In residential areas, at least one Street Name sign should be mounted at each*  
8 *intersection. Signs naming both streets should be installed at each intersection. They should be mounted with*  
9 *their faces parallel to the streets they name.*

10 *Where used, especially in urban areas, Street Name signs should display their legends on both sides of the*  
11 *sign to facilitate navigation for pedestrians.*

12 *Option:*

13 To optimize visibility, Street Name signs may be mounted overhead. Street Name signs may also be  
14 placed above a regulatory or STOP or YIELD sign with no required vertical separation.

15 *Guidance:*

16 *In urban or suburban areas, especially where Advance Street Name signs for signalized and other major*  
17 *intersections are not used, the use of overhead Street Name signs should be strongly considered.*

18 *Option:*

19 At intersection crossroads where the same road has two different street names for each direction of travel,  
20 both street names may be displayed on the same sign along with directional arrows, except where the arrow  
21 would point in a direction opposing the flow of traffic on a one-way street or where a turn in the direction of  
22 the arrow is not allowed.

23 On lower speed roadways, historic street name signs within locally identified historic districts that are  
24 consistent with the criteria contained in 36 CFR 60.4 for such structures and districts may ~~be used~~ remain in  
25 service without complying with the provisions of Paragraphs 3, 4, 6, 9, 12 through 14, and 18 through 20 of  
26 this section.

27 *Guidance:*

28 *Streets or segments of a street that have been memorialized or dedicated should not use a second Street*  
29 *Name sign to display the memorial or dedication name (see Section 2D.56). When signed, the Memorial or*  
30 *Dedication sign should be located to minimize its conspicuity to and potential for confusion by vehicular*  
31 *traffic.*

32 *Support:*

33 Information regarding the use of street names on supplemental plaques for use with intersection-related  
34 warning signs is contained in Section 2C.58.

35 *Information regarding the identification of overcrossing and undercrossing roadways at grade separations*  
36 *is contained in Section 2H.10.*

### 37 **Section ~~2D.44~~2D.46 Advance Street Name Signs (D3-2 Series)**

38 *Support:*

39 Advance Street Name (D3-2) signs (see Figure ~~2D-10~~2D-16) identify ~~an upcoming a downstream~~  
40 intersection. Although this is often the next intersection, it could also be several intersections away in cases  
41 where the next signalized intersection is referenced.

42 **Standard:**

43 **Advance Street Name (D3-2) signs, if used, shall supplement rather than be used instead of the**  
44 **Street Name (D3-1) signs at the intersection.**

45 *Option:*

46 Advance Street Name (D3-2) signs may be installed in advance of signalized or unsignalized intersections  
47 to provide road users with advance information to identify the name(s) of the next intersecting street to  
48 prepare for crossing traffic and to facilitate timely deceleration and/or lane changing in preparation for a turn.

49 *Guidance:*

1 On arterial highways in rural areas, Advance Street Name signs should be used in advance of all  
2 signalized intersections and in advance of all intersections with exclusive turn lanes.

3 In urban areas, Advance Street Name signs should be used in advance of all signalized intersections on  
4 major arterial streets, except where signalized intersections are so closely spaced that advance placement of  
5 the signs is impractical.

6 The heights of the letters on Advance Street Name signs should ~~be the same as those used for Street Name~~  
7 ~~signs (see Section 2D.43)~~ comply with the provisions of Section 2D.05.

#### 8 **Standard:**

9 **If used, Advance Street Name signs shall have a white legend and border on a green background.**  
10 **Alternative background colors shall not be used on Advance Street Name signs.**

11 **If used, Advance Street Name signs shall provide the name(s) of the intersecting street(s) on the top**  
12 **line(s) of the legend and the distance to the intersecting streets or messages such as NEXT SIGNAL,**  
13 **NEXT INTERSECTION, NEXT ROUNDABOUT, or directional arrow(s) on the bottom line of the**  
14 **legend.**

15 **Pictographs shall not be displayed on Advance Street Name signs.**

16 Option:

17 Directional arrow(s) may be placed to the right or left of the street name or message such as NEXT  
18 SIGNAL, as appropriate, rather than on the bottom line of the legend. Curved-stem arrows may be used on  
19 Advance Street Name signs on approaches to circular intersections.

20 For intersecting crossroads where the same road has a different street name for each direction of travel,  
21 the different street names may be displayed on the same Advance Street Name sign along with directional  
22 arrows.

23 In advance of two closely-spaced intersections where it is not practical to install separate Advance Street  
24 Name signs, the Advance Street Name sign may include the street names for both intersections along with  
25 appropriate supplemental legends for both street names, such as NEXT INTERSECTION, 2ND  
26 INTERSECTION, or NEXT LEFT and NEXT RIGHT, or directional arrows.

27 *Guidance:*

28 *If two street names are used on the Advance Street Name sign, the street names should be displayed in the*  
29 *following order:*

- 30 A. *For a single intersection where the same road has a different street name for each direction of travel,*  
31 *the name of the street to the left should be displayed above the name of the street to the right; or*  
32 B. *For two closely-spaced intersections, the name of the first street encountered should be displayed*  
33 *above the name of the second street encountered, and the arrow associated with the second street*  
34 *encountered should be an advance arrow, such as the arrow shown on the W16-6P arrow plaque (see*  
35 *Figure 2C-12).*

36 Option:

37 An Advance Street Name (W16-8P or W16-8aP) plaque (see Section 2C.5864) with black legend on a  
38 yellow background, installed ~~supplemental~~ to supplement an Intersection (W2 series) or Advance Traffic  
39 Control (W3 series) warning sign may be used instead of an Advance Street Name guide sign.

40 ~~Section 2D.45 Signing on Conventional Roads on Approaches to Interchanges~~ This section was  
41 ~~relocated to new Section 2D.49~~

42 ~~Section 2D.46 Freeway Entrance Signs (D13-3 and D13-3a)~~ This section was relocated to new  
43 ~~Section 2D.50~~

#### 44 **Section 2D.47 Parking Area Guide Sign (D4-1)**

45 Option:

46 The Parking Area (D4-1) guide sign (see Figure ~~2D-10~~2D-15) may be used to show the direction to a  
47 nearby public parking area or parking facility.

48 **Standard:**

1 ~~If used, the Parking Area (D4-1) guide sign shall be a horizontal rectangle with a standard size of 30~~  
2 ~~x 24 inches, or with a~~ The smaller size of 18 x 15 inches for the Parking Area guide sign shall be limited  
3 to minor, low-speed streets. ~~It shall carry the word PARKING, with the letter P five times the height~~  
4 ~~of the remaining letters, and a directional arrow. The legend and border shall be green on a~~  
5 ~~retroreflectored white background.~~

6 *Guidance:*

7 *If used, the Parking Area guide sign should be installed on major thoroughfares at the nearest point of*  
8 *access to the parking facility and where it can advise drivers of a place to park. The sign should not be used*  
9 *more than four blocks from the parking area.*

## 10 **Section 2D.48 PARK - RIDE Sign (D4-2)**

11 *Option:*

12 PARK - RIDE (D4-2) signs (see Figure ~~2D-10~~2D-15) may be used to direct road users to park - ride  
13 facilities.

14 **Standard:**

15 **The signs shall ~~contain~~ display the word message PARK - RIDE and direction information (arrow**  
16 **or word message).**

17 *Option:*

18 PARK - RIDE signs may ~~contain~~ display the local transit pictograph and/or carpool symbol ~~on the sign.~~

19 **Standard:**

20 **If used, the local transit pictograph and/or carpool symbol shall be located in the top part of the**  
21 **sign above the message PARK - RIDE. In no case shall the vertical dimension of the local transit**  
22 **pictograph and/or carpool symbol exceed 18 inches.**

23 *Guidance:*

24 *If the function of the parking facility is to provide parking for persons using public transportation, the*  
25 *local transit pictograph should be used on the guide sign. If the function of the parking facility is to serve*  
26 *carpool riders, the carpool symbol should be used on the guide sign. If the parking facility serves both*  
27 *functions, both the pictograph and carpool symbol should be used.*

28 **Standard:**

29 **These signs shall have a retroreflective white legend and border on a rectangular green**  
30 **background. The carpool symbol shall be as shown for the D4-2 sign. The color of the local transit**  
31 **pictograph shall be selected by the local transit authority.**

32 *Option:*

33 *To increase the target value and contrast of the local transit pictograph, and to allow the local transit*  
34 *pictograph to retain its distinctive color and shape, the pictograph may be included within a white border or*  
35 *placed on a white background.*

36

## FREEWAY ENTRANCE SIGNS

Section ~~2D.45~~ ~~2D.49~~ **Signing on Conventional Roads on Approaches to Interchanges** **This section was relocated from existing Section 2D.45**

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.

**Standard:**

**On multi-lane conventional roads approaching an interchange, guide signs shall be provided to identify which direction of turn is to be made and/or which specific lane to use for ramp access to each direction of the freeway or expressway.**

*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 ~~2D-14~~2D-16):*

- 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

### **Figure 2D-16. Example of Interchange Crossroad Signing for a One-Lane Approach**

**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 ~~2D-12~~2D-17):

- A. Junction Assembly
- B. Directional Assembly for the first ramp
- C. Directional Assembly for the second ramp

### **Figure 2D-17. Example of Minor Interchange Crossroad Signing**

*Guidance:*

*On multi-lane conventional roads approaching an interchange, the sign sequence should contain the following signs (see Figures ~~2D-13~~2D-18 through ~~2D-15~~2D-20):*

- 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 Direction signs are used to direct road users to the appropriate lane(s).

**Standard:**

**The Advance 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) and cardinal direction(s).**

Option:

1 The Advance Entrance Direction sign may have destinations, directional arrows, and/or an action message  
2 such as KEEP LEFT, NEXT LEFT, or SECOND RIGHT. Signs in this sequence may be mounted overhead  
3 to improve visibility as shown in Figures ~~2D-13~~ 2D-18 through ~~2D-15~~ 2D-20.

4 Support:

5 A post-mounted Advance Entrance Direction diagrammatic guide sign (see Figure ~~2D-16~~ 2D-21), within  
6 the sequence of approach guide signing described in Paragraphs 3, 6, and 7, might be helpful in depicting the  
7 location of a freeway or expressway entrance ramp that is in close proximity to an intervening intersection on  
8 the same side of the approach roadway and where signing for only the ramp might cause confusion to road  
9 users.

10 **Figure 2D-18. Examples of Multi-Lane Crossroad Signing for a Diamond Interchange**

11 **Figure 2D-19. Examples of Multi-Lane Crossroad Signing for a Partial Cloverleaf Interchange**

12 **Figure 2D-20. Examples of Multi-Lane Crossroad Signing for a Cloverleaf Interchange**

13 **Figure 2D-21. Example of Crossroad Signing for an Exit Ramp with a Nearby Frontage Road**

14 **Standard:**

15 **If used, the post-mounted Advance Entrance Direction diagrammatic guide sign shall display only**  
16 **the two successive turns from the same side of the roadway, one of which shall be the entrance ramp.**  
17 **The post-mounted Advance Entrance Direction sign shall depict only the successive turns and shall not**  
18 **depict lane use with lane lines, multiple arrow shafts for the approach roadway, action messages, or**  
19 **other representations.**

20 Support:

21 [Examples of guide signing for single-point urban intersection and transposed-alignment crossroads for a](#)  
22 [diamond interchange are shown in Figures 2D-22 and 2D-23.](#)

23 Section ~~2D.46~~ 50 contains information regarding the use of a Directional assembly or a FREEWAY  
24 ENTRANCE sign to mark the entrance to a freeway or expressway at the far corner of an intersection.

25 **Figure 2D-22. Guide Signs for Transposed-Alignment Crossroads at a Diamond Interchange**

26 **Figure 2D-23. Example of Crossroad Signing for a Transposed-Alignment Diamond**  
27 **Interchange**

28 **Section ~~2D.46~~ 2D.50 Freeway Entrance Signs (D13-3, and D13-3a) This section was relocated**  
29 **from existing Section 2D.46**

30 Option:

31 FREEWAY ENTRANCE (D13-3) signs or FREEWAY ENTRANCE with downward pointing diagonal  
32 arrow (D13-3a) signs (see Figure ~~2D-14~~ 2D-19) may be used on entrance ramps near the crossroad to inform  
33 road users of the freeway or expressway entrance, as appropriate.

34 The D13-3 and D13-3a signs may display an alternate legend in place of FREEWAY, such as  
35 EXPRESSWAY or PARKWAY, as appropriate, or may display the name of an unnumbered highway.

36 A Directional assembly (see Section 2D.32) with a downward pointing diagonal arrow auxiliary (M6-2a)  
37 [sign-plaque](#) (see Section 2D.28) may be used at the far left-hand corner of an intersection with a freeway or  
38 expressway entrance ramp as an alternative to the D13-3a sign, facing left-turning traffic on the conventional  
39 road approach to indicate the immediate point of entry to the freeway or expressway and distinguish the  
40 entrance ramp from an adjoining exit ramp terminal at the same intersection with the conventional road (see  
41 Figure ~~2D-14~~ 2D-19). A similar Directional assembly may be used at the far right-hand corner of an  
42 intersection with a freeway or expressway entrance ramp where the entrance ramp and a crossroad or side  
43 road follow one another in close succession on the conventional road approach and the point of entry to the  
44 freeway or expressway might be difficult for the road user to distinguish from the crossroad or side road on  
45 the conventional road approach (see Figure ~~2D-14~~ 2D-19).

46 Support:

47 Section 2B.41 contains information regarding the use of regulatory signs to deter wrong-way movements  
48 at intersections of freeway or expressway ramps with conventional roads, and in the area where entrance  
49 ramps intersect with the mainline lanes.

**WEIGH STATION, TRUCK LANE, PASSING LANE, CROSSOVER AND EMERGENCY  
AND SLOW VEHICLE TURN-OUT SIGNS**

**Section ~~2D.49~~2D.51 ~~Weigh Station~~ WEIGH STATION Signing (D8 Series)**

Support:

Independent facilities or areas have been added along many highways where certain commercial vehicles are directed to stop to be weighed or inspected. These areas are sometimes permanent, such as in a roadside area, or temporary mobile facilities deployed along the roadway.

The general concept for signing permanent Weigh Station ~~signing~~ is similar to Rest Area signing (see Section 2I.05) because in both cases traffic using either area remains within the right-of-way.

**Standard:**

The standard ~~installation sequence of signing~~ for a Weigh Station signing on a conventional highway shall include three basic signs (see Figure 2D-24):

- A. Advance Weigh Station Distance sign (D8-1) sign,
- B. ~~Exit Direction sign~~ Weigh Station Next Right (D8-2) sign, and
- C. ~~Exit Gore sign~~ Weigh Station Exit Directional (D8-3) sign.

Guidance:

An Exit Gore sign with the same basic legend as the Weigh Station Exit Direction (D8-3) sign should also be used to emphasize the entrance to the weigh station.

~~Support:~~

~~Example locations of these signs are shown in Figure 2D-17.~~

**Figure 2D-24. Example of WEIGH STATION Signing**

Option:

Where State law requires trucks of a certain weight to enter ~~a regulatory sign (R13-1) in advance of the~~ Weigh Station, a Weigh Station (R13-1) regulatory sign, ~~a fourth sign~~ (see Section 2B.60) may be located following the Advance Weigh Station Distance sign (see Figure 2D-24). **Edited to improve consistency**

Where only commercial vehicle inspections are conducted in the inspection area, the WEIGH STATION legend of the D8 series signs may be replaced with the alternate legend, COMMERCIAL VEHICLE INSPECTION AREA. **Added to improve consistency**

Guidance:

The ~~Weigh Station Next Right-Exit Direction sign (D8-2) Sign~~ or the Advance ~~Weigh Station Distance sign (D8-1) sign~~ should display, either within the sign border or on a supplemental plaque or sign panel, the changeable ~~message-legend~~ OPEN or CLOSED.

**Standard:**

When the WEIGH STATION legend of the D8 series signs is replaced with the COMMERCIAL VEHICLE INSPECTION AREA legend, as provided in Paragraph 6 of this Section, the WEIGH STATION legend of the R13-1 sign shall be replaced with the alternate legend INSPECTION AREA.

~~Section 2D.50 Community Wayfinding Signs~~ **This section relocated to new Section 2D.55**

**Section 2D.54-52 Crossover Signs (D13-1, and D13-2)**

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-21~~2D-25) 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.~~ **Text deleted because it is covered in Standard Highway Signs publication**

Guidance:

1 If used, the CROSSOVER sign should be installed immediately beyond the median opening, either on the  
2 right-hand side of the roadway or in the median.

3 Option:

4 The Advance Crossover (D13-2) sign (see Figure ~~2D-24~~2D-25) may be installed in advance of the  
5 CROSSOVER sign to provide advance notice of the crossover.

6 **Standard:**

7 ~~If used, the Advance Crossover sign shall be a horizontal rectangle of appropriate size to carry the~~  
8 ~~word CROSSOVER and the distance to the median opening. The sign shall have white legend and~~  
9 ~~border on a green background.~~ **Text deleted because it is covered in Standard Highway Signs**  
10 **publication**

11 Guidance:

12 The distance displayed on the Advance Crossover sign should be 1 MILE, 1/2 MILE, or 1/4 MILE, unless  
13 unusual conditions require some other distance. If used, the sign should be installed either on the right-hand  
14 side of the roadway or in the median at approximately the distance displayed on the sign.

### 15 **Figure 2D-25. Crossover Signs (D13-1, D13-2)**

## 16 **Section 2D.513 Truck ~~and/or~~, Passing, ~~or Climbing~~ Lane Signs (D17-1, ~~and~~ D17-2, D17-3, D17-** 17 **4)**

18 Guidance:

19 If an extra lane has been provided to the right-hand side of the travel lane for use by trucks and other  
20 slow-moving traffic, a NEXT TRUCK LANE ~~XX~~1/2 MILES (D17-1~~2~~) sign ~~and/or a TRUCK LANE XX MILES~~  
21 (D17-2) sign (see Figure 2D-~~24~~26) should be installed in advance of the lane.

22 If a series of truck lanes are provided along a highway, a NEXT TRUCK LANE XX MILES (D17-1) sign  
23 (see Figure 2D-26) should be installed after each truck lane segment.

24 If an extra lane has been provided to the left-hand side of the travel lane for passing slower moving  
25 vehicles in the travel lane, a PASSING LANE 1/2 MILE (D17-4) sign (see Figure 2D-26) should be installed in  
26 advance of the lane.

27 If a series of passing lanes are provided along a highway, a NEXT PASSING LANE XX MILES (D17-3)  
28 sign (See Figure 2D-26) should be installed after each passing lane segment.

29 **Option:**

30 ~~Alternative legends such as PASSING LANE or CLIMBING LANE may be used instead of TRUCK~~  
31 ~~LANE.~~

32 **Support:**

33 An example of signing for a truck lane is shown in Figure 2D-27. An example of signing for an  
34 intermittent passing lane is shown in Figure 2D-28.

35 Section 2B.31 contains information regarding regulatory signs for these types of lanes.

36 **New Figure 2D-26. Truck and Passing Lane Signs (D17-1 through D17-4)**

37 **New Figure 2D-27. Example of Signing for a Truck Lane**

38 **New Figure 2D-28. Example of Signing for an Intermittent Passing Lane**

## 39 **Section 2D.524 Emergency and Slow Vehicle Turn-Out Signs (D17-5 through D17-7)**

40 Guidance:

41 If an emergency turn-out area has been provided where a shoulder is not available for emergency  
42 stopping, Emergency Turn-Out signs should be installed. The Emergency Turn-Out advance (D17-5) sign  
43 (see Figure 2D-29) should be installed between 1/4 mile and 500 feet in advance of the turn-out area. The  
44 Emergency Turn-Out directional (D17-6) sign should be installed near the beginning of the turn-out area.

45 If a slow vehicle turn-out area has been provided for slow-moving traffic, a SLOW VEHICLE TURN-OUT  
46 XX MILES (D17-7) sign (see Figure ~~2D-24~~2D-29) should be installed in advance of the turn-out area.

47 **OptionSupport:**

48 An example of signing for an emergency turn-out is shown in Figure 2D-30.

- 1 Section 2B.35 contains information regarding regulatory signs for slow vehicle turn-out areas.
- 2 **New Figure 2D-29. Emergency and Slow Vehicle Turn-Out Signs (D17-5 through D17-7)**
- 3 **New Figure 2D-30. Example of Emergency Turn-Out Signing**
- 4 ~~Section 2D.53 Signing of Named Highways~~ **This section relocated to new Section 2D.56**
- 5 ~~Section 2D.54 Crossover Signs (D13-1 and D13-2)~~ **This section revised and relocated to new**
- 6 **Section 2D.52**
- 7 ~~Section 2D.55 National Scenic Byways Signs (D6-4, D6-4a)~~ **This section was relocated to new**
- 8 **Section 2D.57**
- 9

**OTHER GUIDE SIGNS**

**Section ~~2D.50~~ 2D.55 Community Wayfinding Signs**

Support:

Community wayfinding guide signs are part of a coordinated and continuous system of signs that direct tourists and other road users to key civic, cultural, visitor, and recreational attractions and other similar secondary destinations within a city or a local urbanized or downtown area.

Community wayfinding guide signs are a type of destination guide sign for conventional roads with a common color and/or identification ~~enhancement~~ marker for destinations within an overall wayfinding guide sign plan for an area.

Figures ~~2D-18-31~~ through ~~2D-20-33~~ illustrate various examples of the design and application of community wayfinding guide signs.

**Standard:**

**The use of community wayfinding guide signs shall be limited to conventional roads. Community wayfinding guide signs shall not be installed on freeway or expressway mainlines or ramps. Direction to community wayfinding destinations from a freeway or expressway shall be limited to the use of a Supplemental Guide sign (see Section 2E.35) on the mainline and a Destination sign (see Section ~~2D.37~~36) on the ramp to direct road users to the area or areas within which community wayfinding guide signs are used. The individual wayfinding destinations shall not be displayed on the Supplemental Guide and Destination signs except where the destinations are in accordance with the State or agency policy on Supplemental Guide signs.**

**Community wayfinding guide signs shall not be used to provide direction to primary destinations or highway routes or streets. Destination or other guide signs shall be used for this purpose as described elsewhere in this Chapter and shall have priority over any community wayfinding sign in placement, prominence, and conspicuity.**

**Because regulatory, warning, and other guide signs have a higher priority, community wayfinding guide signs shall not be installed where adequate spacing cannot be provided between the community wayfinding guide sign and other higher priority signs. Community wayfinding guide signs shall not be installed in a position where they would obscure the road users' view of other traffic control devices.**

**Community wayfinding guide signs shall not be mounted overhead.**

*Guidance:*

*If used, a community wayfinding guide sign system should be established on a local municipal or equivalent jurisdictional level or for an urbanized area of adjoining municipalities or equivalent that form an identifiable geographic entity that is conducive to a cohesive and continuous system of signs. Community wayfinding guide signs should not be used on a regional or statewide basis where infrequent or sparse placement does not contribute to a continuous or coordinated system of signing that is readily identifiable as such to the road user. In such cases, Destination or other guide signs detailed in this Chapter should be used to direct road users to an identifiable area in which the type of eligible destination described in Paragraph 1 is located.*

*When a system of community wayfinding guide signs is being considered, the entire system of existing signs should be evaluated for serviceability and general conformance with the provisions of this Manual. Systematic upgrading (see Paragraphs 22 through 24 of the Introduction to this Manual) of higher priority signs, such as regulatory, warning, and major Destination guide signs, should occur prior to the installation of the community wayfinding signs.*

**Figure 2D-31. Example of Community Wayfinding Guide Signs**

**Figure 2D-32. Example of a Community Wayfinding Guide Sign System Showing Direction from a Freeway or Expressway**

**Figure 2D-33. Example of a Color-Coded Community Wayfinding Guide Sign System**

Support:

1 The specific provisions of this Section regarding the design of community wayfinding sign legends apply  
2 to vehicular community wayfinding signs and do not apply to those signs that are intended only to provide  
3 information or direction to pedestrians or other users of a sidewalk or roadside area.

4 *Guidance:*

5 *Because pedestrian wayfinding signs typically use smaller legends that are inadequately sized for viewing*  
6 *by vehicular traffic and because they can provide direction to pedestrians that might conflict with that*  
7 *appropriate for vehicular traffic, wayfinding signs designed for and intended to provide direction to*  
8 *pedestrians or other users of a sidewalk or other roadside area should be located to minimize their*  
9 *conspicuity to vehicular traffic. Such signs should be located as far as practical from the street, such as at the*  
10 *far edge of the sidewalk. Where locating such signs farther from the roadway is not practical, the pedestrian*  
11 *wayfinding signs should have their conspicuity to vehicular traffic minimized by employing one or a*  
12 *combination of the following methods:*

- 13 A. *Locating signs away from intersections where high-priority traffic control devices are present.*
- 14 B. *Facing the pedestrian message toward the sidewalk and away from the street.*
- 15 C. *Cantilevering the sign over the sidewalk if the pedestrian wayfinding sign is mounted at a height*  
16 *consistent with vehicular traffic signs, removing the pedestrian wayfinding signs from the line of sight*  
17 *in a sequence of vehicular signs.*

18 *To further minimize their conspicuity to vehicular traffic during nighttime conditions, pedestrian*  
19 *wayfinding signs should not be retroreflective.*

20 *Support:*

21 Color coding is sometimes used on community wayfinding guide signs to help road users distinguish  
22 between multiple potentially confusing traffic generator destinations located in different neighborhoods or  
23 subareas within a community or area.

24 *Option:*

25 At the boundaries of the geographical area within which community wayfinding guide signing is used, an  
26 informational guide sign (see Figures ~~2D-18-31~~ and 2D-~~203133~~) may be posted to inform road users about the  
27 presence of wayfinding signing and to identify the meanings of the various color codes or pictographs that are  
28 being used.

29 **Standard:**

30 **These informational guide signs shall have a white legend and border on a green background and**  
31 **shall have a design similar to that illustrated in Figures 2D-~~12~~ and 2D-18-31 and shall be consistent with**  
32 **the basic design principles for guide signs. These informational guide signs shall not be installed on**  
33 **freeway or expressway mainlines or ramps.**

34 **The color coding or a pictograph of the identification ~~enhancement~~ markers of the community**  
35 **wayfinding guide signing system shall be included on the informational guide sign posted at the**  
36 **boundary of the community wayfinding guide signing area. The color coding or pictographs shall apply**  
37 **to a specific, identifiable neighborhood or geographical subarea within the overall area covered by the**  
38 **community wayfinding guide signing. Color coding or pictographs shall not be used to distinguish**  
39 **between different types of destinations that are within the same designated neighborhood or subarea.**  
40 **The color coding shall be accomplished by the use of different colored square or rectangular panels on**  
41 **the face of the informational guide sign, each positioned to the left of the neighborhood or named**  
42 **geographic area to which the color-coding panel applies. The height of the colored square or**  
43 **rectangular panels shall not exceed two times the height of the upper-case letters of the principal legend**  
44 **on the sign.**

45 *Option:*

46 The different colored square or rectangular panels may include either a black or a white (whichever  
47 provides the better contrast with the color of the panel) letter, numeral, or other appropriate designation to  
48 identify the destination.

49 Except for the informational guide sign posted at the boundary of the wayfinding guide sign area,  
50 community wayfinding guide signs may use background colors other than green in order to provide a color  
51 identification for the wayfinding destinations by geographical area within the overall wayfinding guide  
52 signing system. Color-coded community wayfinding guide signs may be used with or without the boundary

1 informational guide sign displaying corresponding color-coding panels described in Paragraphs 13 through 16.  
2 Except as provided in Paragraphs 18 and 19, in addition to the colors that are approved in this Manual for use  
3 on official traffic control signs (see Section 2A.10), other background colors may also be used for the color  
4 coding of community wayfinding guide signs.

5 **Standard:**

6 **The standard colors of red, orange, yellow, purple, or the fluorescent versions thereof, fluorescent**  
7 **yellow-green, and fluorescent pink shall not be used as background colors for community wayfinding**  
8 **guide signs, in order to minimize possible confusion with critical, higher-priority regulatory and**  
9 **warning sign color meanings readily understood by road users.**

10 **The minimum contrast value of legend color to background color for community wayfinding guide**  
11 **signs shall be at least 0.70 (or 70%).**

12 **All messages, borders, legends, and backgrounds of community wayfinding guide signs and any**  
13 **identification ~~enhancement~~ markers shall be retroreflective (see Sections 2A.07 and 2A.08).**

14 **Community wayfinding guide signs, exclusive of any identification marker used, ~~should~~ shall be**  
15 **rectangular in shape. Changed from Guidance to Standard**

16 *Guidance:*

17 ~~Community wayfinding guide signs, exclusive of any identification enhancement marker used, should be~~  
18 ~~rectangular in shape. Simplicity and uniformity in design, position, and application as described in Section~~  
19 ~~2A.06 are important and should be incorporated into the community wayfinding guide sign design and~~  
20 ~~location plans for the area.~~

21 *Community wayfinding guide signs should be limited to three destinations per sign (see Section 2D.0706).*

22 *Abbreviations (see Section 1A.15) should be kept to a minimum, and should include only those that are*  
23 *commonly recognized and understood.*

24 *Horizontal lines of a color that contrasts with the sign background color should be used to separate*  
25 *groups of destinations by direction from each other.*

26 **Support:**

27 The basic requirement for all highway signs, including community wayfinding signs, is that they be  
28 legible to those for whom they are intended and that they be understandable in time to permit a proper  
29 response. Section 2A.06 contains additional information on the design of signs, including desirable attributes  
30 of effective designs.

31 *Guidance:*

32 *Word messages should be as brief as practical and the lettering should be large enough to provide the*  
33 *necessary legibility distance.*

34 **Standard:**

35 **The minimum specific ratio of letter height to legibility distance shall comply with the provisions of**  
36 **Section 2A.13. The size of lettering used for destination and directional legends on community**  
37 **wayfinding signs shall comply with the provisions of minimum letter heights as provided in Section**  
38 **2D.0605.**

39 **Interline and edge spacing shall comply with the provisions of Section 2D.0605.**

40 **Except as provided in Paragraph 31,33, the lettering style used for destination and directional**  
41 **legends on community wayfinding guide signs shall comply with the provisions of Section 2D.0504.**

42 **The lettering for destinations on community wayfinding guide signs shall be a combination of lower-**  
43 **case letters with initial upper-case letters (see Section 2D.0504). All other word messages on community**  
44 **wayfinding guide signs shall be in all upper-case letters.**

45 *Guidance:*

46 *Except as provided in Paragraphs 34 and 35, letters, numerals, and other characters should be composed*  
47 *of the Standard Alphabets as detailed in the “Standard Highway Signs” publication.*

48 **Option:**

49 A lettering style other than the Standard Alphabets provided in the “Standard Highway Signs ~~and~~  
50 ~~Markings~~” ~~book~~ ~~publication~~ may be used on community wayfinding guide signs if an engineering study

1 determines that the legibility and recognition values for the chosen lettering style meet or exceed the values  
2 for the Standard Alphabets for the same legend height and stroke width, as provided in Paragraph 32 of this  
3 Section.

4 **Standard:**

5 An alternative lettering style as provided in Paragraph 33 of this Section shall be conventional in  
6 form. The letters, numerals, and other characters shall not be italic, oblique, script, highly decorative,  
7 or of other unusual forms.

8 In accordance with Section 1D.09, Except for signs that are designed and located with the  
9 intent~~ed~~ to be viewed only by pedestrians, bicyclists stopped out of the flow of traffic, or occupants of  
10 parked vehicles, Internet and e-mail addresses, including domain names and uniform resource locators  
11 (URL), quick-response (QR) codes, barcodes, or other graphics intended for optical scanning to obtain  
12 information, shall not be displayed on any community wayfinding guide sign or sign assembly.

13 The arrow location and priority order of destinations shall follow the provisions described in  
14 Sections 2D.08 and 2D.~~37~~36. Arrows shall be of the designs provided in Section 2D.08.

15 Option:

16 Pictographs (see definition in Section 1A.13) may be used on community wayfinding guide signs.

17 **Standard:**

18 **If a pictograph is used, its height shall not exceed two times the height of the upper-case letters of**  
19 **the principal legend on the sign.**

20 **Except for pictographs, symbols that are not approved in this Manual for use on guide signs shall**  
21 **not be used on community wayfinding guide signs.**

22 **Business logos, commercial graphics, or other forms of advertising (see Section 1A.01) shall not be**  
23 **used on community wayfinding guide signs or sign assemblies.**

24 Option:

25 Other graphics that specifically identify the wayfinding system, including identification ~~enhancement~~  
26 markers, may be used on the overall sign assembly and sign supports.

27 Support:

28 An ~~enhancement-identification~~ marker consists of a shape, color, and/or pictograph that is used as a visual  
29 identifier for the community wayfinding guide signing system for an area. Figure ~~2D-18-2D-29~~ shows  
30 examples of identification ~~enhancement~~-marker designs that can be used with community wayfinding guide  
31 signs.

32 Option:

33 An identification ~~enhancement~~-marker may be used in a community wayfinding guide sign assembly, or  
34 may be incorporated into the overall design of a community wayfinding guide sign, as a means of visually  
35 identifying the sign as part of an overall system of community wayfinding signs and destinations.

36 **Standard:**

37 **The sizes and shapes of identification ~~enhancement~~-markers shall be smaller than the community**  
38 **wayfinding guide signs themselves. Identification ~~enhancement~~-markers shall not be designed to have**  
39 **an appearance that could be mistaken by road users as being a traffic control device.**

40 *Guidance:*

41 *The area of the identification ~~enhancement~~-marker should not exceed 1/5 of the area of the*  
42 *community wayfinding guide sign with which it is mounted in the same sign assembly.*

43 **Section ~~2D-53~~2D.56 Signing of Named Highways for Mapping and Address Purposes**

44 Support:

45 A highway name is the officially designated name of a freeway, expressway, or conventional road for  
46 navigational, official mapping, and address purposes. Some highways are named in addition to or in lieu of  
47 being assigned a highway route number. Memorial, honorary, ceremonial, or other secondary names, such as  
48 touring route and byway names, are not considered to be highway names.

49 Option:

1 Guide signs may contain street or highway names if the purpose is to enhance driver communication and  
2 guidance; however, they are to be considered as supplemental information to route numbers.

3 **Standard:**

4 **Highway names shall not replace official numeral designations.**

5 **Memorial, honorary, or other secondary names (see Section 2M.10) shall not appear on**  
6 **supplemental signs or on any other information sign on or along the highway or its intersecting routes.**

7 **The use of route signs shall be restricted to signs officially used for guidance of traffic in accordance**  
8 **with this Manual and the “Purpose and Policy” statement of the American Association of State**  
9 **Highway and Transportation Officials that applies to Interstate and U.S. numbered routes (see Page i**  
10 **for AASHTO’s address).**

11 Option:

12 Unnumbered routes having major importance to proper guidance of traffic may be signed if carried out in  
13 accordance with the aforementioned policies. For unnumbered highways, a name to enhance route guidance  
14 may be used where the name is applied consistently throughout its length.

15 *Guidance:*

16 *Only one name should be used to identify any highway, whether numbered or unnumbered.*

17 **Section ~~2D.55~~ 2D.57 National Scenic Byways Signs and Plaque (D6-4, D6-4aP)**

18 Support:

19 Certain roads have been designated by the U.S. Secretary of Transportation as National Scenic Byways or  
20 All-American Roads based on their archeological, cultural, historic, natural, recreational, or scenic qualities.

21 Direction along routes and to sites relies primarily on touring maps rather than directional signing and  
22 route marking for the byway itself.

23 Option:

24 State and local highway agencies may install the National Scenic Byways (D6-4) sign or (D6-4aP) ~~signs-~~  
25 plaque at entrance points to a route that has been recognized by the U.S. Secretary of Transportation as a  
26 National Scenic Byway or an All-American Road. The D6-4 ~~or D6-4a sign may be installed on route sign~~  
27 ~~assemblies (see Figure 2D-22) or as part of larger roadside structures.~~ National Scenic Byways signs may  
28 ~~also~~ be installed as independent Directional (see Section 2D.32) or Confirming (see Section 2D.33)  
29 assemblies at periodic intervals along the designated route and ~~at near~~ intersections where the designated route  
30 turns or follows a different numbered highway. The D6-4aP plaque may be installed below a Route sign in a  
31 Confirming assembly. At locations where roadside features have been developed to enhance the traveler’s  
32 experience such as rest areas, historic sites, interpretive facilities, or scenic overlooks, the National Scenic  
33 Byways sign or plaque may be placed on the associated sign assembly to inform travelers that the site  
34 contributes to the byway travel experience.

35 *Guidance:*

36 Where the byway is identified only by the National Scenic Byways sign, the Directional assembly should  
37 consist of the D6-4 sign and an M5 series or M6 series Auxiliary plaque when indication of a turn is  
38 necessary to remain on the byway route.

39 Where the name of the byway is to be displayed on identification signs along the byway route, the name  
40 should be displayed in a Directional or Confirming assembly as follows:

41 A. On a plaque mounted below the D6-4 sign; or

42 B. On an identification sign with the D6-4aP plaque mounted below the sign.

43 In either case, the size of the National Scenic Byways (D6-4) sign or the byway identification sign should  
44 be consistent with that specified for route signs (see Section 2D.10) for the roadway classification.

45 Where the name of the byway is to be displayed along the byway route as provided in Paragraph ~~XX5~~ of  
46 this Section, the byway Directional or Confirming assemblies should be located separately from any Route  
47 Sign assemblies or Destination guide signs.

48 **Standard:**

1 When a National Scenic Byways sign is installed on a National Scenic Byway or an All-American  
2 Road, the design shown for the D6-4 sign or D6-4aP sign-plaque in Figure 2D-22-34 shall be used. Use  
3 of this design shall be limited to routes that have been designated as a National Scenic Byway or All-  
4 American Road by the U.S. Secretary of Transportation.

5 If used, the D6-4 sign or D6-4aP sign-plaque shall be placed such that the roadway-highway route-  
6 Route signs have primary visibility for the road user.

7 The D6-4 sign or the D6-4aP plaque shall not be installed as sign panels on a guide sign or as part of  
8 a guide sign assembly.

### 9 **Figure 2D-34. Examples of Use of the National Scenic Byways Sign**

## 10 **Section 2D.58 State-Designated Scenic Byway, Historic Trail, and Auto Tour Route Signs** **New** 11 **Section consisting of new and relocated provisions from existing Section 2H.07**

### 12 Support:

13 Signing for historic trails, auto tour routes, and State-designated scenic byways, is similar in concept to  
14 that for National Scenic Byways as provided in Section 2D.57. Direction along routes and to sites relies  
15 primarily on touring maps rather than directional signing and route marking for the trail, tour route, or byway  
16 itself.

17 Named highways are officially designated and shown on official maps and serve the purpose of providing  
18 route guidance, primarily on unnumbered highways, and property addresses. A highway designated as a trail,  
19 auto tour route, or byway is not considered to be a named highway for the purposes of highway signing or  
20 road user navigation and orientation. Section 2D.56 contains provisions for the signing of named highways.

21 Section 1A.08 provides information on the authority for placement of traffic control devices within the  
22 highway right-of-way.

### 23 Guidance:

24 Route Sign assemblies and Destination guide signs should have priority in visibility and location over  
25 signing related to historic trails, auto tour routes, and byways.

### 26 Option:

27 Identification signs for a historic trail, such as the National Historic Trails administered by the National  
28 Park Service, may be installed along segments of conventional roads that coincide with the original route of  
29 the trail.

30 Identification signs for a State scenic byway may be installed along conventional roads that have been  
31 designated as part of a State scenic byway system.

32 Where a National Scenic Byway is part of a State scenic byway system, the National Scenic Byways  
33 (D6-4aP) plaque (see Section 2D.57) may be installed in a Directional or Confirming assembly below the  
34 identification sign for the State scenic byway (see Figure 2D-35).

35 A State scenic byway system sign may be installed in a Directional or Confirming assembly with the  
36 name of the byway displayed on a plaque below the sign (see Figure 2D-35).

### 37 **Figure 2D-35. Example of Use of National Historic Trails, National, State Scenic Byways Signs**

### 38 Guidance:

39 The design and size of historic trail and State scenic byway identification or system signs should comply  
40 with the general provisions and principles for Route signs (see Section 2D.10). Designs should be simple,  
41 dignified, and devoid of complex graphics. The size of the signs should not exceed the size of the Route signs  
42 used along a particular route.

### 43 Standard:

44 Scenic byway, historic trail and auto tours route signs shall not incorporate standard highway sign  
45 legend elements into their design.

### 46 Guidance:

47 Where used, historic trail and State scenic byway identification signs should be installed as Directional  
48 (see Section 2D.32) or Confirming (see Section 2D.33) assemblies at independent locations, separate from  
49 other Route Sign assemblies and Destination guide signs. Where used, Confirming assemblies for the trail or  
50 byway should be installed at less frequent intervals than Confirming assemblies for the numbered route.

1 Support: **Relocated from Sec. 2H.07 and revised**

2 ~~Auto Tour Route signs are informational signs, plaques, or shields designed to provide road users with~~  
3 ~~route guidance in following an auto tour route of particular cultural, historical, or educational significance.~~

4 Where all or part of the original route of a historic trail does not follow a roadway, an ~~Signed~~ auto tour  
5 routes ~~are~~ is sometimes established along a conventional road in the general vicinity of ~~used in some cases to~~  
6 ~~generally follow~~ the historical route of ~~the~~ trail, ~~such as the National Historic Trails administered by the~~  
7 ~~National Park Service~~. Examples include auto tour routes following other routes that parallel the original  
8 routes of the Lewis and Clark National Historic Trail, the Oregon National Historic Trail, and the Santa Fe  
9 National Historic Trail. The auto tour route is shown on touring maps along State or other highways and  
10 provides access to sites on the trail from those highways.

11 A system of signing providing direction along conventional roads for a historic trail with an auto tour  
12 route is shown in Figure 2D-36. Examples of Destination and Supplemental guide signs (see Section 2E.55)  
13 providing direction to historic trail sites from a freeway or expressway interchange are shown in Figure 2D-  
14 36.

### 15 **Figure 2D-36. Example of Guide and Directional Signing for a National Historic Trail**

#### 16 Guidance:

17 Signing for historic trails should be limited to Destination signs for the sites related to the trail and to  
18 Directional and Confirming assemblies for the original portions of the trail itself. If an auto tour route has  
19 been designated along other highways to provide access to sites along the original trail as described in  
20 Paragraph 11, then the signing should be limited to Destination signs for those sites and directional signing  
21 to access the original route of the trail. Identification signs for the auto tour route should not be installed.  
22 Instead, direction along the auto tour route should rely on the touring map and other directional signs for the  
23 highways that the auto tour route follows.

#### 24 Standard:

25 Identification signs for historic trails, ~~A~~auto ~~T~~our ~~R~~outes, and scenic byways ~~signs~~ shall not be  
26 installed on freeways or expressways, except as necessary to provide continuity between discontinuous  
27 segments of conventional roadways that are designated as a trail, auto tour routes, or byway, for which  
28 the freeway or expressway provides the only connection between the segments. If installed on freeways  
29 or expressways, ~~Auto Tour Route~~ the identification signs shall be installed as independent trailblazer  
30 assemblies (see Sections 2D.35-34 and 2E.27) and shall not be installed with other Route signs or  
31 ~~confirmation~~ Cconfirming assemblies or on guide signs. If installed on freeways or expressways, ~~Auto~~  
32 ~~Tour Route~~ the trailblazer assemblies for the trail, auto tour route, or byway shall be installed at less  
33 frequent intervals than ~~route confirmation~~ Cconfirming assemblies for the highway route.

34 Identification signs for historic trails, auto tour routes, and scenic byways shall not be installed as  
35 sign panels on a guide sign or as part of a guide sign assembly.

### 36 **Section 2D.59 EMERGENCY ROUTE and EMERGENCY ROUTE TO Signs and Plaques**

37 **Added to reflect Official Ruling No. 6(09)-42(I)**

#### 38 Support:

39 As part of an agency's transportation incident management plan it is sometimes desirable to  
40 permanently sign routes that provide rerouting of traffic around highway segments susceptible to  
41 traffic incidents. Permanently installed EMERGENCY ROUTE and EMERGENCY ROUTE TO  
42 signs and plaques (see Figure 2D-37) provide direction on conventional roads from an exit off a  
43 highway upstream of an area susceptible to traffic incidents back to the original route at a point  
44 downstream of the incident susceptible area.

#### 45 Option:

46 EMERGENCY ROUTE and EMERGENCY ROUTE TO signs or plaques used on a directional  
47 assembly may be permanently installed on conventional roadways to provide direction back to the  
48 highway when diverted off of it for a traffic incident.

#### 49 Support:

1 The purpose of EMERGENCY ROUTE and EMERGENCY ROUTE TO signs is for corridor  
2 management along routes that have reoccurring incidents and have reasonable rerouting paths  
3 available. These signs are intended to be permanently installed to provide instant rerouting guidance  
4 to motorists when backups first begin even before emergency responders could provide temporary  
5 traffic control for rerouting traffic. These signs can be used as a standalone system or be a part of a  
6 larger system which may incorporate other devices such as dynamic message signs. These signs  
7 provide motorists assurance that a given exit point will lead them back to their original route of  
8 travel.

9 **Standard:**

10 **EMERGENCY ROUTE and EMERGENCY ROUTE TO signs shall only be installed at**  
11 **departure points and along diversion routes for directing motorists around highway segments**  
12 **in areas that are more susceptible to traffic incidents; see Figure 2D-38. EMERGENCY**  
13 **ROUTE and EMERGENCY ROUTE TO signs shall be placed at each turning decision points**  
14 **along the designated route until it rejoins the original route or until other directional signs**  
15 **leading back to the original route are provided.**

16 **EMERGENCY ROUTE and EMERGENCY ROUTE TO signs shall have a green**  
17 **background with white legend.**

18 **Option:**

19 For emphasis the legend EMERGENCY ROUTE or EMERGENCY ROUTE TO may be  
20 displayed in a yellow panel with black letters on the top of the sign; see Figure 2D-37.

21 **Standard:**

22 **Orange or pink shall not be used as alternate colors on permanently installed signs or**  
23 **plaques for rerouting traffic during an incident or other event. If a route shield is displayed as**  
24 **part of the message, the wording of the sign or plaque shall be EMERGENCY ROUTE TO as**  
25 **shown in Figure 2D-37.**

26 **Option:**

27 An EMERGENCY ROUTE TO plaque with either a white legend on a green background or  
28 black legend on a yellow background may be added to the top of a conventional Route Assembly on  
29 a diversion route providing direction back to the original route past the incident; see Figure 2D-37.

30 **Figure 2D-37. Example of Guide Signs for Rerouting Due to Traffic Incidents**

31 **Figure 2D-38. Example of Signing for Rerouting Due to Traffic Incidents**

**Chapter 2E Subchapter and Section Organization**

General

- 2E.01 Scope of Freeway and Expressway Guide Sign Standards
- 2E.02 Freeway and Expressway Signing Principles
- 2E.03 Guide Sign Classification
- 2E.04 Characteristics of Urban Signing
- 2E.05 Characteristics of Rural Signing
- 2E.06 Signing of Named Highways
- 2E.07 Designation of Destinations

Sign Design

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Guide Signing for Interchanges

- 2E.21 Interchange Guide Signs
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- 2E.26 Exit Gore Signs and Plaque (E5-1 Series)
- 2E.27 Pull-Through Signs (E6-1 Series, E6-2 Series)
- 2E.28 Signing for Interchange Lane Drops
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- 2E.31 Diamond Interchange
- 2E.32 Diamond Interchange in Urban Area
- 2E.33 Cloverleaf Interchange
- 2E.34 Cloverleaf Interchange with Collector-Distributor Roadways
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- 2E.38 Freeway Split with Dedicated Lanes
- 2E.39 Signing for Option Lanes at Splits and Multi-Lane Exits
- 2E.40 Design of Overhead Arrow-per-Lane Guide Signs for Option Lanes
- 2E.41 Design of Freeway and Expressway Diagrammatic Guide Signs for Option Lanes
- 2E.42 Signing for Intermediate and Minor Interchange Multi-Lane Exits with an Option Lane
- 2E.43 Number of Signs at an Overhead Installation and Sign Spreading
- 2E.44 Closely Spaced Interchanges

Other Guide Signs

- 2E.45 Next Exit Plaques (E2-1P, E2-1aP)

1	<a href="#"><u>2E.46 Post-Interchange Signs</u></a>
2	<a href="#"><u>2E.47 Post-Interchange Distance Signs (E7-1 Series, E7-2 Series, E7-3 Series)</u></a>
3	<a href="#"><u>2E.48 Post-Interchange Travel Time Sign (E7-4 Series)</u></a>
4	<a href="#"><u>2E.49 Distance and Travel Time Sign and Comparative Travel Time Sign (E7-5, E7-6)</u></a>
5	<a href="#"><u>2E.50 Supplemental Guide Signs (E3 Series)</u></a>
6	<a href="#"><u>2E.51 Community Interchanges Identification Signs (E9-4 Series, E9-5 Series)</u></a>
7	<a href="#"><u>2E.52 NEXT XX EXITS Sign (E9-3 Series)</u></a>
8	<a href="#"><u>2E.53 Weigh Station Signing</u></a>
9	<a href="#"><u>2E.54 Route Signs and Trailblazer Assemblies</u></a>
10	<a href="#"><u>2E.55 Eisenhower Interstate System Signs (M1-10, M1-10a)</u></a>
11	<a href="#"><u>Signs for Route Diversion by Vehicle Class</u></a>
12	<a href="#"><u>2E.56 Signs for Route Diversion by Vehicle Class</u></a>
13	<a href="#"><u>Signs for Intersections at Grade</u></a>
14	<a href="#"><u>2E.57 Signs for Intersections at Grade</u></a>
15	<a href="#"><u>Interface with Conventional Roadways</u></a>
16	<a href="#"><u>2E.58 Signing on Conventional Road Approaches and Connecting Roadways</u></a>
17	<a href="#"><u>2E.59 Wrong-Way Traffic Control at Interchange Ramps</u></a>
18	
19	

GENERAL

**Section 2E.01 Scope of Freeway and Expressway Guide Sign Standards**

**Support:**

The provisions of this Chapter provide a uniform and effective system of 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 1A.13 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 designation. Guidelines for the design of guide signs for freeways and expressways are provided in the “Standard Highway Signs ~~and Markings~~” ~~book~~ publication (see Section 1A.11).

**Standard:**

**The provisions of this Chapter shall apply to any highway that meets the definition of freeway or expressway facilities.**

Support:

The application of the provisions for freeway and expressway guide signs in tunnels can present unique challenges not encountered elsewhere due to the extended and continuous distances of constrained vertical and horizontal clearances in which to place signs. The effect of these constraints is particularly evident when there are interchange ramps or other geometric features inside the tunnel that warrant signs to provide adequate notice. Accordingly, it might not always be possible to employ the standardized layouts to all signs inside a tunnel. In addition, interchange guide signs might need to be limited to one destination only, with other destinations displayed separately on Supplemental guide signs (see Section 2E.50). Acceptable methods to modify the layout of a sign to limit the space required in a tunnel are provided in Paragraph 5 of this Section.

Option:

Overhead-mounted guide signs in tunnels may be modified in accordance with the following when needed to accommodate limited vertical clearance available for signs:

- A. Some sign legend elements may be arranged side by side, such as by placing route shields to the left of the destination instead of above.
- B. The Exit Number plaque (see Section 2E.23) may be placed at the left edge of the sign instead of at the top edge the sign. The legend of the Exit Number plaque may use a reduced letter height of 6 inches for the word EXIT(S) and 12 inches for numerals and suffixes while maintaining the standard vertical layout.
- C. Destination and roadway names may be displayed in reduced letter heights of 13.33 inches or 10.67 inches, when determined acceptable based on consideration of reduced speeds, fewer visual distractions, and other relevant factors, while maintaining adequate space between the legend and edges of the sign to ensure legibility and quick recognition.
- D. Unusually long destination and roadway names that cannot be adequately shortened or otherwise acceptably abbreviated may be displayed using series D letters in lieu of Series E(modified).

Support:

The visibility and retroreflectivity of sign sheeting inside tunnels can be reduced by the accumulation of residue that results from being unexposed to environmental elements such as rain.

Guidance:

Overhead signs in tunnels should be illuminated to ensure adequate visibility between scheduled maintenance and cleanings.

1 One or more Interchange Sequence signs (see Section 2E.24) should be used on the approach to  
2 the tunnel entrance to display the distances to the next interchanges that have ramps inside the  
3 tunnel or immediately following the exit from the tunnel.

4 Supplementary pavement markings, such as word, arrow, and/or route shield markings (see Part  
5 3), should be considered inside the tunnel in addition to the basic lane and edge line markings.

6 **Standard:**

7 **Applicability of the provisions of Paragraph 5 of this Section shall be limited to those signs**  
8 **within the limits of the tunnel and not extended to the approaches to or departures from the**  
9 **tunnel.**

10 **Section 2E.02 Freeway and Expressway Signing Principles**

11 Support:

12 The development of a signing system for freeways and expressways is approached on the premise that the  
13 signing is primarily for the benefit and direction of road users who are not familiar with the route or area. The  
14 signing furnishes road users with clear instructions for orderly progress to their destinations. Sign  
15 installations are an integral part of the facility and, as such, are best planned concurrently with the  
16 development of highway location and geometric design. For optimal results, plans for signing are analyzed  
17 during the earliest stages of preliminary design, and details are correlated as final design is developed. The  
18 excessive signing found on many major highways usually is the result of using a multitude of signs that are  
19 too small and that are poorly designed and placed to accomplish the intended purpose.

20 Freeway and expressway signing is to be considered and developed as a planned system of installations.  
21 An engineering study is sometimes necessary for proper solution of the problems of many individual  
22 locations, but, in addition, consideration of an entire route is necessary.

23 *Guidance:*

24 *Road users should be guided with consistent signing on the approaches to interchanges, when they drive*  
25 *from one State to another, and when driving through rural or urban areas. Because geographical, geometric,*  
26 *and operating factors regularly create significant differences between urban and rural conditions, the signing*  
27 *should take these conditions into account.*

28 *Guide signs on freeways and expressways should serve distinct functions as follows:*

- 29 A. *Give directions to destinations, or to streets or highway routes, at intersections or interchanges;*
- 30 B. *Furnish advance notice of the approach to intersections or interchanges;*
- 31 C. *Direct road users into appropriate lanes in advance of diverging or merging movements;*
- 32 D. *Identify routes and directions on those routes;*
- 33 E. *Show distances to destinations;*
- 34 F. *Indicate access to general motorist services, rest, scenic, and recreational areas; and*
- 35 G. *Provide other information of navigational value to the road user.*

36 **Section 2E.03 Guide Sign Classification**

37 Support:

38 Freeway and expressway guide signs are classified and ~~addressed as follows~~~~treated in the following-~~  
39 ~~categories:~~ **Item list reordered to reflect reorganized order of chapters and sections**

- 40 A. Interchange signs (see Sections 2E.~~30-21~~ through 2E.~~39~~~~24~~ and 2E.~~26~~ through 2E.~~45~~),
- 41 B. Interchange Sequence signs (see Section ~~2E.40~~2E.~~24~~),
- 42 C. Post-Interchange signs (see Sections 2E.46 through 2E.48),
- 43 D. Community Interchanges Identification signs (see Section ~~2E.41~~2E.~~51~~),
- 44 E. NEXT XX EXITS ~~signs-plaques~~ (see Section ~~2E.42~~2E.~~52~~),
- 45 F. Weigh Station ~~signing-signs~~ (see Section 2E.~~53~~4),
- 46 G. Route signs and Trailblazer Assemblies (see Section ~~2E.27~~2E.~~54~~),
- 47 H. At-Grade Intersection signs (see Section ~~2E.29~~2E.~~56~~),
- 48 I. ~~Miscellaneous- General~~ Information signs (see Section 2H.04),
- 49 J. Reference Location signs (see Section 2H.05),
- 50 K. General Service signs (see Chapter 2I),
- 51 L. Rest and Scenic Area signs (see Section 2I.05),

- 1 M. Tourist Information and Welcome Center signs (see Section 2I.08),
- 2 N. Radio Information, [Travel Information, and Roadside Assistance signing signs](#) (see Sections 2I.09
- 3 [through 2I.13](#)),
- 4 O. Carpool and Ridesharing [signing signs](#) (see Section 2I.11),
- 5 P. Specific Service signs (see Chapter 2J), and
- 6 Q. Recreational and Cultural Interest Area signs (see Chapter 2M).

7 ~~Section 2E.04 – General~~ This section relocated to new Section 2E.08.

8 ~~Section 2E.05 – Color of Guide Signs~~ This section relocated to new Section 2E.09.

9 ~~Section 2E.06 – Retroreflection or Illumination~~ This section relocated to new Section 2E.10.

## 10 Section ~~2E.07~~[2E.04](#) Characteristics of Urban Signing

11 Support:

12 Urban conditions are characterized not so much by city limits or other arbitrary boundaries, as by the

13 following features:

- 14 A. Mainline roadways with more than two lanes in each direction;
- 15 B. High traffic volumes on the through roadways;
- 16 C. High volumes of traffic entering and leaving interchanges;
- 17 D. Interchanges closely spaced;
- 18 E. Roadway and interchange lighting;
- 19 F. Three or more interchanges serving the major city;
- 20 G. A loop, circumferential, or spur [route](#) serving a sizable portion of the urban population; and
- 21 H. Visual clutter from roadside development.

22 Operating conditions and road geometrics on urban freeways and expressways usually make special sign

23 treatments desirable, including:

- 24 A. Use of Interchange Sequence signs (see Section ~~2E.40~~[2E.24](#));
- 25 B. Use of sign spreading to the maximum extent possible (see Section ~~2E.11~~[2E.43](#));
- 26 C. Elimination of General or Specific Service signing (see Chapters 2I and 2J);
- 27 D. Reduction to a minimum of post-interchange signs (see Section ~~2E.38~~[2E.46](#));
- 28 E. Display of advance signs at distances closer to the interchange, with appropriate adjustments in the
- 29 legend (see Section ~~2E.33~~[2E.23](#));
- 30 F. Use of overhead signs on roadway structures and independent sign supports (see Section ~~2E.25~~[2E.19](#));
- 31 G. Use of Overhead Arrow-per-Lane or Diagrammatic guide signs in advance of ~~intersections and~~
- 32 interchanges (see Sections ~~2E.21~~[2E.40](#) and ~~2E.22~~[2E.41](#)); and
- 33 H. Frequent use of street names as the principal message in guide signs.

34 Lower speeds which are often characteristic of urban operations do not justify lower signing standards.

35 Typical traffic patterns are more complex for the road user to negotiate, and large, easy-to-read legends are,

36 therefore, just as necessary as on rural highways.

## 37 Section ~~2E.08~~[2E.05](#) Characteristics of Rural Signing

38 Support:

39 Rural areas ordinarily have greater distances between interchanges, which permits adequate spacing for

40 the sequences of signs on the approach to and departure from each interchange. However, the absence of

41 traffic in adjoining lanes and on entering or exiting ramps often adds monotony or inattention to rural driving.

42 This increases the importance of signs that call for decisions or actions.

43 *Guidance:*

44 *Where there are long distances between interchanges and the alignment is relatively unchanging, signs*

45 *should be positioned for their best effect on road users. The tendency to group all signing in the immediate*

46 *vicinity of rural interchanges should be avoided by considering the entire route in the development of signing*

47 *plans. Extra effort should be given to the placement of signs at natural target locations to command the*

48 *attention of the road user, particularly when the message requires an action by the road user.*

1 **Section ~~2E.09~~2E.06 Signing of Named Highways**

2 *Guidance:*

3 *Signing of named highways on freeways and expressways should comply with the provisions of Section*  
4 *2D.56.*

5 Support:

6 ~~Section 2D.53 contains information, which is also applicable to freeways and expressways, regarding the~~  
7 ~~use of highway names on the signing for unnumbered highways to enhance route guidance and facilitate~~  
8 ~~travel.~~ **Changed to Guidance**

9 Section 2M.10 contains information regarding memorial or dedication signing of routes, bridges, or  
10 highway components.

11 ~~Section 2E.10 Amount of Legend on Guide Signs~~ **This section relocated to new Section 2E.15**

12 ~~Section 2E.11 Number of Signs at an Overhead Installation and Sign Spreading~~ **This section**  
13 **relocated to new Section 2E.43**

14 ~~Section 2E.12 Pull-Through Signs (E6-2, E6-2a)~~ **This section relocated to new Section 2E.27**

15 **Section ~~2E.13~~2E.07 Designation of Destinations**

16 **Standard:**

17 **The direction of a freeway and the major destinations or control cities along it shall be clearly**  
18 **identified through the use of appropriate destination legends (see Section 2D.37). Successive freeway**  
19 **guide signs shall provide continuity in destination names and consistency with available map**  
20 **information. At any decision point, a given destination shall be indicated by way of only one route.**

21 *Guidance:*

22 *Control city legends should be used in the following situations along a freeway:*

- 23 *A. At interchanges between freeways;*
- 24 *B. At separation points of overlapping freeway routes;*
- 25 *C. On directional signs on intersecting routes, to guide traffic entering the freeway;*
- 26 *D. On Pull-Through signs; and*
- 27 *E. On the bottom line of post-interchange distance signs.*

28 Support:

29 Continuity of destination names is also useful on expressways serving long-distance or intrastate travel.

30 The determination of major destinations or control cities is important to the quality of service provided by  
31 the freeway. Control cities on freeway guide signs are selected by the States and are contained in the  
32 “Guidelines for the Selection of Supplemental Guide Signs for Traffic Generators Adjacent to Freeways, 4th  
33 Edition/Guide Signs, Part II: Guidelines for Airport Guide Signing/Guide Signs, Part III: List of Control Cities  
34 for Use in Guide Signs on Interstate Highways,” published by and available from the American Association of  
35 State and Highway Transportation Officials (see Section 1A.11).

36 In some instances the exit that provides the most direct or preferred access to one or more destinations is  
37 different in opposing directions of travel due to the configuration of the crossroads, the density of  
38 development on sections of the crossroads, etc.

39 *Guidance:*

40 The guide signs for exits in each direction of travel should display the destinations with the most direct or  
41 preferred access from that direction of travel even when this results in the destinations being different for an  
42 exit in opposing directions of travel (see Figure 2E-1).

44 **Figure 2E-1. Designation of Destinations for Interchanges in Opposing Directions of Travel**

**Section ~~2E.04~~2E.08 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, symbols, and arrows, 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.05~~2E.09 Color of Guide Signs**

Standard:

Guide signs on freeways and expressways, except as otherwise provided in this Manual, shall have white letters, symbols, arrows, 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 provided in the individual Sections dealing with the particular sign or sign group.

**Section ~~2E.06~~2E.10 Retroreflection or Illumination**

Standard:

Letters, numerals, symbols, arrows, 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 post-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.32~~2E.11 Interchange Classification**

Support:

For signing purposes, interchanges are classified as major, intermediate, and minor. ~~The minimum-~~ Minimum alphabet sizes based on interchange classification are contained in Tables 2E-2 and 2E-4 ~~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.

The applicability of the alphabet sizes shown in the “Overhead” column of Tables 2E-2 and 2E-4 is provided in Section 2E.12.

**Section ~~2E.14~~2E.12 Size and Style of Letters and Signs**

1 **Standard:**

2 Except as provided in Section 2A.11, the sizes of freeway and expressway guide signs that have  
3 standardized designs shall be as shown in Table 2E-1.

4 Support:

5 Section 2A.11 contains information regarding the applicability of the various columns in Table 2E-1.

6 Option:

7 Signs larger than those shown in Table 2E-1 may be used (see Section 2A.11).

8 **Standard:**

9 All names of places, streets, and highways on freeway and expressway guide signs shall be  
10 composed of lower-case letters with initial upper-case letters. The letters and the numerals used shall  
11 be FHWA Standard Alphabet Series E (modified) as provided in the “Standard Highway Signs”  
12 publication (see Section 1A.11). ~~Series E(M) of the “Standard Highway Signs and Markings” book (see~~  
13 ~~Section 1A.11).~~ The nominal loop height of the lower-case letters shall be 3/4 of the height of the initial  
14 upper-case letter (see Paragraph 2 of Section 2D.05 for additional information on the specification of  
15 letter heights). Other word legends shall be composed of upper-case letters. Interline and edge spacing  
16 shall be as provided in Section 2E.135. **Relocated from later in Standard**

17 For all freeway and expressway signs that do not have a standardized design, the message  
18 dimensions shall be determined first, and the outside sign dimensions secondarily. Word messages in  
19 the legend of expressway guide signs shall be in letters at least 8 inches high for words composed of all  
20 upper-case letters. Larger lettering shall be used for major guide signs at or in advance of interchanges  
21 and for all overhead signs. Minimum numeral and letter sizes for expressway guide signs according to  
22 interchange classification, type of sign, and component of sign legend shall be as shown in Tables 2E-23  
23 and 2E-34. Minimum numeral and letter sizes for freeway guide signs according to interchange  
24 classification, type of sign, and component of sign legend shall be as shown in Tables 2E-45 and 2E-56.  
25 The minimum numeral and letter sizes for overhead-mounted expressway and freeway guide signs shall  
26 be those shown in the “Overhead” columns of Tables 2E-2 and 2E-4, respectively, except where a larger  
27 minimum numeral or letter height is provided in the columns for the applicable type of interchange  
28 (Major, Intermediate, or Minor).

29 ~~All names of places, streets, and highways on freeway and expressway guide signs shall be~~  
30 ~~composed of lower-case letters with initial upper-case letters. The letters and the numerals used shall~~  
31 ~~be Series E(M) of the “Standard Highway Signs and Markings” book (see Section 1A.11). The nominal~~  
32 ~~loop height of the lower-case letters shall be 3/4 of the height of the initial upper-case letter (see~~  
33 ~~Paragraph 2 of Section 2D.05 for additional information on the specification of letter heights). Other~~  
34 ~~word legends shall be composed of upper-case letters. Interline and edge spacing shall be as provided~~  
35 ~~in Section 2E.15.~~ **Relocated to earlier in Standard**

36 Lettering size on freeway and expressway signs shall be the same for both rural and urban  
37 conditions.

38 Support:

39 Sign size is determined primarily in terms of the length of the message and the size of the lettering  
40 necessary for proper legibility. Letter style and height, and arrow design have been standardized for freeway  
41 and expressway signs to assure uniform and effective application.

42 Designs for upper-case and lower-case ~~alphabets~~ FHWA Standard Alphabets, together with tables of  
43 recommended letter spacing, are shown in the “Standard Highway Signs ~~and Markings” book~~ publication (see  
44 Section 1A.11).

45 *Guidance:*

46 *Freeway lettering sizes (see Tables 2E-4 and 2E-5) should be used when expressway geometric design is*  
47 *comparable to freeway standards.*

48 *Other sign letter size requirements not specifically identified elsewhere in this Manual should be guided*  
49 *by these specifications. Abbreviations (see Section 2E.17) should be kept to a minimum, except as provided in*  
50 *Section 2E.16.*

51 Support:

1 A sign mounted over a particular roadway lane to which it applies might have to be limited in horizontal  
2 dimension to the width of the lane, so that another sign can be placed over an adjacent lane. The necessity to  
3 maintain proper vertical clearance might also place a further limitation on the size of the overhead sign and  
4 the legend that can be accommodated.

5 **Table 2E-1. Freeway and Expressway Guide Sign and Plaque Sizes**

6 **Table 2E-2. Minimum Letter and Numeral Sizes for Expressway Guide Signs According to**  
7 **Interchange Classification**

8 **Table 2E-3. Minimum Letter and Numeral Sizes for Expressway Guide Signs According to**  
9 **Sign Type**

10 **Table 2E-4. Minimum Letter and Numeral Sizes for Freeway Guide Signs According to**  
11 **Interchange Classification**

12 **Table 2E-5. Minimum Letter and Numeral Sizes for Freeway Guide Signs According to Sign**  
13 **Type**

14 **Section ~~2E.15~~–~~2E.13~~ Interline and Edge Spacing**

15 *Guidance:*

16 *Interline spacing of upper-case letters should be approximately three-fourths the average of upper-case*  
17 *letter heights in adjacent lines of letters.*

18 *The spacings to the top and bottom borders should be equal to the average of the letter height of the*  
19 *adjacent line of letters. The lateral spacing to the vertical borders should be essentially the same as the*  
20 *height of the largest letter.*

21 **Section ~~2E.16~~–~~2E.14~~ Sign Borders**

22 **Standard:**

23 ~~Signs shall have a border of the same color as the legend in order to outline their distinctive shape~~  
24 ~~and thereby give them easy recognition and a finished appearance.~~ **Relocated to existing Section 2A.10**

25 *Guidance:*

26 *For guide signs larger than 120 x 72 inches, the border should have a width of 2 inches. For smaller*  
27 *guide signs, a border width of 1.25 inches should be used; ~~but the width should not exceed the stroke width of~~*  
28 *~~the lettering of the principal legend on the sign.~~ On unusually large signs with oversized letter heights, route*  
29 *shields, or other legend elements, the border should be 2-½ inches wide and should not exceed 3 inches in*  
30 *width. In all cases, the width of the border should not exceed the stroke width of the lettering of the principal*  
31 *legend on the sign.*

32 *Corner radii of sign borders should be approximately 1/8 of the minimum sign dimension on guide signs,*  
33 *except that the radii should not exceed 12 inches on any sign.*

34 **Support:**

35 The “Standard Highway Signs” publication contains detailed information on border widths and corner  
36 radii for ranges of sign sizes.

37 **Option:**

38 The sign material in the area outside of the corner radius may be trimmed.

39 **Section 2E.15 Amount of Legend on Guide Signs**

40 *Guidance:*

41 *No more than two destination names or street names should be displayed on any Advance Guide sign or*  
42 *Exit Direction sign. A city name and street name on the same sign should be avoided. Where two or three*  
43 *signs are placed on the same supports, destinations or street names should be limited to one per sign, or to a*  
44 *total of three in the display. Sign legends should not exceed three lines of copy, exclusive of the exit number*  
45 *and action or distance information.*

46 **Support:**

47 Where only one interchange serves a community, the intersecting street name is generally superfluous to  
48 the city name on the Advance guide and Exit Direction signs. Where a community is served by multiple

1 [interchanges, either the NEXT XX EXITS \(see Section 2E.52\) or the Community Interchanges Identification](#)  
2 [\(see Section 2E.51\) signs are used to display the city name. Each interchange is then identified by its](#)  
3 [intersecting roadway name on the Advance guide and Exit Direction signs rather than by the city name.](#)

#### 4 **Section ~~2E.17~~ 2E.16 Abbreviations**

##### 5 **Standard:**

6 [The use of abbreviations on freeway and expressway guide signs shall comply with the provisions of](#)  
7 [Section 2D.07 of this Manual.](#)

##### 8 *Guidance:*

9 *Abbreviations should be kept to a minimum; however, they are useful when complete destination*  
10 *messages produce excessively long signs. If used, abbreviations should be unmistakably recognized by road*  
11 *users (see Section 1A.15). Longer commonly used words that are not part of a proper name and are readily*  
12 *recognizable, such as Street, Boulevard, and Avenue, should be abbreviated to expedite recognition of the*  
13 *sign legend by reducing the amount and complexity of the legend.*

14 *Periods, apostrophes, question marks, ampersands, or other punctuation or characters that are not*  
15 *letters, numerals, or hyphens should not be used in abbreviations, unless necessary to avoid confusion.*

16 *The solidus (slanted line or forward slash) is intended to be used for fractions only and should not be used*  
17 *to separate words on the same line of legend. Instead, a hyphen should be used for this purpose, such as*  
18 *“CARS—TRUCKS.”*

##### 19 **Standard:**

20 ~~The words NORTH, SOUTH, EAST, and WEST shall not be abbreviated when used with route~~  
21 ~~signs to indicate cardinal directions on guide signs.~~

#### 22 **Section ~~2E.18~~ 2E.17 Symbols**

##### 23 **Standard:**

24 ~~Symbol designs shall be unmistakably like those shown in this Manual and in the “Standard~~  
25 ~~Highway Signs and Markings” book (see Section 1A.11).~~

##### 26 **Support:**

27 [Symbols are not normally displayed on freeway and expressway guide signs. One exception is the Park –](#)  
28 [Ride Supplemental guide sign \(see Section 2E.50\), which displays the Carpool symbol. In some cases,](#)  
29 [General Information symbols \(see Chapter 2H\) might be included in the legend of a guide sign to shorten an](#)  
30 [unusually lengthy legend on the sign.](#)

##### 31 *Guidance:*

32 [When a General Information symbol is incorporated into the legend of a guide sign, all components of the](#)  
33 [legend should be balanced in size and arrangement. A special effort should be made to balance legend](#)  
34 [components for maximum legibility of the symbol with the rest of the sign. The General Information \(I series\)](#)  
35 [sign, rather than the symbol alone, should be placed as a sign panel within the guide sign so that adequate](#)  
36 [recognition of the symbol is provided by the border. The General Information sign panel should be positioned](#)  
37 [to the left of the legend to which it applies. The size of the General Information sign panel should be the](#)  
38 [similar in size to that specified for a route shield for the type of guide sign on which it is displayed.](#)

##### 39 **Option:**

40 ~~Educational plaques may be used below symbol signs where needed.~~

#### 41 **Section ~~2E.19~~ 2E.18 Arrows for Interchange Guide Signs**

##### 42 **Standard:**

43 **Arrows used on interchange guide signs shall be of the types shown in Figure 2D-2 and shall comply**  
44 **with the provisions of this Section and Section 2D.08.**

45 **Except on Overhead Arrow-per-Lane guide signs (see Section ~~2E.21~~ 2E.40) and on Exit Direction**  
46 **signs for lane drops (see Section ~~2E.24~~ 2E.28), and except as provided in Paragraphs 3 and 4 of this**  
47 **Section, directional arrows on all overhead and post-mounted Exit Direction signs shall point**  
48 **diagonally upward, and Directional arrows on overhead Exit Direction signs shall be located on the**  
49 **side of the sign consistent with the direction of the exiting movement. Directional arrows on post-**

1 mounted Exit Direction signs shall be located at the bottom portion of the sign and centered under the  
2 legend.

3 Option:

4 On ~~post-mounted~~overhead Exit Direction signs that are located fully over the tapered portion of the exit  
5 ramp at the theoretical gore, and where a directional arrow to the side of the legend farthest from the roadway  
6 might create an unusually wide sign that limits the road user's view of the arrow, the directional arrow may be  
7 placed at the bottom portion of the sign, centered under the legend.

8 **Standard:**

9 **Directional arrows on guide signs for multi-lane exits shall be positioned below the legend**  
10 ~~approximately~~ over the approximate center of each lane to which the arrow applies (see Figures ~~2E-4~~  
11 ~~2E-38~~ and ~~2E-8~~ 2E-43).

12 ~~On overhead signs where d~~Down arrows shall only be used on overhead signs ~~are used~~ to indicate a  
13 lane to be followed and ~~, a down arrow~~ shall be positioned ~~approximately~~ over the approximate center  
14 of each lane ~~and shall pointing~~ vertically downward toward the approximate center of that lane. Down  
15 arrows shall be used only on overhead guide signs that restrict the use of specific lanes to traffic bound  
16 for the destination(s) and/or route(s) indicated by these arrows. Down arrows shall not be used unless  
17 an arrow can be located over and pointed to the approximate center of each lane that can be used to  
18 reach the destination displayed on the sign.

19 **If down arrows are used, having more than one down arrow pointing to the same lane on a single**  
20 **overhead sign (or on multiple signs on the same overhead sign structure) shall not be permitted.**

21 Support:

22 Directional and down arrows for use on guide signs are shown in Figure 2D-~~24~~. Detailed drawings and  
23 standardized sizes based on ranges of letter heights for these arrows are provided in the "Standard Highway  
24 Signs ~~and Markings~~" ~~book~~ publication (see Section 1A.11). Information on the dimensions for arrows used in  
25 Overhead Arrow-per-Lane and Diagrammatic guide signing is also provided in the "Standard Highway Signs-  
26 ~~and Markings~~" ~~book~~ publication.

27 ~~Section 2E.20 Signing for Option Lanes at Splits and Multi-Lane Exits~~ **This section relocated to**  
28 **new Section 2E.39**

29 ~~Section 2E.21 Design of Overhead Arrow-per-Lane Guide Signs for Option Lanes~~ **This section**  
30 **relocated to new Section 2E.40**

31 ~~Section 2E.22 Design of Freeway and Expressway Diagrammatic Guide Signs for Option~~  
32 ~~Lanes~~ **This section relocated to new Section 2E.41**

33 ~~Section 2E.23 Signing for Intermediate and Minor Interchange Multi-Lane Exits with an~~  
34 ~~Option Lane~~ **This section relocated to new Section 2E.42**

35 ~~Section 2E.24 Signing for Interchange Lane Drops~~ **This section relocated to new Section 2E.28**

INSTALLATION

**Section ~~2E.25~~ 2E.19 Overhead Sign Installations**

Support:

Specifications for the design and construction of structural supports for 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. ~~Conditions that might warrant~~ ~~Factors justifying~~ the installation of overhead signs are given in Section 2A.17 and throughout this Chapter. Vertical clearance of overhead signs is discussed in Section 2A.18.

**Section ~~2E.26~~ 2E.20 Lateral Offset**

Standard:

~~Except where shielded by a rigid traffic barrier, the~~ **The minimum lateral offset outside the usable roadway shoulder for post-mounted freeway and expressway signs or for overhead sign supports, either to the right-hand or left-hand side of the roadway, shall be 6 feet. This minimum clearance shall also apply outside of a 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 10 feet from the edge of the nearest traffic lane. Large guide signs especially should be farther removed, preferably 30 feet or more from the nearest traffic lane.*

*Where an expressway median is 12 feet or less in width, consideration should be given to spanning both roadways without a center support.*

*Where overhead sign supports cannot be placed sufficiently far away from the line of traffic or in an otherwise ~~protected~~ shielded site, they should either be designed to minimize the impact forces, or be adequately shielded by a traffic barrier of suitable design.*

Standard:

**Butterfly-type sign supports and other overhead non-crashworthy sign supports shall not be installed in gores or other unshielded locations within the clear zone.**

Option:

Lesser clearances, but not generally less than 6 feet, may be used on connecting roadways or ramps at interchanges.

~~Section 2E.27 Route Signs and Trailblazer Assemblies~~ **This section relocated to new Section 2E.54**

~~Section 2E.28 Eisenhower Interstate System Signs (M1-10, M1-10a)~~ **This section relocated to new Section 2E.55**

~~Section 2E.29 Signs for Intersections at Grade~~ **This section relocated to new Section 2E.56**

Section ~~2E.30~~-2E.21 Interchange Guide Signs

Support:

For some applications, guide signing for interchanges depends upon the interchange classification as described in Section 2E.11. Sections 2E.23, 2E.25, 2E.30, 2E.39, and 2E.42 contain provisions on guide signing for interchanges that are based on interchange classification.

Standard:

The signs at interchanges and on their approaches shall include Advance ~~G~~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.11 and Sections 2E.33 through 2E.42 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 800 feet apart.*

*Use of ~~S~~supplemental guide signing should be ~~used sparingly~~minimized as provided in Section ~~2E.35~~2E.510.*

Support:

Figure 2E-2 shows the typical sequence of interchange guide signs.

**Figure 2E-2. Typical Sequence of Interchange Guide Signs**

Section ~~2E.31~~-2E.22 Interchange Exit Numbering

Standard:

Interchange exit numbering shall use the reference location sign exit numbering method. The consecutive exit numbering method shall not be used. The exit numbers shall correspond to the posted Reference Location or Enhanced Reference Location signs.

Support:

Reference location sign exit numbering assists road users in determining their destination distances and travel mileage, reporting their location in the event of an incident or breakdown, assists responders in reporting to incidents, and assists highway agencies because the exit numbering sequence does not have to be changed if new interchanges are added to a route. **Moved from later in Section and revised.**

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 exit 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 Exit Gore sign. The exit number shall be displayed on a separate plaque ~~on at the~~ top of the Advance Guide or Exit Direction sign. The ~~e~~Exit ~~n~~Number (E1-5P series) plaques (see Figure ~~2E-22~~ 2E-10) ~~shall be 30 inches in height and~~ shall include the word EXIT or EXITS and the appropriate exit number in a single-line format.

Suffix letters shall only be used to supplement exit numbers where, from the same direction of travel on the freeway mainline, there is more than one exit at an interchange or where interchanges are so closely spaced that it is impracticable to use separate exit numbers associated with the reference mile points of the freeway. ~~Suffix letters shall be used for exit numbering at a multi-exit interchange.~~ The suffix letter shall also be included on the ~~e~~Exit ~~n~~Number plaque and shall be separated from the exit number by a space having a width of between 1/2 and 3/4 of the height of the suffix letter. The suffix letters assigned shall be in ascending alphabetical order starting with the letter A for ramps in the direction of travel with increasing exit numbers, and in descending alphabetical order ending in the

1 letter A in the opposite direction of travel. Exit numbers shall not include the cardinal direction initials  
2 corresponding to the directions of the cross route. The Mminimum numeral and letter sizes shall be  
3 as are given in Tables 2E-2 through 2E-5. If used, the interchange numbering system for expressways  
4 shall comply with the provisions prescribed for freeways.

5 ~~At a multi-exit interchange w~~Where suffix letters are used for exit numbering, an exit of the same  
6 number without a suffix letter shall not be used on the same route in the same direction. For example,  
7 if an exit is designated as EXIT 256 A, then there shall not be an exit designated as EXIT 256 on the  
8 same route in the same direction.

9 Guidance:

10 To the extent practicable, exit numbering should correspond to the nearest reference location sign  
11 number of the freeway at the point the crossroad of the interchange intersects the freeway mainline. The  
12 following are examples of proper numbering under various interchange scenarios:

- 13 1. If a crossroad intersects the mainline approximately at or after mile 15 and before mile 16, the  
14 interchange should be designated as EXIT 15.
- 15 2. If the interchange crossroad is split into two roadways by direction where one direction of the  
16 crossroad is downstream of mile 18 and the other direction is upstream of mile 18, the  
17 interchange exit number should be EXIT 18..
- 18 3. If there are three closely spaced interchanges, e.g. less than 1 mile apart, starting before mile 16  
19 and ending before mile 17, the interchanges should be designated as EXIT 15, EXIT 16 and EXIT  
20 17.
- 21 4. If there are multiple interchanges so closely spaced together that it is impractical to designate the  
22 exit numbers by the freeway mainline reference mile numbers, or doing so would tend to not meet  
23 driver expectations, suffix letters should be used as provided in this Section.

24 ~~Interchange exit numbering shall use the reference location sign exit numbering method. The~~  
25 ~~consecutive exit numbering method shall not be used.~~

26 Support:

27 ~~Reference location sign exit numbering assists road users in determining their destination distances and~~  
28 ~~travel mileage, and assists highway agencies because the exit numbering sequence does not have to be~~  
29 ~~changed if new interchanges are added to a route.~~ **Moved to earlier in Section and revised**

30 Option:

31 Exit numbers may also be used with Supplemental Guide signs, in compliance with Section 2E.50, and  
32 Motorist Service signs, in compliance with Chapters 2I and 2J.

33 Guidance:

34 ~~Exit number (E1-5P) plaques should be added to the top right-hand edge of the sign for an exit to the~~  
35 ~~right.~~ **Incorporated into following Standard.**

36 Standard:

37 Where exit suffix letters are used and the number of exits are not equal in both directions of  
38 travel, the exit suffix lettering for each direction shall be based on the number of exits in that  
39 direction. For example, if in the northbound direction of a freeway there are three exits for  
40 interchange number 25 and two exits in the southbound direction, the exit numbers northbound  
41 shall be EXIT 25 A, EXIT 25 B and EXIT 25 C; and southbound shall be EXIT 25 B followed by  
42 EXIT 25 A (see Drawing D of Figure 2E-3).

43 Exit numbers and suffix letters shall only be used to designate individual exit departure points  
44 directly from the freeway mainline. Exit numbers and suffix letters shall not be used for  
45 designating ramp splits into two ramps after leaving the mainline (see Drawings A and D of Figure  
46 2E-3).

47 The Exit Number (E1-5P through E1-5eP) plaque shall be positioned directly above the top right-  
48 hand edge of the sign for an exit to the right.

49 Because road users might not expect an exit to the left and might have difficulty in maneuvering to  
50 the left, a Left eExit nNumber (E1-5**f**P through E1-5**k**P) plaque (see Figure ~~2E-22~~ 2E-9) shall be  
51 added directly above ~~to~~ the top left-hand edge of the sign for all numbered left-hand exits (see Figures

1 ~~2E-14 2E-34 and 2E-15 2E-18~~). The word LEFT on the ~~E1-5b~~**Left Exit Number** plaque shall be a  
2 black legend on a yellow rectangular sign panel and shall be centered above the word EXIT.

### 3 **Figure 2E-3. Examples of Interchange Exit Numbering**

4 Support:

5 Example exit number plaque designs are shown in Figure ~~2E-22~~**2E-9**. Figures ~~2E-3, 2E-7, 2E-22, 2E-26,~~  
6 ~~and 2E-27~~ **2E-9, 2E-12, 2E-13, 2E-35, and 2E-41** illustrate the incorporation of exit number plaques on guide  
7 signs.

8 **Figure 2E-4 provides an example of Interstate route loops and spurs around major metropolitan areas.**  
9 The general plan for numbering interchange exits is shown in Figures ~~2E-19~~**2E-5** through ~~2E-21~~**2E-8**. Figure  
10 ~~2E-19~~**2E-5** shows a circumferential route, which is a route that makes a complete circle around a city or town  
11 and usually has two interchanges (one on each side of the city or town) with each of the mainline routes that  
12 travel through the city or town. Figure ~~2E-20~~**2E-6** shows a loop route, which is a route that departs from a  
13 mainline route and then rejoins the same mainline route at a subsequent point downstream, and **Figure 2E-7**  
14 **shows** a spur route, which is a route that departs from a mainline route and never rejoins the same mainline  
15 route. **For the purpose of Interstate route numbering, a three-digit Interstate route that provides connectivity**  
16 **between two different Interstate routes is defined as a loop.** Figure ~~2E-21~~**2E-8** shows two mainline routes  
17 that overlap each other.

18 **Standard:**

19 **Regardless of whether a mainline route originates within a State or crosses into a State from**  
20 **another State, the southernmost or westernmost terminus within that State shall be the beginning point**  
21 **for interchange numbering.**

22 **For circumferential routes, interchange numbering shall be in a clockwise direction. The**  
23 **numbering shall begin with the first interchange west of the south end of an imaginary north-south line**  
24 **bisecting the circumferential route, at a radial freeway or other Interstate route, or some other**  
25 **conspicuous landmark in the circumferential route near a south polar location (see Figure ~~2E-19~~2E-5).**

26 **The interchange numbers on loop routes shall begin at the loop interchange nearest the south or**  
27 **west mainline junction and increase in magnitude toward the north or east mainline junction (see**  
28 **Figure ~~2E-20~~2E-6).**

29 **Spur route interchanges shall be numbered in ascending order starting at the interchange where the**  
30 **spur leaves the mainline route (see Figure ~~2E-20~~2E-7).**

31 **If a circumferential, loop, or spur route crosses State boundaries, the numbering sequence shall be**  
32 **coordinated by the States to provide continuous interchange numbering.**

33 **Where numbered routes overlap, continuity of interchange numbering shall be established for only**  
34 **one of the routes (see Figure ~~2E-21~~2E-8). If one of the routes is an Interstate and the other route is not**  
35 **an Interstate, the Interstate route shall maintain continuity of interchange numbering.**

36 *Guidance:*

37 *The route chosen for continuity of interchange numbering should also have reference location sign*  
38 *continuity (see Figure ~~2E-21~~2E-8).*

### 39 **Figure 2E-4. Examples of Interchange Loops and Spurs**

#### 40 **Figure 2E-5. Example of Interchange Numbering for Mainline and Circumferential Routes**

#### 41 **Figure 2E-6. Example of Interchange Numbering for Mainline and Loop Routes**

#### 42 **Figure 2E-7. Example of Interchange Numbering for Mainline and Spur Routes**

#### 43 **Figure 2E-8. Example of Interchange Numbering for Overlapping Routes**

44 ~~Section 2E.32~~ **Interchange Classification** **This section relocated to new Section 2E.11**

45 ~~Section 2E.33~~ ~~2E.23~~ **Advance Guide Signs (E1 Series)**

46 Support:

47 An Advance ~~Guide~~**guide** sign (see Figure ~~2E-22~~**2E-9**) gives notice well in advance of the exit point of the  
48 principal destinations served by the next interchange and the distance to that interchange.

49 **Standard:**

1 Except as provided in Paragraph 15 of this Section, and in Section 2E.24, at least one Advance guide  
2 sign shall be used for all interchange classifications.

3 *Guidance:*

4 ~~For~~ *At major and intermediate interchanges (see Section 2E.322E.11), at least two Advance Gguide signs*  
5 *should be used, placed at 1/2 mile and at 1 mile in advance of the exit, with a A third Advance Gguide sign*  
6 *should be placed at 2 miles in advance of the exit if spacing permits.*

7 *At minor interchanges, only one the Advance Gguide sign should be used. It should be located 1/2 to 1*  
8 *mile from the exit gore.*

9 Support:

10 Sections 2E.29 through 2E.43 contain additional provisions regarding the number, location, and mounting  
11 of Advance guide signs for certain interchange configurations.

12 *Guidance:*

13 ~~If the~~ *Where an Advance guide sign is located less than 1/2 mile from the exit, the distance displayed*  
14 *should be to the nearest 1/4 mile. Where the distance to be displayed on an Advance guide sign is less than 1/4*  
15 *mile, the distance should be displayed in feet, rather than miles, to the nearest 100 feet. Fractions of a mile,*  
16 *rather than decimals, should be displayed in all cases.* **Moved to next Standard**

17 **Standard:**

18 Fractions of a mile, rather than decimals, shall be displayed in all cases. **Changed from Guidance to**  
19 **Standard**

20 For numbered exits to the right, an Exit Number (E1-5P through E1-5eP) plaque (see Figure 2E-9)  
21 shall be added to the top right-hand edge of the sign.

22 For numbered exits to the left, a Left eExit nNumber (E1-5bP through E1-5kP) plaque (see Figure  
23 2E-222E-9) shall be added directly above to the top left-hand edge of the sign.

24 For non-numbered exits to the left, a LEFT (E1-5amP) plaque (see Figure 2E-222E-9) shall be  
25 added to the top left-hand edge of the sign.

26 **Figure 2E-9. Examples of Interchange Advance Guide Signs, Exit Number Plaques, and LEFT**  
27 **Plaque**

28 *Support:*

29 Section ~~2E.31~~2E-22 contains additional information regarding exit numbering.

30 **Standard:**

31 Advance Gguide signs for multi-lane exits having an optional exit lane that also carries the through  
32 route (see Figures 2E-4 2E-36, 2E-5 2E-37, 2E-82E-42, and 2E-92E-43) and for splits with an option  
33 lane (see Figures 2E-6 2E-38 and 2E-10 2E-44) shall be Overhead Arrow-per-Lane or diagrammatic  
34 signs designed in accordance with Sections 2E.202E.39 through 2E.222E.41.

35 Except as provided in Section 2E.242E.36, the legend on Advance Gguide signs, if used, shall  
36 contain the distance message. Except as provided in Paragraph 8 of this Section For each direction of  
37 travel, the legend on the Advance Gguide signs shall be the same as the legend on the Exit Direction  
38 sign, except that the last line shall be the distance message. The distance message and shall read XX  
39 MILE(S) where exit numbers are used. Where interchange exit numbers are not used, the distance  
40 message shall read EXIT XX MILE(S) for an interchange with one exit ramp, and EXITS XX MILE(S)  
41 for an. If the interchange has with two or more exit ramps, roadways, the bottom line shall read EXITS-  
42 XX MILES.

43 *Guidance:*

44 ~~Where interchange exit numbers are used, the word EXIT(S) should be omitted from the bottom line.~~  
45 **Incorporated into preceding Standard**

46 *Option:*

47 Where the distance between interchanges is more than 1 mile, but less than 2 miles, the first Advance  
48 Gguide sign may be closer than 2 miles, but not placed so as to overlap the signing for the previous exit.  
49 Duplicate Advance Gguide signs or Interchange Sequence Series signs may be placed in the median on the  
50 opposite side of the roadway and are not included in the minimum requirements of interchange signing.

1 Guidance:

2 Where there is less than 800 feet between the theoretical gores of successive interchange entrance or exit  
3 ramps, Interchange Sequence Series signs (see Section ~~2E.40~~2E.24) should be used instead of Advance  
4 ~~G~~guide signs for the affected interchanges.

5 The Advance ~~G~~guide signs for the last exit from a highway before it becomes a facility on which toll  
6 payments are required should include the LAST EXIT BEFORE TOLL (W16-16P) plaque (see Section 2F.10  
7 and Figure 2F-~~34~~). The plaque should be installed above the Advance ~~G~~guide signs, but below the Exit  
8 Number or LEFT plaque, if used.

9 Option:

10 ~~If there is insufficient space above the Advance Guide sign because of the presence of an exit number~~  
11 ~~plaque, the W16-16P plaque may be installed below the Advance Guide sign.~~

12 ~~Section 2E.34 Next Exit Plaques~~ This section relocated to new Section 2E.45

13 ~~Section 2E.35 Other Supplemental Guide Signs~~ This section relocated to new Section 2E.50

14 ~~Section 2E.36 Exit Direction Signs~~ This section relocated to new Section 2E.25

15 ~~Section 2E.37 Exit Gore Signs (E5-1 Series)~~ This section relocated to new Section 2E.26

16 ~~Section 2E.38 Post-Interchange Signs~~ This section relocated to new Section 2E.46

17 ~~Section 2E.39 Post-Interchange Distance Signs~~ This section relocated to new Section 2E.48

18 Section ~~2E.40-2E.24~~ Interchange Sequence Signs (E9-1 Series, E9-2 Series)

19 Option/Support:

20 ~~If~~ Interchanges are sometimes closely spaced, particularly through large urban areas, so that typical guide  
21 signs cannot be adequately spaced. In such cases, Interchange Sequence signs identifying the next two or  
22 three interchanges can provide the necessary exit destination guidance. ~~may be used~~.

23 Guidance:

24 ~~If~~ Where there is less than 800 feet between ~~interchanges~~, the theoretical gores of successive interchange  
25 entrance or exit ramps, Interchange Sequence Series signs (see Section 2E.24) should be used instead of  
26 Advance ~~G~~guide signs for the affected interchanges. **Relocated from below and revised**

27 If used, Interchange Sequence signs should be used over the entire length of a route in an urban area.  
28 Except as provided in Paragraph 3 of this Section, they should not be used on a single interchange basis.

29 ~~If there is less than 800 feet between interchanges, Interchange Sequence signs should be used instead of~~  
30 ~~the Advance Guide signs for the affected interchanges.~~ **Relocated above and revised**

31 Support:

32 Interchange Sequence signs ~~are~~ generally supplemental to Advance ~~G~~guide signs. Signing of this type is  
33 illustrated in Figures ~~2E-30~~ 2E-10 and ~~2E-34~~ 2E-11, and is compatible with the sign spreading concept  
34 described in Paragraph 3 of Section ~~2E.14~~ 2E.43.

35 These signs are installed in a series and display the next two or three interchanges by name or route  
36 number with distances to the nearest 1/4 mile. **Incorporated into following Standard**

37 Standard:

38 Except as provided in Paragraph 3, Interchange Sequence signs, shall be installed in a series.  
39 Interchange Sequence signs shall display the next two or three interchanges by name or route number  
40 with distances to the nearest 1/4 mile.

41 ~~If used, t~~The first Interchange Sequence sign in the series shall be located in advance of the first  
42 Advance ~~G~~guide sign for the first interchange.

43 Where the exit direction is to the left, a LEFT (E11-2) sign panel (see Figure ~~2E-13~~ 2E-18) shall be  
44 displayed on the same line immediately to the right of the interchange name or route number.

45 Interchange Sequence signs shall not be substituted for Exit Direction signs.

46 Guidance:

1 Interchange Sequence signs should be located in the median. After the first of the series, Interchange  
2 Sequence signs should be placed approximately midway between interchanges.

3 **Standard:**

4 Interchange Sequence signs located in the median shall be installed at overhead sign height (see  
5 Section 2A.18).

6 **Option:**

7 Interchange numbers may be displayed to the left of the interchange name or route number.

8 **Figure 2E-10. Examples of an Interchange Sequence Sign**

9 **Figure 2E-11. Example of Use of an Interchange Sequence Sign for Closely Spaced**  
10 **Interchanges**

11 ~~Section 2E.41 Community Interchanges Identification Signs~~ This section relocated to new Section  
12 ~~2E.51~~

13 ~~Section 2E.42 NEXT XX EXITS Sign~~ This section relocated to new Section 2E.52

14 ~~Section 2E.43 Signing by Type of Interchange~~ This section relocated to new Section 2E.29

15 ~~Section 2E.36~~ 2E.25 **Exit Direction Signs (E4 Series)**

16 **Support:**

17 The Exit Direction sign (see Figure ~~2E-26~~ 2E-12) repeats the route and destination information that was  
18 displayed on the Advance ~~G~~guide sign(s) for the next exit, and thereby assures road users of the destination  
19 served and indicates whether they exit to the right or left for that destination.

20 **Standard:**

21 Exit Direction signs shall be used at major and intermediate interchanges. Populations or other  
22 similar information shall not be displayed on Exit Direction signs.

23 *Guidance:*

24 Exit Direction signs should be used at minor interchanges (*see Section 2E.30*).

25 **Support:**

26 Sections 2E.29, 2E.33, 2E.37, 2E.39, and 2E.41 through 2E.43 contain additional provisions regarding the  
27 use, location, and mounting of Exit Direction signs for certain interchange configurations. The placement  
28 location of the Exit Direction sign at the interchange depends on how it is mounted, post-mounted or  
29 overhead, and whether there is a deceleration lane (see Figure 2E-14)

30 *Guidance:*

31 When ~~P~~post-mounted, the Exit Direction signs should be installed at the beginning of the deceleration lane  
32 (see Figure 2E-14). If there is less than 300 feet from the upstream end of the deceleration lane to the  
33 theoretical gore (see Figure 3B-8), the Exit Direction sign should be installed overhead over the exiting lane  
34 in the vicinity of the theoretical gore.

35 **Standard:**

36 Except where Overhead Arrow-per-Lane guide signs are used (see Sections ~~2E.21~~2E.40 and 2E.42,  
37 and Paragraph ~~67~~ of this Section), where a through lane is being terminated (dropped) at an exit, the  
38 Exit Direction sign shall be placed overhead at the theoretical gore (~~see Figures 2E-8 through 2E-11,~~  
39 ~~and 2E-14 through 2E-16~~). (see Figures 2E-18, 2E-19, 2E-26, 2E-34, and 2E-42 through 2E-44).

40 Except as provided in Paragraph 4 ~~in~~ of Section ~~2E.21~~2E.40, where Overhead Arrow-per-Lane  
41 guide signs are used for the Advance ~~G~~guide sign(s) for a multi-lane exit having an optional exit lane  
42 that also carries the through route or for a split with an option lane (see Section ~~2E.21~~2E.40), an  
43 Overhead Arrow-per-Lane guide sign shall also be used instead of the Exit Direction sign. ~~This~~  
44 ~~Overhead Arrow-per-Lane guide sign shall include the appropriate exit number (E1-5P or E1-5bP)~~  
45 ~~plaque (if a numbered exit) and it shall be~~ and located near, but not downstream from, the point where  
46 the outside edge of the dropped lane begins to diverge from the ~~mainline~~ main roadway (see Figures ~~2E-~~  
47 ~~4-2E-36~~ through 2E-6 2E-38). The Overhead Arrow-per-Lane guide sign shall be designed in  
48 accordance with the provisions of Section 2E.40.

1 The following provisions shall govern the design and application of overhead Exit Direction signs:

- 2 A. The sign shall ~~carry~~ display the ~~e~~Exit ~~n~~Number plaque (if exit numbering is used), the route  
3 number, cardinal direction, and destination, as applicable, with a diagonally upward-pointing  
4 directional arrow (see Figure ~~2E-26~~ 2E-12).
- 5 B. The message EXIT ONLY in black on a yellow sign panel (E11-1d or E11-1e) shall be used on  
6 the overhead Exit Direction sign to advise road users of a lane drop situation (see Figures ~~2E-8~~  
7 ~~through 2E-11~~ 2E-42 through 2E-44 and 2E-46). The sign shall comply with the provisions of  
8 Section ~~2E-24~~ 2E-28.

9 **Figure 2E-12. Examples of Interchange Exit Direction Signs**

10 **Figure 2E-13. Examples of Interchange Exit Direction Signs with an Advisory Speed Panel**

11 **Figure 2E-14. Exit Direction Sign Placement**

12 *Guidance:*

13 *For numbered exits to the right, an exit number (E1-5P) plaque (see Figure 2E-22) should be added to the*  
14 *top right-hand edge of the sign. **Incorporated into following Standard***

15 **Standard:**

16 For numbered exits to the right, an Exit Number (E1-5P) plaque (see Figure 2E-9) shall be added to  
17 the top right-hand edge of the sign.

18 For numbered exits to the left, a Left ~~e~~Exit ~~n~~Number (E1-5bP) plaque (see Figure ~~2E-22~~2E-9) shall  
19 be added to the top left-hand edge of the sign.

20 For non-numbered exits to the left, a LEFT (E1-5aP) plaque (see Figure ~~2E-22~~9) shall be added to  
21 the top left-hand edge of the sign.

22 Support:

23 Section ~~2E-31~~2E-22 contains additional information regarding exit numbering.

24 *Option:*

25 ~~In some cases, principally in urban areas, where restricted sight distance because of structures or unusual~~  
26 ~~alignment make it impossible to locate the Exit Direction sign without violating the required minimum~~  
27 ~~spacing (see Section 2E.33) between major guide signs, Interchange Sequence signs (see Section 2E.40) may~~  
28 ~~be substituted for an Advance Guide sign. **Relocated to later in Section**~~

29 *Guidance:*

30 *At multi-exit interchanges, the Exit Direction sign should be located directly over the exiting lane for the*  
31 *first exit, in accordance with this Section. An Advance guide sign for the second exit should be installed At*  
32 *the same location, ~~and normally over the right-hand through lane, an Advance Guide sign for the second exit~~*  
33 *~~should be located.~~ Only for those conditions where the through movement is not evident should a*  
34 *confirmatory message (Pull-Through sign as shown in Figure ~~2E-2~~ 2E-16) be used over the left-hand lane(s)*  
35 *to guide road users traveling through an interchange. In the interest of sign spreading (see Section 2E.43),*  
36 *~~three more than two~~ signs on one structure should not be used. ~~When~~ Where the freeway or expressway is on*  
37 *an overpass, the Exit Direction sign for the second exit should be installed on an overhead support over the*  
38 *exit lane in advance of the gore point, as near as practicable to the theoretical gore.*

39 Where the freeway or expressway passes under the crossroad and the exit roadway is located beyond the  
40 overcrossing structure, the overhead Exit Direction sign for the second exit should be placed either on the  
41 overcrossing structure (see Figures 2E-29 through 2E-31) or on a separate structure located immediately in  
42 front of the overcrossing structure.

43 Option:

44 ~~If the second exit is beyond an underpass, the Exit Direction sign may be mounted on the face of the~~  
45 ~~overhead structure. **Incorporated into preceding Guidance above and reworded**~~

46 Where extra emphasis of an especially low advisory ramp speed is needed, an EXIT XX MPH (E13-2)  
47 sign panel (see Figure ~~2E-27~~2E-13) may be placed at the bottom of the Exit Direction sign to supplement, but  
48 not to replace, the exit or ramp advisory speed warning signs.

49 Warning Beacons in compliance with Paragraph 17 may be used with the E13-2 sign panel.

50 **Standard:**

1 Where Warning Beacons are used in conjunction with the E13-2 sign panel within a guide sign (see  
2 Figure 2E-13), the nearest edges of the beacons shall be placed at least 12 inches from the edges of the  
3 E13-2 sign panel, from the edges of the guide sign, and from any other legend within the guide sign.  
4 The design and operation of Warning Beacons shall otherwise comply with the provisions of Chapter  
5 4L of this Manual.

6 Option:

7 In ~~some~~ cases, ~~principally in urban areas~~, where ~~restricted~~ sight distance is restricted because of structures  
8 or unusual alignment, principally in urban areas, making it impossible to locate the Exit Direction sign  
9 without violating the required minimum spacing (~~see Section 2E.33~~) between major guide signs (see Section  
10 2E.23), Interchange Sequence signs (see Section 2E.4024) may be substituted for an Advance Guide sign.

11 **Relocated from earlier in Section and reworded**

12 *Guidance:*

13 *At the last exit from a highway before it becomes a facility on which toll payments are required, the LAST*  
14 *EXIT BEFORE TOLL (W16-16P) plaque (see Section 2F.10 and Figure 2F-34) should be installed above the*  
15 *Exit Direction sign, but below the Exit Number or LEFT plaque, if used.*

16 ~~Option:~~

17 ~~If there is insufficient space above the Exit Direction sign because of the presence of an Exit Number (E1-~~  
18 ~~5P) plaque, the W16-16P plaque may be mounted below the Exit Direction sign.~~

19 **Section ~~2E.37~~ 2E.26 Exit Gore Signs and Plaque (E5-1 Series)**

20 **Support:**

21 The Exit Gore (~~E5-1 or E5-1a~~) sign (see Figure ~~2E-28~~ 2E-15) in the gore indicates the exiting point or the  
22 place of departure from the main roadway. Consistent application of this sign at each exit is important to  
23 provide adequate visibility of the departure of the exit roadway from the main roadway.

24 **Standard:**

25 The gore shall be defined as the area located between the main roadway and the ramp just beyond  
26 where the ramp branches from the main roadway. ~~The~~ An Exit Gore sign shall be located in the gore  
27 for each ramp that departs from the main roadway of a freeway or expressway and shall ~~carry~~ display  
28 the word EXIT (E5-1) if interchange numbering is not used or EXIT XX (E5-1a, E5-1c) if interchange  
29 numbering is used, and an appropriate upward slanting arrow. If suffix letters are used for exit  
30 numbering at a multi-exit interchange, the suffix letter shall also be included on the Exit Gore sign (E5-  
31 1a, E5-1c) or Exit Gore Number (E5-1bP) plaque and shall be separated from the exit number by a  
32 space having a width of between 1/2 and 3/4 of the height of the suffix letter. Breakaway or yielding  
33 supports shall be used.

34 *Guidance:*

35 *The arrow should be aligned to approximate the angle of departure. Each gore should be treated*  
36 *similarly, whether the interchange has one exit roadway or multiple exits.*

37 **Option:**

38 The Narrow Exit Gore (E5-1c) sign (see Figure 2E-15) may be used in gore areas of limited width where  
39 the width of the Exit Gore (E5-1a) sign would not permit sufficient lateral offset (see Section 2A.1921), such  
40 as for ramp departures that are nearly parallel to the main roadway where the Exit Gore sign would be  
41 mounted on a narrow island or barrier. Where the E5-1c sign is mounted at a height of 14 feet or more from  
42 the roadway, the directional arrow may point diagonally downward. **Relocated from later in this section**

43 *Guidance:*

44 *The E5-1c sign should not be used in gore areas where an E5-1a sign could be installed with sufficient*  
45 *lateral offset.* **Relocated from later in this section**

46 **Option:**

47 Where extra emphasis of an especially low advisory ramp speed is needed, ~~an E13-1P~~ the Confirmation  
48 Advisory Speed (W13-1aP) plaque (see Section 2C.59) indicating the advisory speed may be mounted below  
49 the Exit Gore sign (see Figure ~~2E-28~~ 2E-15) to supplement, but not to replace, the exit or ramp advisory speed  
50 warning signs.

1 To improve the visibility of the gore for exiting drivers, a Type 1 object marker (see Chapter 2C) may be  
2 installed [4 feet above the ground line](#) on each sign support below the Exit Gore sign.

3 An Exit [Gore Number \(E5-1bP\)](#) plaque (see Figure [2E-222E-9](#)) may be installed above an existing Exit  
4 Gore (E5-1) sign when a non-numbered exit is converted to a numbered exit.

5 **Standard:**

6 **An Exit Gore (E5-1a) sign shall be used when the replacement of an existing assembly of an E5-1  
7 sign and an E5-1bP plaque becomes necessary.**

8 **Option:**

9 ~~The Narrow Exit Gore (E5-1c) sign may be used in gore areas of limited width where the width of the  
10 Exit Gore (E5-1a) sign would not permit sufficient lateral offset (see Section 2A.19), such as for ramp  
11 departures that are nearly parallel to the mainline roadway where the Exit Gore sign would be mounted on a  
12 narrow island or barrier. Where the E5-1c sign is mounted at a height of 14 feet or more from the roadway,  
13 the directional arrow may point diagonally downward.~~ **Relocated to earlier in this section**

14 **Guidance:**

15 ~~The E5-1c should not be used in gore areas where an E5-1a sign could be installed with sufficient lateral  
16 offset.~~ **Relocated to earlier in this section**

17 **Figure 2E-15. Exit Gore Signs and Plaques**

18 **Section [2E-12](#) [2E-27](#) Pull-Through Signs (E6-~~2~~,1 Series, E6-2a Series)**

19 **Support:**

20 Pull-Through ([E6-~~2~~,1 series and E6-2a series](#)) signs (see Figure [2E-2](#) [2E-16](#)) are overhead guide signs  
21 intended for through traffic.

22 **Guidance:**

23 *Pull-Through signs should be used where the geometrics of a given interchange are such that it is not  
24 clear to the road user as to which is the through roadway, or where additional route guidance is desired.  
25 Pull-Through signs with down arrows should be used where the alignment of the through lanes is curved and  
26 the exit direction is straight ahead, where the number of through lanes is not readily evident, and at multi-  
27 lane exits where there is a reduction in the number of through lanes. Pull-Through signs should not be used  
28 at exits with options lanes which use Overhead Arrow-Per-Lane or Diagrammatic guide signs.*

29 **Support:**

30 Sections [2E-28](#) and Sections [2E-20](#)[2E-39](#) through [2E-24](#) [2E-42](#) contain information regarding the use of  
31 Overhead Arrow-per-Lane or Diagrammatic guide signs at multi-lane exits where there is a reduction in the  
32 number of through lanes and a through lane becomes an interior option lane for through or exiting traffic.

33 **Figure 2E-16. Pull-Through Signs**

34 **Section [2E-24](#) [2E-28](#) Signing for Interchange Lane Drops**

35 **Standard:**

36 **The provisions of this Section shall only apply to lane drops at exits that do not have an optional exit  
37 lane. At exits that have an optional exit lane in addition to the dropped lane, the provisions of Sections  
38 [2E-20](#)[2E-39](#) through [2E-23](#)[2E-42](#) shall apply.**

39 **Except as provided in Paragraph 13 of this Section, Mmajor guide signs for all lane drops at  
40 interchanges shall be mounted overhead. An EXIT ONLY sign panel shall be used for all interchange  
41 lane drops at which the through route is carried on the ~~mainline~~[main roadway](#).**

42 **Except on Overhead Arrow-per-Lane and Diagrammatic guide signs (See Sections [2E-20](#)[2E-39](#)  
43 through [2E-22](#)[2E-41](#)), the EXIT ONLY (down arrow) (E11-1 or E11-1f) sign panel (see Figure [2E-13](#)[2E-  
44 17](#)) shall be used on all ~~signing of lane drops~~ on all overhead Advance Guide signs [of lane drops](#) (see  
45 Figures [2E-14](#) through [2E-16](#) [2E-18](#), [2E-19](#), and [2E-34](#)). The number of arrows on each sign shall  
46 correspond to the number of dropped lanes at the location of each sign. Placement of the down arrow  
47 shall comply with the provisions of Section [2E-19](#)[2E-18](#).**

1 For lane drops, the Exit Direction sign (see Section ~~2E.36~~2E.25 and Figure ~~2E-26~~2E-12) shall be of  
2 the format shown in Figures ~~2E-15~~ 2E-18 and ~~2E-16~~2E-19. The bottom portion of the Exit Direction  
3 sign shall be yellow with a black border and shall include a diagonally upward-pointing black  
4 directional arrow (left or right) for each lane dropped at the exit, with the sign designed and placed so  
5 that each arrow is located over the approximate center of each lane being dropped. ~~The~~ Except as  
6 provided in Paragraph 5 of this Section, the words EXIT and ONLY shall be positioned to the left and  
7 right, respectively, of the arrow on the E11-1d sign panel for a single-lane drop. For a two-lane drop,  
8 the words EXIT ONLY shall be located between the two arrows on the E11-1e sign panel. The number  
9 of arrows on the sign shall correspond to the number of dropped lanes at the location of the sign.

10 Option:

11 Where an existing sign structure length or adjacent signs constrain the width or placement of the Advance  
12 guide sign on that structure, the down arrow may be positioned to the right or left of the words EXIT ONLY,  
13 in lieu of between the words, to allow for the positioning of the arrow over the approximate center of the lane.  
14 Where the width of the Exit Direction sign extends over the adjacent lane, the directional arrow may be placed  
15 to the right of the words EXIT ONLY for an exit to the right, or to the left of the words EXIT ONLY for an  
16 exit to the left, to allow for the positioning of the arrow over the dropped lane.

17 EXIT ONLY messages of either the combination of E11-1a and E11-1b, or the E11-1c ~~formats~~ sign  
18 panels may be used to retrofit existing signing to warn of a lane drop situation ahead.

19 **Standard:**

20 If used to retrofit an existing ~~Advance Guide~~ guide sign, the E11-1a and E11-1b sign panels (see  
21 Figure ~~2E-13~~ 2E-17) shall be placed on either side of a white down arrow on an Advance guide sign and  
22 on either side of a white directional arrow on an Exit Direction sign. The E11-1c sign panel, if used to  
23 retrofit an existing Advance guide sign, shall be placed between the lower destination message and the  
24 white down arrow.

25 *Guidance:*

26 *Except as provided in Paragraph ~~89~~ of this Section for an auxiliary lane, Advance ~~G~~guide signs for lane*  
27 *drops within 1 mile of the interchange should not ~~contain~~ display the distance message.*

28 *Where the dropped lane is an auxiliary lane that is provided between successive entrance and exit ramps*  
29 *of two separate interchanges and the distance between the two ramps is less than 1 mile, the first Advance*  
30 *~~G~~guide sign in the sequence downstream from the entrance ramp should ~~contain~~ display the distance message.*  
31 *(See Figures ~~2E-20~~ and ~~2E-21~~).*

32 *Where ~~ever~~ the dropped lane carries the through route, signs should be used without the EXIT ONLY sign*  
33 *panel.*

34 **Support:**

35 Figure 2E-20 and 2E-21 shows an example of guide sign for a dropped auxiliary lane between separate  
36 interchanges using overhead and post-mounted guide signs. Figure 2E-22 shows guides signs used for an  
37 auxiliary lane that is ½ mile or longer.

38 Sections ~~2E.20~~2E.39 through ~~2E.23~~2E.42 contain information on the signing of lane drops at exits that  
39 also have an option lane.

40 Section 2B.23 contains information regarding regulatory signs that can also be used for freeway lane drop  
41 situations and Section 2C.43 contains information regarding warning signs that can also be used for freeway  
42 lane drop situations.

#### 43 **Figure 2E-17. EXIT ONLY and LEFT Sign Panels**

44 **Figure 2E-18. Guide Signs for a Single-Lane Exit to the Left with a Dropped Lane**

45 **Figure 2E-19. Guide Signs for a Single-Lane Exit to the Right with a Dropped Lane**

46 **Figure 2E-20. Example of Guide Signs for a Dropped Auxiliary Lane between Separate**  
47 **Interchange Ramps**

48 **Figure 2E-21. Example of Post-Mounted Advance Guide and Supplemental Warning Signs**  
49 **for a Dropped Auxiliary Lane Between Separate Interchange Ramps**

50 **Figure 2E-22. Example of Guide Signs for an Auxiliary Lane One-Half Mile or Longer**

51 **Figure 2E-23. Examples of Signing for Mainline Lane Terminations within an Interchange**

1  
2 Guidance:

3 In limited cases in which conditions are so constrained that it is impossible to locate an Advance guide  
4 sign either overhead or partly over the dropped lane, precluding positioning of the down arrow as provided in  
5 Paragraph 5 of this Section, a sign panel displaying the legend RIGHT (LEFT) LANE ONLY in a black legend  
6 on a yellow background should be substituted for the EXIT ONLY panel on that sign. In such cases, the  
7 Advance guide signs should be alternated with Right Lane for Exit Only (W9-7 series) signs (see Section  
8 2C.43).

9 Where a mainline lane is dropped immediately after an exit ramp, overhead and or post mounted warning  
10 signs should be used to warn traffic as shown in Figure 2E-23.

11 **Section ~~2E.43~~ 2E.29 Signing by Type of Interchange**

12 **Support:**

13 Road users need signs to help identify the location of the exit, as well as to obtain route, direction, and  
14 destination information for specific exit ramps. Figures ~~2E-34 through 2E-40~~ 2E-26 through 2E-33 show  
15 examples of guide signs for common types of interchanges. The interchange layouts shown in most of the  
16 figures illustrate only the major guide signs for one direction of traffic on the freeway and on the exit ramps.  
17 Section 2D.45 contains information regarding the signing of the crossroad approaches and connecting  
18 roadways to freeways and expressways.

19 **Standard:**

20 **Interchange guide signing shall be consistent for each type of interchange along a route.**

21 **Guidance:**

22 The signing layout for all interchanges of the same type having only one exit ramp in the direction of  
23 travel should be similar, regardless of the interchange type. For the sake purpose of uniform application, the  
24 significant features of the signing plan for each of the more frequent kinds of interchanges (illustrated in  
25 Figures ~~2E-34 through 2E-40~~ 2E-26 through 2E-33) should be followed as closely as possible. Even when  
26 unusual geometric features exist, variations in signing layout should be held to a minimum.

27 Where a single interchange combines a different type of ramp configuration for each direction of travel,  
28 the main roadway major guide signing should be determined by the specific interchange type for that  
29 direction of travel.

30 **Support:**

31 Figure 2E-24 shows an example of signing for a complex interchange that combines intermediate  
32 interchange ramps within a major interchange.

33 Figure 2E-25 shows an example of signing for an interchange exit ramp with a downstream split.

34 **Figure 2E-24. Example of Signing for an Intermediate Interchange within a Major**  
35 **Interchange**

36 **Figure 2E-25. Example of Signing for an Interchange Exit Ramp with a Downstream Split**

37 **~~Section 2E.44 Freeway-to-Freeway Interchange~~ This section has been relocated to new Section**  
38 **~~2E.37.~~**

39 **~~Section 2E.45 Cloverleaf Interchange~~ This section has been relocated to new Section 2E.33.**

40 **~~Section 2E.46 Cloverleaf Interchange with Collector-Distributor Roadways~~ This section has**  
41 **~~been relocated to new Section 2E.34.~~**

42 **~~Section 2E.47 Partial Cloverleaf Interchange~~ This section has been relocated to new Section 2E.35.**

43 **~~Section 2E.48 Diamond Interchange~~ This section has been relocated to new Section 2E.31.**

44 **~~Section 2E.49 Diamond Interchange in Urban Area~~ This section has been relocated to new Section**  
45 **~~2E.32.~~**

1 ~~Section 2E.50 – Closely-Spaced Interchanges~~ This section has been relocated to new Section 2E.44.

2 **Section ~~2E.51–2E.30~~ Minor Interchange**

3 Option:

4 Less signing may be used for minor interchanges because such interchanges customarily serve low  
5 volumes of local traffic.

6 Support:

7 Examples of guide signs for minor interchanges are shown in Figure ~~2E-40~~ 2E-26.

8 **Standard:**

9 In accordance with the provisions of Sections 2E.23, A **at least one Advance Guide sign and an Exit  
10 Gore sign shall be used at a minor interchange.**

11 *Guidance:*

12 *An Exit Direction sign in compliance with Section 2E.25 should also be used.*

13 **Figure 2E-26. Examples of Guide Signs for a Minor Interchange**

14 **Section ~~2E.48~~ 2E.31 Diamond Interchange**

15 Support:

16 Examples of guide signs for diamond interchanges are shown in Figure ~~2E-38~~ 2E-27.

17 **Standard:**

18 ~~For numbered exits, the singular message EXIT shall be used on the Exit Number plaques (see  
19 Section 2E.31) with the Advance Guide and Exit Direction signs. For non-numbered exits, the singular  
20 message EXIT shall be used as part of the distance message on the Advance Guide signs.~~

21 **Support:**

22 The typical diamond interchange ramp departs from the main ~~line~~ roadway such that a speed reduction  
23 generally is not necessary in order for a driver to negotiate an exit maneuver from the main ~~line~~ roadway onto  
24 the ramp roadway. Section 2C.14 contains the provisions for the use of an Advisory Exit Speed (W13-2) sign  
25 where a speed reduction is necessary.

26 *Guidance:*

27 *When a speed reduction is not necessary, an Advisory exit-Exit speed-Speed sign should not be used.*

28 **Option:**

29 ~~An Advisory Exit Speed sign may be used where an engineering study shows that it is necessary to  
30 display a speed reduction message for ramp signing (see Section 2C.14).~~

31 *Guidance:*

32 *The Advisory Exit Speed sign, if used, should be located along the deceleration lane or along the ramp  
33 such that it is visible to the driver far enough in advance to allow the driver to decelerate before reaching the  
34 curve associated with the exiting maneuver. Use and placement of the Advisory Exit Speed sign should  
35 otherwise comply with Section 2C.14 of this Manual.*

36 Option:

37 A Stop Ahead (W3-1) or Signal Ahead (W3-3) warning sign may be placed, where engineering judgment  
38 indicates a need, along the ramp in advance of the cross street, to give notice to the driver (see Section 2C.36).

39 *Guidance:*

40 *When used on two-lane ramps, Stop Ahead or Signal Ahead signs should be used in pairs with one sign on  
41 each side of the ramp.*

42 Where the exit ramp allows traffic to turn in either direction onto the crossroad, a Destination (D1 series)  
43 sign (see Section 2D.37) should be placed along the ramp that include each destination displayed on the  
44 Advance, Exit Direction, and Supplemental guide signs along the main roadway for that exit.

45 **Figure 2E-27. Examples of Guide Signs for a Diamond Interchange**

1 **Section ~~2E.49~~ 2E.32 Diamond Interchange in Urban Area**

2 Support:

3 Examples of guide signs for diamond interchanges in an urban area are shown in Figure ~~2E-39~~ 2E-28.  
4 This example includes the use of the Community Interchanges Identification sign (see Section ~~2E.44~~2E.51),  
5 which might be useful if two or more interchanges serve the same community.

6 In urban areas, street names are often displayed as the principal message in destination signs.

7 Option:

8 If interchanges are too closely spaced to ~~properly~~ locate the Advance Guide signs at the distances  
9 specified in Section 2E.23, they may be placed closer to the exit with the distances displayed adjusted  
10 accordingly.

11 **Figure 2E-28. Examples of Guide Signs for a Diamond Interchange in an Urban Area**

12 **Section ~~2E.45~~ 2E.33 Cloverleaf Interchange**

13 Support:

14 A cloverleaf interchange has two exits for each direction of travel. The exits are closely spaced and have  
15 common Advance Guide signs. Examples of guide signs for cloverleaf interchanges are shown in Figure ~~2E-~~  
16 ~~35~~ 2E-29.

17 *Guidance:*

18 *The Advance Guide signs should include two place names, one corresponding to each exit ramp, with the*  
19 *name of the place served by the first exit on the upper line.*

20 **Standard:**

21 An overhead guide sign assembly shall be placed at the theoretical gore of the first exit ramp, with a  
22 ~~diagonally upward-pointing directional arrow on the~~ an Exit Direction sign for that exit and ~~the~~ an  
23 ~~message XX MILES, or EXIT XX MILES if interchange numbering is not used, on the~~ Advance  
24 ~~G~~ guide sign for the second exit, as shown in Figure ~~2E-35~~2E-29. The second exit shall be indicated by  
25 an overhead Exit Direction sign over the auxiliary lane. ~~An Exit Gore sign shall also be used at each~~  
26 ~~gore (see Section 2E.37).~~

27 Interchanges with more than one exit from the main line roadway shall be numbered as described  
28 in Section ~~2E.34~~2E.22 with an appropriate suffix.

29 Diagrammatic signs shall not be used for cloverleaf interchanges except as otherwise provided in  
30 Section ~~2E.22~~2E.41.

31 *Guidance:*

32 *Where the ~~mainline~~ main roadway passes under the crossroad and the exit roadway is located beyond the*  
33 *overcrossing structure, placement of the overhead Exit Direction sign for the second exit should be placed*  
34 *~~either on the overcrossing structure~~ comply with Section 2E.25 (see Figure ~~2E-35~~2E-29) ~~or on a separate~~*  
35 *~~structure located immediately in front of the overcrossing structure.~~*

36 **Figure 2E-29. Examples of Guide Signs for a Full Cloverleaf Interchange**

37 **Section ~~2E.46~~ 2E.34 Cloverleaf Interchange with Collector-Distributor Roadways**

38 Support:

39 Examples of guide signs for full cloverleaf interchanges with collector-distributor roadways are shown in  
40 Figure ~~2E-36~~2E-30.

41 *Guidance:*

42 *Signing on the collector-distributor roadways should be the same as the signing on the ~~mainline~~ main*  
43 *roadway of a cloverleaf interchange.*

44 **Standard:**

45 **Guide-Exit Direction signs at exits from the collector-distributor roadways shall be overhead and**  
46 **located at the theoretical gore of the collector-distributor roadway and the exit ramp.**

1 Option Guidance:

2 Exits from the collector-distributor roadways ~~may~~ should be numbered with an appropriate suffix. If the  
3 exits from a collector-distributor roadway are numbered ~~with suffixes~~, the Advance ~~G~~ guide and Exit Direction  
4 signs on the ~~mainline-main roadway~~ ~~may~~ should include, in addition to two place names, ~~and~~ their  
5 corresponding exit numbers ~~and suffixes~~ with the plural EXITS in the Exit Number (E1-5P series) plaque. If  
6 only the exit from the ~~mainline~~ roadway is numbered, the Advance guide and Exit Direction signs on the main  
7 roadway should use the singular EXIT in the Exit Number plaque. ~~or~~ If interchange numbering is not used,  
8 the Advance Guide signs on the mainline-main roadway may should use the singular EXIT in the distance  
9 messages.

10 **Figure 2E-30. Examples of Guide Signs for a Full Cloverleaf Interchange with Collector-**  
11 **Distributor Roadways**

12 **Section ~~2E.47~~ 2E.35 Partial Cloverleaf Interchange**

13 Support:

14 Examples of guide signs for partial cloverleaf interchanges are shown in Figure ~~2E-37~~ 2E-31.

15 Guidance:

16 For a partial cloverleaf with only one exit roadway in a direction of travel, ~~Where~~ the mainline-main  
17 roadway passes under the crossroad and the exit roadway is located beyond the overcrossing structure, the  
18 overhead Exit Direction sign should be placed either on the overcrossing structure (see Figure ~~2E-37~~ 2E-31)  
19 or on a separate structure located immediately in front of the overcrossing structure.

20 **Standard:**

21 **~~A post-mounted Exit Gore sign shall also be installed in the ramp gore.~~**

22 Support:

23 Partial cloverleaf interchanges with successive exit ramps from the same direction of travel are signed the  
24 same as cloverleaf interchanges for that direction of travel (see Section ~~2E.45~~ 2E.33).

25 **Figure 2E-31. Examples of Guide Signs for a Partial Cloverleaf Interchange**

26 **Section 2E.36 Collector-Distributor Roadways for Successive Interchanges**

27 Support:

28 Examples of guide signs for a collector-distributor roadway that provides access to multiple interchanges  
29 are shown in Figure 2E-32.

30 Guidance:

31 Where access to successive interchanges is provided from a single collector-distributor roadway, the  
32 number of lines of destination information displayed on the major guide signs on the main roadway approach  
33 to the collector-distributor roadway should comply with the provisions of Section 2E.15. Where additional  
34 destinations are to be displayed on the main roadway, those destinations should be displayed on Supplemental  
35 guide signs (see Section 2E.50) on the approach to the collector-distributor roadway.

36 Where exit numbering is used, the exit numbers for exits accessed from the collector-distributor roadway  
37 should be displayed on the main roadway guide signs.

38 An Exit Gore sign (see Section 2E.26) should be placed in the gore where collector-distributor roadway  
39 departs from the main roadway.

40 Interchange guide signing along the collector-distributor roadway should comply with the provisions for  
41 interchange signing in this Chapter.

42 If services are available from more than one of the interchanges along the collector-distributor roadway  
43 and those services are signed, then General Service signs should be used on the main roadway in compliance  
44 with the provisions of Chapter 2I of this Manual. Services signed along the collector-distributor roadway  
45 should use either General Service signs or Specific Service signs in compliance with the provisions of  
46 Chapters 2I and 2J of this Manual.

1 **Figure 2E-32. Examples of Guide Signs for Successive Interchanges with collector-Distributor**  
2 **Roadways (2 Sheets)**

3 **Section ~~2E.44~~ 2E.37 Freeway-to-Freeway Interchange**

4 Support:

5 Freeway-to-freeway interchanges are major decision points where the effect of taking a wrong ramp  
6 cannot be easily corrected. Reversing direction on the connecting freeway or reentering to continue on the  
7 intended course is usually not possible. Figure 2E-~~34~~ 33 shows examples of guide signs at a freeway-to-  
8 freeway interchange.

9 *Guidance:*

10 *The sign messages should contain only the route shield, cardinal direction, and the name of the next*  
11 *control city on the route. Arrows should point as indicated in Section 2D.08, except where Overhead Arrow-*  
12 *per-Lane or Diagrammatic signs are used in accordance with the provisions of Sections ~~2E.20~~ 2E.39 through*  
13 *~~2E.22~~ 2E.41.*

14 Support:

15 At splits where the off-route movement is to the left or where there is an optional lane split, expectancy  
16 problems usually result.

17 **Standard:**

18 At splits where the off-route movement is to the left, [see Section 2E.22 for the use of the Left Exit](#)  
19 [Number \(E1-5b\) \(E1-5kP\) plaque.](#) ~~shall be added at the top left hand edge of the guide sign (see~~  
20 ~~Section 2E.31). Overhead Arrow-per-Lane or Diagrammatic guide signs (see Sections 2E.21 and 2E.22)~~  
21 ~~shall be used if~~ For freeway splits with an option lane and for multi-lane freeway-to-freeway exits having an  
22 option lane, [see Section 2E.39 for use of Overhead Arrow-per-lane or Diagrammatic guide signs.](#)

23 **Standard:**

24 The roadway for the off-route shall be signed as an exit. If exit numbering is used, the signs shall  
25 comply with the provisions of Section 2E.22. Distance messages on the Advance guide signs shall  
26 comply with the provisions of Section 2E.23.

27 Overhead signs shall be used at a distance of 1 mile and at the theoretical gore of each connecting  
28 ramp, [except as provided in Sections 2E.40 and 2E.41.](#) When Overhead Arrow-per-Lane or  
29 Diagrammatic guide signs are used, they shall comply with the provisions of Sections ~~2E.21~~ 40 and  
30 ~~2E.22~~ 41.

31 Option:

32 ~~The Advance guide Overhead signs may also be used~~ at the 1/2-mile and 2-mile locations [may also be](#)  
33 [overhead-mounted.](#)

34 ~~The arrow and/or the name of the control city may be omitted on signs that indicate the straight-ahead~~  
35 ~~continuation of a route on a Pull-Through sign (see Section 2E.12).~~

36 *Guidance:*

37 *An Advisory Exit Speed (W13-2) sign ~~may~~ should be used where an engineering study shows that it is*  
38 *necessary to display a speed reduction message for ramp signing (see Section 2C.14).*

39 ~~Where extra emphasis of an especially low advisory ramp speed is needed, an EXIT XX MPH (E13-2)~~  
40 ~~sign panel (see Figure 2E-27) may be placed at the bottom of the Exit Direction sign to supplement, but not to~~  
41 ~~replace, the exit or ramp advisory speed warning signs.~~

42 **Figure 2E-33. Examples of Guide Signs for a Freeway-to-Freeway Interchange**

43 **Section 2E.38 Freeway Split with Dedicated Lanes**

44 **Standard:**

45 Signing for freeway splits with dedicated lanes shall use the sign designs shown in Figure 2E-34.  
46 The arrows on each Advance Guide sign shall match the number of lanes present at the location of  
47 the Advance Guide sign.

48 The signs for this application shall be mounted overhead. When arrows are used, each arrow shall  
49 be located over the approximate center of the lane to which it applies.

1 Where one roadway of the split carries the through route, the other roadway of the split shall be  
2 signed as an exit. If exit numbering is used, the signs shall comply with the provisions of Section 2E.22.  
3 Distance messages on the Advance guide signs shall comply with the provisions of Section 2E.23.

4 The number and location of Advance guide signs shall comply with the provisions of Section 2E.23.  
5 *Guidance:*

6 *The Exit Direction and Pull-Through signs should be located at the theoretical gore.*

7 *The Exit Direction and Pull Through signs should display down arrows if the alignment is straight or*  
8 *diagonally upward pointing directional arrows if the alignment is curved (see Section 2D.08).*

9 **Standard:**

10 The Exit Direction sign shall contain the EXIT ONLY (E11-I series) sign panel (see Section 2E.28).

### 11 **Figure 2E-34. Guide Signs for a Split with Dedicated Lanes**

#### 12 **Section ~~2E.20~~2E.39 Signing for Option Lanes at Splits and Multi-Lane Exits**

13 Support:

14 Some freeway and expressway splits or multi-lane exit interchanges contain an interior option lane  
15 serving both movements in which traffic can either leave the route or remain on the route, or choose either  
16 destination at a split, from the same lane.

17 **Standard:**

18 **On freeways and expressways, either the Overhead Arrow-per-Lane or Diagrammatic guide sign**  
19 **designs as provided in Sections ~~2E.21~~2E.40 and ~~2E.22~~2E.41 shall be used for all multi-lane exits at**  
20 **major interchanges (see Section ~~2E.32~~2E.11) that have an optional exit lane that also carries the**  
21 **through route (see Figures ~~2E-4, 2E-5, 2E-8, and 2E-9~~ 2E-36, 2E-37, 2E-42, and 2E-43) and for all splits**  
22 **that include an option lane (see Figures ~~2E-6~~ 2E-38 and ~~2E-10~~2E-44). Overhead Arrow-per-Lane or**  
23 **Diagrammatic guide signs shall not be used on freeways and expressways for any other types of exits or**  
24 **splits, including single-lane exits and splits that do not have an option lane.**

25 *Guidance:*

26 *The Overhead Arrow-per-Lane guide sign design (see Section ~~2E.21~~2E.40) should also be considered for*  
27 *multi-lane exits with an option lane at intermediate interchanges (see Section ~~2E.32~~ 2E.11) based on such*  
28 *factors as the extent of the need to optimize the mainline operation by maximizing the usage of the option*  
29 *lane, the extent of the period(s) of the day during which the exiting volumes warrant the multi-lane exit*  
30 *arrangement, and the nature of the traffic that primarily uses the option lane during the high-volume periods.*

31 *Signing for multi-lane exits at minor interchanges (see Section ~~2E.32~~2E.11) that have an optional exit*  
32 *lane or at intermediate interchanges that have an optional exit lane at which it has been determined that the*  
33 *Overhead Arrow-per-Lane guide sign design is not warranted should use a combination of conventional guide*  
34 *signing and regulatory lane-use signing, in accordance with the provisions of Section ~~2E.23~~2E.42.*

#### 35 **Section ~~2E.21~~2E.40 Design of Overhead Arrow-per-Lane Guide Signs for Option Lanes**

36 Support:

37 Overhead Arrow-per-Lane guide signs (see Figure ~~2E-3~~ 2E-35) are used where an option lane is present at  
38 freeway and expressway multi-lane exit interchanges and splits. They display an upward-pointing arrow  
39 above each lane that conveys the direction(s) of travel that the lane serves at the point of departure. At  
40 locations where an option lane is present at a multi-lane exit or split, Overhead Arrow-per-Lane guide signs  
41 have been shown to be superior to either conventional guide signs or Diagrammatic guide signs because they  
42 convey positive direction about which destination and direction each approach lane serves, particularly for the  
43 option lane, which is otherwise difficult to clearly sign.

44 **Standard:**

45 **Overhead Arrow-per-Lane guide signs as provided in Section 2E.39 shall be used ~~on~~ at all new or**  
46 **reconstructed freeways and expressways locations and at freeway and expressway locations where**  
47 **replacement of an existing sign support structure is necessitated by reconstruction, as described in**  
48 **Section ~~2E.20~~2E.39.**

1 Where used, the Overhead Arrow-per-Lane guide sign at the exit or split shall be located at or in  
2 the immediate vicinity of the point where the exiting lanes begin to diverge from the through lanes or,  
3 for a split, at the point where the approach lanes begin to diverge from one another, preserving the  
4 relation of the arrows displayed on the sign to their respective lanes. The Overhead Arrow-per-Lane  
5 guide sign at the exit shall not be located at or near the theoretical gore.

6 Option:

7 At existing or non-reconstructed locations where an overhead Exit Direction ~~and Pull-Through~~ signs  
8 exists at the theoretical gore, and the existing sign support structure is retained, the overhead Exit Direction  
9 sign may remain ~~in place, or may be replaced on the existing sign support structure~~ ~~continuing to use Exit~~  
10 ~~Direction and Pull-Through signs~~; in conjunction with a replacement of the advance signs using the Overhead  
11 Arrow-per-Lane guide sign design.

12 **Standard:**

13 **If existing Exit Direction and Pull-Through signs are being retained at an interchange as provided**  
14 **in Paragraph 4, an Overhead Arrow-per-Lane guide sign shall not be used at the location of the Exit**  
15 **Direction and Pull-Through signs at or in the vicinity of the theoretical gore. New installations of Exit**  
16 **Direction and Pull-Through signs shall not be permitted in conjunction with Overhead Arrow-per-Lane**  
17 **guide signs on new or reconstructed facilities.**

18 Option:

19 For unusually long gore areas with narrow lane marking tapers, signs indicating the destinations allowed  
20 by each lane may be added to reinforce positive guidance (See Figure 2E-39).

21 *Guidance:*

22 *Overhead Arrow-per-Lane guide signs should be located at approximately 1/2 mile and 1 mile in advance*  
23 *of the exit or split, and at approximately 2 miles in advance of the exit or split where space is available and*  
24 *conditions allow.*

25 **Standard:**

26 **Overhead Arrow-per-Lane guide signs used on freeways and expressways shall include one arrow**  
27 **above each lane and shall be designed in accordance with the following criteria:**

- 28 **A. The sign shall include an upward-pointing arrow for each lane of the approach to the split or**  
29 **exit, and the shaft of each arrow shall be located ~~approximately~~ over the approximate center of**  
30 **the lane to which it applies.**
- 31 **B. Arrows for continuing through lanes shall be vertically upward pointing (see Figure ~~2E-4~~ 2E-**  
32 **36) unless those lanes are on a significantly curved alignment beyond the theoretical gore, in**  
33 **which case the arrows for the continuing through lanes shall indicate the approximate degree of**  
34 **curvature at the point of departure (see Figure ~~2E-5~~ 2E-37).**
- 35 **C. The arrow for a lane that must exit shall be curved in the direction of the exit and shall be**  
36 **accompanied by black-on-yellow EXIT (E11-1a) and ONLY (E11-1b) sign panels adjacent to**  
37 **the lower end of the arrow shaft. The E11-1a and E11-1b sign panels shall not be used for a**  
38 **split of two overlapping routes where neither of the diverging routes is designated as an exit.**  
39 **Where the through lanes curve and the exit continues on a straight alignment, upward-pointing**  
40 **vertical arrows shall be used for the exiting movement and curved arrows for the through**  
41 **movement.**
- 42 **D. The arrow for an optional exit lane that also carries the through route shall have a single shaft**  
43 **that bifurcates into a vertically upward-pointing arrow and a curving arrow corresponding to**  
44 **the configuration of the through and exit lanes.**
- 45 **E. For splits with an option lane, the arrow for the lane from which either direction of the split can**  
46 **be accessed shall have a single shaft that bifurcates into two upward-pointing curving arrows**  
47 **showing the approximate degrees of curvature of the two roadways beyond the theoretical gore**  
48 **(see Figure ~~2E-6~~ 2E-38).**
- 49 **F. A vertical white line shall be used to separate the route shields and destinations for the two**  
50 **diverging movements from each other.**
- 51 **G. The distance to the exit or split shall be displayed below the off-movement destination on the**  
52 **advance signs at the 1-mile and 2-mile locations.**

- 1 H. The number of lanes displayed on a sign shall correspond to the number of lanes at the location  
2 of that sign. An advance sign shall not depict lanes that are added downstream of a sign  
3 location.  
4 I. For numbered exits, the Exit Number (E1-5P) or Left Exit Number (E1-5bP) plaque shall be  
5 used at the top of the sign in accordance with Section ~~2E-31~~2E.23. For unnumbered left exits,  
6 the LEFT (E1-5aP) plaque shall be used at the top left edge of the sign.

7 *Guidance:*

8 *Overhead Arrow-per-Lane guide signs used on freeways and expressways should be designed in*  
9 *accordance with the following additional criteria:*

- 10 A. No more than one destination should be displayed for each movement, and no more than two  
11 destinations should be displayed per sign.  
12 B. The arrowhead(s) for the diverging movement should be positioned lower on the sign than the  
13 arrowhead(s) for the movement that continues straight ahead, independent of which movement carries  
14 the through route. Where the movements are freeway or expressway splits rather than exits, the  
15 arrowheads should be positioned at approximately the same height on the sign.  
16 C. Route shields, cardinal directions, and destinations should be positioned on the sign such that they  
17 are clearly related to the arrowhead(s) for the movement to which they apply.  
18 D. The cardinal direction should be placed adjacent to the route shield for exits or splits leading in a  
19 single cardinal direction.  
20 E. The vertical white line that is used to separate the route shields and destinations for the two diverging  
21 movements from each other should not descend below the top of the arrowheads for the through  
22 lanes, and should be positioned approximately halfway between the diverging arrowheads for the  
23 optional movement lane (see Figure ~~2E-32~~2E-35).

24 **Standard:**

25 **Overhead Arrow-per-Lane guide signs shall not be used to depict a downstream split of an exit**  
26 **ramp on a sign located on the mainline.**

27 **Support:**

28 Specific guidelines for more detailed design of Overhead Arrow-per-Lane guide signs are contained in the  
29 “Standard Highway Signs ~~and Markings~~” ~~book~~publication (see Section 1A.11).

30 **Option:**

31 Where extra emphasis of an especially low advisory ramp speed is needed, an EXIT XX MPH (E13-2)  
32 sign panel (see Figure ~~2E-27~~2E-13) may be placed below the applicable destination legend to supplement, but  
33 not to replace, the exit or ramp advisory speed warning signs.

34 Warning Beacons in compliance with the provisions of Section 2E.25 may be used with the E13-2 sign  
35 panel.

36 **Figure 2E-35. Overhead Arrow-per-Lane Guide Sign for a Multi-Lane Exit with an Option**  
37 **Lane**

38 **Figure 2E-36. Overhead Arrow-Per-Lane Guide Signs for a Two-Lane Exit to the Right with**  
39 **an Option Lane**

40 **Figure 2E-37. Overhead Arrow-Per-Lane Guide Signs for a Two-Lane Exit to the Right with**  
41 **an Option Lane (Through Lanes Curve to the Left)**

42 **Figure 2E-38. Overhead Arrow-Per-Lane Guide Signs for a Split with an Option Lane**

43 **Figure 2E-39. Use of Overhead Arrow-per-Lane and Exit Direction Signs for Option Lane**  
44 **with a Narrow Gore and Long Divergence**

45 **Figure 2E-40. Use of Overhead Arrow-per-Lane and Exit Direction Signs for Option Lane**  
46 **with a Narrow Gore and Long Divergence where Through Route Curves and Exit Continues**  
47 **Straight**

48 **Section ~~2E-22~~2E.41 Design of Freeway and Expressway Diagrammatic Guide Signs for Option**  
49 **Lanes**

1 **ALTERNATE PROPOSAL FOR SECTION 2E.22: As an alternative to the following changes**  
2 **proposed to existing Section 2E.22 (proposed Section 2E.41), the Section would be deleted**  
3 **in its entirety for purposes of depicting specific lane use in freeway and expressway**  
4 **applications. References throughout other Sections would be deleted accordingly.**  
5 **Additional information on the alternate proposal is included in the Preamble for this**  
6 **Section.**

7 Support:

8 Diagrammatic guide signs (see Figure ~~2E-7~~ 2E-41) are guide signs that show a simplified graphic view of  
9 the exit arrangement in relationship to the main highway. While the use of such guide signs might be helpful  
10 for the purpose of conveying relative direction of each movement, Diagrammatic guide signs have been  
11 shown to be less effective than conventional or Overhead Arrow-per-Lane guide signs at conveying the  
12 destination or direction(s) that each approach lane serves, regardless of whether dedicated or option lanes are  
13 present.

14 **Standard:**

15 Diagrammatic guide signs shall be designed in accordance with the following criteria~~Diagrammatic~~  
16 ~~guide signs used where an option lane is present at a freeway or expressway split or multi-lane exit shall~~  
17 ~~be designed in accordance with the following criteria:~~

- 18 A. The graphic legend shall be of a plan view showing the off-ramp arrangement.
- 19 B. No other symbols or route shields shall be used as a substitute for arrowheads.
- 20 C. They shall not be installed at the Exit Direction sign location (see Section ~~2E-36~~ 2E-25).
- 21 D. The EXIT ONLY sign panel shall not be used on diagrammatic guide signs in advance of the  
22 interchange.
- 23 E. For numbered exits, the Exit Number (E1-5P) or Left Exit Number (E1-5bP) plaque shall be  
24 used at the top of the sign in accordance with Section ~~2E-31~~ 2E-22. For unnumbered left exits,  
25 the LEFT (E1-5aP) plaque shall be used at the top left edge of the sign.
- 26 F. The EXIT ONLY (E11-1e or E11-1f) sign panels shall be used on the Exit Direction sign at the  
27 theoretical gore, except at splits of two overlapping routes where neither of the routes is  
28 designated as an exit.

29 *Guidance:*

30 *Diagrammatic guide signs used on freeways and expressways should be designed in accordance with the*  
31 *following additional criteria:*

- 32 A. *The graphic should not depict deceleration lanes.*
- 33 B. *No more than one destination should be displayed for each movement, and no more than two*  
34 *destinations should be displayed per sign.*
- 35 C. *The arrowhead for the diverging movement should be positioned lower on the sign than the*  
36 *arrowhead for the movement that continues straight ahead, independent of which movement carries*  
37 *the through route (see Figures ~~2E-8~~ 2E-42 and ~~2E-9~~ 2E-43). Where the movements are freeway or*  
38 *expressway splits rather than exits, the arrowheads should be positioned at approximately the same*  
39 *height on the sign (see Figure ~~2E-10~~ 2E-44).*
- 40 D. *Arrow shafts should contain lane lines.*
- 41 E. *Route shields, cardinal directions, and destinations should be positioned on the sign such that they*  
42 *are clearly related to the arrowhead(s), and the arrowhead for the off movement should point toward*  
43 *the route shield for the off movement.*
- 44 F. *For exits or splits leading in a single direction, the cardinal direction should be placed adjacent to*  
45 *the route shield, and the destination should be placed below the route shield and cardinal direction.*

46 **Standard:**

47 **Diagrammatic guide signs shall not be used at cloverleaf interchanges for the purpose of depicting**  
48 **successive departures from the mainline or separate downstream departures from a collector-**  
49 **distributor roadway. The use of Diagrammatic guide signs at cloverleaf interchanges shall be limited to**  
50 **the following cases:**

- 51 A. **Where the outer (non-loop) exit ramp of the cloverleaf is a multi-lane exit having an optional**  
52 **exit lane that also carries the through route; and**

1 B. At cloverleaf interchanges that include collector-distributor roadways, such as those illustrated  
2 in Figure ~~2E-36~~2E-30, that are accessed from the mainline by a multi-lane exit having an  
3 optional exit lane that also carries the through route. In this case, the Diagrammatic guide sign  
4 shall only show the configuration of the lanes at the exit point to the collector-distributor  
5 roadway and not the entire interchange configuration.

6 Diagrammatic guide signs shall not be used to depict a downstream split of an exit ramp on a sign  
7 located on the main roadway.

8 Support:

9 Specific guidelines for more detailed design of Diagrammatic guide signs are contained in the “Standard  
10 Highway Signs ~~and Markings~~” ~~book~~ publication (see Section 1A.11).

11 Option:

12 Where extra emphasis of an especially low advisory ramp speed is needed, an EXIT XX MPH (E13-2)  
13 sign panel (see Figure ~~2E-27~~2E-13) may be placed below the applicable destination legend to supplement, but  
14 not to replace, the exit or ramp advisory speed warning signs.

15 Warning Beacons in compliance with the provisions of Section 2E.25 may be used with the E13-2 sign  
16 panel.

17 **Figure 2E-41. (Existing Figure 2E-7) Diagrammatic Guide Sign for a Multi-Lane Exit with an**  
18 **Option Lane**

19 **Figure 2E-42 (Existing Figure 2E-8) Diagrammatic Guide Signs for a Two-Lane Exit to the**  
20 **Right with an Option Lane**

21 **Figure 2E-43 (Existing Figure 2E-9) Diagrammatic Guide Signs for a Two-Lane Exit to the**  
22 **Right with an Option Lane (Through Lane Curve to the Left)**

23 **Figure 2E-44 (Existing Figure 2E-10). Diagrammatic Guide Signs for a Split with an Option**  
24 **Lane**

## 25 **Section ~~2E.23~~2E.42 Signing for Intermediate and Minor Interchange Multi-Lane Exits with an** 26 **Option Lane**

27 Support:

28 Intermediate and minor multi-lane exits might have an operational need for the presence of an option lane  
29 for only the peak period during which excessive queues might otherwise develop if the option lane were not  
30 available. In such cases, the Overhead Arrow-per-Lane or Diagrammatic guide signing described for option  
31 lanes in Sections ~~2E.21~~2E.40 and ~~2E.22~~2E.41 might not be practical, depending on the level of use of the  
32 option lane and the spacing of nearby interchanges, particularly in non-rural areas.

33 *Guidance:*

34 Signing for an intermediate or minor interchange that has a multi-lane exit with an option lane that also  
35 carries the through route should use a modified form of the Overhead Arrow-per-Lane guide signs. The  
36 modified Overhead Arrow-per-Lane signs should display upward pointing arrows only for the optional and  
37 mandatory exit lanes (see Figure 2E-45). The legend displayed for the exit movement should be clearly  
38 aligned with the arrows pointing in the direction of the exit and not with the arrow depicting the through  
39 movement over the option lane.

40 **Standard:**

41 **The through route and/or destination shall not be displayed on the modified Overhead Arrow-per-**  
42 **Lane guide sign to avoid the implication that the through route is restricted to the option lane.**

43 **Modified Overhead Arrow-per-Lane signs shall be located in compliance with the provisions of**  
44 **Section 2E.40 for unmodified Overhead Arrow-Per-Lane signs (see Figures 2E-46 and 2E-47).**

45 **Option:**

46 At existing or non-reconstructed locations where an overhead Exit Direction sign exists at the theoretical  
47 gore, and the existing sign support structure is retained, the overhead Exit Direction sign may remain or may  
48 be replaced on the existing sign support structure in conjunction with a replacement of the advance signs using  
49 the modified Overhead Arrow-per-Lane guide sign design.

50 *Guidance:*

1 Where the modified Overhead Arrow-per-Lane guide signs described in this Section are not used,  
2 Signing for an intermediate or minor interchange that has a multi-lane exit with an option lane that also  
3 carries the through route should use the same basic principles as those for a conventional exit. In such cases,  
4 the option lane should not be signed on the Advance Guide signs. For such exits that involve the addition of  
5 an auxiliary lane that is not present at the Advance Guide sign locations, but do not involve a lane drop (see  
6 Figure 2E-12-49), a sequence of post-mounted or overhead-mounted Advance Guide signs should be used,  
7 located in accordance with the interchange classification (see Section 2E-32-2E.11). The Exit Direction sign  
8 should be located at the theoretical gore and display a diagonally upward-pointing directional arrow above  
9 each lane that departs from the mainline alignment. The Exit Direction sign should not contain the EXIT  
10 ONLY legend.

11 For such interchanges that also have a lane drop (see Figure 2E-11 2E-48), the Advance Guide and Exit  
12 Direction signs should follow the provisions of Section 2E-24-2E.28. The Exit Direction sign should be  
13 located at the theoretical gore and should contain the EXIT ONLY (E11-1e) sign panel.

14 Where the modified Overhead Arrow-per-Lane guide signs are not used, The-the presence of the option  
15 lane should be conveyed by the use of post-mounted lane-use (R3-8 Series) signs (see Section 2B.22). When  
16 used, the R3-8 signs should be of an appropriate size for their application to optimize their conspicuity. The  
17 signs should be located in succession with the Advance Guide signs, where the option and exit lanes have  
18 developed (see Figure 2E-11-2E-48). In cases where the exiting lane or lanes have not developed and the  
19 option lane is created by the addition of an auxiliary lane that exits, the R3-8 signs should be located only  
20 adjacent to where the lanes have been fully developed and not in advance of the lane or along its transition  
21 (see Figure 2E-12-2E-49).

22 Support:

23 The use of a down arrow on overhead freeway or expressway guide signs has been shown to be  
24 misinterpreted by road users as an indication of a dedicated lane.

25 **Standard:**

26 **Advance Guide signs that are mounted overhead shall not display a down arrow over an option**  
27 **lane.**

28 **Figure 2E-45. Partial Width Overhead Arrow-Per-lane Guide Sign for Intermediate or**  
29 **Minor Interchange**

30 **Figure 2E-46. Example of Overhead Arrow Per Lane Signing for a Two-Lane Intermediate or**  
31 **Minor Interchange Exit with an Option Lane and a Dropped Lane**

32 **Figure 2E-47. Example of Overhead Arrow Per Lane Signing for a Two-Lane Intermediate or**  
33 **minor Interchange Exit with an Option and Auxiliary Lanes**

34 **Figure 2E-48. Example of Conventional Signing for a Two-Lane Intermediate or minor**  
35 **Interchange Exit with an Option a Dropped Lane**

36 **Figure 2E-49. Example of Conventional Signing for a Two-Lane Intermediate or minor**  
37 **Interchange Exit with an Option and Auxiliary Lanes**

38 **Section 2E-11 2E.43 Number of Signs at an Overhead Installation and Sign Spreading**

39 *Guidance:*

40 *If overhead signs are warranted, as set forth in Section 2A.17, the number of signs at these locations*  
41 *should be limited to only those essential in communicating pertinent destination information to the road user.*  
42 *Exit Direction signs for a single exit and the Advance Guide signs should have only one sign with one or two*  
43 *destinations. Regulatory signs, such as speed limits, should not be used in conjunction with overhead guide*  
44 *sign installations. Because road users have limited time to read and comprehend sign messages, there should*  
45 *not be more than three guide signs displayed at any one location either on the overhead structure or its*  
46 *support.*

47 *Option:*

48 *At overhead locations, more than one sign may be installed to advise of a multiple exit condition at an*  
49 *interchange. If the roadway ramp or crossing roadway has complex or unusual geometrics, additional signs*  
50 *with confirming messages may be provided to properly guide the road user.*

51 Support:

1 Sign spreading is a concept where major overhead signs are spaced so that road users are not overloaded  
2 with a group of signs at a single location. Figure ~~2E-1~~2E-50 illustrates an example of sign spreading.

3 *Guidance:*

4 *Where overhead signing is used, sign spreading should be used at all single-exit interchanges and to the*  
5 *extent possible at multi-exit interchanges. Sign spreading should be accomplished by use of the following:*

- 6 A. *Except as provided otherwise for cloverleaf interchanges (see Section 2E.33), the Exit Direction sign*  
7 *should be the only guide sign used in the vicinity of the gore (other than the Exit Gore sign). It should*  
8 *be located overhead near the theoretical gore and generally on an overhead sign support structure.*  
9 B. *The Advance Guide sign to indicate the next interchange exit should be placed near the crossroad*  
10 *location. If the crossroad goes over the mainline, the Advance Guide sign should be placed on the*  
11 *overcrossing structure or on a separate structure immediately in front of the overcrossing structure.*

12 **Figure 2E-50. Example of Sign Spreading**

13 **Section ~~2E.50~~ 2E.44 Closely Spaced Interchanges**

14 *Support:*

15 Section 2E.11 contains information regarding sign spreading where the Exit Direction sign and the  
16 Advance Guide sign for the next interchange are mounted overhead. Sign spreading is particularly beneficial  
17 where interchanges are closely spaced and overhead signing is used in conjunction with Interchange Sequence  
18 signs as provided in Paragraph 2.

19 *Guidance:*

20 *Interchange Sequence signs (see Section ~~2E.40~~2E-24) should be used at closely spaced interchanges.*  
21 *When used, they should identify and show street names and distances for the next two or three exits as shown*  
22 *in Figure ~~2E-30~~2E-11.*

23 **Standard:**

24 **Advance ~~G~~guide signs for closely spaced interchanges shall show information for only one**  
25 **interchange.**

**OTHER GUIDE SIGNS**

**Section ~~2E.34~~2E.45 Next Exit Plaques (E2-1P, E2-1aP)**

Option:

Where the distance to the next interchange is unusually long, a Next Exit (E2-1P or E2-1aP) plaque (see Figure ~~2E-23~~2E-51) may be installed to inform road users of the distance to the next interchange.

Guidance:

*The Next Exit plaque should not be used unless the distance between successive interchanges is more than 5 miles.*

Where the Next Exit plaque is used, the E2-1P plaque should be used where the width of the Advance guide sign is equal to or greater than the width of the E2-1P plaque. The E2-1aP plaque should be used where the width of the E2-1P plaque exceeds the width of the Advance guide sign.

**Standard:**

The Next Exit plaque shall ~~carry~~ display the legend NEXT EXIT XX MILES. If the Next Exit plaque 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 plaque may be displayed in either one or two lines as shown in Figure 2E-23. Support:~~

~~The one-line message on the Next Exit plaque is the more desirable choice unless the message causes the sign to have a horizontal dimension greater than that of the Advance Guide sign.~~ **Incorporated into Guidance above.**

**Figure 2E-51. Next Exit Plaques**

**Section ~~2E.38~~2E.46 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 500 feet beyond the downstream 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 1,000 feet.*

*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.39~~2E.47 Post-Interchange Distance Signs (E7-1 Series, E7-2 Series, E7-3 Series)**

**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-29~~2E-52).

Support:

The minimum sizes of the route shields identifying a significant destination point are prescribed in Tables 2E-3 and 2E-5.

Option:

1 The text identification of a route may be displayed instead of a route shield, such as “U\_S\_XX,” “[State  
2 abbreviation]] ~~Route-XX;~~” (e.g., Del XX), or “County ~~Route-XX.~~”

3 *Guidance:*

4 *If a second line is used, it should be reserved for communities of general interest that are located on or*  
5 *immediately adjacent to the route or for major traffic generators along the route.*

6 *Option:*

7 The choice of names for the second line, if it is used, may be varied on successive Distance signs to give  
8 road users maximum information concerning communities served by the route.

9 **Standard:**

10 **The third, or bottom line, shall contain the name and distance to a control city (if any) that has**  
11 **national significance for travelers using the route.**

12 *Guidance:*

13 *Distances to the same destinations should not be shown more frequently than at 5-mile intervals. The*  
14 *distances displayed on these signs should be the actual distance to the destination points and not to the exit*  
15 *from the freeway or expressway. The distance displayed for each community should comply with the*  
16 *provisions of Section 2D.41.*

### 17 **Figure 2E-52. Post-Interchange Distance Sign**

### 18 **Section 2E.48 Post-Interchange Travel Time Sign (E7-4 Series)**

19 *Support:*

20 At certain locations, it might be more meaningful to the road user to display the travel time rather than the  
21 distance to a destination. Such instances might be areas of adverse roadway conditions due to weather, such  
22 as in mountain passes or high elevations, or congestion that occurs during peak travel seasons.

23 Section 2E.49 contains information on Comparative Travel Time signs for alternative routes.

24 Section 2E.49 contains information on Distance and Travel Time signs for major junctions or  
25 interchanges.

26 **Standard:**

27 The Post-Interchange Travel Time sign (see Figure 2E-53) shall comply with the provisions of  
28 Paragraph 1 of Section 2E.48 with the following exceptions:

29 A. The distance shall be replaced with a changeable message element to display the current travel  
30 time to the applicable destination; and

31 B. The abbreviation MINS shall follow the changeable message element.

32 If used, the Post-Interchange Travel Time sign shall be limited to locations that are susceptible to  
33 congestion on a recurring or otherwise frequent basis. If used, the Post-Interchange Travel Time sign  
34 shall replace of the Post-Interchange Distance sign in the series of post-interchange signs (see Section  
35 2E.47).

36 Travel times shall not be used on Interchange guide signs (see Section 2E.21).

### 37 **Figure 2E-53. Post-Interchange Travel Time Sign**

### 38 **Section 2E.49 Distance and Travel Time Sign and Comparative Travel Time Sign (E7-5, E7-6)**

39 *Support:*

40 Some locations might benefit from a travel time message displayed with the distance, or comparative  
41 travel times for alternative routes to a common destination. These locations are typically in advance of a  
42 decision point where the road user can divert to an alternate route to avoid recurring congestion.

43 Section 2E.48 contains information on Post-Interchange Travel Time signs.

44 Section 2G.19 contains information on Comparative Travel Time signs for parallel lanes within the same  
45 highway route, such as for general-purpose lanes and managed lanes.

46 **Standard:**

1 The Distance and Travel Time sign (E7-5) shall display a major destination or junction, a distance  
2 message, and a travel time message, each on a separate line. The distance units shall be displayed in the  
3 distance message. The travel time shall be displayed in a changeable message element and the  
4 abbreviation MINS shall follow the changeable message element. The Distance and Travel Time sign  
5 shall not display distance and time to more than one destination or junction.

6 The Comparative Travel Time sign (E7-6) shall display a major destination or junction and two  
7 alternative routes with travel time messages. Each alternative route and associated travel time message  
8 shall be on a separate line. The travel time shall be displayed in a changeable message element and the  
9 abbreviation MINS shall follow the changeable message element.

10 Comparative travel times shall not be used to promote different modes of travel, such as personal  
11 vehicle highway travel compared with transit, or different forms of transit.

12 *Guidance:*

13 *Where used, the Distance and Travel Time sign should be located between interchanges away from the*  
14 *interchange guide sign sequence or other major signs. The Distance and Travel time sign should desirably be*  
15 *located in advance of an urbanized area where interchanges become more closely spaced and/or in advance*  
16 *of a circumferential or other alternative route(s) where traffic can decide to divert depending on the*  
17 *destination.*

18 *Where used, the Comparative Travel Time sign should be located in advance of the interchange guide*  
19 *sign sequence to provide adequate time for the road user to decide whether to reroute.*

20 Support:

21 Figure 2E-42E-54 shows examples of the application of the Distance and Travel Time sign and the  
22 Comparative Travel Time sign.

### 23 **Figure 2E-54. Travel Time Sign**

### 24 **Section 2E-35 2E.50 Other Supplemental Guide Signs (E3 Series)**

25 Support:

26 Supplemental ~~Guide-guide~~ signs can be used to provide information regarding destinations accessible from  
27 an interchange, other than places displayed on the standard interchange signing. However, such Supplemental  
28 ~~Guide-guide~~ signing can reduce the effectiveness of other more important guide signing because of the  
29 possibility of overloading the road user's capacity to receive visual messages and make appropriate decisions.  
30 "The AASHTO Guidelines for the Selection of Supplemental Guide Signs for Traffic Generators Adjacent to  
31 Freeways" is incorporated by reference in this section (see Page i for AASHTO's address).

32 *Guidance:*

33 *Because most interchanges will not have a need for Supplemental guide signs, consideration of their use*  
34 *should be limited to situations where there is a demonstrated need to sign for more than the two primary*  
35 *destinations from an interchange that are displayed on the Advance guide and Exit Direction signs.*

36 *A Supplemental guide sign should not be installed unless a destination meets the criteria established by*  
37 *the State or agency policy. States and other agencies should adopt an appropriate policy for installing*  
38 *supplemental signs using the "AASHTO Guidelines for the Selection of Supplemental Guide Signs for Traffic*  
39 *Generators Adjacent to Freeways." In developing policies for such signing, such items as population, amount*  
40 *of traffic generated, distance from the route, and the significance of the destination, should be taken into*  
41 *account. Moved from later in this section.*

42 *No more than one Supplemental ~~Guide-guide~~ sign should be used on each interchange approach.*

43 *A Supplemental ~~Guide-guide~~ sign (see Figure 2E-24E-55) should ~~not list display no~~ more than two*  
44 *destinations and no more than three lines of destination information. Destination names should be followed*  
45 *by the interchange number (and suffix), or if interchanges are not numbered, by the legend NEXT RIGHT or*  
46 *SECOND RIGHT or both, as appropriate. The Supplemental ~~Guide-guide~~ sign should be installed as an*  
47 *independent guide sign assembly.*

48 *Where two or more Advance ~~Guide-guide~~ signs are used, the Supplemental ~~Guide-guide~~ sign should be*  
49 *installed approximately midway between two of the Advance ~~Guide-guide~~ signs. If only one Advance ~~Guide-~~*

1 ~~guide~~ sign is used, the Supplemental ~~Guide~~-guide sign should follow it by at least 800 feet. If the interchanges  
2 are numbered, the interchange number should be used for the action message.

3 A Supplemental guide sign should not be installed in the same location with or where it will detract from  
4 guide signs for a different interchange.

5 ~~States and other agencies should adopt an appropriate policy for installing supplemental signs using “The~~  
6 ~~AASHTO Guidelines for the Selection of Supplemental Guide Signs for Traffic Generators Adjacent to~~  
7 ~~Freeways.” In developing policies for such signing, such items as population, amount of traffic generated,~~  
8 ~~distance from the route, and the significance of the destinations should be taken into account.~~ **Incorporated**  
9 **into Guidance earlier in this section.**

10 **Standard:**

11 No more than four supplemental traffic generator destinations shall be signed from a single  
12 interchange along the main roadway (see Paragraphs 3 and 4 regarding the number of Supplemental  
13 guide signs at an interchange and the number of destinations displayed on a Supplemental guide sign).

14 Supplemental guide signs shall not be placed at the same location as Advance guide, Exit Direction,  
15 or other signs related to that exit or interchange.

16 Guide signs ~~directing drivers to~~for park – ride facilities shall be considered as Supplemental **Guide-**  
17 **guide** signs (see Figure ~~2E-25~~2E-56).

18 Guide signs for recreational or cultural interest destinations (see Chapter 2K) shall be considered as  
19 Supplemental guide signs, except where the interchange provides direct access to such a destination and  
20 is instead displayed on the Advance guide and Exit Direction signs.

21 **Option:**

22 ~~A pictograph (see definition in Section 1A.13) may be used on a Supplemental Guide sign in conjunction~~  
23 ~~with a destination that is associated with governmental agencies, military bases, universities, or other~~  
24 ~~government-approved institutions.~~

25 Pictographs shall not be displayed on Supplemental guide signs, except as provided in Paragraphs  
26 13 and 14 of this Section for the Park – Ride Supplemental guide sign.

27 **Guidance:**

28 The use of a transit pictograph and/or the carpool symbol on the Park – Ride Supplemental guide sign  
29 should comply with the provisions of Paragraph 5 of Section 2D.46.

30 **Standard:**

31 ~~The maximum dimension (height or width) of a pictograph shall not exceed two times the upper-case~~  
32 ~~letter height of the destination legend and shall not exceed the size of a route shield on the guide sign. If~~  
33 ~~used, the pictograph shall be located to the left of the destination legend it represents, except as~~  
34 ~~provided in Paragraph 9 for the park-ride Supplemental Guide sign.~~

35 When a transit pictograph is displayed on the ~~Park – Ride~~ park-ride Supplemental **Guide**-guide sign,  
36 it shall be located on the same line as the carpool symbol, if used, above the word legend. The  
37 maximum dimension (height or width) of the pictograph shall not exceed two times the upper-case  
38 letter height of the PARK – RIDE legend.

39 ~~A pictograph representing a State, county, or municipal corporation or other incorporated or~~  
40 ~~unincorporated community shall not be displayed on a Supplemental Guide sign.~~

41 ~~Pictographs shall otherwise comply with the provisions of Section 2A.06.~~

42 **Figure 2E-55. Supplemental Guide Sign for a Multi-Exit Interchange**

43 **Figure 2E-56. Supplemental Guide Sign for a Park-Ride Facility**

44 **Section ~~2E.41~~ 2E.51 Community Interchanges Identification Signs (E9-4 Series, E9-5 Series)**

45 **Support:**

46 For suburban or rural communities served by two or three interchanges, Community Interchanges  
47 Identification (see Figure 2E-57) signs ~~are useful~~ reduce the amount of information displayed on the Advance  
48 guide and Exit Direction signs by eliminating repetition of the same destinations for separate interchanges. (see  
49 Figure ~~2E-32~~2E-58).

50 **Guidance:**

1 In these cases, the name of the community followed by the word EXITS should be displayed on the top  
2 line; the lines below should display the destination, road name or route number, and the corresponding  
3 distances to the nearest 1/4 mile.

4 The sign should be located in advance of the first Advance Guide sign for the first interchange within the  
5 community.

6 The legend displayed on the Advance guide and Exit Direction signs for each interchange should be  
7 consistent with the interchange names displayed on the Community Interchanges Identification sign. The  
8 name of the community displayed on the Community Interchanges Identification signs should be omitted from  
9 the legends of the Advance guide and Exit Direction signs.

10 Option:

11 If interchanges are not conveniently identifiable or if there are more than three interchanges to be  
12 identified, the NEXT XX EXITS sign (see Section ~~2E.42~~ 2E.52) may be used.

13 **Figure 2E-57 Example of a Community Interchanges Identification Sign**

14 **Figure 2E-58. Example of Use of a Community Interchanges Identification Sign**

### 15 **Section ~~2E.42~~2E.52 NEXT XX EXITS Sign (E9-3 Series)**

16 Support:

17 Many freeways or expressways pass through historical or recreational regions, or urban areas served by a  
18 succession of several interchanges.

19 Option:

20 Such regions or areas may be indicated by a NEXT XX EXITS (E9-3 series) sign (see Figure ~~2E-33~~ 2E-  
21 59) located in advance of the Advance Guide sign or signs for the first interchange (see Figure 2E-60).

22 Guidance:

23 *The sign legend should identify the region or area followed by the words NEXT XX EXITS.*

24 The legend displayed on the Advance Guide and Exit Direction signs for each interchange should not  
25 display the region or area name that is displayed on the NEXT XX EXITS sign.

26 **Figure 2E-59. Example of a Next Exits Sign**

27 **Figure 2E-60. Example of Use of a Next Exits Sign**

28 ~~Section 2E.52 Signing on Conventional Road Approaches and Connecting Roadways~~ This  
29 section has been relocated to new Section 2E.57.

30 ~~Section 2E.53 Wrong Way Traffic Control at Interchange Ramps~~ This section has been relocated  
31 to new Section 2E.58.

### 32 **Section 2E.534 Weigh Station Signing**

33 Support:

34 Independent facilities or areas have been added along many highways where certain commercial vehicles  
35 are directed to stop to be weighed or inspected. These areas are sometimes permanent, such as in a roadside  
36 area, or temporary mobile facilities deployed along the roadway.

37 The general concept for signing permanent Weigh Station is similar to Rest Area signing (see Section  
38 2I.05) because in both cases traffic using either area remains within the highway right-of-way.

39 Standard:

40 The standard sequence of signs for a Weigh Station on an expressway or Freeway shall include four  
41 basic signs (see Figure 2E-59):

42 A. Advance Weigh Station Distance (D8-1) sign, with the distance 1 MILE displayed,

43 B. Advance Weigh Station Distance (D8-1) sign, with the distance ½ MILE displayed,

44 C. Weigh Station Exit Directional (D8-3) sign, and

45 D. Weigh Station Exit Gore Sign (same legend as the Exit Direction (D8-3) sign.

46 Option:

1 Where State law requires trucks of a certain weight to enter the weigh station, a Weigh Station (R13-1)  
2 regulatory sign (See section 2B.60) may be added to the sign sequence as shown in Figure 2E-61.

3 Where only commercial vehicle inspections are conducted in the inspection area and vehicles are not  
4 weighed, the WEIGH STATION legend of the D8 series signs may be replaced with the alternate legend,  
5 COMMERCIAL VEHICLE INSPECTION AREA.

6 **Standard:**

7 **When the WEIGH STATION legend of the D8 series signs is replaced with COMMERCIAL**  
8 **VEHICLE INSPECTION AREA legend as provided for in this Section, the WEIGH STATION legend**  
9 **of the R13-1 sign shall be replaced with the alternate legend INSPECTION AREA.**

10 **A sign or plaque with a changeable legend display that displays either OPEN or CLOSED shall be**  
11 **included in the signing sequence to indicate when trucks are required to enter the weigh station.**

12 **Guidance:**

13 The Weigh Station Advance sign (D8-2) or the Weigh Station Advance sign (D8-1) should display, either  
14 within the sign border or on a supplemental plaque or sign panel, the changeable legend OPEN or CLOSED.

15 **Standard:**

16 ~~**Weigh Station signing on freeways and expressways shall be the same as that provided in Section**~~  
17 ~~**2D.49, except for lettering size and the advance posting distance for the Exit Direction sign, which shall**~~  
18 ~~**be located a minimum of 1,500 feet in advance of the gore.**~~

19 **Support:**

20 Weigh ~~Station and Commercial Vehicle Inspection Area~~ Station sign layouts for freeway and expressway  
21 applications are shown in the “Standard Highway Signs ~~and Markings~~” ~~book~~ publication (see Section 1A.11).  
22 An example of weigh station signing for use on freeways and expressways is shown in Figure 2E-61.

23 **Figure 2E-61. Example of Weigh Station Signing on Freeways**

24 **Section ~~2E.27~~ 2E.54 Route Signs and Trailblazer Assemblies**

25 **Standard:**

26 ~~**The official Route sign for the Interstate Highway System shall be the red, white, and blue**~~  
27 ~~**retroreflective distinctive shield adopted by the American Association of State Highway and**~~  
28 ~~**Transportation Officials (see Section 2D.11).**~~

29 **Guidance:**

30 Route signs (see Figure ~~2E-17~~ 2E-62) should be incorporated as cut-out shields or other distinctive shapes  
31 on large directional guide signs. Where the Interstate shield is displayed in an assembly or on the face of a  
32 guide sign with U.S. or State Route signs, the Interstate numeral should be at least equal in size to the  
33 numerals on the other Route signs. The use of independent Route signs should be limited primarily to route  
34 confirmation assemblies.

35 Route signs and auxiliary ~~signs~~ plaques showing junctions and turns should be used for guidance on  
36 approach roads, for route confirmation just beyond entrances and exits, and for reassurance along the  
37 freeway or expressway. When used along the freeway or expressway, the Route signs should be enlarged to a  
38 36 x 36-inch minimum size for routes with one or two digits and to a 45 x 36-inch minimum size for routes  
39 with three digits as shown in the “Standard Highway Signs ~~and Markings~~” ~~book~~ publication (see Section  
40 1A.11). When independently mounted Route signs are used in place of Pull-Through signs (see Section  
41 2E.27), they should be located just beyond the exit.

42 **Option:**

43 The standard Trailblazer Assembly (see Section 2D.~~35~~ 34) may be used on roads leading to the freeway or  
44 expressway. Component messages of the Trailblazer Assembly may be ~~included on~~ incorporated into a single  
45 sign in accordance with the provisions of Section 2D.12. Independently mounted Route signs may be used  
46 instead of Pull-Through signs (~~see Section 2E.12~~) as confirmation information.

47 **Support:**

48 Section 2H.07 contains information regarding the design of signs for Auto Tour Routes.

49 **Figure 2E-62. Interstate, Off-Interstate, and U.S. Route Signs**

50 **Option:**

1 The commonly used name or trailblazer route sign for a toll highway (see Chapter 2F) may be displayed  
2 on non-toll sections of the Interstate Highway System at:

- 3 A. The last exit before entering a toll section of the Interstate Highway System;
- 4 B. The interchange or connection with a toll highway, whether or not the toll highway is a part of the  
5 Interstate Highway System; and
- 6 C. Other locations within a reasonable approach distance of toll highways when the name or trailblazer  
7 symbol for the toll highway would provide better guidance to road users unfamiliar with the area than  
8 would place names and route numbers.

9 The toll highway name or route sign may be included as a part of the guide sign installations on  
10 intersecting highways and approach roads to indicate the interchange with a toll section of an Interstate route.  
11 Where needed for the proper direction of traffic, a trailblazer for a toll highway that is part of the Interstate  
12 Highway System may be displayed with the Interstate Trailblazer Assembly.

13 Support:

14 Chapter 2F contains additional information regarding signing for toll highways.

### 15 **Section ~~2E.28~~ 2E.55 Eisenhower Interstate System Signs (M1-10, M1-10a)**

16 Option:

17 The Eisenhower Interstate System (M1-10 and M1-10a) signs (see Figure ~~2E-18~~2E-63) may be used, in  
18 accordance with Paragraphs 2 and 3 of this Section, on Interstate highways at periodic intervals and in rest  
19 areas, scenic overlooks, or other similar roadside facilities on the Interstate Highway System.

#### 20 ***Guidance*Standard:**

21 **If used, the M1-10a sign ~~should~~shall be used only in rest areas or other similar facilities where the**  
22 **sign can be viewed by occupants of parked vehicles or by pedestrians. The M1-10a sign ~~should~~shall not**  
23 **be installed on Interstate highway mainlines, ramps, or other roadways where it can be viewed by**  
24 **vehicular traffic.**

#### 25 **Standard:**

26 **The M1-10 and M1-10a signs shall not be used as part of a Junction, Advance Route Turn,**  
27 **Directional, or Trailblazer Assembly, or as part of a guide sign or similar assembly providing direction**  
28 **to a route or destination.**

### 29 **Figure 2E-63. Eisenhower Interstate System Signs**

30

1 **SIGNS FOR ROUTE DIVERSION BY VEHICLE CLASS**

2 **Section 2E.56 Signs for Route Diversion by Vehicle Class**

3 Support:

4 On some highways, a physical condition or highway feature might limit certain types or classes  
5 of vehicles from proceeding along that route through the site of that condition beyond which those  
6 vehicles are otherwise allowed. Examples include a restriction on taller legal height vehicles through  
7 a tunnel with a low clearance; a restriction of hazardous materials through a tunnel or over a bridge;  
8 and a restriction on wider vehicles, such as large trucks, over a viaduct with narrow lanes. In such  
9 cases, the restricted vehicles might be diverted along another route to reach a destination beyond the  
10 location of the limiting condition.

11 Guidance:

12 Where certain vehicles are prohibited at a downstream location along a route and those vehicles  
13 must divert to reach a through destination beyond that location, regulatory, warning, and/or guide  
14 signs advising those vehicle operators of the diversion should be installed in advance of the decision  
15 point to leave the through route for the diversion route.

16 Option:

17 The interchange and pull-through guide signs for the last point at which restricted vehicles must  
18 exit may be modified to incorporate regulatory and/or warning panels with word legends, as shown  
19 in Figure 2E-64, to display the regulations and/or warning messages relative to the vehicle class  
20 restriction.

21 Standard post-mounted regulatory and warning signs, such as the No Hazardous Materials (R14-  
22 3) or Advance Low Clearance (W12-2) signs, may be used as provided elsewhere in this Manual at  
23 independent locations to supplement the regulatory and warning signs and panels referenced in  
24 Paragraphs 2 and 3 of this Section.

25 Support:

26 An example of signing for a route diversion by vehicle class is shown in Figure 2E-62.

27 **Figure 2E-64. Example of Signing for a Route Diversion by Vehicle Class**

28 **SIGNS FOR INTERSECTIONS AT GRADE**

29 **Section 2E.292E.57 Signs for Intersections at Grade**

30 Guidance:

31 If there are intersections at grade within the limits of an expressway, guide sign types provided in Chapter  
32 2D should be used. However, such signs should be of a size compatible with the size of other signing on the  
33 expressway.

34 Option:

35 ~~Advance Guide signs for intersections at grade may take the form of diagrammatic layouts depicting the~~  
36 ~~geometries of the intersection along with essential directional information.~~

37 Where an expressway route with grade-separated interchanges is interrupted by a short segment of at-  
38 grade intersections, exit numbering, if used, may be maintained through that segment for the major  
39 intersections to provide continuity in navigation and signing between the grade-separated segments (see  
40 Figure 2E-63).

41 **Figure 2E-63. Example of At-Grade Intersection Expressway Signing Using Exit Numbering**

42

1 *INTERFACE WITH CONVENTIONAL ROADWAYS*

2 **Section ~~2E.52~~2E.58 Signing on Conventional Road Approaches and Connecting Roadways**

3 Support:

4 Section 2D.45 contains information regarding the signing on conventional roads on the approaches to  
5 interchanges and the signing on connecting roadways.

6 **Section ~~2E.53~~ 2E.59 Wrong-Way Traffic Control at Interchange Ramps**

7 Support:

8 Section 2B.41 contains information regarding the use of regulatory signs to deter wrong-way movements  
9 at intersections of freeway or expressway ramps with conventional roads, and in the area where entrance  
10 ramps intersect with the mainline lanes.

11 Section 2D.46 contains information regarding the use of a Directional assembly or a guide sign to mark  
12 the entrance to a freeway or expressway from a conventional road.

## CHAPTER 2F. TOLL ROAD SIGNS

### Chapter 2F Subchapter and Section Organization

#### General

2F.01 Scope

2F.02 Sizes of Toll Road Signs and Electronic Toll Collection (ETC) System Pictographs

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#### Regulatory Signs

2F.04 Regulatory Signs for Toll Plazas

2F.05 Electronic Toll Collection (ETC) Account-Only Regulatory Sign and Plaque (R3-31, R3-32P)

#### Warning Signs

2F.06 Pay Toll and Take Ticket Advance Warning Signs (W9-6, W9-6e)

2F.07 Pay Toll and Take Ticket Advance Warning Plaques (W9-6bP, W9-6gP)

2F.08 Stop Ahead Pay Toll and Take Ticket Warning Signs (W9-6a, W9-6f)

2F.09 Stop Ahead Pay Toll and Take Ticket Warning Plaques (W9-6cP, W9-6hP)

2F.10 LAST EXIT BEFORE TOLL Warning Plaques (W16-16P, W16-16aP)

2F.11 TOLL Warning Plaque (W16-17P)

#### Guide Signs

2F.12 Toll Facility and Toll Plaza Guide Signs – General

2F.13 Electronic Toll Collection (ETC) Signs – General

2F.14 Advance Signs for Conventional Toll Plazas

2F.15 Advance Signs for Toll Plazas on Diverging Alignments from Open-Road ETC Account-Only Lanes

2F.16 Toll Plaza Canopy Signs

2F.17 Guide Signs for Entrances to ETC Account-Only Facilities

2F.18 Guide Signs for Entrances to ETC-Only Facilities

2F.19 Guide Signs for ETC-Only Entrance Ramps to Non-Toll Highways

2F.20 ETC Account Program Information Signs

### GENERAL

#### **Section 2F.01 Scope**

Support:

Toll highways are typically limited-access freeway or expressway facilities. A portion of or an entire route might be a toll highway, or a bridge, tunnel, or other crossing point might be the only toll portion of a highway at which a toll is collected. A toll highway might be a conventional road. The general signing requirements for toll roads will depend on the type of facility and access (freeway, expressway, or conventional road). The provisions of Chapters 2D and 2E will generally apply for guide signs along the toll facility that direct road users within and off the facility where exit points and geometric configurations are not dependent specifically on the collection of tolls. The aspect of tolling and the presence of toll plazas or collection points necessitate additional considerations in the typical signing needs. The notification of the collection of tolls in advance of and at entry points to the toll highway also necessitates additional modifications to the typical signing.

The scope of this Section applies to a route or facility on which all lanes are tolled. Chapter 2G contains provisions for the signing of managed lanes within an otherwise non-toll facility that employ tolling or pricing as an operational strategy to manage congestion levels.

**Standard:**

**Except where specifically provided in this Chapter, the provisions of other Chapters in Part 2 shall apply to toll roads.**

#### **Section 2F.02 Sizes of Toll Road Signs and Electronic Toll Collection (ETC) System Pictographs**

**Standard:**

1 Except as provided in Section 2A.11, the sizes of toll road signs that have standardized designs shall  
2 be as shown in Table 2F-1.

3 Support:

4 Section 2A.11 contains information regarding the applicability of the various columns in Table 2F-1.

5 Option:

6 Signs larger than those shown in Table 2F-1 may be used (see Section 2A.11).

7 **Table 2F-1. Toll Road Sign and Plaque Minimum Sizes**

8 **The following paragraphs relocated from existing Section 2F.04 and revised**

9 **Standard:**

10 The ETC system pictograph (see Chapter 2A) shall be of a size that makes it a prominent feature of  
11 the sign legend as necessary for conspicuity for those road users with registered ETC accounts seeking  
12 such direction, as well as for those road users who do not have ETC accounts so that it is clear to them  
13 to avoid such direction when applicable.

14 *Guidance:*

15 *Except as provided in Paragraph 6 of this Section, a* ETC pictograph that is in the shape of a  
16 horizontally oriented rectangle should have a minimum height of ~~between approximately 1.5 and 2~~ times the  
17 upper-case letter height of the principal legend on the sign. The width of an ETC pictograph in the shape of a  
18 horizontal rectangle should be between approximately two and three times the height of the pictograph.

19 *When the pictograph is the principal legend on the sign, such as for advance guide signs for open-road*  
20 *tolling lanes (see Section 2F.15), the minimum height of a horizontally oriented* rectangular ETC pictograph  
21 *should be consistent with that of a route shield prescribed for the particular application and type of sign.*

22 *For ETC pictographs whose shape is square, circular, or otherwise similar in height and width, or is a*  
23 *vertically oriented* rectangle, the same basic principles for conspicuity and placement should be followed.  
24 *ETC pictographs whose shape is not in that of a horizontally oriented* rectangle should be suitably sized to  
25 *facilitate conspicuity as described in Paragraph 14 and should be of a similar approximate area as the*  
26 *horizontally oriented* rectangular pictographs designed in accordance with the height and width as provided  
27 *in Paragraph 25.*

28 **Section 2F.03 Use of Purple Backgrounds and Underlay Panels with ETC Account**  
29 **PictographsColor**

30 **Standard:**

31 Use of the color purple on any sign shall comply with the provisions of Sections 1A.12 and 2A.10.  
32 Except as provided in Sections 2F.05 and 2F.12 ~~and 2F.16~~, purple as a background color shall be used  
33 only when the information associated with the appropriate ETC account is displayed on that portion of  
34 the sign. The background color of the remaining portion of such signs shall comply with the provisions  
35 of Sections 1A.12 and 2A.10 as appropriate for a regulatory, warning, or guide sign. Purple shall not be  
36 used as a background color to display a destination, action message, or other legend that is not a display  
37 of the requirement for all vehicles to have a registered ETC account.

38 If only vehicles with registered ETC accounts are allowed to use a highway lane, a toll plaza lane, an  
39 open-road tolling lane, or all lanes of a toll highway or connection, the guide signs for such lanes or  
40 highways shall incorporate the pictograph (see Chapter 2A) adopted by the toll facility's ETC payment  
41 system and the regulatory message ONLY. Except for ETC pictographs whose predominant  
42 background color is purple, if incorporated within the green background of a guide sign, the ETC  
43 pictograph shall be on a white rectangular or square panel set on a purple underlay panel with a white  
44 border. For rectangular ETC pictographs whose predominant background color is purple, a white  
45 border shall be used at the outer edges of the purple rectangle to provide contrast between the  
46 pictograph and the sign background color.

47 If an ETC pictograph is used on a separate plaque ~~with a guide sign~~ in a route sign assembly (see  
48 Section 2F.05) or on a header panel within a guide sign, the plaque or the header panel shall have a  
49 purple background with a white border and the ETC pictograph shall have a white border to provide  
50 contrast between the pictograph and the background of the plaque or header panel.

51 Purple underlay panels for ETC pictographs or purple backgrounds for plaques and header panels  
52 shall only be used in the manner described in Paragraphs 1 through 3 to convey the requirement of a  
53 registered ETC account on signs for lanes reserved exclusively for vehicles with such an account and on

1 **directional signs to an ETC account-only facility from a non-toll facility or from a toll facility that**  
2 **accepts multiple payment forms.**

3 Support:

4 Figure 2F-1 shows examples of ETC account pictographs, their use with various background colors, and  
5 modifications involving underlay panels.

6 Section ~~2F.04~~[2F.02](#) contains provisions regarding the size of pictographs for ETC accounts.

7 **Figure 2F-1. Examples of ETC Account Pictographs and Use of Purple Backgrounds and**  
8 **Underlay Panels**

9 ~~Section 2F.04 – Size of ETC Pictographs~~ Relocated to Section 2F.02

10

## REGULATORY SIGNS

### **Section ~~2F.05~~–~~2F.04~~ Regulatory Signs for Toll Plazas**

Support:

Toll plaza operations often include lane-specific restrictions on vehicle type, forms of payment accepted, and speed limits or required stops. Vehicles are typically required to come to a stop to pay the toll or receive a toll ticket in the attended and exact change or automatic lanes. Electronic toll collection (ETC) lanes with favorable geometrics typically allow vehicles to move through the toll plaza without stopping, but usually within a set regulatory speed limit or advisory speed. In some ETC lanes and in most lanes that accommodate non-ETC vehicles, a stop might be required while the ETC payment is processed because of geometric or other conditions.

*Guidance:*

*Regulatory signs applicable only to a particular lane or lanes should be located in a position that makes their [lane](#) applicability clear to road users approaching the toll plaza.*

*Regulatory signs, or regulatory panels within guide signs, indicating restrictions on vehicle type and forms of toll payment accepted at a specific toll plaza lane should be installed over the applicable lane either on the toll plaza canopy or on a separate structure immediately in advance of the canopy located in a manner such that each sign is clearly related to an individual toll lane.*

Support:

Section ~~2F.13~~ [2F.12](#) contains information regarding the incorporation of regulatory messages into guide signs for toll plazas.

Section 2F.16 contains information regarding the design and use of toll plaza canopy signs.

*Guidance:*

*One or more Speed Limit (R2-1) signs (see Section 2B.13) should be installed in the locations provided in Paragraph 8 for an ETC-Only lane at a toll plaza in which an enforceable regulatory speed limit is established for a lane in which it is intended that vehicles move through the toll plaza without stopping while toll payments requiring stops occur in other lanes at the toll plaza. The speed limit displayed on the signs should be based on an engineering study taking into account the geometry of the plaza and the lanes and other appropriate safety and operational factors.*

*A Speed Limit (R2-1) sign should not be installed for a toll plaza lane that is controlled by a STOP (R1-1) sign or where a stop is required.*

*Guidance*~~Option~~: **Changed from Option to Guidance and edited for clarity**

~~Speed limit signs may be installed over the applicable lane on the toll plaza canopy, on the approach end of the toll booth island, on the toll booth itself, or on a vertical element of the canopy structure.~~

*Where speed limit signs are installed over a toll plaza lane on the toll plaza canopy, on the approach end of the toll booth island, on the toll booth itself, or on a vertical element of the canopy structure, then ~~Down~~ down arrows or diagonally downward-pointing directional arrows ~~may~~ should be used to supplement the speed limit signs if ~~an engineering study or engineering judgment indicates that~~ there is a need ~~the arrow is needed~~ to clarify the applicability of a sign to a specific lane or to improve compliance.*

**Standard:**

**A STOP (R1-1) sign shall not be installed for a toll plaza lane that is operated as an ETC-Only lane and that is designed for tolls to be collected while vehicles continue moving.**

Option:

A STOP (R1-1) sign may be installed to require [all](#) vehicles to come to a complete stop to pay a toll in an attended or exact change lane, even if that lane is also available for optional use by vehicles with registered ETC accounts. A PAY TOLL (R3-29P) or TAKE TICKET (R3-30P) plaque (see Figure 2F-2), as appropriate to the operation, may be installed directly under the STOP (R1-1) sign for a toll plaza lane, if needed.

The mounting height of the STOP sign and any supplemental plaque may be less than the normal mounting height requirements if constrained by the physical features of the toll island or toll plaza.

The lateral offset of a STOP or other regulatory sign located within a toll plaza island may be reduced to a minimum of 1 foot from the face of the toll island or raised barrier to the nearest edge of the sign.

*Guidance:*

1 If used, a STOP (R1-1) sign for a toll plaza cash payment lane should be located in a longitudinal position  
2 as near as practical to the point where a vehicle is expected to stop to pay the toll or take a ticket.

3 Option:

4 A Toll Rate (R3-28) sign (see Figure 2F-2) may be installed in advance of the toll plaza to indicate the toll  
5 applicable to the various vehicle types.

6 Guidance:

7 If used, the Toll Rate (R3-28) sign should be located between the toll plaza and the first advance sign  
8 informing road users of the toll plaza.

9 The R3-28 sign should not contain more than three lines of legend. Each line that shows a toll amount  
10 should display only a single toll amount.

11 Option:

12 Additional toll rate information exceeding three lines of legend may be displayed on the toll booth  
13 adjacent to the payment window of an attended lane or the payment receptacle of an exact change or  
14 automatic lane where it is visible to a road user who has stopped to pay the toll, but is not visible to  
15 approaching road users who have not yet entered the toll lane.

### 16 **Figure 2F-2. Toll Plaza Regulatory Signs and Plaques**

### 17 **Section 2F.122F.05 Electronic Toll Collection (ETC) Account-Only ~~Auxiliary Signs~~ Regulatory** 18 **~~Sign and Plaque (M4-16 and M4-20) R3-31, R3-32P~~**

19 Standard:

20 In any route sign assembly providing directions ~~from a non-toll highway~~ to a toll facility, or to a  
21 tolled segment of a highway, where electronic toll collection (ETC) is the only payment method accepted  
22 and all vehicles are required to have a registered ETC account, the ETC Account-Only (~~M4-20 R3-31~~)  
23 ~~sign auxiliary sign~~ (see Figure 2F-42F-3) shall be mounted directly below the route sign of the  
24 numbered or named toll facility. The ~~M4-20 R3-31 auxiliary~~ sign shall have a white border and purple  
25 background and incorporate the pictograph adopted by the toll facility's ETC payment system and the  
26 word ONLY in black letters on a white panel set on the purple background of the sign.

27 Option:

28 The NO CASH (~~M4-16 R3-32P~~) ~~auxiliary sign~~ plaque (see Figure 2F-42F-3) with a black legend and  
29 border on a white background may be ~~used in a route-mounted~~ directly below the ~~M4-20 auxiliary R3-31 sign~~  
30 ~~in a Directional or other sign assembly~~.

### 31 **Figure 2F-3. ETC Account-Only Regulatory Sign and Plaque**

## WARNING SIGNS

### Section 2F.06 Pay Toll and Take Ticket Advance Warning Signs (W9-6, W9-6e)

#### Standard:

The Pay Toll and Take Ticket Advance Warning (W9-6 and W9-6e) signs shall ~~be a horizontal rectangle with a black legend and border on a yellow background. The legend shall include~~ display the distance to the toll plaza and, except for toll-ticket facilities, the toll for passenger or 2-axle vehicles (see Figure ~~2F-3~~2F-4). Where the toll for passenger or 2-axle vehicles is variable by time of day, a changeable message element shall be incorporated into the W9-6 sign to display the toll in effect. ~~For toll plazas where road users entering a toll-ticket facility are issued a toll ticket, the legend PAY TOLL shall be replaced with a suitable legend such as TAKE TICKET.~~

#### Guidance:

*The Pay Toll Advance Warning signs should be installed ~~overhead~~ at approximately 1 mile and 1/2 mile in advance of mainline toll plazas at which some or all lanes are required to come to a stop to pay a toll (see Sections 2F.14 and 2F.15).*

*The Take Ticket Advance Warning sign should be installed overhead at approximately 1 mile and 1/2 mile in advance of mainline toll plazas at which some or all lanes are required to come to a stop to take a toll ticket (see Sections 2F.14 and 2F.15).*

*The Pay Toll and Take Ticket Advance Warning signs should be overhead-mounted. Separated for distinction between recommendation for sign placement and recommendation for mounting type.*

#### Option:

If there is insufficient space for the W9-6 or W9-6e sign at the 1-mile or 1/2-mile advance locations, the Pay Toll or Take Ticket Advance Warning (W9-6**P**, W9-6gP) ~~Advance Warning (W9-6P)~~ plaque (see Section 2F.07) may be installed at those advance locations above the appropriate guide sign(s) that relate to toll payment types.

An additional W9-6 or W9-6e sign may be installed approximately 2 miles in advance of a mainline toll plaza. This sign may be either overhead\_ or post-mounted.

If the visibility of a ramp toll plaza at which some or all lanes are required to come to a stop to pay a toll or take a ticket is limited, the W9-6 or W9-6e sign may also be installed in advance of the ramp toll plaza.

### **Figure 2F-4. Toll Plaza Warning Signs and Plaques**

### Section 2F.07 Pay Toll and Take Ticket Advance Warning Plaques (W9-6bP, W9-6gP)

#### Option:

The Pay Toll or Take Ticket Advance Warning (W9-6**P**, W9-6gP) plaque (see Figure ~~2F-3~~2F-4) may be installed above the appropriate guide sign(s) relating to toll payment types at the 1-mile and/or 1/2-mile advance locations on the approach to a toll plaza if there is insufficient space for the W9-6 or W9-6e sign (see Section 2F.06) at those advance locations.

#### Standard:

The W9-6**P** and W9-6gP plaques shall ~~be a horizontal rectangle with black legend and border on a yellow background. The legend shall include~~ display the distance to the toll plaza and, except for toll-ticket facilities, the toll for passenger or 2-axle vehicles. Where the toll for passenger or 2-axle vehicles is variable by time of day, a changeable message element shall be incorporated into the W9-6**P** plaque to display the toll in effect. ~~For toll plazas where road users entering a toll-ticket facility are issued a toll ticket, the legend PAY TOLL shall be replaced with a suitable legend such as TAKE TICKET.~~

#### Option:

The distance to the toll plaza may be omitted from the W9-6**P** and W9-6gP plaques if the distance is displayed on the guide sign that the plaque accompanies.

The toll for passenger or 2-axle vehicles may be omitted from the W9-6**P** plaque if the toll information is displayed on the guide sign that the plaque accompanies.

### Section 2F.08 Stop Ahead Pay Toll and Take Ticket Warning Signs (W9-6a, W9-6f)

#### Standard:

1 The Stop Ahead Pay Toll (W9-6a) sign shall ~~be a horizontal rectangle with a black legend and~~  
2 ~~border on a yellow background. The legend shall include~~ display the toll for passenger or 2-axle  
3 vehicles (see Figure ~~2F-32F-4~~). Where the toll for passenger or 2-axle vehicles is variable by time of  
4 day, a changeable message element shall be incorporated into the W9-6a sign to display the toll in effect.  
5 ~~For toll plazas where road users entering a toll ticket facility are issued a toll ticket, the legend PAY-~~  
6 ~~TOLL shall be replaced with a suitable legend such as TAKE TICKET.~~

7 Guidance:

8 The Stop Ahead Pay Toll sign should be installed ~~overhead~~ downstream from the W9-6 sign that is 1/2  
9 mile in advance of a mainline toll plaza where some or all of the lanes are required to come to a stop to pay a  
10 toll (see Sections 2F.14 and 2F.15). ~~The location of the overhead sign should coincide with the approximate~~  
11 ~~location where the mainline lanes begin to widen on the approach to the toll plaza lanes.~~

12 The Stop Ahead Pay Toll Advance Warning sign should be overhead-mounted. The location of the  
13 overhead sign should coincide with the approximate location where the mainline lanes begin to widen on the  
14 approach to the toll plaza lanes. **Separated for distinction between recommendation for sign placement**  
15 **and recommendation for mounting type.**

16 Where open-road tolling is used in addition to a toll plaza at a particular location, the W9-6a or W9-6f  
17 sign should be located such that the message is clearly related to the lanes that access the toll plaza and not to  
18 the open-road tolling lanes.

19 Option:

20 If there is insufficient space for the W9-6a or W9-6f sign at the recommended location, the Stop Ahead  
21 Pay Toll (W9-~~6aP~~6cP) or the Stop Ahead Take Ticket (W9-6hP) plaque (see Section 2F.09) may be installed  
22 at that location above the appropriate guide sign that relates to toll payment types.

23 If the visibility of a ramp toll plaza at which some or all lanes are required to come to a stop to pay a toll  
24 or take a ticket is limited, the W9-6a or W9-6f sign may also be installed in advance of the ramp toll plaza.

## 25 **Section 2F.09 Stop Ahead Pay Toll and Take Ticket Warning Plaques (W9-6aP 6cP, W9-6hP)**

26 Option:

27 The Stop Ahead Pay Toll (W9-~~6aP~~6cP) plaque (see Figure ~~2F-32F-4~~) may be installed above the  
28 appropriate guide sign at the location specified for the Stop Ahead Pay Toll (W9-6a) sign (see Section 2F.08)  
29 if there is insufficient space for the W9-6a sign at that location.

30 Standard:

31 The W9-6cP plaque shall ~~be a horizontal rectangle with black legend and border on a yellow~~  
32 ~~background. The legend shall include STOP AHEAD PAY TOLL and, except for toll ticket facilities,~~  
33 display the toll for passenger or 2-axle vehicles. Where the toll for passenger or 2-axle vehicles is  
34 variable by time of day, a changeable message element shall be incorporated into the W9-6a~~c~~P plaque  
35 to display the toll in effect. ~~For toll plazas where road users entering a toll ticket facility are issued a toll~~  
36 ~~ticket, the legend PAY TOLL shall be replaced with a suitable legend such as TAKE TICKET.~~

37 Option:

38 The toll for passenger or 2-axle vehicles may be omitted from the W9-~~6aP~~ 6cP plaque if the toll  
39 information is displayed on the guide sign that the plaque accompanies.

## 40 **Section 2F.10 LAST EXIT BEFORE TOLL Warning Plaques (W16-16P, W16-16aP)**

41 Guidance:

42 The LAST EXIT BEFORE TOLL (W16-16P or W16-16aP) plaque (see Figure ~~2F-32F-4~~) should be used  
43 to notify road users of the last exit from a highway before it becomes a facility on which toll payments are  
44 required. The plaque should be installed above ~~or below~~ the appropriate guide signs for the exit (see Sections  
45 2E.33 and 2E.36). For numbered exits, the Exit Number plaque (see Section 2E.XX) should be installed above  
46 the LAST EXIT BEFORE TOLL plaque.

47 Standard:

48 ~~The W16-16P plaque shall have a black legend and border on a yellow background.~~

## 49 **Section 2F.11 TOLL Auxiliary Sign Warning Plaque (M4-15W16-17P)**

50 Standard:

1           The TOLL (~~M4-15W16-17P~~ auxiliary sign warning plaque (see Figure ~~2F-42F-3~~) shall have a black  
2 legend and border on a yellow background and shall be mounted directly above the route sign of a  
3 numbered toll highway or, if used, above the cardinal direction and alternative route auxiliary signs, in  
4 any route sign assembly providing directions from a non-toll highway to the a toll highway or to a  
5 segment of a highway on which the payment of a toll is required.  
6

## GUIDE SIGNS

### **Section ~~2F.13~~ 2F.12 Toll Facility and Toll Plaza Guide Signs – General**

Support:

Toll plazas are used on many toll highways, bridges, and tunnels for collection of tolls from road users. Electronic toll collection and/or open-road tolling might also be used on such facilities, either in addition to or in place of collecting toll payments at toll plazas.

Chapter 2G contains information regarding signs for preferential and managed lanes that are applicable to toll roads.

Chapter 3E contains information regarding pavement markings for certain toll plaza applications.

**Standard:**

**Directional assemblies for entrances to a toll highway or to a road leading directly to a toll highway with no opportunity to exit before paying or being charged a toll, shall clearly indicate that the facility is a toll facility. Except where the State Toll Route sign (see Paragraph 8) is used, the TOLL (M4-15W16-20P) auxiliary sign warning plaque (see Section 2F.11) shall be used above the route sign of a numbered toll facility in any route sign assembly that provides directions to the toll route from another highway.**

**Except where the State Toll Route sign (see Paragraph 8) is used, a rectangular panel with the black legend TOLL on a yellow background shall be incorporated into the guide signs leading road users to a tolled highway (see Figure 2F-5)**

**Guide signs for toll highways, toll plazas, and tolled or priced managed lanes (see Chapter 2G) shall have white legends and borders on green backgrounds, except as specifically provided by Sections ~~2F.13~~ 12 through 2F.16.**

Option:

A State Toll Route sign (see Paragraph 8) may be used in lieu of the State Route (M1-5) sign in combination with the TOLL (W16-20P) warning plaque or the TOLL panel (see Paragraphs 10 and 11).

**Standard:**

**A State Toll Route sign shall incorporate into its design the word TOLL using the same letter height, legend, background colors, and overall plaque dimensions specified for the W16-20P plaque.**

**The Interstate, Off-Interstate, and U.S. Route signs shall not be modified for tolled facilities.**

Option:

Where conditions do not ~~permit~~ accommodate separate signs, or where it is important to associate a particular regulatory or warning message with specific guidance information, regulatory and/or warning messages may be combined with guide signs for toll plazas using plaques, header panels, or rectangular regulatory or warning panels incorporated within the guide signs, as long as the proper legend and background colors are preserved.

**Standard:**

**When regulatory messages are incorporated within a guide sign, they shall be on a rectangular panel with a black legend on a white background. When warning messages are incorporated within a guide sign, they shall be on a rectangular panel with a black legend on a yellow background.**

#### **Figure 2F-5. Examples of Guide Signs for Entrances to Toll Highways or Ramps**

*Guidance:*

*Guide signs for toll plazas should be designed in accordance with the general principles of guide signs and the specific provisions of Chapter 2E.*

*Signs for toll plazas should systematically provide road users with advance and toll plaza lane-specific information regarding:*

- A. The amount of the toll, the types of payment accepted, and the type(s) of registered ETC accounts accepted for payment;*
- B. Which lane or lanes are required or allowed to be used for each available payment type; and*
- C. Restrictions on the use of a toll plaza lane or lanes by certain types of vehicles (such as cars only or no trucks).*

**Standard:**

1 Signs for ~~attended~~ attended lanes at toll plazas shall ~~include word messages such as FULL-~~  
2 ~~SERVICE, CASH, CHANGE, or RECEIPTS~~ incorporate the Toll Taker (M4-17) symbol panel (see  
3 Figures 2F-8-6 through 2F-11 2F-9).

4 Option:

5 Signs for ~~A~~ attended lanes at toll plazas may ~~incorporate the Toll Taker (M4-17) symbol~~ also display word  
6 legends such as FULL SERVICE, CASH, CHANGE, or RECEIPTS (see Figures 2F-8-6 ~~and~~ through 2F-119).  
7 ~~in a size that makes the symbol the predominant feature of the sign, to supplement the required word message~~  
8 symbol panel when lanes have different services available through them.

9 **Figure 2F-6. Examples of Conventional Toll Plaza Advance Signs**

10 **Figure 2F-7. Examples of Toll Plaza Canopy Signs**

11 **Figure 2F-8. Examples of Mainline Toll Plaza Approach and Canopy Signing**

12 **Figure 2F-9. Examples of guide Signs for a Mainline Toll Plaza on a Diverging Alignment**  
13 **from Open-Road ETC Lanes**

14 **Standard:**

15 Signs for Exact Change lanes at toll plazas shall incorporate the Exact Change (M4-18) symbol  
16 panel ~~an appropriate word message, such as EXACT CHANGE~~ and, ~~except for ticketed systems,~~  
17 display the amount of the toll for passenger vehicles (see Figures 2F-8-6 through 2F-119).

18 Option:

19 Signs for Exact Change lanes at toll plazas may include ~~include the Exact Change (M4-18) symbol an~~  
20 appropriate word legend, such as EXACT CHANGE (see Figures 2F-8-6 and 2F-9), ~~in a size that makes the~~  
21 ~~symbol the predominant feature of the sign, to supplement the required word message~~ symbol panel.

22 **Standard:**

23 **If When used,** the M4-17 and M4-18 symbols panels shall be used only as panels within guide signs-  
24 ~~that accompany the required word messages.~~ The M4-17 and M4-18 symbols or panels shall not be  
25 used as an independent sign or within a sign assembly.

26 If only vehicles with registered ETC accounts are allowed to use a toll plaza lane, the signs for such  
27 lanes shall incorporate the pictograph adopted by the toll facility's ETC payment system and the  
28 regulatory message ONLY (see Figures 2F-1, 2F-86, 2F-97, ~~and~~ 2F-119, 2F-10 and 2F-11). The use, size,  
29 and placement of the ETC pictograph shall comply with the provisions of Sections 2F.02 and 2F.03 ~~and~~  
30 ~~2F.04.~~

31 An Overhead-Arrow-Per-Lane Guide sign (see Figure 2F-10) shall be used in advance of a location  
32 where the mainline lanes split to separate traffic entering Open-Road ETC lanes from lanes entering a  
33 toll plaza where other methods of payment are accepted and an option lane is provided at the split (see  
34 Figure 2F-11). An Overhead-Arrow-Per-Lane sign shall not be used if there is no option lane at the  
35 split.

36 **Figure 2F-10. Overhead Arrow Per Lane Guide Sign for Split with Option Lane between**  
37 **Open-Road ETC Lanes Only and Toll Plaza Lanes.**

38 **Figure 2F-11. Examples of Guide Signs for a Split with an Option Lane for a Mainline Toll**  
39 **Plaza on a Diverging Alignment from Open-Road ETC Lanes**

40 Option:

41 The ETC payment system's pictograph, without a purple underlay or purple header panel, may be used on  
42 signs for Exact Change or attended lanes at toll plazas to indicate that vehicles with registered ETC accounts  
43 may also use those lanes (see Figure 2F-97).

44 **Section 2F.13 Electronic Toll Collection (ETC) Signs - General** **New Section with paragraphs from**  
45 **existing Section 2F.13**

46 Support:

47 Figure 2F-5 shows examples of guide signs for entrances to various types of toll highways and for ETC  
48 account-only entrances to non-toll highways.

49 **Standard:**

1 **Signing for entrances to toll highways where ETC is employed only through license plate character**  
2 **recognition such that road users are not required to establish a toll account or register their vehicle**  
3 **equipment shall comply with the provisions of Paragraphs 4 and 5 (see ~~Figure 2F-6~~ of Section 2F.12.**

4 Support:

5 Figure 2F-12 shows examples of guide signs for the entrance to a toll highway on which tolls are collected  
6 electronically only and registration in a toll-account program is not required.

7 **If only vehicles with registered ETC accounts are allowed to use a toll highway, the guide signs for**  
8 **entrances to such facilities shall incorporate the pictograph adopted by the toll facility's ETC payment**  
9 **system and the regulatory message ONLY (see Figures 2F-1, 2F-5, 2F-10, 2F-11, and 2F-612). The use,**  
10 **size, and placement of the ETC pictograph and the use and color of the background and underlay panel**  
11 **shall comply with the provisions of Sections 2F.02 and 2F.03 ~~and 2F.04~~.**

12 Support:

13 Sections 2F.05, 2F.11, ~~2F.12,~~ and 2F.17 contain additional provisions regarding signs for toll highways  
14 that only accept ETC payments.

15 Sections 2G.16 through 2G.18 contain additional provisions regarding signs for priced managed lanes that  
16 only accept ETC payments.

17 ~~Option:~~ **Relocated to new Section 2F.18**

18 ~~Where a toll highway on which tolls are collected only electronically also accepts payments from~~  
19 ~~registered toll account users and those road users not registered in a toll-account program are assessed a~~  
20 ~~nominal surcharge in addition to the toll, or registered toll account users are assessed a discounted toll, such~~  
21 ~~information may be displayed on a separate information sign near the entrance to such a facility (see Figure~~  
22 ~~2F-6).~~

23 ~~Support:~~

24 Figure 2F-~~7-13~~ shows an example of guide signs for alternative toll and non-toll ramp connections to a  
25 non-toll highway (see Section 2F.19).

26 Many different ETC payment systems are used by the various toll facility operators. Some of these  
27 systems accept payment from other systems' accounts.

28 Option:

29 Where a facility will accept payments from other systems' accounts in addition to its primary ETC-  
30 account payment system, such information may be displayed on a separate information sign near the entrances  
31 to such a facility or in advance of a toll plaza or open-road tolling lanes, as space allows between primary  
32 signs.

33 **Figure 2F-12. Examples of Guide Signs for the Entrance to a Toll Highway on which Toll**  
34 **are Collected Electronically Only**

35 **Figure 2F-13. Examples of Guide Signs for Alternative Toll and Non-Toll Ramp**  
36 **Connections to a Non-Toll Highway**

## 37 **Section 2F.14 Advance Signs for Conventional Toll Plazas**

38 Guidance:

39 *For conventional toll plazas (those without a divergence onto a separate alignment from mainline-aligned*  
40 *open-road tolling or ETC-Only lanes), one or more sets of overhead advance guide signs complying with the*  
41 *provisions of this Section should be provided. The advance guide signs for multi-lane toll plazas should*  
42 *provide information regarding which lanes to use for all of the toll payment methods accepted at the toll*  
43 *plaza. These signs should include toll plaza lane numbers (if used), or action messages or lane-use*  
44 *information such as LEFT LANE(S), CENTER LANE(S), RIGHT LANE(S), or down arrows over the*  
45 *approximate center of each applicable lane. These signs should also incorporate regulatory messages*  
46 *indicating any restrictions or prohibitions on the use of the lanes associated with the various types of payment*  
47 *methods by certain types of vehicles. For mainline toll plazas, these signs should be at least 1/2 mile in*  
48 *advance of the toll plaza, and farther if practical.*

49 *Additional guide signs with lane information for the toll payment types should be provided between*  
50 *approximately 1/4 mile and 800 feet in advance of the toll plaza at a location that avoids or minimizes*  
51 *obstruction of toll plaza canopy signs (see Section 2F.16) and lane-use control signals.*

1       The number, mounting, and/or spacing of sets of advance signs for approaches to toll plazas on ramps,  
2 toll bridges, or tunnels, to accommodate a limited distance to the plaza from an intersection or from the start  
3 of the approach road to the bridge or tunnel, should be based on an engineering study or engineering  
4 judgment.

5 Support:

6       Figure 2F-~~10~~8 shows examples of advance signs for a conventional toll plaza.

7 **Section 2F.15 Advance Signs for Toll Plazas on Diverging Alignments from Open-Road ETC**  
8 **Account-Only Lanes**

9 Support:

10       Open-Road ETC lanes are sometimes located on the normal mainline alignment while the lanes for other  
11 toll payment methods are located at a toll plaza on a separate alignment (see Figure 2F-~~11~~9). Since road users  
12 paying cash tolls must diverge from the mainline alignment, similar to a movement for an exit, it is important  
13 that the guide signs in advance of and at the point of divergence clearly indicate the required lane use and/or  
14 movements.

15 *Guidance:*

16       For toll plazas located on a separate alignment that diverges from mainline-aligned Open-Road ETC  
17 lanes where vehicles are required to have a registered ETC account to use the Open-Road Tolling lanes,  
18 overhead advance signs should be provided at approximately 1 mile and 1/2 mile in advance of the divergence  
19 point. Both the 1-mile and 1/2-mile advance signs should include:

- 20       A. The ETC (pictograph) Account-Only guide sign (see Figures 2F-8-6 and 2F-~~11~~9) with a down arrow  
21 over the approximate center of each lane that will become an Open-Road ETC lane;  
22       B. For the lane or lanes which will diverge to a toll plaza, guide signs conforming to the provisions of  
23 Section ~~2F.13~~2F.12, indicating which lane or lanes will diverge to the toll plaza for the various cash  
24 toll payment methods; and  
25       C. Regulatory signs, plaques, or panels within the guide signs, indicating any restrictions or prohibitions  
26 of certain types of vehicles from toll plaza lanes associated with the various types of payment  
27 methods.

28       At or near the theoretical gore of the divergence point, an additional set of overhead guide signs should  
29 be provided and should include:

- 30       A. The ETC (pictograph) Account-Only guide sign (see Figures 2F-8-6 and 2F-~~11~~9) with a down arrow  
31 over the approximate center of each Open-Road ETC lane;  
32       B. Guide signs conforming to the provisions of Section 2F.12 and 2F.13, with diagonally upward-  
33 pointing directional arrow(s) over the approximate center of each lane indicating the direction of the  
34 divergence, and providing lane information for all types of payment methods accepted at the toll  
35 plaza; and  
36       C. Regulatory signs, plaques, or panels within the guide signs, indicating any restrictions or prohibitions  
37 on the use of the toll plaza lanes associated with the various types of payment methods by certain  
38 types of vehicles.

39       Approximately 800 feet in advance of the toll plaza at a location that avoids or minimizes any obstruction  
40 of the toll plaza canopy signs (see Section 2F.16) and lane-use control signals, an additional set of overhead  
41 advance signs with lane information for the toll payment types should be provided.

42 **Standard:**

43       **The use of down and directional arrows on the signs at the locations described in Paragraphs 2**  
44 **through 4 shall comply with the provisions of Section 2D.08.**

45 Support:

46       Figure 2F-~~11~~9 shows an example of advance signs for toll plazas on a diverging alignment from Open-  
47 Road ETC Account-Only Lanes.

48       Section 4K.02 contains information regarding the use of lane-use control signals for Open-Road ETC  
49 lanes for temporary lane closure purposes.

50 **Section 2F.16 Toll Plaza Canopy Signs**

51 **Standard:**

1 A sign complying with the provisions of Section ~~2F.13~~ 2F.12 shall be provided above the  
2 approximate center of each lane that is not an Open-Road ETC lane, mounted on or suspended from  
3 the toll plaza canopy, or on a separate structure immediately in advance of the plaza located such that  
4 each sign is clearly related to an individual toll lane, indicating the payment type(s) accepted in the lane  
5 and any restrictions or prohibitions of certain types of vehicles that apply to the lane. Except for toll-  
6 ticket systems, the toll for passenger or 2-axle vehicles shall be included on the canopy sign or on a  
7 separate sign mounted on the upstream side of the tollbooth.

8 The background color of a canopy sign for an ETC Account-Only toll plaza lane shall be purple (see  
9 Figure 2F-97).

10 Option:

11 Where vehicles are required to have a registered ETC account to use the lane, one or two flashing yellow  
12 beacons (see Section 4K.04) may supplement a canopy sign over an ETC Account-Only lane to call special  
13 attention to the location of the ETC Account-Only lane within the plaza.

14 The canopy sign for an ETC-Only toll plaza lane in which a regulatory speed limit is not posted and in  
15 which vehicles are not required to stop may display an advisory speed within a horizontal rectangular panel  
16 with a black legend and yellow background within the bottom portion of the canopy sign.

17 **Standard:**

18 Flashing beacons supplementing a canopy sign over an ETC Account-Only lane shall be mounted  
19 directly above or alongside the sign in a manner that is separated from any lane-use control signals for  
20 that lane (see Figure 2F-97).

21 For multi-lane toll plazas, lane-use control signals (see Section 4K.02) shall be provided above the  
22 approximate center of each toll plaza lane that is not an Open-Road ETC lane to indicate the open or  
23 closed status of each lane. Lane-use control signals shall not be used to call attention to a lane for a  
24 specific toll payment type such as ETC Account-Only lanes.

25 Support:

26 Part 6 contains information regarding the closing of a lane for temporary traffic control purposes.

27 Figure 2F-97 shows examples of toll plaza canopy signs.

## 28 **Section 2F.17 Guide Signs for Entrances to ETC Account-Only Facilities**

29 Support:

30 Some toll highways, bridges, and tunnels are restricted to use only by vehicles with a specific registered  
31 ETC account.

32 **Standard:**

33 Where vehicles are required to have a registered ETC account to use an ETC Account-Only facility,  
34 guide signs for the facility shall comply with the applicable provisions of Chapter 2E and specifically  
35 with the applicable provisions of Section 2F.13.

36 Guide signs for the entrance ramps to such ETC Account-Only facilities shall incorporate the  
37 pictograph of the toll facility's ETC payment system and the word ONLY in a header panel or plaque  
38 designed in accordance with the provisions of Section 2F.13 (see Figure 2F-5).

39 Option:

40 A separate information sign displaying the route number, the TOLL warning panel (see Sections 2F.12  
41 and 2F.13), and the legend NO CASH may be located within the sequence of the Advance guide signs on the  
42 approach to the entrance to an ETC Account-Only facility (see Figure 2F-12).

43 Exit Gore signs for entrance ramps to such ETC Account-Only facilities may incorporate the pictograph  
44 of the toll facility's ETC payment system and the word ONLY in a header panel or plaque designed in  
45 accordance with the provisions of Section 2F.13 (see Figure 2F-12 and Figure 2F-13)

46 Support:

47 Section ~~2F.12~~2F.05 contains information regarding ETC Account-Only auxiliary signs-plaques for use  
48 with route signs in route sign assemblies.

## 49 **Section 2F.18 Guide Signs for Entrances to ETC-Only Facilities**

50 Support:

1 Some toll highways, bridges, and tunnels collect tolls electronically using license plate character  
2 recognition in which the registered vehicle owner is then billed by postal mail. Registration in an ETC  
3 account program is not required. Registered ETC account users might have the option to be billed through  
4 their accounts if the facility also accepts such payments.

5 **Standard:**

6 **Where vehicles are not required to have a registered ETC account to use an ETC-Only facility,**  
7 **guide signs for the facility shall comply with the applicable provisions of Chapter 2E and specifically**  
8 **with the applicable provisions of Section 2F.13.**

9 **Advance and Exit Direction guide signs for the entrances to such ETC-Only facilities that do not**  
10 **require the registration in an ETC toll account program shall not display a pictograph of an accepted**  
11 **ETC payment system or use purple as a background color on any portion of the signs.**

12 **If the ETC-Only facility collects tolls by post-travel billing of registered vehicle owners without**  
13 **registration in an ETC toll account program, a separate informational guide sign, if used, shall display**  
14 **one of the following legends (see Figure 2F-12):**

15 **A. TOLL BILLED BY MAIL ONLY, if there is no alternative payment method; or**

16 **B. TOLL BILLED BY MAIL OR [ETC Account Pictograph], if the facility also accepts payments**  
17 **from registered users of an ETC account program.**

18 **Option:**

19 A plaque with the legend NO CASH may be added below the signs described in Paragraph 4 of this  
20 section.

21 **Guidance:**

22 The signs described in Paragraph 4 of this Section should be located within the sequence of Advance  
23 Guide signs for the entrance to the facility and/or at a location along the facility itself (see Figure 2F-12).

24 **Option:**

25 If the ETC-Only facility also accepts payments from other toll account programs, but does not require  
26 registration in the primary ETC account program associated with the facility in order to use the facility, then  
27 the pictographs of the other accepted ETC account programs may be displayed on the separate information  
28 sign displaying the legend TOLL BILLED BY MAIL or ETC System. (See Figure 2F-12).

29 If, in addition to a toll, a nominal surcharge (not a fine, penalty or violation) is assessed road users not  
30 registered in the toll account program ~~in addition to the toll~~, or registered toll account users are assessed a  
31 discounted toll, such information may be displayed on a separate information sign ~~near~~ on the approach to the  
32 entrance to such a facility (see Figure 2F-612). **Paragraph 14 from existing Section 2F.13**

33 **Section 2F.19 Guide Signs for ETC-Only Entrance Ramps to Non-Toll Highways**

34 **Support:**

35 In some cases, access to or from a non-toll route might be provided by a ramp on which a toll is charged  
36 in order to manage congestion, limit access, or for other reasons. The toll ramp might be provided as an  
37 alternative to or in lieu of a ramp providing similar access without charging a toll. Figures 2F-5 and 2F-13  
38 show examples of guide signs for a ramp on which a toll is charged to enter a non-toll route.

39 **Standard:**

40 **Guide signs for ETC-Only Entrance Ramps to non-toll highways shall comply with the provisions of**  
41 **2F.18.**

42 **Option:**

43 A NO-TOLL panel with a black legend and a yellow background may be included on the top  
44 section of the Exit Gore sign for an exit that provides access to the facility without charging a toll.

45 **Section 2F.18-2F.20 ETC Account Program Information Signs**

46 **Standard:**

47 Except as provided in Paragraph 2, signs that inform road users of telephone numbers, Internet  
48 addresses, including domain names and uniform resource locators (URLs), or e-mail addresses for  
49 enrolling in an ETC account program of a toll facility or managed lane, obtaining an ETC transponder,  
50 and/or obtaining ETC account program information shall only be installed in rest areas, parking areas,

1 **or similar roadside facilities where the signs are viewed only by pedestrians or occupants of parked**  
2 **vehicles.**

3 Option:

4 ETC [account](#) program information signs displaying telephone numbers that have no more than four  
5 characters may be installed on roadways in locations where they will not obscure the road user's view of  
6 higher priority traffic control devices and that are removed from key decision points where the road user's  
7 view is more appropriately focused on other traffic control devices, roadway geometry, or traffic conditions,  
8 including exit and entrance ramps, intersections, toll plazas, temporary traffic control zones, and areas of  
9 limited sight distance.

# CHAPTER 2G. PREFERENTIAL AND MANAGED LANE SIGNS

## Chapter 2G Subchapter and Section Organization

### General

- 2G.01 Scope
- 2G.02 Sizes of Preferential and Managed Lane Signs

### Regulatory Signs

- 2G.03 Regulatory Signs for Preferential Lanes – General
- 2G.04 Vehicle Occupancy Definition Signs (R3-10 Series, R3-13 Series)
- 2G.05 Preferential Lane Operation Signs (R3-11 Series, R3-14 Series)
- 2G.06 Preferential Lane Advance Signs (R3-12, R3-12e, R3-12f, R3-15, R3-15a, R3-15d)
- 2G.07 Preferential Lane Ends Signs (R3-12a, R3-12b, R3-12c, R3-12d, R3-12g, R3-12h, R3-15b, R3-15c, R3-15e)

### Warning Signs

- 2G.08 Warning Signs on Median Barriers for Preferential Lanes
- 2G.09 High-Occupancy Vehicle (HOV) Plaque (W16-11P)

### Guide Signs

- 2G.10 Preferential Lane Guide Signs – General
- 2G.11 Signing for Initial Entry Points to Preferential Lanes
- 2G.12 Signing for Intermediate Entry Points to Preferential Lanes
- 2G.13 Signing for Egress from Preferential Lanes to General-Purpose Lanes
- 2G.14 Signing for Direct Entrances to Preferential Lanes from Another Highway
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### Managed Lane Signs

- 2G.16 Signs for Managed Lanes – General
- 2G.17 Signs for Priced Managed Lanes – General
- 2G.18 Regulatory Signs for Priced Managed Lanes
- 2G.19 Guide Signs for Priced Managed Lanes
- 2G.20 Signs for Part-Time Travel on a Shoulder – General
- 2G.21 Regulatory Signs and Plaques for Part-Time Travel on a Shoulder
- 2G.22 Warning Signs for Part-Time Travel on a Shoulder
- 2G.23 Guide Signs for Part-Time Travel on a Shoulder
- 2G.24 Lane-Use Control Signals for Part-Time Travel on a Shoulder
- 2G.25 Lane-Use Control Signals for Active Lane Management on Freeways and Expressways
- 2G.26 Variable Speed Limits for Active Traffic Management on Freeways and Expressways

## GENERAL

### **Section 2G.01 Scope**

Support:

Preferential lanes are lanes designated for special traffic uses such as high-occupancy vehicles (HOVs), light rail, buses, taxis, or bicycles. Preferential 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.

Preferential lanes might be barrier-separated (on a separate alignment or physically separated from the other travel lanes by a barrier or median), buffer-separated (separated from the adjacent general-purpose lanes only by a narrow buffer area created with longitudinal pavement markings), or contiguous (separated from the adjacent general-purpose lanes only by a lane line). Preferential lanes might allow continuous access with the adjacent general-purpose lanes or restrict access only to designated locations. Preferential lanes might be operated in a constant direction or operated as reversible lanes. Some reversible preferential lanes on a

1 divided highway might be operated counter-flow to the direction of traffic on the immediately adjacent  
2 general-purpose lanes.

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

5 Open-road tolling lanes and toll plaza lanes that segregate traffic based on payment method are not  
6 considered preferential lanes. Chapter 2F contains information regarding signing of open-road tolling lanes  
7 and toll plaza lanes.

8 Managed lanes typically restrict access with the adjacent general-purpose lanes to designated locations  
9 only.

10 Under certain operational strategies, such as the occupancy requirement of an HOV lane changing in  
11 response to actual congestion levels, a managed lane is a special type of preferential lane (see Sections 2G.03  
12 through 2G.07).

13 A managed lane operated on a real-time basis in response to changing conditions might be operated as an  
14 HOV lane for a period of time as needed to manage congestion levels.

15 Sections 2G.16-17 through 2G.18-19 contain additional information regarding signs for managed lanes  
16 that use tolling or pricing as a management strategy.

17 Section 9B.04 contains information regarding Preferential Lane signs for bike lanes.

18 **Standard:**

19 **Unless otherwise provided, the provisions of this Chapter shall not apply to bike lanes.**

20 **Section 2G.02 Sizes of Preferential and Managed Lane Signs**

21 **Standard:**

22 **Except as provided in Section 2A.11, the sizes of preferential and managed lane signs that have**  
23 **standardized designs shall be as shown in Table 2G-1.**

24 **Support:**

25 Section 2A.11 contains information regarding the applicability of the various columns in Table 2G-1.

26 **Option:**

27 Signs larger than those shown in Table 2G-1 may be used (see Section 2A.11).

28 **Table 2G-1. Managed and Preferential Lanes Sign and Plaque Minimum Sizes**  
29

## REGULATORY SIGNS

### **Section 2G.03 Regulatory Signs for Preferential Lanes – General**

#### **Standard:**

**When a preferential lane is established, the Preferential Lane regulatory signs (see Figure 2G-1) and pavement markings (see Chapter 3D3E) for these lanes shall be used to advise road users.**

#### Support:

Preferential Lane (R3-10 series through R3-15 series) regulatory signs consist of several different general types of regulatory signs as follows (see Figure 2G-1):

- A. Vehicle Occupancy Definition signs define the vehicle occupancy requirements applicable to an HOV lane (such as “2 OR MORE PERSONS PER VEHICLE”) or types of vehicles not meeting the minimum occupancy requirement (such as motorcycles or ILEVs) that are allowed to use an HOV lane (see Section 2G.04).
- B. Periods of Operation signs notify road users of the days and hours during which the preferential restrictions are in effect (see Section 2G.05).
- C. Preferential Lane Advance signs notify road users that a preferential lane restriction begins ahead (see Section 2G.06).
- D. Preferential Lane Ends signs notify users of the termination point of the preferential lane restrictions (see Section 2G.07).

#### **Figure 2G-1. Preferential Lane Regulatory Signs and Plaques (2 Sheets)**

#### **Standard:**

**Regulatory signs applicable only to a preferential lane shall be distinguished from regulatory signs applicable to general-purpose lanes by the inclusion of the applicable symbol(s) and/or word(s) (see Figure 2G-1).**

#### Support:

The symbol and word message displayed on a particular Preferential Lane regulatory 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.

#### Option:

Changeable message signs may supplement, substitute for, or be incorporated into static Preferential Lane regulatory signs where travel conditions change or where multiple types of operational strategies (such as variable occupancy requirements or vehicle types) are used and varied throughout the day or week, or on a real-time basis, to manage the use of, control of, or access to preferential lanes.

#### Support:

Figure 2G-1 illustrates examples of changeable messages incorporated into static Preferential Lane regulatory signs [displaying open and closed status using lane-use control signal indications \(see Chapter 4M\)](#). [The LED sign legends are normally the variable text such as the open and closed lane legends.](#)

#### **Standard:**

**When changeable message signs (see Chapter 2L) are used as regulatory signs for preferential 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.**

#### *Guidance:*

*When Preferential Lane regulatory signs are used on conventional roads, the decision regarding whether to use a post-mounted or overhead version of a particular type of sign should be based on an engineering study that considers the available space, the existing signs for the adjacent general-purpose traffic lanes, roadway and traffic characteristics, the proximity to existing overhead signs, the ability to install overhead signs, and any other unique local factors.*

*If overhead regulatory signs applicable only to a preferential lane are located in approximately the same longitudinal position along the highway as overhead signs applicable only to the general-purpose lanes, the signs for the preferential lane should be separated laterally from the signs for the general-purpose lanes to the maximum extent practical to minimize conflicting information, while maintaining their visual relationship to the lanes below necessitated by specific legend or arrows indicating lane assignment.*

1 **Standard:**

2 **If used, overhead Preferential Lane (R3-13 series, R3-14 series, and R3-15 series) regulatory signs**  
3 **shall be installed on the side of the roadway where the entrance to the preferential lane is located and**  
4 **any appropriate adjustments shall be made to the sign message.**

5 **Option:**

6 Where a median of sufficient width is available, the R3-13 series and R3-15 series signs may be post-  
7 mounted.

8 **Support:**

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

11 *Guidance:*

12 *The edges of Preferential Lane regulatory signs that are post-mounted on a median barrier should not*  
13 *project beyond the outer edges of the barrier, including in areas where lateral clearance is limited.*

14 **Option:**

15 Where lateral clearance is limited, Preferential Lane regulatory signs that are post-mounted on a median  
16 barrier and that are 72 inches or less in width may be skewed up to 45 degrees in order to fit within the barrier  
17 width or may be mounted higher, such that the vertical clearance to the bottom of the sign, light fixture, or  
18 structural support, whichever is lowest, is not less than [14-17](#) feet above any portion of the pavement and  
19 shoulders.

20 **Standard:**

21 **Where lateral clearance is limited, Preferential Lane regulatory signs that are post-mounted on a**  
22 **median barrier and that are wider than 72 inches shall be mounted with a vertical clearance that**  
23 **complies with the provisions of Section 2A.18 for overhead mounting [if any portion of the sign extends](#)**  
24 **[over the roadway.](#)**

25 *Guidance:*

26 *On conventional roadways, Preferential Lane regulatory sign spacing should be determined by*  
27 *engineering judgment based on speed, block length, distances from adjacent intersections, and other site-*  
28 *specific considerations.*

29 **Support:**

30 Sections 2G.04 and 2G.05 contain provisions regarding the placement of Preferential Lane regulatory  
31 signs on freeways and expressways.

32 **Standard:**

33 **The signs illustrated in Figure 2G-1 that incorporate the diamond symbol shall be used exclusively**  
34 **with preferential lanes for high-occupancy vehicles to indicate the particular occupancy requirement**  
35 **and time restrictions applying to that lane. The signs illustrated in Figure 2G-1 that do not have a**  
36 **diamond symbol shall be used with preferential lanes that are not HOV lanes, but are designated for**  
37 **use by other types of vehicles (such as bus and/or taxi use).**

38 ~~**Option:**~~

39 ~~Agencies may select from either the HOV abbreviation or the diamond symbol, or use both, to reference~~  
40 ~~the HOV lane designation.~~

41 ~~**Standard:**~~

42 ~~**When the diamond symbol (or HOV abbreviation) is used without text on the post-mounted**~~  
43 ~~**Preferential Lane (R3-10 series, R3-11 series, and R3-12 series) regulatory signs, it shall be centered on**~~  
44 ~~**the top line of the sign. When the diamond symbol (or HOV abbreviation) is used with associated text**~~  
45 ~~**on the post-mounted Preferential Lane (R3-10 series, R3-11 series, and R3-12 series) regulatory signs, it**~~  
46 ~~**shall appear to the left of the associated text. When the diamond symbol is used on the overhead**~~  
47 ~~**Preferential Lane (R3-13, R3-13a, R3-14, and R3-14a) regulatory signs, it shall appear in the top left**~~  
48 ~~**quadrant. The diamond symbol for the R3-15, R3-15a, R3-15b, and R3-15e signs shall appear on the**~~  
49 ~~**left hand side of the sign. The diamond symbol shall not be used on the bus, taxi, or bicycle Preferential**~~  
50 ~~**Lane signs.**~~

1 **Vehicle Occupancy Definition, Periods of Operation, and Preferential Lane Advance regulatory**  
2 **signs for HOV lanes shall display the minimum allowable vehicle occupancy requirement established**  
3 **for each HOV lane, displayed immediately after the word message HOV ~~or the diamond symbol.~~**

4 Support:

5 The agencies that own and operate HOV lanes have the authority and responsibility to determine how they  
6 are operated and the minimum occupancy requirements. Information about federal requirements for certain  
7 types of vehicles not meeting the minimum occupancy requirement to be eligible to use HOV lanes that  
8 receive Federal-aid program funding and about requirements associated with proposed significant changes to  
9 the operation of an existing HOV lane and certain vehicles are contained in the “Federal-Aid Highway  
10 Program Guidance on High Occupancy Vehicle (HOV) Lanes” (see Section 1A.11).

11 **Standard: Paragraphs Relocated to New Section 2G.16**

12 ~~The provisions of Sections 2G.03 through 2G.07 regarding regulatory signs for Preferential lanes~~  
13 ~~shall apply to managed lanes operated at all times or at certain times by varying vehicle occupancy~~  
14 ~~requirements (HOV) or by using vehicle type restrictions as a congestion management strategy. Such~~  
15 ~~managed lanes shall use changeable message signs or changeable message elements within static signs to~~  
16 ~~display the appropriate regulatory sign messages only when they are in effect.~~

17 ~~When certain types of vehicles (such as trucks) are prohibited from using a managed lane or when a~~  
18 ~~managed lane is restricted to use by only certain types of vehicles during certain operational strategies,~~  
19 ~~regulatory signs or regulatory panels within the appropriate guide signs that include changeable~~  
20 ~~message elements shall be used to display the open/closed status of the managed lane for such vehicle~~  
21 ~~types.~~

22 ~~When the vehicle occupancy required for use of an HOV lane is varied as a part of a managed lane~~  
23 ~~operational strategy, regulatory signs that include changeable message elements shall be used to display~~  
24 ~~the required vehicle occupancy in effect.~~

25 ~~Support:~~

26 ~~See Section 2G.17 for regulatory signs for managed lanes that use tolling or pricing as a congestion~~  
27 ~~management strategy, either exclusively or with other management strategies.~~

28 Figures 2G-2 and 2G-3 illustrate the use of regulatory signs for the beginning, along the length, and at the  
29 end of contiguous or buffer-separated preferential lanes that provide continuous access with the adjacent  
30 general-purpose lanes.

31 **Figure 2G-2. Example of Signing for an Added Continuous-Access Contiguous of Buffer-**  
32 **Separated HOV Lane**

33 **Figure 2G-3. Example of Signing for a General Purpose Lane that Becomes a Continuous-**  
34 **Access Contiguous Buffer-Separated HOV Lane**

35 **Section 2G.04 Preferential Lane Vehicle Occupancy Definition Regulatory Signs (R3-10**  
36 **Series, and R3-13 Series)**

37 **Standard:**

38 The R3-10, R3-13, and R3-13a Vehicle Occupancy Definition signs (see Figure 2G-1) shall be used  
39 where agencies determine that it is appropriate to provide a sign that defines the minimum occupancy  
40 of vehicles that are allowed to use an HOV lane.

41 *Guidance:*

42 *The Inherently Low Emission Vehicle (ILEV) (R3-10a) sign (see Figure 2G-1) should be used when it is*  
43 *permissible for a properly labeled and certified ILEV, regardless of the number of occupants, to use an HOV*  
44 *lane. When used, the ILEV signs should be post-mounted in advance of and at intervals along the HOV lane*  
45 *based upon engineering judgment and the placement of other Preferential Lane regulatory signs. The R3-10a*  
46 *sign is only applicable to HOV lanes and should not to be used with other preferential lane applications.*

47 Support:

48 ILEVs are defined by the Environmental Protection Agency (EPA) as vehicles having no fuel vapor  
49 (hydrocarbon) emissions and are certified by the EPA as meeting the emissions standards and requirements  
50 specified in ~~40 CFR 88.311-93~~ [40 CFR §88.311-93](#) and ~~40 CFR 88.312-93(e)~~ [40 CFR §88.312-93\(c\)](#).

51 *Guidance:*

52 *The legend format of the R3-10 and R3-13 signs should have the following sequence:*

- 1 ~~A. Top Line: "HOV 2+ ONLY" (or 3+ or 4+ if appropriate)~~  
2 ~~B. Bottom Lines: "2 OR MORE PERSONS PER VEHICLE" (or 3 or 4 if appropriate)~~  
3 ~~The legend format of the R3-13a sign should have the following sequence:~~  
4 ~~A. Top Line: "HOV 2+ ONLY" (or 3+ or 4+ if appropriate)~~  
5 ~~B. Middle Lines: "2 OR MORE PERSONS PER VEHICLE" (or 3 or 4 if appropriate)~~  
6 ~~C. Bottom Lines: Times and days the occupancy restriction is in effect~~

7 **Support:**

8 Section 2G.17-18 contains information regarding the legends of Vehicle Occupancy Definition signs for a  
9 priced managed lane that has an occupancy requirement for non-toll travel.

10 **Standard:**

11 For barrier- or buffer-separated or contiguous preferential lanes where access between the  
12 preferential and general-purpose lanes is restricted to designated locations on freeways and  
13 expressways, an overhead Vehicle Occupancy Definition (R3-13 or R3-13a) sign shall be installed at  
14 least 1/2 mile in advance of the beginning of or initial entry point to an HOV lane. These signs shall  
15 only be displayed in advance of the beginning of or initial or intermediate entry point to HOV lanes.

16 For buffer-separated or contiguous HOV lanes where access is restricted to designated locations on  
17 freeways and expressways, the sequence of a post-mounted Periods of Operation (R3-11a) sign (see  
18 Section 2G.05) followed by a post-mounted Vehicle Occupancy Definition (R3-10) sign shall be located  
19 at intervals not greater than 1/2 mile along the length ~~of the access restricted HOV lane, at of~~  
20 ~~designated gaps where vehicles are allowed to legally access the HOV lane, and within designated~~  
21 ~~enforcement areas as defined by the operating agency.~~ **Relocated from later in Section, portions of**  
22 **provision changed to Option that follows**

23 **Option:**

24 For buffer-separated or contiguous HOV lanes where access is restricted to designated locations on  
25 freeways and expressways, the sequence of a post-mounted Periods of Operation (R3-11a) sign (see Section  
26 2G.05) followed by a post-mounted Vehicle Occupancy Definition (R3-10) sign may be located at intervals of  
27 approximately 1/2 mile along the length of the HOV lane.

28 For barrier-separated HOV lanes on freeways and expressways, the sequence of a post-mounted Periods  
29 of Operation (R3-11a) sign (see Section 2G.05) followed by a post-mounted Vehicle Occupancy Definition  
30 (R3-10) sign may be located at intervals of approximately 1/2 mile along the length of the HOV lane, at  
31 intermediate entry points, and at designated enforcement areas as defined by the operating agency.

32 **Standard:**

33 ~~For buffer-separated or contiguous HOV lanes where access is restricted to designated locations,~~  
34 ~~the sequence of a post-mounted Periods of Operation (R3-11a) sign followed by a post-mounted Vehicle~~  
35 ~~Occupancy Definition (R3-10) sign shall be located at intervals not greater than 1/2 mile along the~~  
36 ~~length of the access restricted HOV lane, at designated gaps where vehicles are allowed to legally access~~  
37 ~~the HOV lane, and within designated enforcement areas as defined by the operating agency.~~ **Relocated**  
38 **to earlier in Section, portions of provision changed to Option**

39 For buffer-separated or contiguous HOV lanes where continuous access with the adjacent general-  
40 purpose lanes is provided on freeways and expressways, the sequence of a post-mounted Periods of  
41 Operation (R3-11a) sign (see Section 2G.05) followed by a post-mounted Vehicle Occupancy Definition  
42 (R3-10) sign, and ILEV (R3-10a) signs if appropriate, shall be located at intervals not greater than 1/2  
43 mile along the length of the HOV lane.

44 **Guidance:**

45 On freeways and expressways, the signs within each Preferential Lane regulatory sign sequence should  
46 be separated by a minimum distance of 800 feet and a maximum distance of 1,000 feet.

47 On conventional roads, the distance between Preferential Lane regulatory signs within each sequence  
48 should be determined by engineering judgment based on speed, block length, distances from adjacent  
49 intersections, and other site-specific considerations.

50 **Standard:**

51 For all types of direct access ramps that provide access to or lead to HOV lanes, a post-mounted  
52 Vehicle Occupancy Definition (R3-10) sign, and an ILEV (R3-10a) sign if appropriate, shall be used at  
53 the beginning or initial entry point for the direct access ramp.

1 **Section 2G.05 Preferential Lane ~~Periods of Operation~~ Regulatory Signs (R3-11 Series, and R3-**  
2 **14 Series)**

3 *Guidance:*

4 *The sizes of post-mounted ~~Periods of Operation (R3-11 series) signs should remain consistent to~~*  
5 *accommodate any manual addition or removal of a single line of text for each sign.* **Incorporated into**  
6 **following Support statement**

7 Support:

8 The standardized sizes of post-mounted Preferential Lane Operation (R3-11 series) signs are consistent to  
9 accommodate any future addition or removal of a single line of legend for each sign. Each size  
10 accommodates two lines of legend for the times of day and days of week that the regulation is in effect.  
11 Consistent sign sizes are beneficial for agencies when ordering sign materials, as well as when making ~~text-~~  
12 legend changes to existing signs if changes occur to operating times or occupancy restrictions in the future.  
13 ~~For example, the R3-11e sign has space for one line located below “24 HOURS” if an agency determines that~~  
14 ~~it is appropriate to display additional information (such as “MON—FRI”), yet the R3-11e sign has the same-~~  
15 ~~dimensions as the other R3-11 series signs.~~

16 *Guidance:*

17 Where the regulation is in effect during more than one time period of the day, such as during the morning  
18 and afternoon peak periods, the height of the R3-11 series signs should be suitably increased to accommodate  
19 the additional line(s) of legend.

20 **Standard:**

21 When used, the post-mounted ~~Periods of Operation~~Preferential Lane Operation (R3-11 series) signs  
22 shall be located adjacent to the preferential lane, and the overhead Preferential Lane Operation ~~Periods~~  
23 ~~of Operation~~ (R3-14 series) signs shall be mounted directly over the lane.

24 The legend format of the post-mounted Preferential Lane Operation ~~Periods of Operation~~ (R3-11  
25 series) signs shall have the following sequence:

- 26 A. Top Lines: Lanes applicable, such as “RIGHT LANE” or “2 RIGHT LANES” ~~or “THIS~~  
27 ~~LANE”~~  
28 B. Middle Lines: Eligible uses, such as “HOV 2+ ONLY” (or 3+ or 4+ if appropriate) or “BUSES  
29 ONLY” or other applicable uses or eligible turning movements  
30 C. Bottom Lines: Applicable times and days, such as “7 AM – 9 AM” or “6:30 AM – 9:30 AM,  
31 MON-FRI”

32 The legend format of the overhead Preferential Lane Operation ~~Periods of Operation~~ (R3-14 series)  
33 signs shall have the following sequence:

- 34 A. Top Lines: Eligible uses, such as “HOV 2+ ONLY” (or 3+ or 4+ if appropriate) or “BUSES  
35 ONLY” or other applicable uses or eligible turning movements  
36 B. Bottom Lines: Applicable times and days, with the time and day placed above the down arrow,  
37 such as “7 AM – 9 AM” or “6:30 AM – 9:30 AM, MON-FRI” (When the operating periods  
38 exceed the available line width, the hours and days of the week shall be stacked as shown for the  
39 R3-14a sign in Figure 2G-1.)

40 For preferential lanes restrictions that are in effect on a full-time basis, ~~either the full-~~ Preferential  
41 Lane Operation ~~time Periods of Operation (R3-11b and R3-11b, R3-11c, R3-11e, R3-11g, R3-14b, R3-~~  
42 14e or R3-14g) signs shall be used, modified to display no legend relative to the period of operation or  
43 the legends of the part-time Periods of Operations (R3-11, R3-11a, R3-14, R3-14a) signs shall be  
44 modified to display the legend 24 HOURS except as provided in Paragraph 7. **Deleted portion**  
45 **converted to Option that follows and text revised**

46 *Option:*

47 In lieu of using the full-time ~~Preferential Lane Operation~~ ~~Periods of Operation~~ signs, the legend 24  
48 HOURS may be substituted for the times and days of the week on the part-time Preferential Lane  
49 Operation ~~Periods of Operation~~ (R3-11, R3-11a, R3-11d, R3-11f, R3-14, ~~R3-14a, R3-14d, and R3-14f)~~ signs  
50 for preferential lane restrictions that are in effect on a full-time basis.

51 *Support:*

52 The 24 HOURS legend displayed on the R3-11c sign reinforces the full-time operation where several  
53 facilities in the same area have different hours of operation—some part-time, others full-time, or where the  
54 same lane changes from part-time to full-time operation somewhere along its length.

1 **Standard:**

2 The full-time Preferential Lane Operation ~~Periods of Operation~~ (R3-11b, R3-11c, R3-11e, R3-11g,  
3 R3-14b, R3-14e, R3-14g) signs shall not be used where the preferential lane restriction is in effect only  
4 on a part-time basis.

5 **Option:**

6 Where additional movements are ~~permitted~~ allowed from a preferential lane by vehicles not meeting the  
7 preferential lane regulation on an approach to an intersection, the format and words used in the legend in the  
8 middle lines on the post-mounted Preferential Lane Operation ~~Periods of Operation~~ (R3-11 series) signs and  
9 on the top line of the overhead Preferential Lane Operation ~~Periods of Operation~~ (R3-14 series) signs may be  
10 modified to accommodate the ~~permitted~~ allowable movements (such as “HOV 2+ AND RIGHT TURNS  
11 ONLY”).

12 ~~A~~ The MOTORCYCLES ALLOWED (R3-11hP) plaque may be used where motorcycles, regardless of  
13 the number of occupants, are allowed to use an HOV lane.

14 **Standard:**

15 If used, the MOTORCYCLES ALLOWED plaque shall be mounted below a post-mounted  
16 Preferential Lane ~~Periods of Operation~~ (R3-11, R3-11a, or R3-11eb) sign.

17 For all barrier- or buffer-separated or contiguous preferential lanes where access is restricted to  
18 designated locations, an overhead Preferential Lane Operation ~~Periods of Operation~~ (R3-14 series) sign  
19 shall be used at the beginning or initial entry point on freeways, expressways, and at locations on  
20 conventional roadways where the preferential lane is not the outermost (far right or far left) lane of the  
21 roadway, and at any intermediate entry points or gaps in the barrier or buffer where vehicles are  
22 allowed to legally ~~access~~ enter the access-restricted preferential lanes. For all barrier-separated and  
23 buffer-separated preferential lanes, post-mounted Preferential Lane Operation ~~Periods of Operation~~  
24 (R3-11 series) signs shall be used only as a supplement to the overhead signs on freeways, expressways,  
25 and at locations on conventional roadways where the preferential lane is not the outermost lane of the  
26 roadway at the beginning or initial entry point, or at any intermediate entry points or gaps in the  
27 barrier or buffer.

28 For buffer-separated or contiguous preferential lanes where continuous access with the adjacent  
29 general-purpose lanes is provided, including those where a preferential lane is added to the roadway  
30 (see Figure 2G-2 for HOV lanes) and those where a general-purpose lane transitions into a preferential  
31 lane (see Figure 2G-3 for HOV lanes), an overhead Preferential Lane Operation ~~Periods of Operation~~  
32 (R3-14 series) sign shall be used at the beginning or initial entry point of the preferential lane on  
33 freeways and expressways.

34 **Option:**

35 On conventional roads where preferential lane operations exist, R3-11 series post mounted signs may be  
36 used in lieu of or in addition to overhead R3-14 series signs, except where overhead signs are required as  
37 provided in Paragraph 14.

38 *Guidance:*

39 *Overhead (R3-14 series) or post mounted (R3-11 series) Periods of Operation signs should be installed at*  
40 *periodic intervals along the length of a contiguous or buffer separated preferential lane where continuous*  
41 *access with the adjacent general purpose lanes is provided.*

42 **Option:**

43 Additional overhead (R3-14 series) or post-mounted (R3-11 series) Preferential Lane Operation ~~Periods of~~  
44 ~~Operation~~ signs may be provided along the length of any type of preferential lane.

45 ~~On conventional roads, the overhead Periods of Operation (R3-14 series) signs may be installed at the~~  
46 ~~beginning or entry points and/or at intermediate points along preferential lanes in any geometric configuration.~~

47 **Standard:**

48 For all types of direct access ramps that provide access to or lead to preferential lanes, a post-  
49 mounted Preferential Lane Operation ~~Periods of Operation~~ (R3-11 series) sign shall be used at the  
50 beginning or initial entry point of the direct access ramp.

51 **Option:**

1 For direct access ramps to preferential lanes, an overhead [Preferential Lane Operation](#) ~~Periods of~~  
2 ~~Operation~~ (R3-14 series) sign may be used at the beginning or initial entry point to supplement the required  
3 post-mounted signs.

4 Lane-use control signals (see Chapter 4M) may be used at access points to preferential lanes to indicate  
5 that a ramp or access roadway leading to the preferential lane or facility, or one or more specific lanes of the  
6 facility, are open or closed (see Figure 2G-~~14~~[15](#)).

## 7 **Section 2G.06 Preferential Lane Advance ~~Regulatory~~ Signs (R3-12, R3-12e, R3-12f, R3-15, R3- 8 [15a](#), and R3-15d)**

9 *Guidance:*

10 *The Preferential Lane Advance (R3-12, R3-12f, R3-15, and R3-15d) signs should be used for advance  
11 notification of a barrier-separated, buffer-separated, or contiguous preferential lane that is added to the  
12 general-purpose lanes (see Figure 2G-~~12~~[13](#)).*

13 *The Preferential Lane Advance (R3-12e and R3-15a) signs should be used for advance notification of a  
14 general-purpose lane that becomes a preferential lane (see Figure 2G-~~13~~[14](#)).*

15 *Option:*

16 The legends on the R3-12f and R3-15d signs may be modified to suit the type of preferential lane.

17 *Guidance:*

18 *On conventional roads, for general-purpose lanes that become preferential lanes, a post-mounted (R3-  
19 12e) or overhead (R3-15a) Preferential Lane Advance sign should be installed in advance of the beginning of  
20 or initial entry point to the preferential lane at a distance determined by engineering judgment based on  
21 speed, traffic characteristics, and other site-specific considerations. The distance selected should provide  
22 adequate opportunity for ineligible vehicles to vacate the lane prior to the beginning of the restriction.*

23 *On freeways and expressways, for general-purpose lanes that become preferential lanes, an overhead  
24 Preferential Lane Advance (R3-15a) sign should be installed at least 1 mile in advance of the beginning of the  
25 preferential lane restriction.*

26 *Option:*

27 Additional post-mounted or overhead Preferential Lane Advance signs may be placed farther in advance  
28 of or closer to the beginning or initial entry points to a preferential lane.

## 29 **Section 2G.07 Preferential Lane Ends ~~Regulatory~~ Signs (R3-12a, R3-12b, R3-12c, R3-12d, R3- 30 [12g](#), R3-12h, R3-15b, R3-15c, and R3-15e)**

31 **Standard:**

32 A post-mounted Preferential Lane Ends (R3-12b or R3-12h) sign shall be installed at least 1/2 mile  
33 in advance of the termination of a preferential lane [on freeways and expressways](#).

34 Except as provided in Paragraph [67 of this Section](#), a post-mounted Preferential Lane Ends (R3-12a  
35 or R3-12g) sign shall be installed at the point where a preferential lane and restriction end and traffic  
36 must merge into the general-purpose lanes.

37 A post-mounted Preferential Lane Ends (R3-12d) sign shall be installed at least 1/2 mile in advance  
38 of the point where a preferential lane restriction ends and the lane becomes a general-purpose lane [on  
39 freeways and expressways](#).

40 Except as provided in Paragraph [78 of this Section](#), a post-mounted Preferential Lane Ends (R3-  
41 12c) sign shall be installed at the point where a preferential lane restriction ends and the lane becomes a  
42 general-purpose lane.

43 *Guidance:*

44 *[On conventional roads, the distance at which Preferential Lane Ends signs are installed in advance of the  
45 termination of a preferential lane and/or restriction should be determined by engineering judgment.](#)*

46 *Option:*

47 The legends on the R3-12g and R3-15e signs may be modified to suit the type of preferential lane.

48 An overhead Preferential Lane Ends (R3-15b or R3-15e) sign may be installed instead of or in addition to  
49 a post-mounted R3-12a or R3-12g sign at the point where a preferential lane and restriction ends and traffic  
50 must merge into the general-purpose lanes.

1           An overhead Preferential Lane Ends (R3-15c) sign may be installed instead of or in addition to a post-  
2 mounted R3-12c sign at the point where the preferential lane restriction ends and the lane becomes a general-  
3 purpose lane.  
4

## WARNING SIGNS

### **Section 2G.08 Warning Signs on Median Barriers for Preferential Lanes**

Option:

When a warning sign applicable only to a preferential lane is installed on a median barrier with limited lateral clearance to the adjacent travel lanes or shoulders, the warning sign may have a vertically oriented rectangular shape. For a High Occupancy Vehicle lane, such signs may be used instead of using the HOV Plaque (W16-11P) (see Section 2G.09) with a standard diamond-shaped warning sign.

**Standard:**

When a vertically oriented rectangular-shaped warning sign applicable only to a preferential lane is installed on a median barrier, the top portion of the sign shall be comprised of a white symbol or legend denoting the type of preferential lane (such as the diamond symbol for HOV or the legend BUS LANE) on a black background with a white border, and the bottom portion of the sign shall be comprised of the standard word message or symbol of the standard warning sign as a black legend on a yellow background with a black border (see Figure 2G-4).

*Guidance:*

Where lateral clearance is limited, such as when a post-mounted warning sign applicable only to a preferential lane 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, warning signs applicable only to a preferential lane that are post-mounted on a median barrier and that are 72 inches or less in width may be skewed up to 45 degrees in order to fit within the barrier width or may be mounted higher, such that the vertical clearance to bottom of the sign, light fixture, or its structural support, whichever is lowest, is not less than 14-17 feet above any portion of the pavement and shoulders.

#### **Figure 2G-4. Examples of Warning Signs and Plaques Applicable Only to Preferential Lanes**

**Standard:**

Where lateral clearance is limited, Preferential Lane warning signs that are post-mounted on a median barrier and that are wider than 72 inches shall be mounted with a vertical clearance that complies with the provisions of Section 2A.18 for overhead mounting.

### **Section 2G.09 High-Occupancy Vehicle (HOV) Plaque (W16-11P)**

Option:

In situations where there is a need to warn drivers in an HOV lane of a specific condition, a the HOV (W16-11P) plaque (see Figure 2G-4) may be used above a warning sign. The HOV plaque may be used to differentiate a warning sign specific for applicable to the HOV lanes when the sign is also visible to traffic on the adjacent general-purpose roadway. Among the warning signs that may be possible applications of the HOV plaque are the Advisory Exit Speed, Added Lane, and Merge signs.

The diamond symbol may be used instead of the word message HOV on the W16-11P plaque. When appropriate, the words LANE or ONLY may be used on this plaque.

Support:

Section 2G.08 contains information regarding warning signs that can be mounted on barriers for HOV or other types of preferential lanes.

## GUIDE SIGNS

### **Section 2G.10 Preferential Lane Guide Signs – General**

Support:

Preferential lanes are used on freeways, expressways, and conventional roads. Except as otherwise provided, Sections 2G.10 through 2G.15 apply only to guide signs for preferential lanes on freeways and expressways.

*Guidance:*

*On conventional roads, guide signs applicable only to preferential lanes are ordinarily not needed, but if used they should comply with the provisions for guide signs in Chapter 2D and any principles for Preferential Lane guide signs in Sections 2G.10 through 2G.15 that engineering judgment finds to be appropriate for the conditions.*

Support:

~~Consistency in signs and pavement markings for preferential lanes plays a critical role in building public awareness, understanding, and acceptance, and makes enforcement more effective.~~

Additional guidance and standards related to the designation, operational considerations, signs, pavement markings, and other considerations for preferential lanes ~~is~~ are provided in Sections 2G.03 through 2G.07, and 2G.09, and Chapter ~~3D~~ 3E.

*Guidance:*

*The appropriate combinations of pavement markings and standard overhead and post-mounted regulatory, warning, and guide signs for a specific preferential lane application should be selected based on an engineering study.*

*If overhead signs applicable only to a preferential lane are located in approximately the same longitudinal position along the highway as overhead signs applicable only to the general-purpose lanes, the signs for the preferential lane should be separated laterally from the signs for the general-purpose lanes to the maximum extent practical to minimize conflicting information.*

*The Preferential Lane signs should be designed and located to avoid overloading the road user. ~~Based on the importance of the sign, regulatory signs should be given priority over guide signs.~~ The order of priority of guide signs should be Advance Guide, Preferential Lane Entrance Direction, and finally Preferential Lane Exit Destination supplemental guide signs.*

**Standard:**

**Signs applicable only to a preferential lane shall be distinguished from signs applicable to general-purpose lanes by the inclusion of the applicable symbol(s) and/or word(s).**

Support:

The symbol and/or word message that appears on a particular guide sign applicable only to a preferential lane will vary based on the specific type of ~~allowed~~-traffic allowed 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.

**Standard:**

**For HOV lanes, the diamond symbol shall appear on each Advance Guide sign, Preferential Lane Entrance Direction sign, and Preferential Lane Entrance Gore sign, as shown in Figures 2G-5 through 2G-7 for the designated entry and exit points for barrier- and buffer-separated geometric configurations and direct access ramps to or from such lanes. The diamond symbol shall not be used with preferential lanes for other types of traffic, such as bus lanes or taxi lanes.**

**Signing for an HOV lane that is managed by means of varying the occupancy requirement in response to changing conditions shall also comply with these provisions.**

**The diamond symbol shall be displayed in the legend of each Preferential Lane guide sign at the designated entry and exit points for all types of HOV lanes (including barrier- and buffer-separated, contiguous, 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. Guide signs shall not display the occupancy requirement for the preferential lane.**

**A combination of guide and regulatory signs shall be used in advance of and at the initial entry point and all intermediate entry points from general-purpose lanes or facilities to contiguous, barrier-**

1 separated, and buffer-separated preferential lanes where access between the preferential and general-  
2 purpose lanes is restricted to designated locations. The regulatory signs shall comply with the  
3 provisions of Sections 2G.03 through 2G.07.

4 Regulatory signs alone shall be used in advance of, at the beginning of, and at periodic intervals  
5 along contiguous or buffer-separated preferential lanes that provide continuous access between the  
6 adjacent general-purpose lanes and the preferential lane (see Figures 2G-~~12-13~~ and 2G-~~13~~14). The  
7 design and placement of the regulatory signs shall comply with the provisions of Sections 2G.03 through  
8 2G.07.

9 Except as otherwise provided in Sections 2G.10 through 2G.13, guide signs applicable to a  
10 preferential lane with a vehicle occupancy requirement shall be distinguished from those applicable to  
11 general-purpose lanes by displaying the white diamond symbol on a black background at the left-hand  
12 edge of these signs.

13 Option:

14 When post-mounted guide signs applicable only to a preferential lane are installed on a median barrier  
15 with limited lateral clearance to the adjacent travel lanes or shoulders, the guide signs may have a vertical~~ly~~  
16 oriented rectangular shape.

17 **Standard:**

18 When vertically oriented rectangular shaped guide signs applicable only to a preferential lane are  
19 installed on a median barrier, the top portion of the signs shall be comprised of the applicable white  
20 symbol or white word message that identifies the type of preferential lane (such as the diamond symbol  
21 for an HOV lane) on a black background with a white border, and the bottom portion of the sign shall  
22 be comprised of the appropriate guide sign legend on a green background with a white border (see  
23 Figures 2G-3, 2G-6, and 2G-7).

24 *Guidance:*

25 *Where lateral clearance is limited, such as when a post-mounted Preferential Lane guide sign is installed*  
26 *on a median barrier, the edges of the sign should not project beyond the outer edges of the barrier.*

27 Option:

28 Where lateral clearance is limited, Preferential Lane guide signs that are 72 inches or less in width may be  
29 skewed up to 45 degrees in order to fit within the barrier width or may be mounted higher, such that the  
30 vertical clearance to the bottom of the sign, light fixture, or its structural support, whichever is lowest, is not  
31 less than ~~14-17~~ feet above any portion of the pavement and shoulders.

32 **Standard:**

33 **Where lateral clearance is limited, Preferential Lane guide signs that are post-mounted on a median**  
34 **barrier and that are wider than 72 inches shall be mounted with a vertical clearance that complies with**  
35 **the provisions of Section 2A.18 for overhead mounting.**

36 Option:

37 Lane-use control signals (see Chapter 4M) may be used at access points to preferential lanes to indicate  
38 that a ramp or access roadway leading to or from the preferential lane or facility, or one or more specific lanes  
39 of the facility, are open or closed.

40 Changeable message signs may supplement, substitute for, or be incorporated into static guide signs (see  
41 Figure 2G-6) where travel conditions change or where multiple types of operational strategies (such as  
42 variable occupancy requirements, vehicle types, or pricing policies) are used and varied throughout the day or  
43 week to manage the use of, control of, or access to preferential lanes.

44 **Standard:**

45 **When changeable message signs (see Chapter 2L) are used as guide signs for preferential lanes, they**  
46 **shall be the required sign size and shall display the required letter height and legend format that**  
47 **corresponds to the type of roadway facility and design speed.**

48 **Advance Guide signs, Preferential Lane Entrance Direction signs, and Preferential Lane Entrance**  
49 **Gore signs for the initial entry point and intermediate entry points into a preferential lane from the**  
50 **general-purpose lanes on the same designated route shall not identify the entry point as an exit by using**  
51 **the word “EXIT” on the sign or on a plaque.**

52 *Guidance:*

1 Advance Guide signs and Preferential Lane Entrance Direction signs for initial and intermediate entry  
2 points into a preferential lane should use the word “ENTRANCE,” such as “HOV LANE ENTRANCE” (see  
3 Figures 2G-5 and 2G-6) to convey the fact that vehicles are not leaving the designated route.

4 Preferential Lane Entrance Gore signs (see Figure 2G-7) at the initial entry point to a preferential lane  
5 should use the word “ENTRANCE.” Preferential Lane Entrance Gore signs at intermediate entry points to a  
6 barrier-separated preferential lane where the sign would be located immediately adjacent to and directly  
7 viewed by traffic in the preferential lane should not use the word “ENTRANCE.”

8 **Figure 2G-5. Example of an Overhead Advance Guide Sign for a Preferential Lane**  
9 **Entrance**

10 **Figure 2G-6. Example of Overhead or Post-Mounted Preferential Lane Entrance Direction**  
11 **Signs**

12 **Figure 2G-7. Entrance Gore Signs for Barrier-Separated Preferential Lanes**

13 **Standard:**

14 When the entry point is on the left-hand side of the general-purpose lanes, a LEFT (E1-5aP) plaque  
15 (see Figure 2E-229) shall be added to the top left edge of the Advance Guide and Preferential Lane  
16 Entrance Direction signs. The LEFT plaque shall not be used on a preferential lane regulatory sign.

17 **Section 2G.11 ~~Guide Signs~~Signing for Initial Entry Points to Preferential Lanes**

18 **Standard:**

19 Except where a buffer-separated or contiguous preferential lane is added or where a general-  
20 purpose lane becomes a buffer-separated or contiguous preferential lane, and provides continuous  
21 access with the adjacent general-purpose lanes as illustrated in Figures 2G-2 and 2G-3, an Advance  
22 Guide sign shall be provided at least 1/2 mile prior to the initial entry point to all types of preferential  
23 lanes in any type of geometric configuration on freeways and expressways. A Preferential Lane  
24 Entrance Direction sign shall also be provided at the initial entry point. Advance Guide and  
25 Preferential Lane Entrance Direction signs for such entry points shall not include the word “EXIT” (see  
26 Section 2G.10).

27 Where a general-purpose lane becomes a preferential lane that does not provide continuous access  
28 with the adjacent general purpose lanes, an Advance Guide sign shall also be provided at  
29 approximately 1 mile in advance of the initial entry point. The Advance Guide and Entrance Direction  
30 signs in this sequence shall include a panel at the bottom of the sign with a black legend and border on a  
31 yellow background displaying a down arrow and the word ONLY as illustrated in Figure 2G-8.

32 *Guidance:*

33 *Except as required in Paragraph 2, an Advance Guide sign should also be installed and located*  
34 *approximately 1 mile in advance of the initial entry point to a preferential lane that restricts access with the*  
35 *adjacent general-purpose lanes to designated locations on freeways and expressways.*

36 *Option:*

37 An Advance Guide sign may also be installed and located approximately 2 miles in advance of the initial  
38 entry point to a preferential lane that restricts access with the adjacent general-purpose lanes to designated  
39 locations.

40 **Standard:**

41 **For barrier-separated, buffer-separated, or contiguous preferential lanes where entry is restricted**  
42 **to only designated points on freeways and expressways, the Advance Guide and Preferential Lane**  
43 **Entrance Direction signs shall be mounted overhead.**

44 *Guidance:*

45 *Preferential Lane Exit Destination guide signs, identifying final destination and downstream exit*  
46 *locations accessible from the preferential lane (see Figures ~~2G-8~~2G-9, ~~2G-13~~2G-14, ~~2G-14~~2G-15, and ~~2G-~~*  
47 *~~16~~2G-17), should be installed in advance of the initial entry points to access-restricted preferential lanes*  
48 *(such as barrier- and buffer-separated). These signs should be located based on the priority of the message,*  
49 *the available space, the existing signs on adjacent general-purpose traffic lanes, roadway and traffic*  
50 *characteristics, the proximity to existing overhead signs, the ability to install overhead signs, and other*  
51 *unique local factors.*

1 **Standard:**

2 Advance destination guide signs for preferential lanes shall include an upper section displaying a  
3 black legend that includes the type of preferential lane and the word “EXITS,” such as “HOV EXITS,”  
4 on a white background. For preferential lanes that incorporate a vehicle occupancy requirement, the  
5 white diamond symbol on a black background shall be displayed at the left-hand edge of this upper  
6 section (see Figure ~~2G-8~~2G-9).

7 Support:

8 [Figure 2G-8 shows an example of signing for a general-purpose lane that becomes a preferential lane](#)  
9 [that does not provide continuous access with the adjacent general purpose lanes.](#)

10 Figure ~~2G-8~~2G-9 shows an example of signs for the initial entry point to a preferential lane.

11 **Figure 2G-8. Example of Advance Guide and Entrance Direction Signs for a General**  
12 **Purpose Lane that becomes a Preferential Lane**

13 **Figure 2G-9. Example Signing for an Entrance to Access-Restricted HOV Lanes**

14 **Section 2G.12 Guide SignsSigning for Intermediate Entry Points to Preferential Lanes**

15 **Standard:**

16 For barrier-separated, buffer-separated, and contiguous preferential lanes where entry is restricted  
17 only to designated points, an overhead Preferential Lane Entrance Direction sign shall be provided at  
18 intermediate entry points to the preferential lane from the general-purpose lanes.

19 *Guidance:*

20 *For barrier- and buffer-separated preferential lanes where intermediate entry from the general-purpose*  
21 *lanes is provided via a separate lane or ramp (see Figure ~~2G-9~~2G-10), at least one Advance Guide sign*  
22 *should be provided in addition to the Preferential Lane Entrance Direction sign.*

23 *For access-restricted preferential lanes where intermediate entrance and egress are at the same*  
24 *designated access location, the Preferential Lane Entrance Direction sign should be located between 1/2 and*  
25 *1/4 of the length of the designated entry area, as measured from the downstream end of the entry area (see*  
26 *Figure ~~2G-10~~2G-11).*

27 **Figure 2G-10. Example Signing for Intermediate Entry Point to a Barrier- or Buffer-**  
28 **Separated HOV Lane**

29 **Figure 2G-11. Example of Signing for the Intermediate Entry to, Egress from, and End of**  
30 **Access-Restricted HOV Lanes**

31 **Standard:**

32 The Advance Guide signs, if used for intermediate entry points to a preferential lane from the  
33 general-purpose lanes, shall be overhead.

34 Option:

35 Advance Guide signs may be provided at approximately 1/2 mile, 1 mile, and 2 miles in advance of  
36 intermediate entry points from the general-purpose lanes to a preferential lane.

37 **Standard:**

38 Advance Guide and Preferential Lane Entrance Direction signs for intermediate entry points shall  
39 not include the word “EXIT” (see Section 2G.10).

40 *Guidance:*

41 *Exit Destination guide signs, identifying the final destination and downstream exit locations accessible*  
42 *from the preferential lane, should be installed in advance of intermediate entry points from the general-*  
43 *purpose lanes to access-restricted preferential lanes.*

44 Support:

45 Section 2G.11 contains information on the design and placement of Preferential Lane Exit Destination  
46 guide signs.

47 Figures ~~2G-9~~2G-10 and ~~2G-10~~2G-11 show examples of signs for various geometric configurations of  
48 intermediate entry to a barrier- or buffer-separated preferential lane where access is restricted to designated  
49 locations.

1 **Section 2G.13 Guide SignsSigning for Egress from Preferential Lanes to General-Purpose**  
2 **Lanes**

3 **Standard:**

4 **Except as provided in Paragraphs 4 and 5, For for barrier-separated, buffer-separated, and**  
5 **contiguous preferential lanes where egress is restricted only to designated points, post-mounted**  
6 **Advance Guide and post-mounted Intermediate Egress Direction signs (see Figure ~~2G-11~~2G-12) shall**  
7 **be installed in the median or on median barriers that separate two directions of traffic prior to and at**  
8 **the intermediate exit points from the preferential lanes to the general-purpose lanes (see Figure ~~2G-~~**  
9 **92G-10).**

10 **The legends of these signs shall refer to the next exit or exits from the general-purpose lanes by**  
11 **displaying the appropriate destination information, exit number(s), or both. The Intermediate Egress**  
12 **Direction signs for egress from the preferential lanes to the general-purpose lanes shall not refer to the**  
13 **egress as an exit.**

14 **Support:**

15 Section 2G.10 contains information on the design of post-mounted guide signs applicable to a preferential  
16 lane when installed on a median barrier. Figures ~~2G-9~~2G-10 and ~~2G-12~~2G-13 show examples of signs for  
17 various geometric configurations of intermediate egress from a barrier- or buffer-separated preferential lane  
18 where access is restricted to designated locations.

19 *Guidance:*

20 *Where two or more adjacent preferential lanes are present in a single direction, consideration should be*  
21 *given to the use of overhead guide signs to display the information related to egress from the preferential*  
22 *lanes.*

23 *For barrier-separated and buffer-separated preferential lanes where egress from a preferential lane to*  
24 *the general-purpose lanes is restricted only to designated points via a separate lane or ramp, the Advance*  
25 *Guide and Intermediate Egress Direction signs for the egress should be mounted overhead and a Pull-*  
26 *Through sign should be mounted with the Intermediate Egress Direction sign (see Figure ~~2G-12~~2G-13).*

27 **Figure 2G-12. Examples of Barrier-Mounted Guide Signs for an Intermediate Egress from**  
28 **Preferential Lanes**

29 **Figure 2G-13. Examples of Signs for an Intermediate Egress from a Barrier- or Buffer-**  
30 **Separated HOV Lane**

31 **Standard:**

32 **For preferential lanes that incorporate a vehicle occupancy requirement, the design of the overhead**  
33 **Advance Guide and Egress Direction signs for intermediate egress from the preferential lanes to the**  
34 **general-purpose lanes shall display a white diamond symbol on a black background at the left-hand**  
35 **edge of the signs.**

36 **The design of Pull-Through signs when used in conjunction with an Egress Direction sign at an**  
37 **intermediate egress from the preferential lanes to the general-purpose lanes shall be distinguished from**  
38 **those applicable to general-purpose lanes by inclusion of an upper section with the applicable black**  
39 **legend on a white background, such as HOV LANE. For preferential lanes that incorporate a vehicle**  
40 **occupancy requirement, the white diamond symbol on a black background shall be displayed at the**  
41 **left-hand edge of this upper section.**

42 **Section 2G.14 Guide SignsSigning for Direct Entrances to Preferential Lanes from Another**  
43 **Highway**

44 **Standard:**

45 **For direct access ramps to preferential lanes from a transit facility (such as a park - ride lot or a**  
46 **transit station or terminal) that is accessible from surface streets, advance guide signs shall be provided**  
47 **along the adjoining surface streets to direct traffic into and through the transit facility to the**  
48 **preferential lane (see Figure ~~2G-13~~2G-14).**

49 **Support:**

50 Figure 2G-14 provides examples of recommended uses and layouts of signs for HOV lanes for direct  
51 access ramps, park - ride lots, and access from surface streets.

1 **Figure 2G-14. Example of Signing for a Direct Entrance Ramp to an HOV Lane from a**  
2 **Park-and-Ride Facility and a Local Street**

3 **Section 2G.15 Guide Signs Signing for Direct Exits from Preferential Lanes to Another**  
4 **Highway**

5 **Standard:**

6 For contiguous preferential lanes on the left-hand side of the roadway, Advance Guide signs, Exit  
7 Direction signs, and Exit Gore signs (see Figure ~~2G-14~~2G-15) specifically applicable to the preferential  
8 lanes shall be used for exits to direct access ramps, such as HOV lane ramps (see Figure ~~2G-15~~2G-16) or  
9 ramps to park - ride facilities.

10 The design of Advance Guide, Exit Direction, and Pull-Through signs for direct exits from  
11 preferential lanes shall be distinguished from those applicable to general-purpose lanes by inclusion of  
12 an upper section with the applicable black legend on a white background, such as HOV LANE (for  
13 Pull-Through signs) or HOV EXIT (for Advance Guide and Exit Direction signs). For preferential  
14 lanes that incorporate a vehicle occupancy requirement, the white diamond symbol on a black  
15 background shall be displayed at the left-hand edge of this upper section (see Figures ~~2G-15~~2G-16 and  
16 ~~2G-16~~2G-17).

17 *Guidance:*

18 *Advance Guide and Exit Direction signs for exits to direct access ramps from a preferential lane should*  
19 *be mounted overhead. A Pull-Through sign over the preferential lane should be used with the Exit Direction*  
20 *sign at exits to direct access ramps.*

21 **Standard:**

22 **Post-mounted guide signs in a vertically oriented rectangular shape installed on a median barrier**  
23 **shall not be used for the Advance Guide and Exit Direction signs for exits to direct access ramps.**

24 **Because direct access ramps for preferential lanes at interchanges connecting two freeways are**  
25 **typically left-hand side exits and typically have design speeds similar to the preferential lane, overhead**  
26 **Advance Guide signs and overhead Exit Direction signs shall be provided in advance of and at the entry**  
27 **point to each freeway-to-freeway preferential lane ramp (see Figure ~~2G-16~~2G-17).**

28 *Guidance:*

29 *The use of guide signs for preferential lanes at freeway interchanges should comply with the provisions*  
30 *for guide signs established in Chapter 2E of this Manual.*

31 **Support:**

32 Guide signs for direct access ramps for preferential lanes at interchanges connecting two freeways are  
33 similar to those for a connecting ramp between two freeway facilities.

34 **Figure 2G-15. Exit Gore Sign for a Direct Exit from a Preferential Lane**

35 **Figure 2G-16. Examples of Guide Signs for Direct HOV Lane Entrance and Exit Ramps**

36 **Figure 2G-17. Examples of Guide Signs for a Direct Access Ramp between HOV Lanes on**  
37 **Separate Freeways**

## MANAGED LANE SIGNS

### Section 2G.16 Signs for Managed Lanes – General Paragraphs from Existing Section 2G.03

#### Standard:

The provisions of Sections 2G.03 through 2G.07 regarding regulatory signs for Preferential lanes shall apply to managed lanes operated at all times or at certain times by varying vehicle occupancy requirements (HOV) or by using vehicle type restrictions as a congestion management strategy. Such managed lanes shall use changeable message signs or changeable message elements within static signs to display the appropriate regulatory sign messages only when they are in effect.

When certain types of vehicles (such as trucks) are prohibited from using a managed lane or when a managed lane is restricted to use by only certain types of vehicles during certain operational strategies, regulatory signs or regulatory panels within the appropriate guide signs that include changeable message elements shall be used to display the open/closed status of the managed lane for such vehicle types.

When the vehicle occupancy required for use of an HOV lane is varied as a part of a managed lane operational strategy, regulatory signs that include changeable message elements shall be used to display the required minimum vehicle occupancy in effect.

#### Support:

See Section 2G.17-18 for regulatory signs for managed lanes that use tolling or pricing as a congestion management strategy, either exclusively or with other management strategies.

### Section ~~2G.16~~ 2G.17 Signs for Priced Managed Lanes – General

#### Support:

A priced managed lane is a managed lane that employs tolling or pricing, typically through electronic toll collection, to manage congestion levels and maintain a certain level of service for users of the facility. A priced managed facility typically provides a less congested alternative to adjacent lanes along the same designated route, or to a nearby facility, that experience recurring congestion during peak periods. A priced managed lane might allow non-toll travel by certain vehicles based on occupancy or other criteria. A variety of operational management strategies might be used in conjunction with tolling or pricing.

The number and combination of operational strategies that are applied to a managed lane to manage congestion or improve efficiency might be practically limited by the amount of information that can be legibly displayed on signs or in signing sequences and still be readily comprehended by road users. Such factors to consider when evaluating alternatives for managed lanes are locations of signs for general-purpose interchanges and for other roadway conditions, the number of intermediate access points between the managed and general-purpose lanes and the need to repeat the operational information, and the distance over which a signing sequence that displays all of the eligibility requirements can be displayed.

Because managed lanes have the capability to employ a variety of operational strategies on a changing basis, it is not practical to assign a naming convention to such lanes for the purpose of signing based on the specific operational management strategies, as is more readily accomplished with other types of preferential lanes, such as HOV, Bus, or Bike lanes. Instead, the various requirements, restrictions, and eligibility criteria are more appropriately conveyed through a sequence of regulatory and guide signs with a more encompassing designation for the purpose of providing directional information.

As priced managed lanes have become ~~more~~-prevalent as an operational strategy, it ~~will be~~is important to ~~establish~~-maintain a uniform naming convention to distinguish those lanes that are an alternative to travel on adjacent general-purpose lanes on the same designated route to effectively communicate to motorists the range of basic requirements for similar facilities in different regions.

#### Standard:

**Priced managed lanes that are adjacent to general-purpose lanes along the same designated route shall be signed using the legend EXPRESS or EXPRESS LANE(S) as provided in this Chapter. This provision shall apply when any of the following operational strategies is used for a managed lane:**

- A. All users of the managed lane are charged a fixed or variable toll;**
- B. General-purpose traffic using the managed lane is charged a fixed or variable toll, but HOV traffic is allowed to travel without being charged a toll on either a full- or part-time basis;**

- 1 C. General-purpose traffic using the managed lane is charged a fixed or variable toll, but HOV  
2 traffic is offered a discounted toll on either a full- or part-time basis; or  
3 D. General-purpose traffic using the managed lane is charged a fixed or variable toll, but HOV  
4 traffic registered with a local program travels at a discounted toll or without being charged a  
5 toll on either a full- or part-time basis (a transponder or other identifier is typically required of  
6 HOVs to indicate registration in conjunction with electronic or visual enforcement and  
7 verification of vehicle occupancy).

8 The legends EXPRESS and EXPRESS LANE(S) shall not be used on signs for entrances to  
9 highways on which all lanes are managed and there are no adjacent general-purpose lanes on the same  
10 designated route. The legends EXPRESS and EXPRESS LANE(S) shall not be used on signs for a  
11 managed ramp connection that provides an alternative to a general-purpose ramp connection (see  
12 Figure 2F-713), except where the ramp leads directly to a managed lane as described in Section 2G.14.  
13 The legends EXPRESS and EXPRESS LANE(S) shall not be used on signs for open-road tolling lanes  
14 that bypass a conventional toll plaza (see Chapter 2F).

15 ~~The diamond symbol shall be reserved exclusively for preferential lanes whose operational strategy~~  
16 ~~is occupancy-based only (see Sections 2G.03 through 2G.14) and shall not be used to designate a~~  
17 ~~managed lane in which other operational strategies, such as tolling and pricing, are employed to allow~~  
18 ~~general-purpose traffic to use the lane.~~

## 19 Section ~~2G.17~~ 2G.18 Regulatory Signs for Priced Managed Lanes

### 20 Standard:

21 Except as otherwise provided in this Section, the provisions of Sections 2G.03 through 2G.07  
22 regarding regulatory signs for Preferential lanes shall apply to priced managed lanes operated at all  
23 times or at certain times with a toll payment requirement of some or all vehicles to use the lane(s). Such  
24 managed lanes shall use changeable message signs or changeable message elements within static signs to  
25 display the appropriate regulatory sign messages only when they are in effect.

26 Regulatory signs for preferential lanes shall be appropriately modified for adaptation to a priced  
27 managed lane, where applicable, as shown in Figure ~~2G-17~~2G-18.

28 Regulatory signs shall be used to indicate the toll charged. If the toll varies, regulatory signs that  
29 include changeable message elements, such as the R3-48 and R3-48a signs that are shown in Figure ~~2G-~~  
30 ~~17~~2G-18, shall be used to display the actual toll amount in effect at any given time.

31 When only vehicles with a registered ETC account are allowed to use a managed lane where some  
32 or all vehicles are charged a toll, regulatory signs to indicate such a restriction shall be provided and  
33 shall incorporate the pictograph adopted by the toll facility's ETC payment system and the word  
34 ONLY (see Section 2G.18 for the incorporation of such regulatory legends into the guide signs for the  
35 entrances to such facilities). The display of the ETC system pictograph shall comply with the provisions  
36 of Sections 2F.03 and 2F.04 as shown in Figures ~~2G-17~~2G-18 and ~~2G-18~~2G-19.

37 When HOV traffic is allowed to use a priced managed lane without paying a toll and registration in  
38 a local program is not required to receive the toll exemption, the Vehicle Occupancy Definition (R3-10  
39 or R3-13) signs (see Section 2G.04) shall be modified to delete the diamond symbol to create priced  
40 managed lane Vehicle Occupancy Definition (R3-40 and R3-43) signs to indicate the minimum  
41 occupancy related to the management strategy (see Figure ~~2G-17~~2G-18).

42 A priced managed lane Periods of Operation (R3-44 or R3-44a) sign (see Figure ~~2G-17~~2G-18) shall  
43 be installed at the beginning or initial entry point, and at any intermediate entry points where vehicles  
44 are allowed to legally enter an access-restricted priced managed lane.

45 When the vehicle occupancy required for non-toll use of a managed lane is varied as a part of a  
46 priced managed lane operational strategy, regulatory signs that include changeable message elements  
47 shall be used to display the required vehicle occupancy in effect for non-toll travel.

### 48 Option:

49 Where registration in a local program or ETC account is required for HOV traffic to travel in a priced  
50 managed lane without being charged a toll or by being charged a discounted toll, such information may be  
51 displayed on a separate sign within the sequence of the required regulatory and guide signs.

## 52 **Figure 2G-18. Regulatory Signs for Managed Lanes**

## 53 **Figure 2G-19. Examples of Guide Signs for Entrances to Priced Managed Lanes**

1 **Standard:**

2 R3-42 Series and R3-45 Series signs (see Figure ~~2G-17~~2G-18) shall be installed in accordance with  
3 the provisions of Section 2G.07 to indicate the termination of a priced managed lane or restriction. The  
4 R3-42, R3-42a, and R3-45 signs shall be used only where the managed lane and restriction end and  
5 traffic must merge into the general-purpose lanes. The R3-42b, R3-42c, and R3-45a signs shall be used  
6 only where the managed lane restriction ends and the lane becomes a general-purpose lane.

7 **Section ~~2G.18~~ 2G.19 Guide Signs for Priced Managed Lanes**

8 **Standard:**

9 Except as otherwise provided in this Section, guide signs for barrier-separated, buffer-separated,  
10 and contiguous managed lanes shall follow the specific provisions for Preferential Lane guide signs  
11 contained in Sections 2G.10 through 2G.15. Except as otherwise provided in this Section, guide signs  
12 for highways on which all lanes are managed shall follow the general provisions for freeway and  
13 expressway guide signs as contained in Chapter 2E as a whole. Guide signs for highways on which all  
14 lanes are managed and tolling or pricing is used as a management strategy shall follow the applicable  
15 provisions for toll road guide signs as contained in Chapter 2F, in addition to the general provisions of  
16 Chapter 2E.

17 If fixed or variable tolls are used as an operational strategy for a managed lane, the guide signs shall  
18 comply with the provisions of Sections 2F.03, 2F.04, and 2F.17 regarding the use, size, and placement of  
19 ETC-account pictographs.

20 Guide signs at the initial and intermediate entry points to a priced managed lane in which all  
21 general-purpose passenger vehicles are allowed shall include the legend ~~EXPRESS or~~ EXPRESS  
22 LANE(S). Except as provided in Paragraph 5, The the guide signs shall incorporate the pictograph of  
23 the ETC account system into a header panel within the guide sign in accordance with Sections 2F.03,  
24 2F.04, and 2F.17. For a priced managed lane that allows non-toll travel by HOV traffic without  
25 registration in a local program, the header panel shall be modified to a regulatory format to display  
26 both the pictograph of the ETC account system and the minimum occupancy requirement for non-toll  
27 travel with a black legend on a white background (see Figure 2G-~~18~~19). **Paragraph relocated from later**  
28 **in Section**

29 Guide signs at the initial and intermediate entry points to a managed lane that allows only HOV  
30 traffic with either a fixed or variable occupancy requirement shall follow the provisions of Sections  
31 2G.10 through 2G.12 and 2G.14. **Paragraph relocated from later in Section**

32 If registration in a toll-account program is not required for travel in a managed lane in which tolls  
33 are charged, then the ETC-account pictographs shall not be displayed on primary guide signs directing  
34 traffic to the managed lane. In such cases, the purple header panel shall be replaced with a warning  
35 header panel with a black legend and border on a yellow background displaying the word TOLL as  
36 illustrated in Figure 2G-20.

37 Option:

38 If the managed lane does not accept toll payments from an ETC account system and collects tolls only by  
39 post-travel billing of registered vehicle owners, then the legend TOLL BILLED BY MAIL ONLY may be  
40 displayed on a separate information sign within the sequence of primary guide signs in advance of the  
41 entrance to the managed lane.

42 If the managed lane accepts payments from registered ETC accounts, but does not require registration to  
43 use the lane, then the pictographs of the accepted ETC account programs may be displayed on a separate  
44 information sign within the sequence of primary guide signs in advance of the entrance to the managed lane.  
45 The information sign may also display the legend TOLL BILLED BY MAIL in addition to the pictograph of  
46 the accepted ETC account program.

47 **Support:**

48 Figure 2G-~~18~~19 shows examples of Guide signs for entrances to priced managed lanes and other ETC  
49 account-only toll facilities that incorporate header panels with ETC account pictographs and regulatory  
50 legends.

51 Figures 2G-21 through 2G-24 show examples of guide signs for various configurations of initial and  
52 intermediate entrances to a priced managed lane. **Paragraph relocated from below**

53 **Guidance:**

1 *Exit Destination supplemental guide signs, identifying final destination and downstream exit locations*  
2 *accessible from the managed lane (see Figure 2G-19~~25~~), should be installed in advance of the initial entry*  
3 *points to priced managed lanes. These signs should be located in accordance with the provisions of*  
4 *Paragraph ~~5-6~~ of Section 2G.11.*

5 *For managed lanes that are available as an alternative to travel on adjacent general-purpose lanes on the*  
6 *same designated route, changeable message signs indicating the comparative travel times or congestion levels*  
7 *using the managed lanes versus the general-purpose lanes (see Figure ~~2G-20~~2G-26) should be installed in*  
8 *advance of the initial and intermediate entry points to the managed lanes.*

9 Option:

10 Changeable message signs may also be used on non-managed highways to display comparative travel  
11 times or congestion levels for a nearby managed highway.

12 **Standard:** Paragraphs relocated to earlier in this Section

13 ~~Guide signs at the initial and intermediate entry points to a priced managed lane in which all~~  
14 ~~general-purpose passenger vehicles are allowed shall include the legend EXPRESS or EXPRESS~~  
15 ~~LANE(S). The guide signs shall incorporate the pictograph of the ETC account system into a header~~  
16 ~~panel within the guide sign in accordance with Sections 2F.03, 2F.04, and 2F.17. For a priced managed~~  
17 ~~lane that allows non-toll travel by HOV traffic without registration in a local program, the header panel~~  
18 ~~shall be modified to a regulatory format to display both the pictograph of the ETC account system and~~  
19 ~~the minimum occupancy requirement for non-toll travel with a black legend on a white background~~  
20 ~~(see Figure 2G-19.)~~

21 ~~Guide signs at the initial and intermediate entry points to a managed lane that allows only HOV~~  
22 ~~traffic with either a fixed or variable occupancy requirement shall follow the provisions of Sections~~  
23 ~~2G.10 through 2G.12 and 2G.14.~~

24 **Figure 2G-20. Signing for Entrance to Access Restricted Price managed Lane – No ETC**  
25 **Account Required**

26 **Figure 2G-21. Signing for Entrance to Access Restricted Price managed Lane – ETC**  
27 **Account Required**

28 **Figure 2G-22. Example of Signing for the Entrance to an Access-Restricted Priced**  
29 **Managed Lane Where a General-Purpose Lane Becomes the Managed Lane**

30 **Figure 2G-23. Example of Signing for the Intermediate Entry to a Barrier-or Buffer-**  
31 **Separated Priced Managed Lane**

32 **Figure 2G-24. Example of Signing for the Intermediate Entry to, Egress from, and End of**  
33 **Access-Restricted Priced Managed Lanes**

34 **Figure 2G-25. Example of an Exit Destinations Sign for a Managed Lane**

35 **Figure 2G-26. Example of Comparative Travel Time Information Sign for Preferential or**  
36 **Managed Lanes**

37 Support:

38 ~~Figures 2G-21 through 2G-24 show examples of guide signs for various configurations of initial and~~  
39 ~~intermediate entrances to a priced managed lane. Paragraph relocated to above~~

40 Standard:

41 The use and locations of guide signs for intermediate egress locations and direct exits from a priced  
42 managed lane (see Figures 2G-24 ~~and Figures through 2G-27~~ through 2G-29) shall comply with the  
43 provisions of Sections 2G.13 and 2G.15. The signs shall be suitably modified to display header messages  
44 of white legend on a green background that relate the guide sign legends to the managed lane(s) as  
45 appropriate in accordance with the following:

- 46 A. Post-mounted or overhead-mounted Advance Guide signs for intermediate egress to the general-  
47 purpose lanes shall include the legend LOCAL EXITS in a header panel within the guide signs,  
48 destination information or the exit number(s) for the next exit(s) accessible from the general-

1 purpose lanes, and the appropriate distance information to the location of the egress (see  
2 Figures 2G-24 and 2G-~~2527~~).

3 B. Post-mounted or overhead-mounted Intermediate Egress Direction signs shall include the legend  
4 LOCAL EXITS in a header panel within the signs, the destination information or the exit  
5 number(s) of the next exit(s) accessible from the general-purpose lanes, and a diagonally  
6 upward-pointing directional arrow (see Figures 2G-24 and 2G-~~2527~~).

7 C. For direct exits to another roadway, the legend EXPRESS EXIT shall be used on the Advance  
8 Guide and Exit Direction signs (see Figure 2G-~~2628~~).

9 D. For pull-through signs, the legend EXPRESS LANE(S) shall be used, either as a header panel  
10 within the pull-through sign or as the principal legend of the sign without a header panel (see  
11 Figures 2G-~~2527~~, 2G-~~2628~~, and 2G-~~2729~~).

12 Support:

13 Section 2G.13 contains information on the use of overhead-mounted guide signs for intermediate egress to  
14 the general-purpose lanes.

15 Figures ~~2G-282G-30~~ and ~~2G-292G-31~~ show examples of guide signing for direct entrances to a priced  
16 managed lane from a crossroad or surface street.

17 **Figure 2G-27. Examples of Guide Signs for an Intermediate Egress from a Barrier- or**  
18 **Buffer-Separated Managed Lane**

19 **Figure 2G-28. Examples of Guide Signs for a Direct Managed Lane Entrance and Exit**  
20 **Ramps**

21 **Figure 2G-29. Examples of Guide Signs for a Direct Access Ramp between Managed Lanes**  
22 **on Separate Freeways**

23 **Figure 2G-30. Examples of Guide Signs for a Direct Entrance Ramp to a Priced Managed**  
24 **Lane and Trailblazing to a Nearby Entrance to the General-Purpose Lanes**

25 **Figure 2G-31. Examples of Guide Signs for Separate Entrance Ramps to General-Purpose**  
26 **and Priced Managed Lanes from the Same Crossroad**

## 27 Section 2G.20 Signs for Part-Time Travel on a Shoulder – General

28 Support:

29 In some cases, paved shoulders are allowed to be used for driving use during peak periods to manage  
30 congestion. Configurations might be on freeways and expressways, as well as on conventional roads. Travel  
31 on the shoulder during these periods might be restricted to certain classes of vehicles, such as buses or HOV,  
32 or might be open to general traffic. When the part-time travel on a shoulder is limited to certain classes of  
33 vehicles, the signing is similar to that for preferential lanes. Additional signing is typically used to advise  
34 road users that the shoulder is not available for emergency use during these periods. Part-time travel on a  
35 shoulder might also employ lane-use control signals and/or blank-out signs to inform traffic of the allowable  
36 use of the shoulder. Depending on the design of exit ramp terminals and auxiliary lanes, guide signs must  
37 account for exit maneuvers during both shoulder use conditions and might necessitate changeable legend  
38 elements. However, additional guide signs are not normally necessary specifically for the condition when the  
39 shoulder is used for travel. The pavement markings might also be modified where travel allowed on the  
40 shoulder begins and ends.

41 Figure 2G-32 shows an example of signing for part-time travel on a shoulder.

42 **Figure 2G-32. Example of signing for Part-time Travel on a Shoulder**

43 Standard:

44 A shoulder that has been opened to travel on a permanent, full-time basis shall be considered a  
45 travel lane and shall be signed and marked in accordance with other provisions of this Manual.

46 Support:

47 Section 3E.04 contains provisions regarding the placement of markings on paved shoulders that  
48 are open for part-time travel.

## 49 Section 2G.21 Regulatory Signs and Plaques for Part-Time Travel on a Shoulder

50 Standard:

1 Regulatory signs shall be used to notify road users of the periods of operation that travel is allowed  
2 on a paved shoulder. The Part-Time Travel on Shoulder Operation (R3-51) sign shall be used where  
3 traffic is allowed to travel on the shoulder during certain fixed periods of operation. The Part-Time  
4 Travel on Shoulder Variable Operation (R3-51d) sign with two flashing beacons (see Chapter 4S)  
5 mounted above it shall be used when the period of operation is variable

6 If certain classes of vehicles are not allowed to use the shoulder during these periods, then a  
7 Selective Exclusion (R3-51aP or R3-51bP) plaque shall be mounted below the R3-51 or R3-51d sign. If  
8 the travel on the shoulder is restricted to certain classes of vehicles, then the regulatory signs shall  
9 display that information.

10 Option:

11 The EMERGENCY STOPPING ONLY OTHER TIMES (R3-51cP) plaque may be mounted  
12 below the R3-51 sign if the R3-51aP or R3-51bP plaque is not used.

13 Guidance:

14 The TRAVEL ON SHOULDER BEGINS ½ MILE (R3-52c) sign should be used in advance of the  
15 location where part-time travel on shoulder first begins and followed by the DO NOT DRIVE ON  
16 SHOULDER (R4-17) sign appropriately spaced downstream.

17 Standard:

18 Approximately ½ mile from where part-time travel on shoulder ends the TRAVEL ON  
19 SHOULDER ENDS (R3-52a) sign shall be used. At the location provided for traffic to transition from  
20 shoulder travel back to permanent highway lane travel, an END TRAVEL ON SHOULDER (R3-52)  
21 sign shall be used. After this transition location a DO NOT DRIVE ON SHOULDER (R4-17) sign shall  
22 be used.

23 Guidance:

24 Where a shoulder that allows part-time travel is interrupted by a deceleration lane for an exit,  
25 the BEGIN EXIT LANE (R3-56) sign should be used at the beginning of the deceleration lane where  
26 traffic is allowed to enter during the periods that travel is prohibited on the shoulder.

27 Where turnouts are provided for emergency stopping during periods when travel is allowed on the  
28 shoulder, the EMERGENCY STOPPING ONLY (R8-7) sign (see Section 2B.49) should be used adjacent to the  
29 turnout.

30 Where traffic on an entrance ramp is required to yield to traffic using the shoulder of the freeway  
31 or expressway mainline during the periods when travel is allowed on the shoulder, the TO TRAFFIC  
32 ON SHOULDER (R3-57P) plaque should be mounted below the Yield (R2-1) sign (see Section  
33 2B.08).

## 34 Section 2G.22 Warning Signs for Part-Time Travel on a Shoulder

35 Guidance:

36 The Traffic Using Shoulder (W3-9) sign should be used on a ramp that enters a freeway or expressway on  
37 which part-time travel is allowed on the shoulder. When used, the W3-9 sign should be located on the side of  
38 the ramp from which the shoulder traffic approaches (see Figure 2G-32).

39 Option:

40 The W3-9 sign may be used on a conventional road that is required to stop for or yield to the through  
41 street or highway on which part-time travel is allowed on the shoulder.

## 42 Section 2G.23 Guide Signs for Part-Time Travel on a Shoulder

43 Support:

44 Guide signs for part-time travel on a freeway or expressway shoulder generally consist of the typical  
45 interchange guide sign sequence (see Chapter 2E). While specialized guide signs are not normally necessary,  
46 modifications to the typical guide signs might be necessary, especially where an interchange lane drop is  
47 created only during the periods when the shoulder is open to travel.

48 Standard:

49 Where an interchange lane drop is created only during the periods when a shoulder is open to  
50 travel, the Advance and Exit Direction guide signs (see Sections 2E.24 and 2E.26) shall be overhead-

1 mounted and shall be modified to include a blank-out or changeable EXIT ONLY message that  
2 complies with the provisions of Section 2E.29 and is displayed only during the periods that the shoulder  
3 is open to travel (see Figure 2G-32).

4 Guide signs located in conjunction with part-time travel on a shoulder shall otherwise comply with  
5 the provisions of Chapters 2D and 2E.

6 Guidance:

7 Where turnouts are provided for emergency stopping during periods when travel is allowed on the  
8 shoulder, the Emergency Turn-Out directional (D17-6) sign should be used as provided in Section 2D.51.

## 9 Section 2G.24 Lane-Use Control Signals for Part-Time Travel on a Shoulder

10 Support:

11 Lane-use control signals (see Chapter 4T) are sometimes used for part-time travel on a paved shoulder, in  
12 addition to signs, to indicate the allowable use of the shoulder.

13 Option:

14 Overhead lane-use control signals may be used above a shoulder on which part-time travel is allowed.

15 Standard:

16 Except as otherwise provided in this Section, lane-use control signals that are used for part-time  
17 travel on a shoulder shall comply with the provisions of Chapter 4T. When used for part-time travel on  
18 a shoulder, lane-use control signals shall not be required above the lanes adjacent to the shoulder.  
19 When used for part-time travel on a shoulder, a steady RED X signal indication shall be displayed when  
20 the shoulder is available for emergency stopping only and travel on the shoulder is otherwise  
21 prohibited.

22 When part-time travel on shoulder is allowed for variable periods of operation, lane-use control  
23 signals (see Chapter 4T) shall be used and evenly spaced approximately every ½ mile or less and  
24 centered over the shoulder to indicate when the shoulder is open or closed to vehicle travel. The lane-  
25 use control signals shall display a green down arrow during times when travel is allowed on the  
26 shoulder, followed by a yellow X just before the shoulder is to be closed to travel, and a red X when  
27 shoulder travel is discontinued. Additionally, during the period when travel is allowed on the shoulder a  
28 lane-use control signal that continuously displays a yellow X shall be used approximately ½ mile in  
29 advance of the location where part-time travel on the shoulder ends, and then displays a red X the  
30 travel on shoulder ends. A lane-use control signal with a red X shall be displayed at all times at the  
31 location where part-time travel on the shoulder ends.

32 Option:

33 For part-time travel on shoulder with variable periods of operation, post-mounted TRAVEL ON  
34 SHOULDER ALLOWED WHEN FLASHING (R3-51d) signs with flashing beacons may be used lieu of the  
35 lane-use control signals at the same intervals.

36 The TRAVEL ON SHOULDER ON GREEN AROW ONLY (R3-51e) sign may be used with a lane-use  
37 control signal; mounted adjacent to the signal head, elsewhere on the signal support, ground mounted next to,  
38 or in advance of, the signal.

## 39 Section 2G.25 Lane-Use Control Signals for Active Lane Management on Freeways and 40 Expressways

41 Support:

42 Active lane management is a component of active traffic management in which the use of travel lanes and  
43 speed limits might be varied in real time in response to traffic conditions to manage congestion. Active lane  
44 management might employ lane-use control signals (see Chapter 4T) and/or changeable message signs (see  
45 Chapter 2L). Figure 2G-33 shows an example of lane-use control signals and Variable Speed Limit signs for  
46 active lane management during an incident

47 **Figure 2G-33. Example of Lane-Use Control Signals and Variable Speed Limit Signs for**  
48 **Active Lane Management During an Incident**

49 Standard:

50 Except as otherwise provided in this Section, lane-use control signals that are used for active lane  
51 management shall comply with the provisions of Chapter 4T. When used for active lane management

1 on a freeway or expressway, a steady YELLOW X signal indication shall be displayed to warn road  
2 users to vacate the lane when the next downstream lane-use control signal over the same lane is  
3 displaying a steady RED X signal indication.

4 Option:

5 A steady YELLOW X signal indication may be displayed on one or more lane-use control signals in  
6 advance of the steady YELLOW X signal indication required by Paragraph 2 as conditions warrant to warn  
7 road users to vacate the lane.

8 Support:

9 Using too many YELLOW X signal indications could diminish the effectiveness of the YELLOW X in  
10 conveying the lane is closed a short distance ahead and the road user needs to vacate the lane soon

11 Standard:

12 When operated in conjunction with a temporary planned lane closure, lane-use control signals shall  
13 only supplement the temporary traffic control devices as provided in Part 6 of this Manual.

14 Guidance:

15 Spacing of lane-use control signals for active lane management on freeways and expressways should be  
16 at 1/2-mile intervals. Closer spacing should be used where the viewing distance is limited by the roadway  
17 geometry, overcrossings or other sight obstructions, or where traffic entering from intervening interchange  
18 ramps is not adequately served by the 1/2-mile spacing.

19 Combining lane-use control signals with overhead sign support structures should be minimized to avoid  
20 overloading road users with too much information or conflicting or incorrect messages, such as exclusive  
21 lane use or lane drop implied by the display of a DOWNWARD GREEN ARROW below a guide sign.

## 22 Section 2G.26 Variable Speed Limits for Active Traffic Management on Freeways and 23 Expressways

24 Support:

25 Active traffic management on freeways and expressways might employ variable speed limits as an  
26 element of an overall congestion management plan using changeable Speed Limit (R2-1) signs (see Section  
27 2B.22).

28 Careful consideration is needed in locating Variable Speed Limit signs along the roadway and potential  
29 positioning adjacent to Guide signs or Lane-Use Control signals so that the speed displayed is clearly  
30 associated with the lane or lanes intended to be regulated and not other adjacent lanes, ramps or roadways.  
31 This might result in the need to place Variable Speed Limit signs on separate supports away from Guide and  
32 other signs or Lane-Use Control signals.

33 Standard:

34 The regulatory speed displayed on a changeable Speed Limit sign shall comply with Paragraph 2 of  
35 Section 2B.22 of this Manual.

36 Guidance:

37 The location and positioning of Variable Speed Limit signs should clearly associate the speed displayed to  
38 the lane or lanes intended to be regulated such that it would not present a conflict or confusion with other  
39 posted speed limit or advisory speeds for adjacent lanes, ramps or roadways.

40 In addition to the post-interchange Speed Limit sign (see Section 2E.38), the spacing of changeable Speed  
41 Limit signs on freeways and expressways should be based on an engineering study that considers such factors  
42 as recurring congestion, high-volume interchanges, weaving sections, and other location-specific factors that  
43 are known to affect travel speeds. The changeable Speed Limit signs should be placed far enough in advance  
44 of known congestion points to adequately adjust the operating speed to minimize the extent of vehicle queuing.

1 CHAPTER 2H. GENERAL INFORMATION SIGNS

2 Section ~~2H.01 Scope~~ ~~2H.02 General Information Signs (I Series)~~ This text has been relocated  
3 from existing Section 2H.02, reorganized, and revised

4 Support:

5 ~~Of interest to the traveler, though not directly necessary for guidance, are~~ General Information signs  
6 provide road users with navigational or orientation, geographic, or other information useful for traffic  
7 operational purposes. ~~numerous kinds of information that can properly be conveyed by General Information~~  
8 ~~signs (see Figure 2H-1) or miscellaneous information signs (see Section 2H.04).~~ They include such items as  
9 State lines, city limits, ~~other political boundaries~~, time zones, stream names, elevations, landmarks, and  
10 similar ~~items of geographical interest~~ geographic features, and ~~safety and transportation related messages.~~  
11 ~~Chapter 2M contains recreational and cultural interest area symbol signs that are sometimes used in~~  
12 ~~combination with General Information signs.~~ Section 1D.09 discusses unnecessary traffic control devices.  
13 Section 2A.03 discusses the excessive use of signs and sign clutter.

14 Option:

15 An information symbol sign (I3-5 through I3-9) may be used to ~~identify a route leading to a transportation~~  
16 ~~or general information facility, or to provide additional guidance to the facility~~ provide direction to a  
17 transportation (I3 series signs) or General Information (I4 series signs) facility. The symbol sign may be  
18 supplemented by an educational plaque where necessary; also, the name of the facility may be used if needed  
19 to distinguish between similar facilities in the same area.

20 The Advance Turn (M5 series) or Directional Arrow (M6 series) auxiliary ~~signs-plaques~~ shown in Figure  
21 2H-1 with white arrows on green backgrounds may be used with General Information symbol signs to create a  
22 General Information Directional Assembly.

23 **Figure 2H-1. General Information and Miscellaneous Information Signs**

24 *Guidance:*

25 *General Information signs should not be installed within a series of guide signs, or at other equally*  
26 *critical locations, unless there are specific reasons for orienting the road user or identifying control points for*  
27 *activities that are clearly in the public interest. On all such signs, the designs should be simple and dignified,*  
28 *devoid of any tendency toward advertising, such as complex graphics or unnecessary messages, and in*  
29 *general compliance with other guide signing.*

30 **Standard:**

31 Promotional descriptive messages that are not relevant to navigation and orientation, such as  
32 “Scenic” or “Historic,” shall not be included in the legends of General Information signs, except as  
33 provided otherwise in this Chapter or in cases in which these terms are part of an official name, such as  
34 for a Scenic Byway or Historic District.

35 ~~Except for~~ political boundary State Welcome signs (see Section 2H.07), Acknowledgment signs (see  
36 Section 2H.13), and Alternative Fuels Corridor signs (see Section 2H.14), General Information signs  
37 shall have white legends and borders on green rectangular-shaped backgrounds.

38 Section ~~2H.01~~ 2H.02 Sizes of General Information Signs

39 **Standard:**

40 **Except as provided in Section 2A.11, the sizes of General Information signs that have a**  
41 **standardized design shall be as shown in Table 2H-1.**

42 Support:

43 Section 2A.11 contains information regarding the applicability of the various columns in Table 2H-1.

44 Option:

45 Signs larger than those shown in Table 2H-1 may be used (see Section 2A.11), except where a maximum  
46 allowable size is specified.

47 **Table 2H-1. General Information Sign Sizes**

48 ~~Option:~~

49 ~~An information symbol sign (I-5 through I-9) may be used to identify a route leading to a transportation or~~  
50 ~~general information facility, or to provide additional guidance to the facility.~~ The symbol sign may be  
51 ~~supplemented by an educational plaque where necessary; also, the name of the facility may be used if needed~~  
52 ~~to distinguish between similar facilities.~~ **This text relocated to new Section 2H.01**

1 The Advance Turn (M5 series) or Directional Arrow (M6 series) auxiliary signs shown in Figure 2H-1  
2 with white arrows on green backgrounds may be used with General Information symbol signs to create a  
3 General Information Directional Assembly. **This text relocated to new Section 2H.01**

4 Guide signs for commercial service airports and non-carrier airports may be provided from the nearest  
5 Interstate, other freeway, or conventional highway intersection directly to the airport, normally not to exceed  
6 15 miles. The Airport (I-5) symbol sign along with a supplemental plaque may be used to indicate the  
7 specific name of the airport. An Airport symbol sign, with or without a supplemental name plaque or the  
8 word AIRPORT, and an arrow may be used as a trailblazer. **This text relocated to new Section 2H.03**

9 **Standard:**

10 **Adequate trailblazer signs shall be in place prior to installing the airport guide signs. This text**  
11 **relocated to new Section 2H.03**

12 **Support:**

13 Location and placement of all airport guide signs depends upon the availability of longitudinal spacing on  
14 highways. **This text relocated to new Section 2H.03**

15 **Option:**

16 The Recycling Collection Center (I-11) symbol sign may be used to direct road users to recycling  
17 collection centers.

18 *Guidance:*

19 *The Recycling Collection Center symbol sign should not be used on freeways and expressways.*

20 **Standard:**

21 **If used on freeways or expressways, the Recycling Collection Center symbol sign shall be considered**  
22 **one of the supplemental sign destinations.**

23 **When a sign is used to display a safety or transportation-related message, the display format shall**  
24 **not be of a type that would be considered similar to advertising displays. Messages and symbols that**  
25 **resemble any official traffic control device shall not be used on safety or transportation-related message**  
26 **signs.**

27 **Option:**

28 The pictograph of a political jurisdiction (such as a State, county, or municipal corporation) may be  
29 displayed on a political boundary General Information sign.

30 **Standard:**

31 **If used, the height of a pictograph on a political boundary General Information sign shall not**  
32 **exceed two times the height of the upper-case letters of the principal legend on the sign. The pictograph**  
33 **shall comply with the provisions of Section 2A.06. This text relocated to new Section 2H.05**

34 **Section 2H.03 Airport Signs**

35 **Support:**

36 Guide signs for commercial service airports and non-carrier airports may be provided from the nearest  
37 Interstate, other freeway, or conventional highway intersection directly to the airport, normally not to exceed  
38 15 miles. The Airport (I-5) symbol sign along with a supplemental plaque may be used to indicate the  
39 specific name of the airport. An Airport symbol sign, with or without a supplemental name plaque or the  
40 word AIRPORT, and an arrow may be used as a trailblazer. **This text relocated from existing Section 2H.02**

41 **Standard:**

42 **Airport pictographs or other graphical representation of the specific airport shall not be used with**  
43 **or in place of the specific airport name on guide signs.**

44 **Standard:Guidance:**

45 *If airport guide signs are used, Adequate trailblazer signs shall should be used to provide motorist*  
46 *direction to the airport. in place prior to installing the airport guide signs. This text relocated from existing*  
47 **Section 2H.02 and revised**

48 **Support:**

49 Location and placement of all airport guide signs depends upon the availability of longitudinal spacing on  
50 highways. **This text relocated from existing Section 2H.02**

51 **Section 2H.032H.04 Traffic Signal Speed Sign (I1-1)**

1 Option:

2 The Traffic Signal Speed (I1-1) sign (see Figure 2H-1), ~~reading displaying the legend~~ SIGNALS SET  
3 FOR XX MPH, may be used to indicate a section of street or highway on which the traffic control signals are  
4 coordinated into a progressive system timed for a specified speed at all hours during which they are operated  
5 in a coordinated mode.

6 If different system progression speeds are set for different times of the day, a changeable message element  
7 may be used for the numerals of the Traffic Signal Speed ~~(I1-1)~~ sign. If the system is operated in coordinated  
8 mode only during certain times, a blank-out version of the Traffic Signal Speed ~~(I1-1)~~ sign may be used to  
9 display the entire message only during those times.

10 **Standard:**

11 An electronic-display changeable section of the Traffic Signal Speed sign shall be a white legend on  
12 a black opaque or green background.

13 *Guidance:*

14 *If used, the sign should be mounted as near as practical to each intersection where the timed speed*  
15 *changes, and at intervals of several blocks throughout any section where the timed speed remains constant.*

16 **Standard:**

17 ~~The Traffic Signal Speed sign shall be a minimum of 24 x 36 inches with the longer dimension~~  
18 ~~vertical. It shall have a white message and border on a green background.~~

19 ~~Section 2H.04 Miscellaneous Information Signs~~ This section renumbered and edited and is  
20 ~~now Section 2H.06~~

21 **Section 2H.05 Jurisdictional Boundary (I2-1) Signs**

22 Option:

23 The Jurisdictional Boundary (I2-1) sign may be used to mark the location of a jurisdictional boundary of a  
24 State, county, or municipality or the limits of an unincorporated municipal-level community.

25 Guidance:

26 If used, the Jurisdictional Boundary sign should be located at or as near as practicable to the  
27 jurisdictional boundary without interfering with higher priority traffic control devices. Notices of statutes or  
28 local ordinances should be located separately using regulatory signs (see Chapter 2B).

29 If used for an unincorporated community, the community should be one that is readily identifiable on  
30 official maps and be consistent with postal mailing addresses.

31 **Standard:**

32 In accordance with Section 2H.01, the Jurisdictional Boundary sign shall be rectangular in shape  
33 and shall have a white legend on a green background. The sign shall display only the name of the State,  
34 county, municipality, or other identifiable community, and an appropriate legend such as ENTERING,  
35 STATE LINE, County, or the municipal classification.

36 Names of elected officials or promotional messages, such as notable accomplishments or claims,  
37 shall not be displayed on a Jurisdictional Boundary sign.

38 Option:

39 A pictograph representing the jurisdiction may be displayed on the Jurisdictional Boundary sign.

40 **Standard:**

41 If a pictograph is displayed on the Jurisdictional Boundary sign, it shall be the official seal of the  
42 jurisdiction and shall comply with the provisions of Section 2A.06. The pictograph shall be placed to  
43 the left of the legend. The height of the pictograph shall not exceed two times the height of the initial  
44 upper-case letter of the principal legend.

45 Support:

46 Signs are not normally warranted to identify the boundaries of special-purpose governmental districts,  
47 such as school districts, sanitary districts, or improvement districts. Such signs are generally promotional in  
48 nature and do not provide navigational or orientation assistance in conjunction with official maps that are  
49 available to the general public.

50 Section 2H.07 contains information on State Welcome signs.

1 **Section 2H.06 Geographical Feature (I2-2) Signs**

2 **Option:**

3 The Geographical Feature (I2-2) sign may be used to mark the locations of land features such as river and  
4 stream crossings, and summits, that are identifiable on maps or serve as landmarks in providing navigational  
5 orientation or reference to the road user.

6 **Guidance:**

7 If used, the Geographical Feature (I2-2) sign should display only the name of the geographical feature.  
8 Additional information that is unnecessary for navigational or orientation purposes, such as watershed or  
9 tributary names, should not be displayed on the sign .

10 **Section 2H.07 State Welcome Signs**

11 **Support:**

12 The design, placement, and function of State Welcome signs differ from Jurisdictional Boundary (I2-1)  
13 signs (see Section 2H.05) that are used to identify State lines. Because of these differences, it is necessary to  
14 distinguish State Welcome signs from State line Jurisdictional Boundary signs.

15 **Option:**

16 A State Welcome sign may be located at or in the vicinity of the State boundary except as prohibited in  
17 Paragraph 4.

18 State Welcome signs may display the State seal, the officially adopted State motto or slogan, and the  
19 name of the Governor, in addition to the State name. State Welcome signs may use legend and background  
20 colors that provide adequate visual contrast other than the standard sign colors.

21 **Standard:**

22 **State Welcome signs shall not be located where they could interfere with or detract from other**  
23 **traffic control devices. If used, State Welcome signs shall be installed as independent, post-mounted**  
24 **sign assemblies.**

25 **State Welcome signs shall not display changeable or other electronic-display messages (see Chapter**  
26 **2L). State Welcome signs shall not display messages that emulate promotional advertising of any type.**  
27 **State Welcome signs shall not incorporate Acknowledgment signs or messages (see Section 2H.13), or**  
28 **business identification sign panels or logos (see Section 2J.03) into their legends or assemblies. In**  
29 **accordance with Section 2A.04 of this Manual, telephone numbers, Internet addresses and e-mail**  
30 **addresses, including domain names and uniform resource locators (URL), and quick-response (QR)**  
31 **codes, bar codes, or other graphics intended for optical scanning for the purpose of obtaining**  
32 **information shall not be displayed in the legends of State Welcome signs or on their supports.**

33 **Guidance:**

34 State Welcome signs should be located farther from the edge of the roadway than other traffic control  
35 devices.

36 The size of a State Welcome sign should be consistent with the prevailing size of other guide signs based  
37 on the roadway type.

38 **Section 2H.08 Future Interstate Signs (I2-4, I2-4a)**

39 **Option:**

40 The Future Interstate Route (I2-4) or Future Interstate Corridor (I2-4a) sign (see Figure 2H-2) may be  
41 used sparingly along an existing route that will be reconstructed as an Interstate route or along an existing  
42 route adjacent to a corridor through which an Interstate route will be constructed, in accordance with the  
43 Policy and Conditions stated in 23 CFR 470, Appendix C.

44 Where the route number has been approved by the FHWA, either the I2-4 or I2-4a sign may be used.

45 **Standard:**

46 **The I2-4 sign shall not be used where the route number has not been approved by the FHWA.**  
47 **Future Interstate signs shall not be located where they could interfere with or detract from other**  
48 **traffic control devices. If used, Future Interstate signs shall be installed as independent, post-mounted**  
49 **sign assemblies.**

50 **Future Interstate signs shall display a word legend only and shall not display the Interstate route**  
51 **marker or likeness thereof. Future Interstate signs shall not imply that an existing route has already**

1 been designated and marked as an Interstate route. Signs indicating that an existing route is designated  
2 as a future Interstate route or corridor shall not provide directional or distance information. Route  
3 Sign assemblies (see Section 2D.29) of any type shall not be used to sign a route as a future Interstate or  
4 other route.

5 **Figure 2H-2. Example of Future Interstate Corridor Sign**

6 Guidance:

7 Future Interstate signs should be limited to strategic locations, such as at the beginning of the designated  
8 route or corridor, or beyond interchanges connecting from existing Interstate highways.

9 **Section 2H.09 Project Information Sign (I2-5)**

10 Support:

11 The Project Information (I2-5) sign (see Figure 2H-3) provides limited information about a highway  
12 construction project on which work is ongoing.

13 Standard:

14 Project Information signs shall not be installed prior to the commencement of work or be used to  
15 provide advance notification of road work that will begin at some future date. Project Information  
16 signs shall be removed at the conclusion of work on the project, even if the final inspection or project  
17 closeout has not yet occurred.

18 The number of Project Information signs shall be limited to one per direction of travel on the  
19 roadway on which the project is based. The location of the Project Information sign shall not interfere  
20 with the temporary traffic control zone devices.

21 **Figure 2H-3. Example of Project Information Signs**

22 **Section 2H.10 Grade Separation Identification Signs (I2-43, I2-43a)**

23 Option:

24 The Grade Separation Identification (I2-43, I2-43a) signs (see Figure 2H-4) may be used to identify a  
25 grade separation of another highway or other transportation facility such as a railway, bikeway, or pathway.

26 **Figure 2H-4. Grade Separation Identification Sign**

27 Guidance:

28 Except as provided in Paragraph 4, when used to identify an overcrossing structure, the I2-43 sign should  
29 be mounted to the fascia of the structure above the travel lanes or shoulder of the highway below. Adequate  
30 separation from other overhead signs that are mounted to the structure should be provided.

31 When used to identify an undercrossing structure, the I2-43 or I2-43a sign should be post-mounted in  
32 advance of the structure as near to it as practicable.

33 Option:

34 When used to identify an overcrossing structure, the I2-43 or I2-43a sign may be post-mounted in front of  
35 an overcrossing or may be mounted to the abutment of the overcrossing facing approaching traffic.

36 **Section 2H.052H.11 Reference Location Signs (D10-1 through D10-3) and Intermediate**  
37 **Reference Location Signs (D10-1a through D10-3a)**

38 Support:

39 There are two types of reference location signs:

- 40 A. Reference Location (D10-1, 2, and 3) signs show an integer distance point along a highway, and
- 41 B. Intermediate Reference Location (D10-1a, 2a, and 3a) signs also show a decimal between integer
- 42 distance points along a highway.

43 Standard:

44 Except when Enhanced Reference Location signs (see Section 2H.062H.12) are used instead,  
45 Reference Location (D10-1 through D10-3) signs shall be placed on all expressway facilities that are  
46 located on a route where there is reference location sign continuity and on all freeway facilities to assist  
47 road users in estimating their progress, to provide a means for identifying the location of emergency  
48 incidents and traffic crashes, and to aid in highway maintenance and servicing.

49 Option:

1 Reference Location (D10-1 ~~to~~ through D10-3) signs (see Figure 2H-~~25~~) may be installed along any  
2 section of a highway route or ramp to assist road users in estimating their progress, to provide a means for  
3 identifying the location of emergency incidents and traffic crashes, and to aid in highway maintenance and  
4 servicing.

5 To augment the reference location sign system, Intermediate Reference Location (D10-1a to D10-3a)  
6 signs (see Figure 2H-~~36~~), which show the tenth of a mile with a decimal point, may be installed at one tenth of  
7 a mile, two tenths of a mile, or one-half mile intervals, ~~or at some other regular spacing~~.

8 **Figure 2H-5. Reference Location Signs**

9 **Figure 2H-6. Intermediate Reference Location Signs**

10 **Standard:**

11 When Intermediate Reference Location (D10-1a ~~to~~ through D10-3a) signs are used to augment the  
12 reference location sign system, the reference location sign at the integer mile point shall display a  
13 decimal point and a zero numeral.

14 ~~When placed on freeways or expressways, reference location signs shall contain 10-inch white-~~  
15 ~~numerals on a 12-inch wide green background with a white border. The signs shall be 24, 36, or 48-~~  
16 ~~inches in height for one, two, or three digits, respectively, and shall contain the word MILE in 4-inch-~~  
17 ~~white letters.~~

18 ~~When placed on conventional roads, reference location signs shall contain 6-inch white numerals on-~~  
19 ~~a green background that is at least 10 inches wide with a white border. The signs shall contain the word~~  
20 ~~MILE in 4-inch white letters.~~

21 Reference location signs shall have a minimum mounting height of 4 feet, measured vertically from  
22 the bottom of the sign to the elevation of the near edge of the roadway, and shall not be governed by the  
23 mounting height requirements prescribed in Section 2A.18.

24 The distance numbering shall be continuous for each route within a State, except where overlaps  
25 occur (see Section 2E.31). Where routes overlap, reference location sign continuity shall be established  
26 for only one of the routes. If one of the overlapping routes is an Interstate route, that route shall be  
27 selected for continuity of distance numbering.

28 *Guidance:*

29 *The route selected for continuity of distance numbering should also have continuity in interchange exit*  
30 *numbering (see Section 2E.31).*

31 *On a route without reference location sign continuity, the first reference location sign beyond the overlap*  
32 *should indicate the total distance traveled on the route so that road users will have a means of correlating*  
33 *their travel distance between reference location signs with that shown on their odometer.*

34 **Standard:**

35 For divided highways, the distance measurement shall be made on the northbound and eastbound  
36 roadways. The reference location signs for southbound or westbound roadways shall be set at locations  
37 directly opposite the reference location signs for the northbound or eastbound roadways.

38 *Guidance:*

39 *Zero distance should begin at the south and west State lines, or at the south and west terminus points*  
40 *where routes begin within a State.*

41 **Standard:**

42 Except as provided in Paragraph ~~15~~13, reference location signs shall be installed on the right-hand  
43 side of the roadway.

44 **Option:**

45 Where conditions limit or restrict the use of reference location signs on the right-hand side of the  
46 roadway, they may be installed in the median. On two-lane conventional roadways, reference location signs  
47 may be installed on one side of the roadway only and may be installed back-to-back. Reference location signs  
48 may be placed up to 30 feet from the edge of the pavement.

49 If a reference location sign cannot be installed in the correct location, it may be moved in either direction  
50 as much as 50 feet.

51 *Guidance:*

If a reference location sign cannot be placed within 50 feet of the correct location, it should be omitted.

**Section ~~2H.06~~ 2H.12 Enhanced Reference Location Signs (D10-4, ) and Intermediate Enhanced Reference Location Signs (D10-5)**

Support:

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).

Option:

Enhanced Reference Location (D10-4) signs (see Figure 2H-47), 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 2H-47), which show the tenth of a mile with a decimal point, may be installed along any section of a highway route or ramp at one tenth of a mile intervals, or at some other regular spacing.

**Figure 2H-7. Enhanced Reference Location Signs**

Standard:

When Intermediate Enhanced Reference Location (D10-5) signs are used to augment the reference location sign system, the enhanced reference location sign at the integer mile point shall display a decimal point and a zero numeral.

If enhanced reference location signs are used, they shall be vertical signs having a blue or green backgrounds with white numerals, letters, legends and borders, except for the route shield, which shall be the standard color and shape. The top line shall consist of display the cardinal direction for the roadway. The second line shall consist of display the applicable route shield for the roadway. The third line shall identify the mile reference for the location and the bottom line of the Intermediate Enhanced Reference Location sign shall give the tenth of a 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 6 inches. The height of the route shield on enhanced reference location signs shall be a minimum of 12 inches.~~

~~The background color shall be the same for all enhanced reference location signs within a jurisdiction.~~

Support:

The provisions in Section ~~2H.05~~ 2H.11 regarding mounting height, distance numbering and measurements, sign continuity, and placement with respect to the right-hand shoulder and/or median for reference location signs also apply to enhanced reference location signs.

~~Section 2H.07 Auto Tour Route Signs~~ **This section relocated to Chapter 2D and combined with Section 2D.57**

**Section ~~2H.08~~ 2H.13 Acknowledgment Signs and Plaques (I20 Series)**

Support:

Acknowledgment signs and plaques are a way of recognizing a company, business, or volunteer group that provides or sponsors a highway-related service. Acknowledgment signs include sponsorship signs for adopt-a-highway litter removal programs, maintenance of a parkway or interchange, and other highway maintenance or beautification sponsorship programs.

Guidance:

A State or local highway agency that elects to have an sponsorship acknowledgement sign program should develop an acknowledgement sign policy on Acknowledgment signs and plaques. The policy should require that eligible sponsoring organizations comply with State laws prohibiting discrimination based on race, religion, color, age, sex, national origin, and other applicable laws. ~~The acknowledgment sign policy should include all of the provisions regarding sign placement and sign design that are described in this Section.~~ **This text incorporated into the following Standard statement**

Standard:

1 The State or local acknowledgment sign policy shall include all of the provisions regarding  
2 placement and design of Acknowledgment signs and plaques that are contained in this Section.

3 Because regulatory, warning, and guide signs have a higher priority, acknowledgment signs shall  
4 only be installed where adequate spacing is available between the acknowledgment sign and other  
5 higher priority signs. Acknowledgment signs shall not be installed in a position where they would  
6 obscure the road users' view of other traffic control devices.

7 Acknowledgment signs shall not be installed at any of the following locations:

- 8 A. On the front or back of, adjacent to, or around any other traffic control device, including traffic  
9 signs, highway traffic signals, and changeable message signs;  
10 B. On the front or back of, adjacent to, or around the supports or structures of other traffic  
11 control devices, or bridge piers; or  
12 C. At key decision points where a road user's attention is more appropriately focused on other  
13 traffic control devices, roadway geometry, or traffic conditions, including exit and entrance  
14 ramps, merging or weaving areas, lane terminations, intersections, grade crossings, toll plazas,  
15 temporary traffic control zones, and areas of limited sight distance.

16 Acknowledgment signs and plaques shall have a white legend on a blue background.  
17 Acknowledgment signs shall be independent post-mounted roadside installations only and shall not be  
18 overhead-mounted.

19 Option:

20 An Acknowledgment sign for the sponsor of a rest area or welcome center may be located on the highway  
21 mainline (one sign per direction of travel from which the rest area is accessible) at least 500 feet from other  
22 traffic control devices. An additional Acknowledgment sign may be used within the rest area provided that it  
23 is not visible from the highway mainline or ramps to and from the rest area.

24 Standard:

25 Acknowledgment signs for rest areas shall not display names or representations of specific products  
26 or services provided by the sponsor within the rest area. Acknowledgment signs for rest areas shall  
27 display the legend REST AREA as the program activity, such as REST AREA SPONSORED BY. In  
28 accordance with Paragraph 4, the Rest Area and Welcome Center Acknowledgment (I20-4 and I20-4a)  
29 signs shall not be combined in the same sign assembly with or substitute for the Rest Area General  
30 Service guide signs (see Section 2I.05).

31 Option:

32 If a State has officially adopted and is actively promoting a program to encourage the use of safety rest  
33 areas through the use of a program name, then that program name may be displayed in smaller lettering below  
34 the legend REST AREA on the Rest Area Acknowledgment sign.

35 Standard:

36 Program name or slogans, as described in Paragraph 13, shall not be displayed on the rest area  
37 guide sign or other types of traffic signs.

38 *Guidance:*

39 *The minimum spacing between acknowledgment signs and any other traffic control signs, except parking*  
40 *regulation signs, should be:*

- 41 A. 150 feet on roadways with speed limits of less than 30 mph,  
42 B. 200 feet on roadways with speed limits of 30 to 45 mph, and  
43 C. 500 feet on roadways with speed limits greater than 45 mph.

44 *If the placement of a newly-installed higher-priority traffic control device, such as a higher-priority sign,*  
45 *a highway traffic signal, or a temporary traffic control device, conflicts with an existing acknowledgment*  
46 *sign, the acknowledgment sign should be relocated, covered, or removed.*

47 *Option:*

48 State or local highway agencies may ~~develop their own acknowledgment sign designs and may also~~ use  
49 their own pictograph (see definition in Section 1A.13) and/or a brief jurisdiction-wide program ~~slogan name,~~  
50 such as "Adopt-A-Highway" or "Litter Removal," as part of any portion of the acknowledgment sign,  
51 provided that the signs comply with the provisions for shape, sign and legend size, color, and lettering style in  
52 this Chapter and in Chapter 2A.

53 *Guidance:*

Acknowledgment signs should clearly indicate the type of highway services provided by the sponsor.

**Standard:**

In addition to the general provisions for signs described in Chapter 2A and the sign design principles covered in the “Standard Highway Signs ~~and Markings~~” ~~book publication~~ (see Section 1A.11), acknowledgment sign and plaque designs developed by State or local highway agencies shall comply with the following provisions:

- A. Neither the sign or plaque design nor the sponsor acknowledgment name or logo shall contain any contact information, directions, slogans (other than a brief jurisdiction-wide program ~~slogan~~name, if used), telephone numbers, ~~or e-mail or~~ Internet addresses, including domain names and uniform resource locators (URL), metadata tags (“hash-tags”), or quick-response (QR) codes, bar codes, or similar graphics (see Section 2A.0504);
- B. Except for ~~the lettering, if any, on~~ the sponsor acknowledgment logo, all of the lettering shall be in upper-case letters of the Standard Alphabets as provided in the “Standard Highway Signs ~~and Markings~~” ~~book publication~~ (see Section 1A.11);
- C. If a logo, instead of a word legend, is used to represent the sponsor, the logo shall be the primary logo that identifies the sponsoring entity. Secondary or alternate logos, slogans, products, mascots, spokespersons, or other items associated with the sponsoring entity’s commercial advertising or marketing shall not be displayed on Acknowledgment signs or plaques;
- ~~CD.~~ In order to keep the main focus on the highway-related service and not on the sponsor acknowledgment name or logo, the area reserved for the sponsor acknowledgment name or logo (1) shall be a horizontally oriented rectangle with its width at least 1.67 times its height; (2) shall not be located at the top of the sign or plaque; (3) shall be a maximum of 8 square feet in area; and (4) for an Acknowledgment sign, shall not exceed 1/3 of the total area of the sign ~~and shall be a maximum of 8 square feet, and shall not be located at the top of the sign;~~
- ~~DE.~~ The entire sign display area of an Acknowledgment sign assembly shall not exceed 24 square feet;
- ~~EF.~~ The sign or plaque shall not contain any messages, lights, symbols, or ~~trademarks~~ logos that resemble any official traffic control devices;
- ~~FG.~~ The sign or plaque shall not contain any external or internal illumination, light-emitting diodes, luminous tubing, fiber optics, luminescent panels, or other flashing, moving, or animated features; ~~and~~
- ~~GH.~~ The sign or plaque shall not distract from official traffic control messages such as regulatory, warning, or guidance messages;
- I. The sign or plaque shall be a horizontally oriented rectangle with the horizontal dimension longer than the vertical dimension;
- J. The area of the plaque shall not exceed the lesser of 1/3 the area of the General Service sign below which it is mounted or 24 square feet;
- K. The plaque size shall be based on the standard sizes as specified in Table 2I-1. If the size of the General Service sign is oversized for its application (greater than the size specified for the corresponding roadway application in Table 2I-1), or if the size of the General Service sign increases due to modification of the sign legend, a corresponding increase in the size of the plaque shall not be allowed; and
- L. The sign or plaque shall not display promotional or contact information about the agency’s sponsorship program, including if the sign or plaque does not currently display a sponsor.

Option:

If a specific outlet of a business with multiple locations in the same area is the sponsoring entity, such as a franchisee, the area reserved for the sponsor acknowledgment name or logo may include the name of the municipality or neighborhood in which the sponsoring entity is located.

An Acknowledgment plaque may be mounted below the following General Service signs to acknowledge the sponsor of a corridor- or region-based highway-related service:

- A. Radio-Weather Information (D12-1) sign (see Section 2I.09);
- B. Radio-Traffic Information (D12-1a) sign (see Section 2I.09);
- C. TRAVEL INFO CALL 511 (D12-5 and D12-5a) signs (see Section 2I.12);

1 D. Roadside Assistance (D12-6) sign (see Section 2I.13).

2 **Standard:**

3 **An Acknowledgment plaque shall not be mounted in conjunction with any other sign or other**  
4 **traffic control device. An Acknowledgment plaque shall not be used alone or without one of the**  
5 **General Service signs specified in Paragraph 14.**

6 **The general restrictions on the type of content allowed for display on Acknowledgment signs (see**  
7 **Paragraph 13) shall apply to the legends of Acknowledgment plaques.**

8 Support:

9 Examples of acknowledgment signs ~~designs~~ and plaques are shown in Figure 2H-58.

10 **Figure 2H-8. Examples of Acknowledgement Sign Designs**

11 **Section 2H.14 Alternative Fuels Corridor Sign**

12 **Support:**

13 The Alternative Fuels Corridor sign (D9-19) is sometimes used to inform motorists of an Alternative Fuels  
14 Corridor highway segment that have been designated by the Secretary of Transportation as alternative fuels  
15 “Corridor Ready.”

16 **Option:**

17 The D18-1 sign may be used to identify an Alternative Fuels Corridor highway segment designated by the  
18 Secretary of Transportation as “Corridor Ready”.

19 **Standard:**

20 **Alternative Fuels Corridor signs shall only be used to designate alternative fuels corridor highway**  
21 **segments that have been designated by the Federal Highway Administration as “Corridor Ready.”**  
22 **The appropriate General Service signs or plaques identifying the alternative fuels available in the**  
23 **corridor shall be included with the Alternative Fuels Corridor signs in a sign assembly.**

24 **Alternative Fuels Corridor Signs shall only be post mounted on the side of the road and shall not be**  
25 **mounted in an overhead installation.**

26 **State or agency variations of the Alternative Fuels Corridor sign shall not be allowed.**  
27 **Acknowledgments of sponsors shall not be allowed in Alternative Fuels Corridor sign assemblies.**

28 **Support:**

29 The Alternative Fuels Corridor sign provides limited information to travelers and therefore are used  
30 sparingly.

31 **Standard:**

32 **Except as provided in Paragraph 8, Alternative Fuels Corridor signs shall be limited to one sign at**  
33 **or near the beginning of the Alternative Fuels Corridor in each direction of travel.**

34 **Option:**

35 For long corridors, additional signs may be located beyond major intersections or major interchanges  
36 following the typical post-interchange sign sequence.

37 The beginning of an Alternative Fuels Corridor may be indicated with a BEGIN (M4-14) plaque with a  
38 white legend and border on a blue background mounted above the Alternative Fuels Corridor sign in the sign  
39 assembly.

40 The end of an Alternative Fuels Corridor may be indicated with an END (M4-6) plaque with a white  
41 legend and border on a blue background mounted above the Alternative Fuels Corridor sign in the sign  
42 assembly.

43 **Standard:**

44 **The General Service signs shall not be used in the sign assembly indicating the end of a corridor.**

45 **Guidance:**

46 When the availability of one or more of the alternative fuel facilities discontinues in an Alternative Fuels  
47 Corridor, the LAST IN CORRIDOR (W16-19P)(See Figure 2H-9) warning plaque should be included on the  
48 last General Service Directional Assembly on the approach to the interchange or intersection.

49 **Option:**

50 When the availability of one or more of the alternative fuel facilities discontinues in an Alternative Fuels  
51 Corridor, an Alternative Fuels Corridor sign with accompanying General Service signs indicating the types of

1 fuels still available in the corridor may be provided beyond the intersection or interchange where the last  
2 discontinues fuel facilities were available.

3 **Standard:**

4 **The Alternative Fuels Corridor signs shall not be used as directional signs or be combined with**  
5 **other signs, except as provided herein.**

6 **Option:**

7 Up to three General Service symbol signs displaying the alternative fuels available in the designated  
8 corridor may be installed below the Alternative Fuels Corridor sign, arranged horizontally (see Figure 2H-10).

9 **Standard:**

10 **The size of the General Service symbol signs for the alternative fuels available shall not exceed 18**  
11 **inches when mounted with the 24-inch Alternative Fuels Corridor sign and 24 inches when mounted**  
12 **with the 36-inch Alternative Fuels Corridor sign.**

13 **Guidance:**

14 *When the number of eligible alternative fuels available in the corridor exceeds three, a separate plaque*  
15 *with the two- or three-letter designations (D9-11gP or D9-11hP) of each of the fuels available should be used*  
16 *in place of the General Service symbol signs (see Figure 2H-10).*

17 **Standard:**

18 **When the Alternative Fuels Corridor sign is used in a designated corridor on a freeway or**  
19 **expressway, the applicable General Service sign(s) shall be installed on the approach to an interchange**  
20 **in the corridor from which the designated fuel services are available. If the services are not visible from**  
21 **the ramp of a single-exit interchange, the service signing shall be repeated at the intersection of the exit**  
22 **ramp and the crossroad. Where the alternative fuel facility is not located along the crossroad,**  
23 **additional General Service Directional Assemblies shall be installed in advance of each subsequent turn**  
24 **to reach the facility.**

25 **Support:**

26 Because regulatory, warning, and guide signs are necessary for safe and efficient movement of traffic they  
27 have a higher priority in placement location over Alternative Fuels Corridor signs.

28 **Figure 2H-9. Alternative Fuels Corridor Sign**

29 **Figure 2H-10. Example of Signing Alternative Fuels Corridors**

30 **Standard:**

31 **Alternative Fuels Corridor sign assemblies shall be limited to those locations where adequate**  
32 **spacing is available between the Alternative Fuels Corridor sign and other higher priority signs.**  
33 **Alternative Fuels Corridor signs shall not be installed in a location where they would obscure the road**  
34 **users' view of other traffic control devices or distract driver's attention from the roadway in a complex**  
35 **roadway environment. Alternative Fuels Corridor sign shall not be installed at any of the following**  
36 **locations:**

- 37 **A. On the front or back of, adjacent to, or around any other traffic control device, including traffic**  
38 **signs, highway traffic signals, and changeable message signs;**
- 39 **B. On the front or back of, adjacent to, or around the supports or structures of other traffic**  
40 **control devices;**
- 41 **C. At key decision points where a road user's attention is more appropriately focused on other**  
42 **traffic control devices, roadway geometry, or traffic conditions, including exit and entrance**  
43 **ramps, intersections, grade crossings, toll plazas, temporary traffic control zones, and areas of**  
44 **limited sight distance; or**
- 45 **D. On routes other than those officially designated as Alternative Fuels Corridors, even if to**  
46 **provide directional information to such corridors, i.e., they shall not appear on supplemental**  
47 **signs or on any other information sign on or along the highway or its intersecting routes.**

48 **The minimum spacing between Alternative Fuels Corridor signs and any other traffic control signs,**  
49 **except parking regulation signs, should be:**

- 50 **A. 150 feet on roadways with speed limits of less than 30 mph,**  
51 **B. 200 feet on roadways with speed limits of 30 to 45 mph, and**

1 C. 500 feet on roadways with speed limits greater than 45 mph.  
2 If the placement of a newly-installed, higher-priority traffic control device, such as a higher-priority  
3 sign, a highway traffic signal, or a temporary traffic control device, conflicts with an existing  
4 Alternative Fuels Corridor sign, the Alternative Fuels Corridor sign shall be relocated, covered, or  
5 removed.

1 **CHAPTER 2I. GENERAL SERVICE SIGNS**

2 **Section 2I.01 Sizes of General Service Signs**

3 **Standard:**

4 **Except as provided in Section 2A.11, the sizes of General Service signs that have a standardized**  
5 **design shall be as shown in Table 2I-1.**

6 Support:

7 Section 2A.11 contains information regarding the applicability of the various columns in Table 2I-1.

8 Option:

9 Signs larger than those shown in Table 2I-1 may be used (see Section 2A.11).

10 **Table 2I-1. General Service Sign and Plaque Sizes**

11 **Section 2I.02 General Service Signs for Conventional Roads**

12 Support:

13 On conventional roads, commercial services such as gas, food, and lodging generally are within sight and  
14 are available to the road user at reasonably frequent intervals along the route. Consequently, on this class of  
15 road there usually is no need for special signs calling attention to these services. Moreover, General Service  
16 signing is usually not ~~required~~needed in urban areas except for hospitals, law enforcement assistance, tourist  
17 information centers, and camping.

18 Option:

19 General Service signs (see Figure 2I-1) may be used where such services are infrequent and are found  
20 only on an intersecting highway or crossroad.

21 **Figure 2I-1. General Service Signs and Plaques**

22 **Standard:**

23 **All General Service signs and supplemental sign panels shall have white ~~letters, symbols, arrows,~~**  
24 **legends and borders on a blue background.**

25 *Guidance:*

26 *General Service signs should be installed at a suitable distance in advance of the turn-off point or*  
27 *intersecting highway.*

28 *States that elect to provide General Service signing should establish a statewide policy or warrant for its*  
29 *use, and criteria for the availability of services. Local jurisdictions electing to use such signing should follow*  
30 *State policy for the sake of uniformity.*

31 Option:

32 Individual States may sign for whatever alternative fuels are available at appropriate locations.

33 **Standard:**

34 **General Service signs, if used at intersections, shall be accompanied by a directional message.**

35 Option:

36 The Advance Turn (M5 series) or Directional Arrow (M6 series) auxiliary ~~signs~~plaques with white  
37 arrows on blue backgrounds as shown in Figure 2I-1 may be used with General Service symbol signs to create  
38 a General Service Directional Assembly.

39 The General Service sign legends may be either symbols or word messages.

40 **Standard:**

41 **Symbols and word message General Service legends shall not be intermixed on the same sign. The**  
42 **Pharmacy (D9-20) sign shall only be used to indicate the availability of a pharmacy that is open, with a**  
43 **State-licensed pharmacist present and on duty, 24 hours per day, 7 days per week, and that is located**  
44 **within 3 miles of an interchange on the Federal-aid system. The D9-20 sign shall have a 24 HR (D9-**  
45 **20aP) plaque mounted below it.**

46 **Use of the Hospital (D9-2) sign or the HOSPITAL word message shall be limited to facilities that**  
47 **operate 24 hours per day, 7 days per week.**

48 Option:

1 [The Emergency Medical Services \(D9-13\) sign \(see Paragraph 19\) may be used for facilities that provide](#)  
2 [emergency medical care but do not operate on a full-time basis.](#)

3 Support:

4 Formats for displaying different combinations of these services are described in Section 2I.03.

5 Option:

6 If the distance to the next point at which services are available is 10 miles or more, a NEXT SERVICES  
7 XX MILES (D9-17P) plaque (see Figure 2I-2) may be installed below the General Service sign.

8 The International Symbol of Accessibility for the Handicapped (D9-6) sign may be used beneath General  
9 Service signs where paved ramps and rest room facilities accessible to, and usable by, the physically  
10 handicapped are provided.

11 *Guidance:*

12 *When the D9-6 sign is used in accordance with Paragraph 13, and van-accessible parking is available at*  
13 *the facility, a VAN ACCESSIBLE (D9-6P) plaque (see Figure 2I-1) should be mounted below the D9-6 sign.*

14 Option:

15 The Recreational Vehicle Sanitary Station (D9-12) sign may be used as needed to indicate the availability  
16 of facilities designed for the use of dumping wastes from recreational vehicle holding tanks.

17 The Litter Container (D9-4) sign may be placed in advance of roadside turnouts or rest areas, unless it  
18 distracts the driver's attention from other more important regulatory, warning, or directional signs.

19 The Emergency Medical Services (D9-13) symbol sign may be used to identify medical service facilities  
20 that have been included in the Emergency Medical Services system under a signing policy developed by the  
21 State and/or local highway agency.

## 22 **Figure 2I-2. Example of Next Services Plaque**

23 **Standard:**

24 **The Emergency Medical Services symbol sign shall not be used to identify services other than**  
25 **qualified hospitals, ambulance stations, and qualified free-standing emergency medical treatment**  
26 **centers. If used, the Emergency Medical Services symbol sign shall be supplemented by a sign [or](#)**  
27 **[plaque, as provided in Paragraph 21](#), identifying the type of service provided.**

28 Option:

29 The Emergency Medical Services symbol sign may be used above the HOSPITAL (D9-13aP) plaque ~~or~~  
30 ~~Hospital (D9-2) symbol sign~~ or above a plaque with the legend AMBULANCE STATION (D9-13bP),  
31 EMERGENCY MEDICAL CARE (D9-13cP), or TRAUMA CENTER (D9-13dP). The Emergency Medical  
32 Services symbol sign may also be used to supplement Telephone (D9-1), Channel 9 Monitored (D12-3), or  
33 POLICE (D9-14) signs.

34 **Standard:**

35 **The legend EMERGENCY MEDICAL CARE shall not be used for services other than qualified**  
36 **free-standing emergency medical treatment centers.**

37 *Guidance:*

38 *Each State should develop ~~guidelines~~ [a policy](#) for the implementation of the Emergency Medical Services*  
39 *symbol sign.*

40 *The State should consider the following guidelines in the preparation of its policy:*

41 A. AMBULANCE

- 42 1. 24-hour service, 7 days per week.
- 43 2. Staffed by two State-certified persons trained at least to the basic level.
- 44 3. Vehicular communications with a hospital emergency department.
- 45 4. Operator should have successfully completed an emergency-vehicle operator training course.

46 B. HOSPITAL

- 47 1. 24-hour service, 7 days per week.
- 48 2. Emergency department facilities with a physician (or emergency care nurse on duty within the  
49 emergency department with a physician on call) trained in emergency medical procedures on  
50 duty.
- 51 3. Licensed or approved for definitive medical care by an appropriate State authority.
- 52 4. Equipped for radio voice communications with ambulances and other hospitals.

1 C. Channel 9 Monitored

- 2 1. Provided by either professional or volunteer monitors.  
3 2. Available 24 hours per day, 7 days per week.  
4 3. The service should be endorsed, sponsored, or controlled by an appropriate government authority  
5 to guarantee the level of monitoring.

6 **Section 2I.03 General Service Signs for Freeways and Expressways**

7 Support:

8 General Service (D9-18 series) signs (see Figure 2I-3) are generally not appropriate at major interchanges  
9 (see definition in Section 2E.32) and in urban areas.

10 **Figure 2I-3. Examples of General Service Signs with and without Exit Numbering**

11 Standard:

12 General Service signs shall have white ~~letters, symbols, arrows,~~ legends and borders on a blue  
13 background. Letter and numeral sizes shall comply with the minimum requirements of Tables 2E-2  
14 through 2E-5. All approved symbols shall be permitted as alternatives to word messages, but symbols  
15 and word service messages shall not be intermixed on the same sign. If the services are not visible from  
16 the ramp of a single-exit interchange, the service signing shall be repeated in smaller size at the  
17 intersection of the exit ramp and the crossroad. Such service signs shall use arrows to indicate the  
18 direction to the services.

19 Option:

20 ~~For numbered interchanges, the exit number may be incorporated within the sign legend (D9-18b) or~~  
21 ~~displayed on an Exit Number (E1-5P) plaque (see Section 2E.31).~~ **This text relocated to later in this section**  
22 **and revised**

23 Guidance:

24 The D9-18 or D9-18a sign should be used for numbered interchanges.

25 Distance to services should be displayed on General Service signs along the exit ramp where distances  
26 are more than 1 mile from the ramp intersection with the crossroad.

27 General Service signing should only be provided at locations where the road user can return to the  
28 freeway or expressway and continue in the same direction of travel.

29 Option:

30 For numbered interchanges, the exit number may be ~~incorporated~~ displayed within the sign legend (D9-  
31 18b) or displayed on an Exit Number (E1-5P) plaque (see Section 2E.31) instead of within the General  
32 Service sign (D9-18 or D9-18a). **This text relocated from earlier in this section and revised**

33 Guidance:

34 Only services that fulfill the needs of the road user should be displayed on General Service signs. If State  
35 or local agencies elect to provide General Service signing, there should be a statewide policy for such signing  
36 and criteria for the availability of the various types of services. The criteria should consider the following:

- 37 A. Gas, Diesel, ~~LP Gas, EV Charging,~~ and/or ~~other~~ alternative fuels if all of the following are available:
- 38 1. Vehicle services such as gas, oil, and water;  
39 2. Modern sanitary facilities and drinking water;  
40 3. Continuous operations at least 16 hours per day, 7 days per week; and  
41 4. Public telephone.
- 42 B. Food if all of the following are available:
- 43 1. Licensing or approval, where required;  
44 2. Continuous operation to serve at least two meals per day, at least 6 days per week;  
45 3. Public telephone; and  
46 4. Modern sanitary facilities.
- 47 C. Lodging if all of the following are available:
- 48 1. Licensing or approval, where required;  
49 2. Adequate sleeping accommodations;  
50 3. Public telephone; and  
51 4. Modern sanitary facilities.

- 1 D. Public Telephone if continuous operation, 7 days per week is available.
- 2 E. Hospital if continuous emergency care capability, with a physician on duty 24 hours per day, 7 days
- 3 per week is available. A physician on duty would include the following criteria and should be signed
- 4 in accordance with the priority as follows:
- 5 1. Physician on duty within the emergency department;
- 6 2. Registered nurse on duty within the emergency department, with a physician in the hospital on
- 7 call; or
- 8 3. Registered nurse on duty within the emergency department, with a physician on call from office or
- 9 home.
- 10 F. 24-Hour Pharmacy if a pharmacy is open, with a State-licensed pharmacist present and on duty, 24
- 11 hours per day, 7 days per week and is located within 3 miles of an interchange on the Federal-aid
- 12 system.
- 13 G. Camping if all of the following are available:
- 14 1. Licensing or approval, where required;
- 15 2. Adequate parking accommodations; and
- 16 3. Modern sanitary facilities and drinking water.

17 Support:

18 Motorist expectations for facilities providing alternative fuels, e.g. EV Charging, compressed natural gas,

19 liquefied natural gas, liquefied propane gas, and hydrogen, vary considerably and alternative fuel vehicles

20 may have different needs than conventional fuel vehicles.

21 Option:

22 The policy criteria for alternative fuel vehicles may vary from other conventional fuel facilities, taking

23 into account motorist needs, convenience and safety.

24 **Standard:**

25 **For any service that is operated on a seasonal basis only, the General Service signs shall be removed**

26 **or covered during periods when the service is not available.**

27 **The General Service signs shall be mounted in an effective location, between the Advance Guide**

28 **sign and the Exit Direction sign, in advance of the exit leading to the available services.**

29 *Guidance:*

30 *The General Service sign should ~~contain~~ display the interchange number, if ~~any applicable~~ ,~~contain the~~*

31 *~~interchange number, if any~~, as shown in Figure 2I-3.*

32 *Option:*

33 *If the distance to the next point where services are available is greater than 10 miles, a NEXT SERVICES*

34 *XX MILES (D9-17P) plaque (see Figure 2I-2) may be installed below the Exit Direction sign.*

35 **Standard:**

36 **Signs for services shall comply with the format for General Service signs (see Section 2I.02) and as**

37 **provided in this Manual. No more than six general road user services shall be displayed on one sign,**

38 **which includes any appended supplemental signs or plaques. General Service signs shall ~~carry~~ display**

39 **the legends for one or more of the following services: Food, Gas, Lodging, Camping, Phone, Hospital,**

40 **24-Hour Pharmacy, or Tourist Information.**

41 **The qualified services available shall be displayed at specific locations on the sign. ~~To provide~~**

42 **~~flexibility for the future when the services that might become available, the sign space normally reserved for a~~**

43 **~~given service symbol or word shall be left blank when that service is not present.~~ Incorporated into**

44 **Guidance statement that follows**

45 Guidance:

46 *To provide ~~flexibility~~ for ~~the~~ future ~~when the~~ services that might become available, the sign space*

47 *normally reserved for a given service symbol or word ~~shall~~ should be left blank when that service is not*

48 *present.*

49 *The standard display of word messages should be FOOD and PHONE in that order on the top line, and*

50 *GAS and LODGING on the second line. If used, HOSPITAL, 24-HR PHARMACY, and CAMPING should be*

51 *on separate lines (see Figure 2I-3).*

52 *Option:*

1 Signing for DIESEL, LP- ~~GAS~~Gas, or other alternative fuel services may be substituted for any of the  
2 general services or appended to such signs. The International Symbol of Accessibility for the Handicapped  
3 (D9-6) sign (see Figure 2I-1) may be used for facilities that qualify.

4 *Guidance:*

5 *When symbols are used for the road user services, they should be displayed as follows:*

6 A. *Six services:*

- 7 1. *Top row—GAS, FOOD, and LODGING*
- 8 2. *Bottom row—PHONE, HOSPITAL, and CAMPING*

9 B. *Four services:*

- 10 1. *Top row—GAS and FOOD*
- 11 2. *Bottom row—LODGING and PHONE*

12 C. *Three services:*

- 13 1. *Top row—GAS, FOOD, and LODGING*

14 *Option:*

15 Substitutions of other services for any of the services described in Paragraph ~~46-18~~ may be made by  
16 placing the substitution in the lower right (four or six services) or extreme right (three services) portion of the  
17 sign. An action message or an interchange number may be used for symbol signs in the same manner as they  
18 are used for word message signs. The Diesel Fuel (D9-11) symbol or the LP-Gas (D9-~~4511d~~) symbol may be  
19 substituted for the symbol representing fuel -or appended to such assemblies. The Tourist Information (D9-  
20 10) symbol or the 24-Hour Pharmacy (D9-20 and D9-20aP) symbol may be substituted on any of the  
21 configurations provided in Paragraph ~~4618~~.

22 At rural interchange areas where limited road user services are available and where it is unlikely that  
23 additional services will be provided within the near future, a supplemental plaque ([D9-18dP](#)) displaying one to  
24 three services (words or symbols) may be ~~appended-mounted~~ below a post-mounted interchange [Advance](#)  
25 guide sign.

26 **Standard:**

27 **If more than three services become available at rural interchange areas where limited road user**  
28 **services were anticipated, the appended supplemental plaque described in Paragraph ~~18-20~~ shall be**  
29 **removed and replaced with an independently mounted General Service sign as described in this Section.**

30 *Option:*

31 A separate Telephone Service (D9-1) sign (see Figure 2I-1) may be installed if telephone facilities are  
32 located adjacent to the route at places where public telephones would not normally be expected.

33 The Recreational Vehicle Sanitary Station (D9-12) sign (see Figure 2I-1) may be used as needed to  
34 indicate the availability of facilities designed for dumping wastes from recreational vehicle holding tanks.

35 In some locations, signs may be used to indicate that services are not available.

36 A separate Truck Parking (D9-16) sign (see Figure 2I-1) may be mounted below the other general road  
37 user services to direct truck drivers to designated parking areas.

38 **Section 2I.04 Interstate Oasis Signing (D5-12 Series)**

39 **Support:**

40 An Interstate Oasis is a facility near an Interstate highway that provides products and services to the  
41 public, 24-hour access to public restrooms, and parking for automobiles and heavy trucks. Interstate Oasis  
42 guide signs inform road users on Interstate highways as to the presence of an Interstate Oasis at an interchange  
43 and which businesses have been designated by the State within which they are traveling as having met the  
44 eligibility criteria of the Federal Highway Administration's Interstate Oasis policy. The FHWA's policy,  
45 which is dated October 18, 2006, and which can be viewed on the MUTCD website at  
46 <http://mutcd.fhwa.dot.gov/res-policy.htm>, provides a more detailed definition of an Interstate Oasis and  
47 specifies the eligibility criteria for an Interstate Oasis designation in compliance with the requirements of laws  
48 enacted by Congress.

49 *Guidance:*

50 *If a State elects to provide or allow Interstate Oasis signing (see Figure 2I-4), there should be a statewide*  
51 *policy, program, procedures, and criteria for the designation and signing of a facility as an Interstate Oasis*  
52 *that complies with FHWA's policy and with the provisions of this Section.*

1 States electing to provide or allow Interstate Oasis signing should use the following signing practices on  
2 the freeway for any given exit to identify the availability of a designated Interstate Oasis:

- 3 A. If adequate sign spacing allows, a separate Interstate Oasis (D5-12) sign should be installed in an  
4 effective location with spacing of at least 800 feet from other adjacent guide signs, including any  
5 Specific Service signs. This Interstate Oasis sign should be located upstream from the Advance Guide  
6 sign or between the Advance Guide sign and the Exit Direction sign for the exit leading to the  
7 Interstate Oasis. The Interstate Oasis sign should ~~have a white legend with a letter height of at least~~  
8 ~~10 inches and a white border on a blue background and should contain~~ display the words  
9 INTERSTATE OASIS and the exit number or, for an unnumbered interchange, an action message  
10 such as NEXT RIGHT. ~~The names or logos of the businesses designated as Interstate Oases should~~  
11 ~~not be included on this sign.~~ **Incorporated into Option statement that follows**
- 12 B. If the spacing of the other guide signs precludes the use of a separate sign as described in Item A, an  
13 INTERSTATE OASIS (D5-12aP)-supplemental plaque ~~with a letter height of at least 10 inches and~~  
14 ~~with a white legend and border on a blue background~~ should be ~~appended above or~~ mounted below an  
15 existing D9-18 series General Service sign for the interchange.

16 ~~If a separate Interstate Oasis (D5-12) sign is installed, an Interstate Oasis sign panel should be incorporated~~  
17 ~~into the design of the sign (see Figure 2I-4).~~

#### 18 **Figure 2I-4. Examples of Interstate Oasis Signs and Plaques**

##### 19 **Standard:**

20 ~~The Interstate Oasis sign panel shall only be used on the separate Interstate Oasis sign where it is~~  
21 ~~accompanied by the words INTERSTATE OASIS and shall not be used independently without the~~  
22 ~~words.~~

##### 23 **Option:**

24 If Specific Service signing is provided at the interchange, a business designated as an Interstate Oasis and  
25 having a business logo sign panel on the Food and/or Gas Specific Service signs may use the bottom portion  
26 of the business logo sign panel to display the word OASIS.

27 If Specific Service signing is not provided at the interchange, the name of the business designated as an  
28 Interstate Oasis may be displayed on a business identification sign panel, in compliance with the provisions of  
29 Sections 2J.03 through 2J.05, below the INTERSTATE OASIS legend on the D5-12 sign.

##### 30 **Standard:**

31 ~~If Specific Services signs containing the OASIS legend as a part of the business logo(s) are not used~~  
32 ~~on the ramp and if the Interstate Oasis is not clearly visible and identifiable from the exit ramp, an~~  
33 ~~Interstate Oasis Directional (D5-12b) sign with a white INTERSTATE OASIS legend with a letter~~  
34 ~~height of at least 6 inches and a white border on a blue background~~ shall be provided on the exit ramp  
35 to indicate the direction and distance to the Interstate Oasis.

36 If needed, additional trailblazer guide signs shall be used along the crossroad to guide road users to  
37 an Interstate Oasis.

#### 38 **Section 2I.05 Rest Area and Other Roadside Area Signs (D5-1 through D5-11 series)**

##### 39 **Standard:**

40 Rest Area signs (see Figure 2I-5) shall have a retroreflective white legend and border on a blue  
41 background.

42 Signs that include the legend REST AREA shall be used only where parking and restroom facilities  
43 are available.

##### 44 **Guidance:**

45 A roadside area that does not contain restroom facilities should be signed to indicate the major road user  
46 service that is provided. For example, the sign legends for an area with only parking should use the words  
47 PARKING AREA (D5-9 series) instead of REST AREA. The sign legends for an area with only picnic tables  
48 and parking should use words such as PICNIC AREA, ROADSIDE TABLE, or ROADSIDE PARK (D5-10  
49 series) instead of REST AREA.

50 Rest areas that have tourist information and welcome centers should be signed as ~~discussed~~ provided in  
51 Section 2I.08.

1 Scenic area signing should be consistent with that provided for rest areas, except that the legends should  
2 use words such as SCENIC AREA, SCENIC VIEW, or SCENIC OVERLOOK ([D5-11 series](#)) instead of REST  
3 AREA.

4 If a rest area or other roadside area is provided on a conventional road, a D5-1 and/or D5-1a sign should  
5 be installed in advance of the rest area or other roadside area to permit the driver to reduce speed in  
6 preparation for leaving the highway. A D5-5 sign (or a D5-2 sign if an exit ramp is provided) should be  
7 installed at the turnoff point where the driver needs to leave the highway to access the rest area or other  
8 roadside area.

9 If a rest area or other roadside area is provided on a freeway or expressway, a D5-1 sign should be  
10 placed 1 mile and/or 2 miles in advance of the rest area.

### 11 **Figure 2I-5. Rest Area and Other Roadside Area Signs**

#### 12 **Standard:**

13 **A D5-2a sign shall be placed at the rest area or other roadside area exit gore.**

#### 14 **Option:**

15 A D5-1a sign may be placed between the D5-1 sign and the exit gore on a freeway or expressway. A  
16 second D5-1 sign may be used in place of the D5-1a sign with a distance to the nearest 1/2 or 1/4 mile  
17 displayed as a fraction rather than a decimal for distances of less than 1 mile.

18 To provide the road user with information on the location of succeeding rest areas, a NEXT REST AREA  
19 XX MILES (D5-6) sign (see Figure 2I-5) may be installed independently or as a supplemental sign mounted  
20 below one of the REST AREA advance guide signs.

#### 21 **Standard:**

22 **All signs on freeways and expressways for rest and other roadside areas shall have letter and**  
23 **numeral sizes that comply with the minimum requirements of Tables 2E-2 through 2E-5. The sizes for**  
24 **General Service signs that have standardized designs shall be as shown in Table 2I-1.**

#### 25 **Option:**

26 If the rest area has facilities for the physically impaired (see Section 2I.02), the International Symbol of  
27 Accessibility for the Handicapped (D9-6) sign (see Figure 2I-1) may be placed with or beneath the REST  
28 AREA advance guide sign.

29 If telecommunication devices for the deaf (TDD) are available at the rest area, the TDD (D9-21) symbol  
30 sign (see Figure 2I-1) may be used to supplement the advance guide signs for the rest area.

31 If wireless Internet services are available at the rest area, the Wi-Fi (D9-22) symbol sign (see Figure 2I-1)  
32 may be used to supplement the advance guide signs for the rest area.

### 33 **Section 2I.06 Brake Check Area Signs (D5-13 ~~and~~, D5-14)**

#### 34 *Guidance:*

35 *If an area has been provided for drivers to check the brakes on their vehicle, a BRAKE CHECK AREA XX*  
36 *MILES (D5-13) sign (see Figure 2I-6) should be installed in advance of the brake check area, and a D5-14*  
37 *sign (see Figure 2I-6) should be placed at the entrance to the brake check area.*

### 38 **Figure 2I-6. Brake Check Area and Chain-Up Area Signs**

### 39 **Section 2I.07 Chain-Up Area Signs (D5-15 ~~and~~, D5-16)**

#### 40 *Guidance:*

41 *If an area has been provided for drivers to pull off of the roadway to install chains on their tires, a*  
42 *CHAIN-UP AREA XX MILES (D5-15) sign (see Figure 2I-6) should be installed in advance of the chain-up*  
43 *area, and a D5-16 sign (see Figure 2I-6) should be placed at the entrance to the chain-up area.*

### 44 **Section 2I.08 Tourist Information and Welcome Center Signs (D5-7 Series, D5-8)**

#### 45 **Support:**

46 Tourist information and welcome centers have been constructed within rest areas on freeways and  
47 expressways and are operated by either a State or a private organization. Others have been located within  
48 close proximity to these facilities and operated by civic clubs, chambers of commerce, or private enterprise.

#### 49 *Guidance:*

1 ~~An excessive~~The number of supplemental sign panels ~~should not be~~ installed with Tourist Information or  
2 Welcome Center signs should be limited to three so as not to ~~overload~~ impose an undue informational load on  
3 the road user.

4 **Standard:**

5 **Tourist Information or Welcome Center signs (see Figure 2I-7) shall have a white legend and**  
6 **border on a blue background. Continuously staffed or unstaffed operation at least 8 hours per day, 7**  
7 **days per week, shall be required.**

8 **If operated only on a seasonal basis, the Tourist Information or Welcome Center signs shall be**  
9 **removed or covered during the off seasons.**

10 *Guidance:*

11 *For freeway or expressway rest area locations that also serve as tourist information or welcome centers,*  
12 *the following signing criteria should be used:*

- 13 A. *The locations for tourist information and welcome center Advance Guide, Exit Direction, and Exit*  
14 *Gore signs should meet the General Service signing requirements described in Section 2I.03.*
- 15 B. *If the signing for the tourist information or welcome center is to be accomplished in conjunction with*  
16 *the initial signing for the rest areas, the message on the Advance Guide (D5-7) sign should be REST*  
17 *AREA, TOURIST INFO CENTER, XX MILES or REST AREA, STATE NAME (optional), WELCOME*  
18 *CENTER XX MILES. On the Exit Direction (D5-8 or D5-11) sign the message should be REST*  
19 *AREA, TOURIST INFO CENTER with a diagonally upward-pointing directional arrow (or NEXT*  
20 *RIGHT), or REST AREA, STATE NAME (optional), WELCOME CENTER with a diagonally upward-*  
21 *pointing directional arrow (or NEXT RIGHT).*
- 22 C. *If the initial rest area Advance Guide and Exit Direction signing is in place, these signs should*  
23 *include, on supplemental signs, the legend TOURIST INFO CENTER or STATE NAME (optional),*  
24 *WELCOME CENTER.*
- 25 D. *The Exit Gore sign should contain only the legend REST AREA with the arrow and should not be*  
26 *supplemented with any legend pertaining to the tourist information center or welcome center.*

27 **Option:**

28 ~~An~~ As an alternative to the supplemental TOURIST INFO CENTER legend, ~~is~~ the Tourist Information  
29 (D9-10) sign (see Figure 2I-1) ~~which~~ may be appended beneath the REST AREA advance guide sign.

30 The name of the State or local jurisdiction may appear on the Advance Guide and Exit Direction tourist  
31 information/welcome center signs if the jurisdiction controls the operation of the tourist information or  
32 welcome center and the center meets the operating criteria set forth in this Manual and is consistent with State  
33 policies.

34 *Guidance:*

35 *For tourist information centers that are located off the freeway or expressway facility, additional signing*  
36 *criteria should be as follows:*

- 37 A. *Each State should adopt a policy establishing the maximum distance that a tourist information center*  
38 *can be located from the interchange in order to be included on official signs.*
- 39 B. *The location of signing should be in accordance with requirements pertaining to General Service*  
40 *signing (see Section 2I.03).*
- 41 C. *Signing along the crossroad should be installed to guide the road user from the interchange to the*  
42 *tourist information center and back to the interchange.*

43 **Option:**

44 As an alternative, the Tourist Information (D9-10) sign (see Figure 2I-1) may be appended to the guide  
45 signs for the exit that provides access to the tourist information center. As a second alternative, the Tourist  
46 Information sign may be combined with General Service signing.

47 **Figure 2I-7. Examples of Tourist Information and Welcome Center Signs**

48 **Section 2I.09 Radio Information Signing (D12-1 Series)**

49 **Option:**

50 Radio-Weather Information (D12-1) signs (see Figure 2I-8) may be used in areas where difficult driving  
51 conditions commonly result from weather systems. Radio-Traffic Information (D12-1a) signs may be used in  
52 conjunction with traffic management systems.

53 **Figure 2I-8. Radio, Telephone, and Carpool Information Signs**

1 **Standard:**

2 **Radio-Weather and Radio-Traffic Information signs shall have a white legend and border on a blue**  
3 **background. Only the numerical indication of the radio frequency shall be used to identify a station**  
4 **broadcasting travel-related weather or traffic information. No more than three frequencies shall be**  
5 **displayed on each sign. Only radio stations whose signal will be of value to the road user and who agree**  
6 **to broadcast either of the following two items shall be identified on Radio-Weather and Radio-Traffic**  
7 **Information signs:**

- 8 **A. Periodic weather warnings at a rate of at least once every 15 minutes during periods of adverse**  
9 **weather; or**  
10 **B. Driving condition information (affecting the roadway being traveled) at a rate of at least once**  
11 **every 15 minutes, or when required, during periods of adverse traffic conditions, and when**  
12 **supplied by an official agency having jurisdiction.**

13 **If a station to be considered operates only on a seasonal basis, its signs shall be removed or covered**  
14 **during the off season.**

15 *Guidance:*

16 *The radio station should have a signal strength to adequately broadcast 70 miles along the route. Signs*  
17 *should be spaced as needed for each direction of travel at distances determined by an engineering study. The*  
18 *stations to be included on the signs should be selected in cooperation with the association(s) representing*  
19 *major broadcasting stations in the area to provide: (1) maximum coverage to all road users on both AM and*  
20 *FM frequencies; and (2) consideration of 24 hours per day, 7 days per week broadcast capability.*

21 *Option:*

22 The Urgent Message When Flashing (D12-1bP) plaque may be mounted below the D12-1 or D12-1a sign  
23 if supplemented by warning beacons (see Section 4L.03) that flash only when a message related to adverse  
24 travel conditions is being broadcast.

25 In roadway rest area locations, a smaller sign using a greater number of radio frequencies, but of the same  
26 general design, may be used.

27 **Standard:**

28 **Radio-Weather and Radio-Traffic Information signs installed in rest areas shall be positioned such**  
29 **that they are not visible from the main roadway.**

30 ~~*Option:*~~

31 ~~A Channel 9 Monitored (D12-3) sign (see Figure 2I-8) may be installed as needed. Official public~~  
32 ~~agencies or their designees may be displayed as the monitoring agency on the sign.~~

33 ~~**Standard:**~~

34 ~~**Only official public agencies or their designee shall be displayed as the monitoring agency on the**~~  
35 ~~**Channel 9 Monitored sign.**~~ **This text relocated to new Section 2I.10**

36 ~~*Option:*~~

37 ~~An EMERGENCY CALL XX (D12-4) sign (see Figure 2I-8), along with the appropriate number to call,~~  
38 ~~may be used for cellular phone communications.~~ **This text relocated to new Section 2I.11**

39 **Section 2I.10 Channel 9 Monitored Sign (D12-3)** **This text relocated from existing Section 2I.09**

40 *Option:*

41 A Channel 9 Monitored (D12-3) sign (see Figure 2I-8) may be installed as needed. Official public  
42 agencies or their designees may be displayed as the monitoring agency on the sign.

43 **Standard:**

44 **Only official public agencies or their designee shall be displayed as the monitoring agency on the**  
45 **Channel 9 Monitored sign.**

46 **Section 2I.11 EMERGENCY CALL XX Sign (D12-4)**

47 *Option:*

48 An EMERGENCY CALL XX (D12-4) sign (see Figure 2I-8), along with the appropriate number to call,  
49 may be used for cellular telephone communications. **This text relocated from existing Section 2I.09 and**  
50 **revised**

1 **~~Section 2I.10~~ Section 2I.12 TRAVEL INFO CALL 511 Signs (D12-5 and, D12-5a)**

2 Option:

3 A TRAVEL INFO CALL 511 (D12-5, D12-5a) sign (see Figure 2I-8) may be installed if a 511 travel  
4 information services telephone number is available to road users for obtaining traffic, public transportation,  
5 weather, construction, or road condition information.

6 The pictograph of the transportation agency or the travel information service or program that is providing  
7 the travel information may be ~~incorporated within~~ displayed in place of the 511 pictograph on the D12-5a sign  
8 ~~either above or below~~ the TRAVEL INFO CALL 511 legend.

9 **Standard:**

10 **The logo of a commercial entity shall not be incorporated within the TRAVEL INFO CALL 511**  
11 **signs.**

12 If the pictograph of the transportation agency or the travel information service or program is used  
13 in place of the 511 pictograph on the D12-5a sign (see Paragraph 2), the maximum height of the  
14 pictograph shall not exceed the height of the 511 pictograph on the standard sign size specified for the  
15 roadway classification in Table 2H-1.

16 The TRAVEL INFO CALL 511 signs shall have a white legend and border on a blue background.

17 *Guidance:*

18 *If the pictograph of the transportation agency or the travel information service or program is used, the*  
19 *pictograph's maximum height should not exceed two times the letter height used in the legend of the sign.*

20 **Section 2I.13 Roadside Assistance Sign (D12-6)**

21 Option:

22 A Roadside Assistance (D12-6) sign (see Figure 2I-8) may be used along a highway that is served by an  
23 authorized roadside assistance program with authorized service vehicles and personnel that provide roadside  
24 vehicle repair assistance to road users free of charge.

25 **~~Section 2I.11~~ Section 2I.14 Carpool and Ridesharing Signing (D12-2)**

26 Option:

27 In areas having carpool matching services, Carpool Information (D12-2) signs (see Figure 2I-8) may be  
28 provided adjacent to highways with preferential lanes or along any other highway.

29 Carpool Information signs may include an Internet domain name or telephone number of more than  
30 four characters within the legend.

31 *Guidance:*

32 *Because this is an information sign related to road user services, the Carpool Information sign should have a*  
33 *white legend and border on a blue*

34 **Standard:**

35 **If a local transit pictograph or carpool symbol is incorporated into the Carpool Information sign,**  
36 **the maximum vertical dimension of the ~~logo~~ pictograph or symbol shall not exceed 18 inches and the**  
37 **maximum horizontal dimension shall not exceed 30 inches.**

38 **Section 2I.15 Signing for Truck Parking Availability (D9-16b through D9-16e)**

39 Option:

40 General Service signs may be used to display the number of available truck parking spaces at roadside  
41 areas such as rest areas, welcome centers, and weigh stations, and at facilities off a highway that are open to  
42 the public and provide parking for commercial vehicles 24 hours a day, seven days a week.

43 **Standard:**

44 The Truck Parking Availability General Service (D9-16b through D9-16e) sign (see Figure 2I-9)  
45 shall include a changeable message element with a white changeable legend on a black opaque  
46 background that displays only the number of parking spaces currently available at each location or the  
47 legend FULL. The upper section of the sign shall display the Truck Parking (D9-16) symbol sign and  
48 the legend SPACES OPEN. The sign shall display the number of available truck parking spaces for no  
49 more than three parking facilities. Where two lines of legend, such as the location and a distance, are  
50 displayed for a parking facility, not more than two parking facilities shall be displayed on the sign.

1 Where the truck parking facility is located off the main highway and is accessed from the crossroad,  
2 directional assemblies with the Truck Parking (D9-16) sign shall be installed along the ramp and along  
3 crossroads where the route to the facility requires a direction change, where it is questionable as to  
4 which roadway to follow, or where additional guidance is needed.

5 Support:

6 Displaying the number of parking spaces available at a facility when the number is small could result in  
7 truckers choosing to drive to a facility for parking just to find that facility full by the time they arrive.

8 Option:

9 The word FULL in a white legend may be displayed on a changeable message elements of a Truck  
10 Parking Space Availability General Service when the number of truck parking spaces available at the  
11 associated facility reaches a predetermined lower threshold.

12 Guidance:

13 Truck Parking Space Availability signs should be located three to five miles in advance of the nearest  
14 parking facility. The parking facilities displayed on the sign should be no more than 60 miles from the sign  
15 location.

16 Support:

17 Examples of Truck Parking Availability Signs are show in Figure 2I-9. Examples of uses of Truck  
18 Parking Space Availability signs are shown in Figure 2I-10.

19 **Figure 2I-9. Examples of Truck Parking Availability Signs**

20 **Figure 2I-10. Examples of Use of Truck Parking Availability Signs**

1 CHAPTER 2J. SPECIFIC SERVICE SIGNS

2 Section 2J.01 Eligibility

3 Standard:

4 Specific Service signs shall be defined as guide signs that provide road users with business  
5 identification and directional information for eligible services and ~~for eligible~~ attractions. Eligible  
6 service categories shall be limited to gas, food, lodging, camping, and attractions, ~~and 24-hour~~  
7 ~~pharmacies.~~

8 Guidance:

9 The use of Specific Service signs should be limited to areas primarily rural in character with ~~or to areas~~  
10 ~~where adequate~~ space for all signs to ~~sign spacing can be~~ properly accommodated ~~maintained.~~

11 Option:

12 Where an engineering study determines a need, Specific Service signs may be used on any class of  
13 highways, i.e. freeway, expressway, or conventional.

14 Guidance:

15 Specific Service signs should not be installed at an interchange where the road user cannot conveniently  
16 reenter the freeway or expressway and continue in the same direction of travel.

17 Standard:

18 Eligible service facilities shall comply with laws concerning the provisions of public  
19 accommodations without regard to race, religion, color, age, sex, or national origin, and laws  
20 concerning the licensing and approval of service facilities.

21 The attraction services shall include only facilities which have the primary purpose of providing  
22 amusement, historical, cultural, or leisure activities to the public.

23 ~~Distances to eligible 24-hour pharmacies shall not exceed 3 miles in any direction of an interchange~~  
24 ~~on the Federal-aid system.~~

25 Guidance:

26 Except as provided in Paragraph 98, distances to eligible services ~~other than pharmacies~~ should not  
27 exceed 3 miles in any direction.

28 Option:

29 If, within the 3-mile limit, facilities for the services being considered other than pharmacies are not  
30 available or choose not to participate in the program, the limit of eligibility may be extended in 3-mile  
31 increments until one or more facilities for the services being considered chooses to participate, or until 15  
32 miles is reached, whichever comes first.

33 ~~Guidance~~ **Standard: Guidance changed to Standard**

34 If State or local agencies elect to provide Specific Service signing, there ~~should~~ shall be a statewide  
35 policy for such signing and criteria for the availability of the various types of services.

36 Guidance:

37 The criteria for the statewide policy should consider the following:

- 38 A. To qualify for a GAS ~~logo~~ business identification sign panel, a business should have:
  - 39 1. Vehicle services including gas oline ~~and/or alternative fuels~~, oil, and water;
  - 40 2. Continuous operation at least 16 hours per day, 7 days per week for freeways and expressways,  
41 and continuous operation at least 12 hours per day, 7 days per week for conventional roads;
  - 42 3. Modern sanitary facilities and drinking water; and
  - 43 4. Public telephone.
- 44 B. To qualify for a FOOD ~~logo~~ business identification sign panel, a business should have:
  - 45 1. Licensing or approval, where required;
  - 46 2. Continuous operations to serve at least two meals per day, at least 6 days per week;
  - 47 3. Modern sanitary facilities; and
  - 48 4. Public telephone.
- 49 C. To qualify for a LODGING ~~logo~~ business identification sign panel, a business should have:
  - 50 1. Licensing or approval, where required;
  - 51 2. Adequate sleeping accommodations;

3. Modern sanitary facilities; and
  4. Public telephone.
- D. To qualify for a CAMPING ~~logo~~ business identification sign 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~~ business identification sign panel, a facility should have:
1. Regional significance, in compliance with the provisions of Paragraph 6; 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:~~

- ~~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 3 miles of an interchange on the Federal-aid system.~~

Support:

Section 2J.12 contains additional information on criteria for the statewide policy regarding signing.

Section 2I.04 contains information regarding the Interstate Oasis program.

**Section 2J.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 flow, successive Specific Service signs shall be for ~~24-hour pharmacy~~, attraction, camping, lodging, food, and gas services, in that order.

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.*

**Relocated from later in this section**

*Where a service type is displayed on two signs, the signs for that service should follow one another in succession.* **Relocated from later in this section**

**Standard:**

A Specific Service sign shall display the word message GAS, FOOD, LODGING, CAMPING, or 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~~ business identification sign panels. Distances to eligible facilities shall not be displayed on the Specific Service signs on the approach to an interchange.

A business that does not offer gasoline but offers alternative fuels shall not be signed using GAS Specific Service signs.

Option:

A business that does not offer gasoline but offers alternative fuels may be signed using General Service signs for the alternative fuel provided.

Support:

General Service signs for facilities providing alternative fuels, including Electric Vehicle Charging, Compressed Natural Gas, Liquefied Natural Gas, Liquefied Propane Gas, and Hydrogen fuel, are provided in Chapter 2I.

Specific Service signs are intended for areas primarily rural in character. When services at an interchange are abundant, this is an indication that the character of the area is no longer primarily rural and General Service signs would be more appropriate.

Guidance:

1 Due to the unique and widely varying characteristics of the services that qualify as attractions, and lesser  
2 recognition of their business identification sign panels (see Paragraph 10 ), ATTRACTION Specific Service  
3 signs should have no more than four business identification sign panels.

4 **Support:**

5 The types of services that meet the definition of attraction, i.e. those providing amusement, historical,  
6 cultural, or leisure activities to the public, vary considerably. In most cases, attractions do not include well-  
7 known services or easily recognizable logos, making it more difficult and requiring more time to distinguish  
8 between types of attractions shown on an ATTRACTION sign than for other categories of Specific Service  
9 signs.

10 **Standard:**

11 No more than three types of services shall be represented on any sign or sign assembly. If three  
12 types of services are displayed on one sign, then the ~~logo-business identification~~ sign panels shall be  
13 limited to two for each service type (for a total of six ~~logo-business identification~~ sign panels). If two  
14 types of services are displayed on one sign, then the ~~logo-business identification~~ sign panels shall be  
15 limited to either three for each service type, ~~(for a total of six logo-sign panels)~~ or four for one service  
16 type and two for the other service type (for a total of six ~~logo-business identification~~ sign panels in either  
17 case). The legend and ~~logo-business identification~~ sign panels applicable to a service type shall be  
18 displayed such that the road user will not associate them with another service type on the same sign.  
19 Other configurations or arrangements of business identification sign panels shall not be allowed.

20 No service type shall appear on more than two signs (see Paragraph 63 of this Section).

21 The signs shall have a blue background, a white border, and white legends of upper-case letters,  
22 ~~numbers~~numerals, and arrows.

23 *Guidance:*

24 ~~Where a service type is displayed on two signs, the signs for that service should follow one another in~~  
25 ~~succession.~~ **Relocated to earlier in this Section**

26 If a service type is no longer available from an interchange or intersection the sign should be removed  
27 when the business identification sign panels are removed. If a sign is to remain, but the service type is no  
28 longer available, then the service type legend should be covered so that road users do not misinterpret the  
29 sign as a General Service sign implying that the service is available.

30 No sign should be installed when a service type is not currently available from an interchange or  
31 intersection.

32 ~~The Specific Service signs should be located to take advantage of natural terrain, to have the least~~  
33 ~~impact on the scenic environment, and to avoid visual conflict with other signs within the highway right-of-~~  
34 ~~way~~ **Relocated to earlier in this Section**

35 *Option:*

36 If there is indication that a service of this type will again be available in the near future, the sign may be  
37 covered, in accordance with Paragraph 13, rather than removed.

38 Separate installations of General Service signs (see Sections 2I.02 and 2I.03) may be used in conjunction  
39 with Specific Service signs for eligible types of services that are not represented by a Specific Service sign.

40 **Support:**

41 Examples of Specific Service signs are shown in Figure 2J-1. Examples of sign locations are shown in  
42 Figure 2J-2.

43 **Figure 2J-1. Examples of Specific Service Signs**

44 **Figure 2J-2. Examples of Specific Service Sign Locations**

45 **Section 2J.03 Logos and ~~Logo~~-Business Identification Sign Panels**

46 **Standard:**

47 A business identification sign panel legend ~~logo~~ shall be either an identification ~~symbol~~/trademark  
48 or a word message of the businesses name. Each logo or word message shall be placed on a separate  
49 ~~logo-sign panel~~business identification sign panel that shall be attached to the Specific Service sign.  
50 ~~Symbols~~ Logos or trademarks used alone for a business identification sign panel ~~logo~~ shall be  
51 reproduced in the colors and general shape consistent with customary use, and any integral legend shall  
52 be in proportionate size. A logo that resembles an official traffic control device shall not be used.

1 Guidance:

2 The logo or trademark used on a business identification sign panel should be consistent with the on-  
3 premise business identification signs at the location of the business that are visible from the roadway.

4 A word message ~~logo~~business identification sign panel, not using a ~~symbol~~logo or trademark, should  
5 have a blue background with white legend and border.

6 Support:

7 Section 2J.05 contains information regarding the minimum letter heights for ~~logo sign panel~~business  
8 identification sign panels.

9 Option:

10 ~~Where business identification symbols or trademarks are used alone for a logo, the border may be omitted~~  
11 ~~from the logo sign panel.~~

12 A portion of a ~~logo sign panel~~business identification sign panel may be used to display a supplemental  
13 message horizontally along the bottom of the ~~logo sign panel~~business identification sign panel, provided that  
14 the message displays essential motorist information consistent with the service category type and related to the  
15 operation of the business- (see Figure 2J-3).

### 16 **Figure 2J-3. Examples of Supplemental Messages on Business Identification Sign Panels**

17 Standard:

18 All supplemental messages shall be displayed within the ~~logo sign panel~~business identification sign  
19 panel and shall have letters and numerals that comply with the minimum height requirements shown in  
20 Table 2J-1. Supplemental messages promoting the availability of products, amenities, or services that  
21 are not directly related to the service category and/or those not available to non-patrons of the primary  
22 service provided for the service category, such as car wash, automated teller machines, Internet,  
23 lottery, or pool, shall not be displayed on business identification sign panels.

24 Messages related to the promotion or availability of business identification sign panel space shall  
25 not be displayed on Specific Service signs.

26 Option:

27 A Supplemental message identifying an alternative fuel available may be added only to the business  
28 identification sign -panels on the GAS Specific Services sign for gasoline facilities that provide the specified  
29 alternative fuel in addition to gasoline.

### 30 **Table 2J-1. Minimum Letter and Numeral Sizes for Specific Service Signs According to Sign** 31 **Type**

32 Guidance:

33 A ~~logo~~business identification sign panel should not display more than one supplemental message.

34 The supplemental message should be displayed in a ~~color to contrast effectively with the background of~~  
35 ~~the business sign or separated from the other legend or logo by a divider bar~~black legend on a yellow  
36 background for that portion of the business identification sign.

37 State or local agencies that elect to allow supplemental messages on ~~logo~~business identification sign  
38 panels should develop a statewide policy for such messages.

39 Support:

40 Typical supplemental messages might include DIESEL, LP-GAS, 24 HOURS, CLOSED SUNDAY ~~and~~  
41 ~~the day of the week when the facility is closed, ALTERNATIVE FUELS (see Section 2I.03), and RV~~  
42 ACCESS.

43 Option:

44 ~~The RV ACCESS supplemental message may be circular.~~

45 Standard:

46 ~~If the RV ACCESS supplemental message is circular, it shall be the abbreviation RV in black letters~~  
47 ~~inside a yellow circle with a black border and it shall be displayed within the logo sign panel near the~~  
48 ~~lower right hand corner (see Figure 2J-4).~~

49 Guidance:

50 ~~If the circular RV ACCESS supplemental message is used, the circle should have a diameter of 10 inches~~  
51 ~~and the letters should have a height of 6 inches.~~

1 If a State or local agency elects to display the designation of businesses as providing on-premise  
2 accommodations for recreational vehicles with the RV ACCESS supplemental message ~~or the RV Access~~  
3 ~~ircular message~~, there should be a statewide policy for such designation and criteria for qualifying  
4 businesses. The criteria should include such site conditions as access between the public roadway and the  
5 site, on-premise geometry, and parking.

6 Option:

7 If a business designated as an Interstate Oasis (see Section 2I.04) has a business ~~logo-identification~~ sign  
8 panel on the Food and/or Gas Specific Service signs, the word OASIS may be displayed on the bottom portion  
9 of the ~~logo-sign-panel~~business identification sign panel for that business.

10 **Standard:**

11 A ~~logo-sign-panel~~business identification sign panel shall not display the ~~symbol~~identification  
12 logo/trademark or name of more than one business. A business identification sign panel shall not  
13 display more than one name or identification logo/trademark for the same business. Slogans, e.g.  
14 marketing slogans associated with the business, shall not be displayed on business identification sign  
15 panels or the Specific Service sign itself.

16 **Section 2J.04 Number and Size of Signs and Logo-Business Identification Sign Panels**

17 *Guidance:*

18 *Sign sizes should be determined by the amount and height of legend and the number and size of ~~logo-sign-~~*  
19 *~~panel~~business identification sign panels attached to the sign. All ~~logo-sign-panel~~business identification sign*  
20 *panels on a sign should be the same size.*

21 **Standard:**

22 Each Specific Service sign or sign assembly shall be limited to no more than six ~~logo-sign-~~  
23 ~~panel~~business identification sign panels.

24 Option:

25 Where more than six businesses of a specific service type are eligible for ~~logo-sign-panel~~business  
26 identification sign panels at the same interchange, additional ~~logo-sign-panel~~business identification sign panels  
27 of that same specific service type may also be displayed in accordance with the provisions of Paragraph 4.  
28 The additional ~~logo-sign-panel~~business identification sign panels may be displayed either by placing more  
29 than one specific service type on the same sign (see Paragraph ~~3-711~~ of Section 2J.02) or by using a second  
30 Specific Service sign of that specific service type if the additional sign can be added without exceeding the  
31 limit of four Specific Service signs at an interchange or intersection approach (see Paragraph ~~6-3~~ of Section  
32 2J.02).

33 **Standard:**

34 Where ~~logo-sign-panel~~business identification sign panels for more than six businesses of a specific  
35 service type are displayed at the same interchange or intersection approach, the following provisions  
36 shall apply:

- 37 A. No more than 12 ~~logo-sign-panel~~business identification sign panels of a specific service type shall  
38 be displayed on no more than two Specific Service signs or sign assemblies;
- 39 B. No more than six ~~logo-sign-panel~~business identification sign panels shall be displayed on a single  
40 Specific Service sign; and
- 41 C. No more than four Specific Service signs shall be displayed on the approach.

42 Support:

43 Section 2J.08 contains information regarding Specific Service signs for double-exit interchanges.

44 Section 2J.09 contains information regarding Specific Service signs for multiple interchanges that are  
45 accessed from collector-distributor roadways rather than from the highway mainline.

46 **Standard:**

47 Each ~~logo-sign-panel~~business identification sign panel attached to a Specific Service sign shall ~~have~~  
48 ~~a rectangular shape~~be a horizontally oriented rectangle with a width longer than the height. A ~~logo-~~  
49 ~~sign-panel~~business identification sign panel on signs for freeways and expressways shall not exceed 60  
50 inches in width and 36 inches in height (see Table 2J-2). A ~~logo-sign-panel~~business identification sign  
51 panel on signs for conventional roads and freeway and expressway ramps shall not exceed 30 inches in  
52 width and 18 inches in height (see Table 2J-2). The vertical and horizontal spacing between ~~logo-sign-~~  
53 ~~panel~~business identification sign panels shall not exceed 8 inches and 12 inches, respectively.

1 Support:

2 Sections 2A.14, 2E.15, and 2E.16 contain information regarding borders, interline spacing, and edge  
3 spacing.

4 **Table 2J-2. Maximum Business Identification Sign Panel Sizes by Roadway Classification**

5 **Section 2J.05 Size of Lettering**

6 **Standard:**

7 All Specific Service signs and ~~logo-sign panel~~business identification sign panels shall have letter and  
8 numeral sizes that comply with the minimum requirements of Table 2J-1.

9 *Guidance:*

10 Any legend on a ~~symbol~~business identification graphic/trademark should be proportional to the size of the  
11 ~~symbol~~graphic/trademark.

12 **Section 2J.06 Signs at Interchanges**

13 **Standard:**

14 The Specific Service signs shall be installed between the preceding interchange and at least 800 feet  
15 in advance of the Exit Direction sign at the interchange from which the services are available (see  
16 Figure 2J-2).

17 Specific Service signs shall not be used at freeway-to-freeway interchanges (see Section 2E.37),  
18 except where the exit ramp also provides direct access to a conventional road within that interchange.

19 *Guidance:*

20 There should be at least an 800-foot spacing between the Specific Service signs, except for Specific  
21 Service ramp signs. However, excessive spacing is not desirable.

22 Specific Service ramp signs should be spaced at least 100 feet longitudinally from beyond the Exit Gore  
23 sign, from each other, and from the ramp terminal. Specific Service ramp signs should be spaced at least 200  
24 feet longitudinally from any Destination guide signs along the ramp. Longer longitudinal spacing should be  
25 provided between Specific Service ramp signs and any warning or regulatory signs along the ramp, and any  
26 intersection traffic control devices at the ramp terminal.

27 **Section 2J.07 Single-Exit Interchanges**

28 **Standard:**

29 At numbered single-exit interchanges, the name of the service type followed by the exit number  
30 shall be displayed on one line above the ~~logo-sign panel~~business identification sign panels. At  
31 unnumbered interchanges, the directional legend NEXT RIGHT (LEFT) shall be used in place of the  
32 exit number.

33 At single-exit interchanges where traffic is allowed to turn onto the crossroad in either direction  
34 from the ramp, Specific Service ramp signs shall be installed along the ramp or at opposite the ramp  
35 terminal for facilities that have ~~logo-sign panel~~business identification sign panels displayed along the  
36 main roadway if the facilities are not readily visible from the ramp terminal. Directions to the service  
37 facilities shall be indicated by arrows on the ramp signs. ~~Logo-sign panel~~Business identification sign  
38 panels on Specific Service ramp signs shall be duplicates of those displayed on the Specific Service signs  
39 located in advance of the interchange, but shall be reduced in size (see Paragraph ~~6-74~~ of Section 2J.04).

40 *Option:*

41 Specific Service ramp signs may display distances (see Section 2A.08) to a service facility when the  
42 facility is not visible from ramp intersection with the crossroad.

43 *Guidance:*

44 ~~Specific Service ramp signs should include distances to the service facilities.~~Distances of less than 1/4 mile,  
45 when displayed, should be displayed to the nearest 1/10 mile.

46 *Option:*

47 ~~An exit number plaque (see Section 2E.31) may be used instead of the exit number on the signs located in~~  
48 ~~advance of an interchange.~~

49 **Section 2J.08 Double-Exit Interchanges**

1 *Guidance:*

2 *At double-exit interchanges, the Specific Service signs should consist of two sections, one for each exit*  
3 *(see Figure 2J-1).*

4 **Standard:**

5 **At a double-exit interchange, the top section shall display the ~~logo-sign-panel~~business identification**  
6 **sign panels for the first exit and the bottom section shall display the ~~logo-sign-panel~~business**  
7 **identification sign panels for the second exit. At numbered interchanges, the name of the service type**  
8 **and the exit number shall be displayed above the ~~logo-sign-panel~~business identification sign panels in**  
9 **each section. At unnumbered interchanges, the word message NEXT RIGHT (LEFT) and SECOND**  
10 **RIGHT (LEFT) shall be used in place of the exit number. The number of ~~logo-sign-panel~~business**  
11 **identification sign panels on the sign (total of both sections) or the sign assembly shall be limited to six.**

12 *Guidance:*

13 *At a double-exit interchange, where a service type is displayed on two Specific Service signs in*  
14 *accordance with the provisions of Section 2J.04, one of the signs should display the ~~logo-sign-panel~~business*  
15 *identification sign panels for that service type for the businesses that are accessible from one of the two exits*  
16 *and the other sign should display the ~~logo-sign-panel~~business identification sign panels for that service type*  
17 *for the businesses that are accessible from the other exit.*

18 **Option:**

19 **At a double-exit interchange where there are four ~~logo-sign-panel~~business identification sign panels to be**  
20 **displayed for one of the exits and one or two ~~logo-sign-panel~~business identification sign panels to be displayed**  
21 **for the other exit, the ~~logo-sign-panel~~business identification sign panels may be arranged in three rows with**  
22 **two ~~logo-sign-panel~~business identification sign panels per row.**

23 **At a double-exit interchange, where a service is to be signed for only one exit, one section of the Specific**  
24 **Service sign may be omitted, or a single exit interchange sign may be used. Signs on ramps and crossroads as**  
25 **described in Section 2J.07 may be used at a double-exit interchange.**

## 26 **Section 2J.09 Collector-Distributor Roadways for Successive Interchanges**

27 **Support:**

28 **Examples of guide signs for a collector-distributor roadway that provides access to multiple interchanges**  
29 **are shown in Figure 2J-4.**

30 **Guidance:**

31 **Where mainline access to successive interchanges is provided from a single collector-distributor roadway**  
32 **(see Section 2E.36), Specific Service signs, if used, should be limited to locations along the collector-**  
33 **distributor roadway in advance of each interchange in compliance with the provisions of Sections 2J.07 and**  
34 **2J.08.**

35 **If services are available from more than one of the interchanges along the collector-distributor roadway**  
36 **and those services are signed with Specific Service signs as described in Paragraph, then General Service**  
37 **signs should be used on the mainline in conformance with the provisions of Chapter 2I.**

38 **Standard:**

39 **If Specific Service signs are located on the highway mainline for an interchange that is accessed**  
40 **from a collector-distributor roadway, then additional Specific Service signs shall not be allowed along**  
41 **the collector-distributor roadway. No more than four Specific Service signs shall be displayed on a**  
42 **highway mainline approach to a collector-distributor roadway, regardless of the number of**  
43 **interchanges that are accessed from the collector-distributor roadway.**

### 44 **Figure 2J-4. Example of Signing Services from Collector-Distributor Road Signs**

## 45 **Section 2J.092J.10 Specific Service Trailblazer Signs**

46 **Support:**

47 **Specific Service trailblazer signs (see Figure 2J-5) are guide signs with one to four ~~logo-sign-~~**  
48 **~~panel~~business identification sign panels that display business identification and directional information for**  
49 **services and ~~for~~ eligible attractions. Specific Service trailblazer signs are installed along crossroads for**  
50 **facilities that have ~~logo-sign-panel~~business identification sign panels displayed along the main roadway and**  
51 **ramp, and that require additional vehicle maneuvers.**

## Figure 2J-5. Examples of Specific Service Trailblazer Signs

### Standard:

Specific Service trailblazer signs shall be installed along crossroads where the route to the business requires a direction change, where it is questionable as to which roadway to follow, or where additional guidance is needed. Where it is not feasible or practical to install Specific Service trailblazer signs to such businesses, those businesses shall not be considered eligible for signing from the ramp and main roadway. A Specific Service trailblazer sign shall not be required at the point where the business is visible from the roadway and its access is readily apparent.

### Guidance:

*If used, a Specific Service trailblazer sign should be located a maximum of 500 feet in advance of any required turn.*

### Standard:

The location of other traffic control devices shall take precedence over the location of a Specific Service trailblazer sign.

When used, each Specific Service trailblazer sign or sign assembly shall be limited to no more than four ~~logo-sign-panel~~ business identification sign panels. The ~~logo-sign-panel~~ business identification sign panels on Specific Service trailblazer signs shall be duplicates of those displayed on the Specific Service ramp signs.

Appropriate legends, such as directional arrows or the ~~word-action~~ message NEXT RIGHT or SECOND RIGHT, shall be displayed with the ~~logo-sign-panel~~ business identification sign panel to provide proper guidance. The directional legend and border shall be white and shall be displayed on a blue background.

### Option:

Specific Service trailblazer signs may contain various types of services on a single sign or on a sign assembly.

Specific Service trailblazer signs may be placed farther from the edge of the road than other traffic control signs.

## Section ~~2J.10~~ 2J.11 Signs at Intersections

### Standard:

~~Where both tourist-oriented information (see Chapter 2K) 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 both tourist-oriented information (See Chapter 2K) and specific service information are proposed to be used at the same intersection, the tourist-oriented directional and Specific Service signs should be spaced sufficiently apart from one another, as well as apart from other guide, warning and regulatory signs, to avoid confusion and allow sufficient time for road users to read and react to the information.*

### Standard:

If sufficient space to provide appropriate reading and reaction to all proposed signs is not available, priority shall be given the higher priority guide, warning and regulatory signs and either the tourist-oriented directional signs or the Specific Service signs, or both, shall not be used.

### Guidance:

*If Specific Service signs are used on conventional roads based on an engineering study (see Paragraph 3 of Section 2J.01) or at intersections on expressways, they should be installed between the previous interchange or intersection and at least 300 feet 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-sign-panel~~ Business identification sign panels should not be displayed for a type of service for which a qualified facility is readily visible.

### Standard:

1 If Specific Service signs are used on conventional roads or at intersections on expressways, the name  
2 of each type of service shall be displayed above its ~~logo-sign panel~~ business identification sign panel(s),  
3 together with an appropriate legend, such as NEXT RIGHT (LEFT) or a directional arrow, either  
4 displayed on the same line as the name of the type of service or displayed below the ~~logo-sign-~~  
5 ~~panel~~ business identification sign panel(s).

6 Option:

7 Signs similar to Specific Service ramp signs as described in Section 2J.07 may be provided on the  
8 crossroad.

9 **Section ~~2J.11~~2J.12 Signing Policy**

10 ~~Guidance~~ **Standard:** Guidance changed to Standard

11 In addition to a statewide policy for eligibility of service providers (see Section 2J.01), ~~Each~~ each  
12 highway agency that elects to use Specific Service signs ~~should~~ shall establish a signing policy.

13 Guidance:

14 The signing policy ~~that should~~ includes, ~~as at~~ a minimum, the guidelines of Section 2J.01 and at least the  
15 following criteria:

- 16 A. Selection of eligible businesses;
- 17 B. Distances to eligible services;
- 18 C. The use of ~~logo-sign panel~~ business identification sign panels, legends, and signs ~~conforming-~~  
19 complying with the provisions of this Manual and State design requirements;
- 20 D. Removal or covering of ~~logo-sign panel~~ business identification sign panels during off seasons for  
21 businesses that operate on a seasonal basis;
- 22 E. The circumstances, if any, under which Specific Service signs are permitted to be used in non-rural  
23 areas; and
- 24 F. Determination of the costs to businesses for initial permits, installations, annual maintenance, and  
25 removal of ~~logo-sign panel~~ business identification sign panels.

1 CHAPTER 2K. TOURIST-ORIENTED DIRECTIONAL SIGNS

2 Section 2K.01 Purpose and Application

3 Support:

4 Tourist-oriented directional signs are post-mounted guide signs assemblies with one or more signs panels-  
5 that display the business identification of and directional information for eligible business, service, and  
6 activity facilities.

7 Standard:

8 A facility shall be eligible for tourist-oriented directional signs only if it derives its major portion of  
9 income or visitors during the normal business season from road users not residing in the area of the  
10 facility.

11 Option:

12 Tourist-oriented directional signs may include businesses involved with seasonal agricultural products.

13 Standard:

14 ~~When used,~~ The use of tourist-oriented directional signs shall be ~~used only on~~ limited to rural  
15 highways (see definition in Section 1C.02)-conventional roads, and Tourist-oriented directional signs  
16 shall not be used installed on conventional roads in urban or urbanized areas or at interchanges on  
17 freeways or expressways main roadways or ramps.

18 ~~Where both tourist-oriented directional signs and Specific Service signs (see Chapter 2J) would be~~  
19 ~~needed at the same intersection, the tourist-oriented directional signs shall incorporate the needed~~  
20 ~~information from, and be used in place of, the Specific Service signs.~~

21 Option:

22 Tourist-oriented directional signs may be used in conjunction with General Service signs (see Section  
23 2I.02).

24 Support:

25 Section 2K.07 contains information on the adoption of a State policy for States that elect to use tourist-  
26 oriented directional signs.

27 Section 2K.02 Design

28 Standard:

29 Tourist-oriented directional signs assemblies shall have one or more signs panels ~~(see Figure 2K-1)~~  
30 for the purpose of displaying the business identification of and directional information for eligible  
31 facilities. Each sign ~~panel~~ shall be rectangular in shape and shall have a white legend and border on a  
32 blue background.

33 The content of the legend on each sign ~~panel~~ shall be limited to the identification and directional  
34 information for no more than one eligible business, service, or activity facility. The legends shall not  
35 include promotional advertising.

36 Guidance:

37 Each sign ~~panel~~ should have a maximum of two lines of legend including no more than one symbol ~~(see~~  
38 Paragraph 4 of this Section), a separate directional arrow, and the distance to the facility displayed beneath  
39 the arrow. Arrows pointing to the left or up should be at the extreme left of the sign panel. Arrows pointing  
40 to the right should be at the extreme right of the sign panel. Symbols, when used, should be to the left of the  
41 word legend or ~~logo~~ business identification sign panel (see Paragraph ~~79~~ of this Section).

42 Option:

43 The General Service sign symbols (see Section 2I.02) and the symbols for recreational and cultural  
44 interest area signs (see Chapter 2M)- may be used on tourist-oriented directional signs.

45 Based on engineering judgment, the hours of operation may be displayed on the sign ~~panels~~. **Relocated**  
46 **from later in this Section**

47 ~~Logo sign panel~~ Business identification sign panels (see Section 2J.03) for specific businesses, services,  
48 and activities may also be used in place of word legends on tourist-oriented direction signs. ~~Based on~~  
49 ~~engineering judgment the hours of operation may be displayed on the sign panels~~. **Relocated earlier in this**  
50 **Section**

1 **Standard:**

2 When used, recreational and cultural interest area symbols shall be white on a brown background.

3 When used, symbols ~~and logo sign panels~~ shall be an appropriate size (see Section 2K.04). Business  
4 identification sign panels shall not exceed 24 inches in width and 15 inches in height. Logos resembling  
5 official traffic control devices shall not be permitted.

6 Option:

7 The ~~tourist-oriented directional sign may display the~~ word message TOURIST ACTIVITIES may be  
8 displayed at the top of the tourist-oriented directional sign assembly.

9 **Standard:**

10 The TOURIST ACTIVITIES word message shall have a white legend in all upper-case letters and a  
11 white border on a blue background. If used, it shall be placed above and in addition to the directional  
12 signs ~~panels~~.

13 Support:

14 Examples of tourist-oriented directional signs are shown in Figures 2K-1 and 2K-2.

15 **Figure 2K-1. Examples of Tourist-Oriented Directional Signs**

16 **Figure 2K-2. Examples of Intersection Approach Signs and Advance Signs for Tourist-**  
17 **Oriented Directional Signs**

18 **Section 2K.03 Style and Size of Lettering**

19 *Guidance:*

20 All letters and numbers on tourist-oriented directional signs, except on the ~~logo sign panel~~business  
21 identification sign panels, should be upper-case and at least 6 inches in height. Any legend on a ~~logo~~business  
22 identification sign panel should be proportional to the size of the ~~logo~~business identification sign panel.

23 **Standard:**

24 Design standards for letters, numerals, and spacing shall be as provided in the “Standard Highway  
25 Signs ~~and Markings~~” ~~book~~publication (see Section 1A.11).

26 **Section 2K.04 Arrangement and Size of Signs**

27 **Standard:**

28 The ~~size~~ total height of athe tourist-oriented directional signs in a sign assembly shall be limited to a  
29 maximum ~~height~~ of 6 feet. Additional height shall be allowed to accommodate the addition of the  
30 optional TOURIST ACTIVITIES message provided in Section 2K.02 and the action messages provided  
31 in Section 2K.05.

32 *Guidance:*

33 The number of intersection approach signs ~~assemblies~~ assemblies (one sign assembly for tourist-oriented destinations  
34 to the left, one for destinations to the right, and one for destinations straight ahead) installed in advance of an  
35 intersection should not exceed three. The number of signs ~~panels~~ installed ~~on~~in each ~~sign~~assembly should  
36 not exceed ~~four~~ three. The signs ~~panels~~ for right-turn, left-turn, and straight-through destinations should be  
37 on separate signs ~~assemblies~~. The left-turn destination sign assembly should be located farthest from the  
38 intersection, then the right-turn destination sign assembly, with the straight-through destination sign assembly  
39 located closest to the intersection (see Figure 2K-2). Signs for facilities in the straight-through direction  
40 should be considered only when there are signs for destinations in either the left or right direction.

41 If it has been determined to be appropriate to combine the left-turn and right-turn destination signs ~~panels~~  
42 on a single sign assembly, the left-turn destination signs ~~panels~~ should be above the right-turn destination  
43 signs ~~panels~~ (see Figure 2K-1). When there are multiple destinations in the same direction, they should be in  
44 order based on their distance from the intersection. Except as provided in Paragraph 5, a straight-through  
45 sign ~~panel~~ should not be combined ~~with~~in a sign assembly displaying left- and/or right-turn destinations.

46 The signs ~~panels~~ should not exceed the size necessary to accommodate two lines of legend without  
47 crowding. Symbols ~~and logo sign panels~~ on a directional sign ~~panel~~ should not exceed the height of two lines  
48 of a word legend. All directional signs ~~panels~~ and other parts of the sign assembly should be the same width,  
49 which should not exceed 6 feet.

50 Option:

1 At intersection approaches where three or fewer facilities are displayed, the left-turn, right-turn, and  
2 straight-through destination sign panels may be combined on the same sign.

### 3 **Section 2K.05 Advance Signs**

4 *Guidance:*

5 *Advance signs should be limited to those situations where sight distance, intersection vehicle maneuvers,*  
6 *or other vehicle operating characteristics require advance notification of the destinations and their directions.*

7 *The design of the advance sign should be identical to the design of the intersection approach sign.*

8 *However, the directional arrows and distances to the destinations should be omitted and the action messages*  
9 *NEXT RIGHT, NEXT LEFT, or AHEAD should be placed on the sign above the business identification signs-*  
10 *panels. The action messages should have the same letter height as the other word messages on the directional*  
11 *signs panels (see Figures 2K-1 and 2K-2).*

12 **Standard:**

13 **The action message signs panels shall have a white legend in all upper-case letters and a white**  
14 **border on a blue background.**

15 *Option:*

16 The legend RIGHT 1/2 MILE or LEFT 1/2 MILE may be used on advance signs assemblies when there  
17 are intervening minor roads.

18 The height required to add the directional word messages recommended for the advance sign assembly  
19 may be added to the maximum sign height of 6 feet.

20 *Guidance:*

21 *The optional TOURIST ACTIVITIES message, when used on an advance sign assembly, and the action*  
22 *message should be combined on a single sign panel with TOURIST ACTIVITIES as the top line and the action*  
23 *message as the bottom line (see Figure 2K-2).*

### 24 **Section 2K.06 Sign Locations**

25 *Guidance:*

26 *If used, the intersection approach signs should be located at least 200 feet in advance of the intersection.*  
27 *Signs assemblies should be spaced at least 200 feet apart and at least 200 feet from other traffic control*  
28 *devices.*

29 *If used, advance signs should be located approximately 1/2 mile from the intersection with 500 feet*  
30 *between these signs assemblies. In the direction of travel, the order of advance sign placement should be to*  
31 *show the destinations to the left first, then destinations to the right, and last, the destinations straight ahead.*

32 *Position, height, and lateral offset of signs assemblies should be governed by Chapter 2A except as*  
33 *permitted in this Section.*

34 *Option:*

35 Tourist-oriented directional signs may be placed farther from the edge of the road than other traffic  
36 control signs.

37 **Standard:**

38 **The location of other traffic control devices shall take precedence over the location of tourist-**  
39 **oriented directional signs.**

### 40 **Section 2K.07 State Policy**

41 **Standard:**

42 **To be eligible for tourist-oriented directional signing, facilities shall comply with applicable State**  
43 **and Federal laws concerning the provisions of public accommodations without regard to race, religion,**  
44 **color, age, sex, or national origin, and with laws concerning the licensing and approval of service**  
45 **facilities. Each State that elects to use tourist-oriented directional signs shall adopt a policy that**  
46 **complies with these provisions.**

47 *Guidance:*

48 *The State policy should include:*

49 *A. A definition of tourist-oriented business, service, and activity facilities.*

50 *B. Eligibility criteria for signs for facilities.*

- 1 C. ~~Provision for incorporating Specific Service signs into the tourist-oriented directional signs as~~  
2 ~~required by Paragraph 5 of Section 2K.01.~~  
3 D. Provision for covering signs during off seasons for facilities operated on a seasonal basis.  
4 E. Provisions for signs to facilities that are not located on the crossroad when such facilities are eligible  
5 for signs.  
6 F. A definition of the immediate area in compliance with the provisions of Paragraph 2 of Section 2K.01.  
7 G. Maximum distances to eligible facilities. The maximum distance should be 5 miles.  
8 H. Provision for information centers (plazas) when the number of eligible sign applicants exceeds the  
9 maximum permissible number of sign panel installations.  
10 I. Provision for limiting the number of signs when there are more applicants than the maximum number  
11 of signs permitted.  
12 J. Criteria for use at intersections on expressways.  
13 K. Provisions for controlling or excluding those businesses which have illegal signs as defined by the  
14 Highway Beautification Act of 1965 (23 U.S.C. 131).  
15 L. Provisions for States to charge fees to cover the cost of signs through a permit system.  
16 M. A definition of the conditions under which the time of operation is displayed.  
17 N. Provisions for determining if advance signs will be permitted, and the circumstances under which  
18 they will be installed.

## CHAPTER 2L. CHANGEABLE MESSAGE SIGNS

### Section 2L.01 Description of Changeable Message Signs

Support:

A changeable message sign (CMS) is a traffic control device that is capable of displaying one or more alternative messages. Some changeable message signs have a blank mode when no message is displayed, while others display multiple messages with only one of the messages displayed at a time (such as OPEN/CLOSED signs at weigh stations).

The provisions in this Chapter apply to both permanent and portable changeable message signs with electronic displays or the electronic display portion of an otherwise conventional static sign. Additional provisions that only apply to portable changeable message signs can be found in Section ~~6F.606~~L.05. The provisions in this Chapter generally do not apply to changeable message signs with non-electronic displays that are changed either manually or electromechanically, such as a hinged-panel, rotating-drum, or back-lit curtain or scroll CMS.

The CMS is a traffic control device at all times regardless of the type of message being displayed. Accordingly, the limitations on design, format and manner of displayed of a message conveyed on a traffic control device apply to changeable message signs regardless of the type of message being displayed at any given time. Some of the general provisions regarding traffic control devices are reiterated in this Chapter. However, this Chapter is not an independent or stand-alone reference for changeable message signs. Users of Chapter 2L are expected to consult the other chapters in this Manual for criteria on how to develop effective messages that comply with this Manual and meet the expectancy and limitations of the road user. In this regard, the engineering processes applied to decisions about whether to use a particular sign, for example, are no different for the decisions about the type and content of the message under consideration for display on a changeable message sign. The other limited use messages allowed on CMS as provided for in this chapter likewise fall under the same MUTCD provisions as the primary use traffic operation regulatory, warning and guidance messages except as stated otherwise in this chapter.

**Standard:**

~~Except as provided in Paragraph 2 of Section 2L.02, changeable message signs shall display only traffic operational, regulatory, warning, and guidance information. Advertising messages shall not be displayed on changeable message signs or its supports or other equipment.~~ **Relocated to 2L.02**

The design of legends for non-electronic display changeable message signs shall comply with the provisions of Chapters 2A through 2K, 2M, and 2N of this Manual. ~~All o~~Other changeable message signs shall comply with the design and application principles established in this Chapter, ~~and in Chapter 2A, and provisions elsewhere in this Manual for specific signs.~~

No items other than inventory or maintenance-related information (see Section 2A.05) shall be displayed on the front or back of a CMS or portable CMS. Names or logos of the manufacturer, brand, or model shall not be displayed on a CMS or portable CMS, either in the message display itself or on the exterior housing.

*Guidance:*

*Blank-out signs that display only single-phase, predetermined electronic-display legends that are limited by their composition and arrangement of pixels or other illuminated forms in a fixed arrangement (such as a blank-out sign indicating a part-time turn prohibition, a blank-out or changeable lane-use sign, or a changeable OPEN/CLOSED sign for a weigh station) should comply with the provisions of the applicable Section for the specific type of sign, provided that the letter forms, symbols, and other legend elements are duplicates of the static messages as detailed in the “Standard Highway Signs ~~and Markings~~” book publication (see Section 1A.11). Because such a sign is effectively an illuminated version of a static sign, the size of its legend elements, the overall size of the sign, and placement of the sign should comply with the applicable provisions for the static version of the sign.*

### Section 2L.02 Applications of Changeable Message Signs

**Standard:** **Relocated from 2L.01 and revised**

~~Except as provided in Paragraph 2 of Section 2L.02, e~~Changeable message signs shall display only traffic operational, regulatory, warning, and guidance information except as otherwise provided for in this chapter. Advertising or other messages shall not related to traffic control shall not be displayed on changeable message signs or its supports or other equipment. **Relocated from 2L.01 and revised**

1 Option:

2  
3 Changeable message signs may ~~be used by State and local agencies to~~ display traffic safety campaign  
4 messages (as a supporting element of a broader safety campaign), transportation-related messages, emergency  
5 homeland security messages, and America’s Missing: Broadcast Emergency Response (AMBER) alert  
6 messages, all as provided for in this Chapter. Relocated and revised from later in this section.

7 Guidance:

8 CMS should not be used in place of static guide signs for conditions that do not change, except for blank-  
9 out type signs used to display regulatory, warning, and guidance information that routinely reoccurs but only  
10 on a part-time basis. Similarly, when only certain elements of a message on a non-changeable sign is subject  
11 to change, only those elements of the sign should be in an electronic display, for example the prices shown on  
12 the R3-48 and R3-48a signs (see Figure 2G-17).

13 Support:

14 The purpose of Changeable message signs is to provide real-time traffic regulatory, warning or guidance  
15 messages as follows~~have a large number of applications including, but not limited to, the following:~~

- 16 A. Incident management and route diversion
- 17 B. Warning of adverse ~~weather~~ roadway conditions due to weather
- 18 C. Special event applications associated with traffic control or conditions
- 19 ~~D. Control at crossing situations-~~
- 20 ~~E~~D. Lane, ramp, and roadway control
- 21 ~~F~~E. Priced or other types of managed lanes
- 22 ~~G~~F. Travel times
- 23 ~~H~~G. Warning situations
- 24 ~~I~~H. Traffic regulations
- 25 ~~J~~I. Speed control
- 26 ~~K~~J. Destination guidance

27 CMS provide significant flexibility and capability in communicating many types of real-time traffic  
28 control messages to road users. While their intended purpose is the display of traffic regulatory, warning, or  
29 guidance information, other limited uses are also allowed under certain conditions, as provided in this  
30 Chapter. Their integrity as an official traffic control device rests significantly on their judicious use and  
31 proper messaging format and content, regardless of the message type being displayed.

32 Option:

33 ~~Changeable message signs may be used by State and local highway agencies to display safety messages,~~  
34 ~~transportation related messages, emergency homeland security messages, and America’s Missing: Broadcast~~  
35 ~~Emergency Response (AMBER) alert messages. Relocated to earlier in this section~~

36 Standard ~~Guidance:~~

37 State and local highway agencies that have permanently installed or positioned CMS shall  
38 issue~~develop and establish and maintain~~ a policy regarding the use and the display of all the types of  
39 messages to be used on their CMS~~provided in Paragraph 2.~~ The policy shall define the types of  
40 messages that will be allowed, the priority of messages, the proper syntax of messages, the timing of  
41 messages, and other important messaging elements to ensure messages displayed meet the basic  
42 principles that govern the design and use of traffic control devices in general (see Section 1D.01) and  
43 traffic signs in particular as provided for in this Manual. Changed from Guidance to Standard and  
44 revised

45 Guidance:

46 State and local agencies that use CMS but do not have permanently installed or positioned signs should  
47 develop and establish a policy as discussed in the preceding paragraph.

48 When changeable message signs are used at multiple locations to address a specific situation, the  
49 message displays should be consistent along the roadway corridor and adjacent corridors, which might  
50 necessitate coordination among different operating agencies.

51 AMBER alerts, when displayed, should not pre-empt messages related to traffic or travel conditions.  
52 AMBER alert messages should be kept as brief as possible and display only that information which will direct  
53 road users to another source, such as broadcast or highway advisory radio, for detailed information about the

1 alert. Other information, such as detailed descriptions of persons, vehicles, or license plate numbers, should  
2 not be displayed in an AMBER alert message on a CMS.

3 **Standard:**

4 **Other types of “alert” messages that are unrelated to traffic or travel conditions shall not be**  
5 **displayed on CMS.**

6 **Support:**

7 Examples of traffic safety campaign messages include “FASTEN SEAT BELTS ~~BUCKLED?~~ FINE +  
8 POINTS” and “~~DON’T DRINK AND DRIVE~~ IMPAIRED DRIVERS LOSE LICENSE + JAIL.” Examples  
9 of transportation-related messages include “STADIUM EVENT SUNDAY, ~~EXPECT~~ DELAYS NOON TO 4  
10 PM” and “OZONE ALERT ~~CODE RED~~—USE TRANSIT.”

11 **Guidance:**

12 When a CMS is used to display a traffic safety campaign or ~~transportation~~-transportation-related  
13 message, the message should be simple, brief, legible, and clear (see Section 1D.01). A CMS should not be  
14 used to display a traffic safety campaign or transportation-related message if doing so ~~would~~ could adversely  
15 affect respect for the sign. “CONGESTION AHEAD” or other overly simplistic or vague messages should not  
16 be displayed alone. These messages should be supplemented with a message on the location or distance to the  
17 congestion or incident, delay and travel time, alternative route, or other similar messages.

18 When displayed, traffic safety campaign and transportation-related messages should be simple and direct  
19 (see Section 1D.01). Traffic safety campaign messages should emphasize the applicable regulation or  
20 warning and reference any penalties associated with violations of the regulation. Messages with obscure or  
21 secondary meanings, such as those with popular culture references, unconventional sign legend syntax, or  
22 that are intended to be humorous, should not be used as they may be misunderstood or understood only by a  
23 limited segment of road users and require greater time to process and understand. Similarly, slogan-type  
24 messages and the display of statistical information should not be used.

25 Traffic safety campaign and transportation-related messages should be relevant to the road user on the  
26 roadway on which the message is displayed. For example, messages regarding school bus-stop safety should  
27 not be displayed on freeways where school bus stops are not found.

28 **Standard:**

29 ~~When a CMS is used to display a safety, transportation-related, emergency homeland security, or~~  
30 ~~AMBER alert message, the display~~ **The format of CMS displays shall not be of a type that could be**  
31 **considered similar to advertising or promotional displays.**

32 **Traffic safety campaign messages shall not be displayed on CMS unless they are part of an active,**  
33 **coordinated safety campaign that uses other media forms as the primary means of outreach.**

34 **Guidance:**

35 Traffic safety campaigns using CMS should include coordinated enforcement efforts where penalties or  
36 enforcement type warnings are part of the message displayed on the CMS.

37 **Support:**

38 In times of a declared state of emergency, it might be appropriate to display messages related to  
39 evacuation, homeland security or emergency information. Traffic patterns, movement or other situations  
40 might be atypical due to the emergency, necessitating unique messaging not specifically related to traffic  
41 conditions.

42 **Standard:**

43 **Homeland security and emergency messages shall only be displayed in declared states of emergency**  
44 **when there is an imminent threat to the general population. Generic security or personal safety**  
45 **messages shall not be displayed when there is no context of a declared state of emergency or known**  
46 **imminent national security threat. Homeland security and emergency messages shall not be**  
47 **promotional or advisory in nature, including the message design, layout or manner of display.**

48 **Guidance:**

49 Homeland Security and emergency messages should undergo significant levels of scrutiny prior to being  
50 approved for broadcast to ensure accuracy and consistency with emergency conditions. These messages  
51 should be designed to convey a clear and simple meaning in a similar format to traffic control messages.

52 **Support:**

1 Section 2B.13~~22~~ contains information regarding the design of changeable message signs that are used to  
2 display variable speed limits that change based on ambient or operational conditions, ~~or that display the speed~~  
3 ~~at which approaching drivers are traveling on the variable Speed Limit (R2-1) sign.~~

4 Section 2C.13 contains information regarding the design of changeable message signs that are used to  
5 display the speed at which approaching drivers are traveling on the Driver Speed Feedback (W13-20, W13-  
6 20aP) sign and plaque.

7 Section 2H.03 contains information regarding the design of changeable message signs that are used to  
8 display variable speeds for traffic signal progression on the Traffic Signal Speed (I1-1) sign.

### 9 **Section 2L.03 Legibility and Visibility of Changeable Message Signs**

10 Support:

11 The maximum distance at which a driver can first correctly identify letters and words on a sign is called  
12 the legibility distance of the sign. Legibility distance is affected by the characteristics of the sign design and  
13 the visual capabilities of drivers. Visual capabilities, and thus legibility distances, vary among drivers.

14 For the more common types of changeable message signs, the longest measured legibility distances on  
15 sunny days occur during mid-day when the sun is overhead. Legibility distances are much shorter when the  
16 sun is behind the sign face, when the sun is on the horizon and shining on the sign face, or at night.

17 Visibility is the characteristic that enables a CMS to be seen. Visibility is associated with the point where  
18 the CMS is first detected, whereas legibility is the point where the message on the CMS can be read.  
19 Environmental conditions such as rain, fog, and snow impact the visibility of changeable message signs and  
20 can reduce the available legibility distances. During these conditions, there might not be enough viewing time  
21 for drivers to read the message.

22 *Guidance:*

23 *Changeable message signs used on roadways with speed limits of 55 mph or higher should be visible from*  
24 *1/2 mile under both day and night conditions. The message should be designed to be legible from a minimum*  
25 *distance of 600 feet for nighttime conditions and 800 feet for normal daylight conditions. When*  
26 *environmental conditions that reduce visibility and legibility are present, or when the legibility distances*  
27 *stated in the previous sentences in this paragraph cannot be practically achieved, messages composed of*  
28 *fewer units of information should be used and consideration should be given to limiting the message to a*  
29 *single phase (see Section 2L.05 for information regarding the lengths of messages displayed on changeable*  
30 *message signs).*

31 The electronic display of standardized regulatory and warning signs used individually or as part of the  
32 legend for a larger sign should meet the size and legend requirements for those specific signs in Chapters 2B  
33 and 2C of this Manual.

### 34 **Section 2L.04 Design Characteristics of ~~Changeable Messages Signs~~**

35 Standard:

36 Except as provided in Paragraph 2, ~~Changeable messages signs~~ shall not include ~~advertising,~~  
37 animation, ~~flashing, rapid flashing,~~ dissolving, exploding, scrolling, or other dynamic ~~display~~ elements.

38 Support:

39 ~~Section 6F.61 contains information regarding the use of arrow boards that use flashing or sequential~~  
40 ~~displays for lane closures.~~

41 When a portable CMS is used as an arrow board that uses a flashing or sequential display for a lane  
42 or shoulder closure, the display and operation shall be considered that of an arrow board and shall  
43 comply with the provisions of Section 6F.61.

44 *Guidance:*

45 In developing messages for display on changeable message signs, the provisions of Section 1D.01 should  
46 be consulted for the principles of an effective traffic control device.

47 Standard:

48 All message displays on CMS, whether for traffic operational regulatory, warning or guidance  
49 information, or for the other allowable message types as defined in this section, shall follow the same  
50 design and display principles found in the MUTCD used for other traffic control signs, except as  
51 provided elsewhere in this chapter.

52 *Guidance:*

1 Except in the case of a limited-legend CMS (such as a blank-out or ~~electronic display changeable~~  
2 ~~message~~ part-time regulatory sign display) that is used in place of a static regulatory sign or an activated  
3 blank-out warning sign that supplements a static warning sign at a separate location, ~~the changeable message~~  
4 signs should be used as a supplement to and not as a substitute for conventional signs and markings unless  
5 otherwise provided for in this Manual.

6 Support:

7 When CMS are overused for messages not directly associated with real-time driving conditions, road  
8 users may pay less attention the sign thereby limiting its effectiveness as a traffic control device. Instead of  
9 limiting the use of such messages, some agencies have gone to other means in an attempt to draw attention  
10 back to the signs when the signs are displaying real-time driving conditions.

11 Guidance:

12 Warning beacons should not be installed on CMS for the purpose of drawing attention to certain types of  
13 messages over others. Instead, CMS should be used predominately to display messages that are critical to  
14 real-time travel conditions.

15 CMS word messages should be limited to no more than three lines, with no more than 20 characters per  
16 line.

17 The spacing between characters in a word should be between 25 ~~to~~ and 40 percent of the letter height.  
18 The spacing between words in a message should be between 75 and 100 percent of the letter height. Spacing  
19 between the message lines should be between 50 and 75 percent of the letter height. See Table 2L-1 for  
20 spacing between characters, words, and lines of text.

21 Except as provided in Paragraph 18 of this Section, and in Paragraph 5 of Section 2L.01, word messages  
22 on changeable message signs should be composed of all upper-case letters. The minimum letter height should  
23 be 18 inches for changeable message signs on roadways with speed limits of 45 mph or higher. The minimum  
24 letter height should be 12 inches for changeable message signs on roadways with speed limits of less than 45  
25 mph. When a message is composed of two phases and higher informational load (see Section 2L.05), the  
26 letter height should be 18 inches, regardless of the speed limit, to optimize legibility distance and available  
27 viewing time.

28 **Table 2L-1. Spacing Between Characters, Words and Lines of Text**

29 Support:

30 Using letter heights of more than 18 inches will not result in proportional increases in legibility distance.

31 Guidance:

32 The width-to-height ratio of the sign characters should be between 0.7 and 1.0. The stroke width-to-  
33 height ratio should be 0.2.

34 Support:

35 The width-to-height ratio is commonly accomplished using a minimum font matrix density of five pixels  
36 wide by seven pixels high.

37 **Standard:**

38 **Changeable message signs shall automatically adjust their brightness under varying light conditions**  
39 **to maintain legibility.**

40 Guidance:

41 The luminance of changeable message signs should meet industry criteria for daytime and nighttime  
42 conditions. Luminance contrast should be between 8 and 12 for all conditions.

43 Contrast orientation of changeable message signs should always be positive, that is, with luminous  
44 characters on a dark or less luminous background.

45 Support:

46 Legibility distances for negative-contrast changeable message signs are likely to be at least 25 percent  
47 shorter than those of positive-contrast messages. In addition, the increased light emitted by negative-contrast  
48 changeable message signs has not been shown to improve detection distances and might visually overwhelm  
49 the darker characters of the sign legend.

50 **Standard:**

51 **The colors used for the legends and backgrounds on changeable message signs shall be as provided**  
52 **in Table 2A-2.**

1 **Guidance:** **Changed from Guidance to Standard and revised**

2 If a black background is used, the color used for the legend on a changeable message sign ~~should~~  
3 **shall** match the background color that would be used on a standard sign for that type of legend as  
4 specified in Table 2A-2 ~~such as white for regulatory, yellow for warning, orange for temporary traffic~~  
5 ~~control, red for stop or yield, fluorescent pink for incident management, and fluorescent yellow-green for~~  
6 ~~bicycle, pedestrian, and school warning.~~

7 **Standard:**

8 If a green background is used for a guide message on a CMS or if a blue background is used for a  
9 motorist services message on a CMS, the background color shall be provided by green or blue lighted  
10 pixels such that the entire CMS would be lighted, not just the white legend.

11 Support:

12 Some CMS that employ newer technologies have the capability to display ~~an a near exact~~-duplicate of a  
13 standard sign or other sign legend using standard symbols, the Standard Alphabets and letter forms, route  
14 shields, and other typical sign legend elements with no apparent loss of resolution or recognition to the road  
15 user when compared with a static version of the same sign legend. Such signs are of the full-matrix type and  
16 can typically display full-color legends. ~~Use of such technologies for new CMS is encouraged for greater~~  
17 ~~legibility of their displays and enhanced recognition of the message as it pertains to regulatory, warning, or~~  
18 ~~guidance information~~ Figure 2L-1 shows comparative examples of the effects of varying pixel densities on  
19 legend form.

20 *Guidance:*

21 *If used, the CMS described in the preceding paragraph should not display symbols or route shields unless*  
22 *they can do so in the appropriate legend and background color combinations. Where an LED matrix is used*  
23 *to form the changeable legend, signs with pixel spacing greater than 20mm should display only word legends*  
24 *and no symbols or route shields.*

25 *For a single-phase message where the Standard Alphabets and other legend elements of standard designs*  
26 *are used, the lettering style, size, and line spacing should comply with the applicable provisions for the type of*  
27 *message displayed as provided elsewhere in this Manual. For two-phase messages, larger legend heights*  
28 *should be used as described previously in this Section because of the need for such messages to be legible at a*  
29 *greater distance. Regardless of the number of phases, the CMS should comply with the legibility and visibility*  
30 *provisions of Section 2L.03.*

31 **Figure 2L-1. Example of Acceptable Message Layout on Full-Matrix Color and Monochrome**  
32 **CMS Displays**

33 **Section 2L.05 Message Length and Units of Information**

34 *Guidance:*

35 *The maximum length of a message should be dictated by the number of units of information contained in*  
36 *the message, in addition to the size of the CMS. A unit of information, which is a single answer to a single*  
37 *question that a driver can use to make a decision, should not be more than four words.*

38 Support:

39 In order to illustrate the concept of units of information, Table 2L-1 shows an example message that is  
40 comprised of four units of information.

41 The maximum allowable number of units of information in a CMS message is based on the principles  
42 described in this Section, the current highway operating speed, the legibility characteristics of the CMS, and  
43 the lighting conditions.

44 **Standard:**

45 Each message shall consist of no more than two phases. A phase shall consist of no more than three  
46 lines of text. Each phase shall be understood by itself, and the meaning of the entire message shall be  
47 the same, regardless of the sequence in which it is read. ~~Messages shall be centered within e~~  
48 legend shall be centered on the sign. Except for signs located on toll plaza structures or other facilities  
49 with a similar booth-lane arrangement, if more than one CMS is visible to road users, then only one  
50 sign shall display a sequential message at any given time.

51 ~~Techniques of message display such as fading, rapid flashing, exploding, dissolving, or moving~~  
52 ~~messages shall not be used. The text of the message shall not scroll or travel horizontally or vertically,~~  
53 ~~across the face of the sign.~~ **Covered elsewhere in the MUTCD**

1 **Abbreviations displayed on CMS shall comply with the provisions of Section 1A.15. Relocated and**  
2 **modified from Guidance below - provisions of referenced section are Standard**

3 *Guidance:*

4 *When designing and displaying messages on changeable message signs, the following principles ~~relative~~*  
5 *~~to message design~~ should be used:*

- 6 A. *The minimum time that an individual phase is displayed should be based on 1 second per word or 2*  
7 *seconds per unit of information, whichever produces a lesser value. The display time for a phase*  
8 *should never be less than 2 seconds.*
- 9 B. *The maximum cycle time of a two-phase message should be 8 seconds.*
- 10 C. *The duration between the display of two phases should not exceed 0.3 seconds.*
- 11 D. *No more than three units of information should be displayed ~~in on a message phase of a message.~~*
- 12 E. *No more than four units of information should be in a message when the traffic operating speeds are*  
13 *35 mph or more.*
- 14 F. *No more than five units of information should be in a message when the traffic operating speeds are*  
15 *less than 35 mph.*
- 16 G. *Only one unit of information should appear on each line of the CMS.*
- 17 ~~H. *Compatible units of information should be displayed on the same message phase.*~~ **Covered in P4**  
18 **above**

19 *Support:*

20 [Table 2L-2 provides an example of the number of units of information in a message.](#)

21 **Table 2L-2. Examples of Units of Information**

22 *Option:*

23 A unit of information consisting of more than one word may be displayed on more than one line. An  
24 additional changeable message sign at a downstream location may be used for the purpose of allowing the  
25 entire message to be read twice.

26 *Guidance:*

27 If more than two phases would be needed to display the necessary information, additional changeable  
28 message signs ~~may~~ should be used to display this information as a series of two distinct, independent messages  
29 with a maximum of two phases at each location, in accordance with the provisions of Paragraph 4 [of this](#)  
30 [Section](#).

31 ~~When the message on a CMS includes an abbreviation, the provisions of Section 1A.15 should be~~  
32 ~~used.~~ **Relocated and changed to a Standard above**

33 *Support:*

34 [Table 2L-3 and Table 2L-4 provide examples of message construction for changeable message signs.](#)  
35 [Each example shows the message content, layout, and phasing for a potential message and an improved](#)  
36 [message. The improved message for each example has been optimized for recognition, comprehension, and](#)  
37 [effectiveness.](#)

38 **Table 2L-3. Examples of Message Construction on CMS**

39 **Table 2L-4. Examples of Message Construction on Portable CMS**

40 **[Section 2L.06 Frequency of Display of Messages](#)**

41 *Support:*

42 [Overuse of certain types of traffic control devices can result in a reduction of their effectiveness \(see Section](#)  
43 [2A.04\) due to habituation, a phenomenon by which repeated exposure to a stimulus results in diminished](#)  
44 [response. With respect to signs, habituation can occur through repeated exposure to a message, especially](#)  
45 [those messages that might not be perceived as having relevance to the road user, resulting in diminished](#)  
46 [responsiveness of the road user to that sign or message. Because messages can be changed or extinguished,](#)  
47 [the effectiveness of changeable message signs is tied more to the messages displayed thereon, the frequency](#)  
48 [of displayed messages, and the relevance to the road user, rather than to the installation of the signs](#)  
49 [themselves.](#)

50 *Guidance:*

51 [Changeable message signs should be used judiciously to avoid habituation and preserve their](#)  
52 [effectiveness during the display of real-time messages about traffic conditions or traffic advisories.](#)

1 **Section 2L.07 Travel Time Messages**

2 **Support:**

3 Travel times provide road users useful information about the level of congestion on segments of highways  
4 that motorists experience frequent incidents that slows traffic. Travel times are only helpful to the road user if  
5 they have a general understanding of the length of the road segment the travel time is related to so that they  
6 can compare that to the time it take them to travel a similar distance on a highway without congestion.  
7 However, travel time messages requires road users to read and process a significant amount of information  
8 and careful consideration is needed to ensure the overall message is not overloading the motorist.

9 **Guidance:**

10 Travel times should be tied to the distance to a particular destination or junction so that road users can  
11 estimate the level of congestion based on the time to travel that distance. When travel times are displayed on  
12 changeable message signs, such as during peak traffic conditions, the message should comply with the  
13 provisions of Section. 2E.49 and 2E.50. If both a travel time and distance are displayed, the sign should  
14 display only one destination. A distance displayed as part of a travel time message should be displayed as an  
15 integer rounded to the nearest whole mile.

16 **Option:**

17 A reference-location-based exit number (see Section 2E.22) may be displayed in lieu of a destination  
18 name or junction thereby providing the necessary distance information to the road user. If reference-location-  
19 based exit numbers are displayed, then up to two travel times may be displayed provided that the distance to  
20 the exit is not also displayed.

21 **Section 2L.08 Traffic Safety Campaign Messages**

22 **Support:**

23 An allowable ancillary use of changeable message signs is the display of traffic safety messages in  
24 conjunction with a traffic safety campaign that includes other forms of media as the primary communication  
25 and education mechanism.

26 **Guidance:**

27 The broad traffic safety campaign marketing message should be appropriately shortened or otherwise  
28 modified to comply with the provisions of Section 2L.05 when a traffic safety campaign message is displayed  
29 on a changeable message sign.

30 For consistency on a national level, traffic safety campaigns should be coordinated with those on the  
31 National Highway Transportation Safety Administration’s annual communications calendar.

32 **Standard:**

33 **Traffic control messages shall have primacy over traffic safety campaign messages.**

34 **Section 2L.0609 LocationInstallation of Permanent Changeable Message Signs**

35 **Support:**

36 Careful consideration of CMS installation location is important to having a safe and effective message,  
37 taking into account several factors. CMS message length and complexity will vary and often include two-  
38 phase displays, all of which may require longer glance times by motorists than would be required for  
39 conventional sign messages. CMS are also generally used on higher speed, multi-lane facilities with high  
40 traffic volumes where more time might be required to properly respond to a message, such as by changing  
41 lanes or reducing their speed. It is also not uncommon for other signs to be in the same vicinity of the desired  
42 location for a CMS raising the concern of overloading road users with information.

43 **Guidance:**

44 A CMS that is used in place of a static sign (such as a blank-out or variable legend regulatory sign)  
45 should be located in accordance with the provisions of Chapter 2A and the provisions for the static sign it  
46 replaces. The following factors should be considered when installing other permanent changeable message  
47 signs:

- 48 A. Changeable message signs should be located sufficiently upstream of known bottlenecks and high  
49 crash locations to enable road users to select an alternate route or take other appropriate action in  
50 response to a recurring condition.

- 1        *B. Changeable message signs should be located sufficiently upstream of major diversion decision points,*
- 2        *such as interchanges, to provide adequate distance over which road users can change lanes to reach*
- 3        *one destination or the other.*
- 4        *C. Changeable message signs should not be located within an interchange except for toll plazas or*
- 5        *managed lanes.*
- 6        *D. Changeable message signs should not be positioned at locations where the information load on*
- 7        *drivers is already high because of guide signs and other types of information.*
- 8        *E. Changeable message signs should not be located in areas where drivers frequently perform lane-*
- 9        *changing maneuvers in response to static guide sign information, or because of merging or weaving*
- 10       *conditions.*

11 Support:

12        Information regarding the design and application of portable changeable message signs in temporary  
13 traffic control zones is contained in Section 6F.60.

1           **CHAPTER 2M. RECREATIONAL AND CULTURAL INTEREST AREA SIGNS**

2           **Section 2M.01 Scope**

3           Support:

4           Recreational or cultural interest areas are attractions or traffic generators that are open to the general  
5           public for the purpose of play, amusement, or relaxation. Recreational attractions include such facilities as  
6           parks, campgrounds, ~~gaming-game-hunting~~ facilities, and ski areas, while examples of cultural attractions  
7           include museums, art galleries, and historical buildings or sites.

8           The purpose of recreation and cultural interest area signs is to guide road users to a general area and then  
9           to specific facilities or activities within the area.

10          Option:

11          Recreational and cultural interest area guide signs directing road users to significant traffic generators may  
12          be used on freeways and expressways where there is direct access to these areas as provided in Section 2M.09.

13          Recreational and cultural interest area signs may be used off the road network, as appropriate.

14          **Section 2M.02 Application of Recreational and Cultural Interest Area Signs**

15          Support:

16          Provisions for signing recreational or cultural interest areas are subdivided into two different types of  
17          signs: (1) symbol signs and (2) destination guide signs.

18          Guidance:

19          ~~When a~~ Highway agencies ~~decide to provide~~ ing recreational and cultural interest area signing, ~~these~~  
20          ~~agencies should have a policy for such signing. The policy~~ should establish a policy with signing criteria for  
21          the eligibility of the various types of services, accommodations, and facilities. ~~These signs should not be used~~  
22          ~~where they might be confused with other traffic control signs.~~

23          Option:

24          Recreational and cultural interest area guide signs may be used on any road to direct persons to facilities,  
25          structures, and places, and to identify various services available to the general public. These guide signs may  
26          also be used in recreational or cultural interest areas for signing non-vehicular events and amenities such as  
27          trails, structures, and facilities.

28          **Standard:**

29          Where a symbol for a recreational and cultural interest area application is used on a roadway  
30          outside a recreational and cultural interest area facility, and a standard symbol is prescribed elsewhere  
31          in this Manual for that message, the symbol shall be the standard design and size prescribed elsewhere  
32          in this Manual. Alternative symbol designs shall not be allowed. The legend and color of the sign shall  
33          be as prescribed for the standard symbol sign.

34          Support:

35          Symbols for use only within recreational and cultural interest area facilities are noted in Table 2M-1.

36          Section 2A.12 contains information regarding the use of recreational and cultural interest area symbols on  
37          other types of signs.

38          **Section 2M.03 Regulatory and Warning Signs**

39          **Standard:**

40          All regulatory and warning signs installed on ~~public~~ roads and streets open to public travel within  
41          recreational and cultural interest areas shall comply with the requirements ~~of Chapters 2A, 2B, 2C, 7B,~~  
42          ~~8B, and 9B, elsewhere in this Manual.~~

43          **Section 2M.04 General Design Requirements for Recreational and Cultural Interest Area**  
44          **Symbol Guide Signs**

45          **Standard:**

46          When a General Information symbol contained in Chapter 2H is used in conjunction with  
47          recreational and cultural interest area signing on roadways outside a recreational and cultural interest  
48          facility, the legend and background color of the General Information symbol sign shall be as prescribed  
49          in Chapter 2H.

1 When a General Service symbol contained in Chapter 2I is used in conjunction with recreational  
2 and cultural interest area signing on roadways outside a recreational and cultural interest facility, the  
3 legend and background color of the General Information symbol sign shall be as prescribed in Chapter  
4 2I.

5 Recreational and cultural interest area symbol guide signs shall be square or rectangular in shape  
6 and shall have a white symbol or message and white border on a brown background. The symbols shall  
7 be grouped into the following usage and series categories:

- 8 A. General Applications,
- 9 B. Accommodations,
- 10 C. Services,
- 11 D. Land Recreation,
- 12 E. Water Recreation, and
- 13 F. Winter Recreation.

14 Support:

15 Table 2M-1 contains a listing of the symbols within each series category.

16 **Table 2M-1. Category Chart for Recreational and Cultural Interest Area Symbols**

17 Option:

18 Mirror images of symbols may be used where the reverse image will better convey the message ([see](#)  
19 [Section 2A.09](#)).

20 **Section 2M.05 Symbol Sign Sizes**

21 *Guidance:*

22 *Recreational and cultural interest area symbol signs should be 24 x 24 inches. Where greater visibility or*  
23 *emphasis is needed, larger sizes should be used. Symbol sign enlargements should be in 6-inch increments.*

24 *Recreational and cultural interest area symbol signs should be 30 x 30 inches when used on guide signs*  
25 *on freeways or expressways.*

26 Option:

27 A smaller size of 18 x 18 inches may be used on low-speed, low-volume roadways and on non-road  
28 applications.

29 **Section 2M.06 Use of Educational Plaques**

30 *Guidance:*

31 *Educational plaques should accompany all initial installations of recreational and cultural interest area*  
32 *symbol signs. ~~The educational plaque should remain in place for at least 3 years after the initial installation.~~*  
33 *If used, the educational plaque should be the same width as the symbol sign.*

34 Option:

35 Symbol signs that are readily recognizable by the public may be installed without educational plaques.

36 Support:

37 Figure 2M-1 illustrates some examples of the use of educational plaques.

38 **Figure 2M-1. Examples of Use of Arrows, Educational Plaques, and Prohibitive Slashes**

39 **Section 2M.07 Use of Prohibitive Circle and Diagonal ~~Slash~~ for Non-Road Applications**

40 Standard:

41 Where it is necessary to indicate a prohibition of an activity or an item within a recreational or  
42 cultural interest area for non-road use and a standard regulatory sign for such a prohibition is not  
43 provided in Chapter 2B, the appropriate recreational and cultural interest area symbol shall be used in  
44 combination with a red prohibitive circle and red-diagonal slash. The recreational and cultural interest  
45 area symbol and the sign border shall be black and the sign background shall be white. The symbol  
46 shall be scaled proportionally to fit completely within the circle. ~~and the The~~ diagonal slash shall be  
47 oriented from the upper left to the lower right portions of the circle as shown in Figure 2M-1 ~~and as~~  
48 [detailed in the “Standard Highway Signs” publication.](#)

49 Requirements for retroreflection of the red circle and red-diagonal slash shall be the same as those  
50 requirements for backgrounds, legends, symbols, arrows, and borders.

1 **Section 2M.08 Placement of Recreational and Cultural Interest Area Symbol Signs**

2 **Standard:**

3 If used, recreational and cultural interest area symbol signs shall be placed in accordance with the  
4 general requirements contained in Chapter 2A. The symbol(s) shall be placed as sign panels in the  
5 uppermost part of the sign and the directional information shall be placed below the symbol(s).

6 ~~Except as provided in Paragraph 3, if~~ the name of the recreational or cultural interest area facility  
7 or activity is displayed on a destination guide sign (see Section 2M.09) and a symbol is used, the symbol  
8 shall be placed below the name (see Figure 2M-2).

9 **Figure 2M-2. Examples of Recreational and Cultural Interest Area Guide Signs**

10 Option:

11 ~~When the legend Wildlife Viewing Area is displayed with the RS-076 symbol on a destination guide sign,~~  
12 ~~the symbol may be placed to the left or right of the legend and the arrow may be placed below the symbol (see~~  
13 ~~Figure 2M-2).~~

14 The symbols displayed with the facility or activity name may be placed below the destination guide sign  
15 as illustrated in Figure 2M-2 instead of as sign panels placed with the destination guide sign.

16 Secondary symbols of a smaller size (18 x 18 inches) may be placed beneath the primary symbols (see  
17 Drawing A in Figure 2M-1), where needed.

18 **Standard:**

19 **Recreational and cultural interest area symbols installed for non-road use shall be placed in**  
20 **accordance with the general sign position requirements of the authority having jurisdiction.**

21 Support:

22 Figure 2M-3 illustrates typical height and lateral mounting positions. Figure 2M-4 illustrates some  
23 examples of the placement of symbol signs within a recreational or cultural interest area. Figures 2M-5  
24 through 2M-10 illustrate some of the symbols that can be used.

25 **Figure 2M-3. Arrangement, Height, and Lateral Position of Signs Located Within**  
26 **Recreational and Cultural Interest Areas**

27 **Figure 2M-4. Examples of Symbol and Destination Guide Signing Layout**

28 **Figure 2M-5. Recreational and Cultural Interest Area Symbol Signs for General**  
29 **Applications**

30 **Figure 2M-6. Recreational and Cultural Interest Area Symbol Signs for Accommodations**

31 **Figure 2M-7. Recreational and Cultural Interest Area Symbol Signs for Services**

32 **Figure 2M-8. Recreational and Cultural Interest Area Symbol Signs for Land Recreation**

33 **Figure 2M-9. Recreational and Cultural Interest Area Symbol Signs for Water Recreation**

34 **Figure 2M-10. Recreational and Cultural Interest Area Symbol Signs for Winter**  
35 **Recreation**

36 *Guidance:*

37 *The number of symbols used in a single sign assembly should not exceed four.*

38 Option:

39 The Advance Turn (M5 series) or Directional Arrow (M6 series) auxiliary signs with white arrows on  
40 brown backgrounds shown in Figure 2D-5 may be used with Recreational and Cultural Area Interest symbol  
41 guide signs to create a Recreational and Cultural Interest Area Directional Assembly. The symbols may be  
42 used singularly, or in groups of two, three, or four on a single sign assembly (see Figures 2M-1, 2M-3, and  
43 2M-4).

44 **Section 2M.09 Destination Guide Signs**

45 *Guidance:*

46 ~~When recreational or cultural interest area destinations are displayed on supplemental guide signs, the~~  
47 ~~sign should be rectangular or trapezoidal in shape. The order of preference for use of shapes and colors~~

1 ~~should be as follows: (1) rectangular with a white legend and border on a green background; (2) rectangular~~  
2 ~~with a white legend and border on a brown background; or (3) trapezoidal with a white legend and border on~~  
3 ~~a brown background.~~

4 **Standard:**

5 When recreational or cultural interest area destinations are displayed on a Supplemental guide sign  
6 (see Section 2E.35), the sign shall be rectangular in shape with a white legend on a green or brown  
7 background.

8 Option:

9 Trapezoidal shaped signs may be used to display recreational and cultural interest area destinations on  
10 conventional roads.

11 **Standard:**

12 **Whenever the trapezoidal shape is used, the color combination shall be a white legend and border**  
13 **on a brown background. When the trapezoidal shape is used for a sign with a directional arrow, a**  
14 **right-angled trapezoid with the wider dimension of the bases (parallel sides) at the top of the sign shall**  
15 **be used. The diagonal leg of the trapezoid shall be oriented in the same direction as the directional**  
16 **arrow. When the trapezoidal shape is used for an advance sign legend, such as with a distance or action**  
17 **message, an isosceles trapezoid with the wider dimension of the bases at the top of the sign shall be used.**  
18 **Added to increase clarity regarding sign shape**

19 **Option:**

20 Destination guide signs with a white legend and border on a brown background may be posted at the first  
21 point where an access or crossroad intersects a highway where recreational or cultural interest areas are a  
22 significant destination along conventional roads, expressways, or freeways. Supplemental guide signs with a  
23 white legend and border on a brown background may be used along conventional roads, expressways, or  
24 freeways to direct road users to recreational or cultural interest areas. Where access or crossroads lead  
25 exclusively to the recreational or cultural interest area, the **a**Advance guide sign (see Section 2E.33) and the  
26 **e**Exit **d**Direction sign (see Section 2E.36) may have a white legend and border on a brown background.

27 **Standard:**

28 All Exit Gore (E5-1 ~~and E5-1a~~series) signs (see Section 2E.37) shall have a white legend and border  
29 on a green background. The background color of the interchange Exit Number **plaque** (E1-5P and E1-  
30 5bP, ~~) plaque~~ (see Section 2E.31) shall match the background color of the guide sign above which it is  
31 mounted. Design characteristics of conventional road, expressway, or freeway guide signs shall comply  
32 with Chapter 2D or 2E except as provided in this Section for color combination.

33 The **a**Advance guide sign and the Exit Direction sign shall retain the white-on-green color  
34 combination where the crossroad also leads to a destination other than a recreational or cultural  
35 interest area.

36 **Support:**

37 Figure 2M-2 illustrates destination guide signs commonly used for identifying recreational or cultural  
38 interest areas or facilities.

39 **Section 2M.10 Memorial or Dedication Signing**

40 **Support:**

41 Legislative bodies will occasionally adopt an act or resolution memorializing or dedicating a highway,  
42 bridge, or other component of the highway.

43 Named highways (see Section 2D.53) are officially designated and shown on official maps and serve the  
44 purpose of providing route guidance, primarily on unnumbered highways, and property addresses. A highway  
45 designated as a memorial or dedication is not considered to be a named highway for the purposes of highway  
46 signing or road user navigation and orientation. Section 2D.53 contains provisions for the signing of named  
47 highways. **Relocated from end of Section and revised**

48 Section 2A.03 contains information regarding excessive use of signs. Because memorial or dedication  
49 names are not official highway names, memorial and dedication signing is not essential to providing  
50 navigational guidance.

51 **Guidance:**

52 *Such memorial or dedication names should not appear on or along a highway, or be placed on bridges or*  
53 *other highway components. If a route, bridge, or highway component is officially designated as a memorial*

1 or dedication, and if notification of the memorial or dedication is to be made on the highway right-of-way,  
2 such notification should consist of installing a memorial or dedication marker in a rest area, scenic overlook,  
3 recreational area, or other appropriate location where parking is provided with the signing inconspicuously  
4 located relative to vehicle operations along the highway.

5 **Option:**

6 ~~If the installation of a memorial or dedication marker off the main roadway is not practical, memorial or~~  
7 ~~dedication signs may be installed on the mainline.~~

8 **Guidance:**

9 *Memorial or dedication signs should have a white legend and border on a brown background. On all*  
10 *such signs, the design should be simple and dignified, devoid of any appearance of advertising, and in general*  
11 *compliance with other signing.*

12 *The letter height of the principal legend on memorial or dedication signs should conform to the minimum*  
13 *letter height specified for Miscellaneous Information signs (see Section 2H.04). Memorial and Dedication*  
14 *signs should not be oversized.*

15 *The lettering for the name of the person or entity being recognized should be composed of a combination*  
16 *of lower-case letters with initial upper-case letters.* Relocated from later in this Section and changed to

17 **Guidance**

18 **Standard:**

19 Where such memorial or dedication signs are installed on the highway mainline because the  
20 provisions of Paragraph 3 cannot be met, (1) memorial or dedication names shall not appear on  
21 directional guide signs, (2) memorial or dedication signs shall not interfere with the placement of any  
22 other ~~necessary signing~~traffic control devices, and (3) memorial or dedication signs shall not  
23 compromise the safety or efficiency of traffic flow. The memorial or dedication signing shall be limited  
24 to one sign at an appropriate location in each route direction, each as an independent post-mounted  
25 sign installation.

26 Memorial or dedication signs shall be rectangular in shape. The legend displayed on memorial or  
27 dedication signs shall be limited to the name of the person or entity being recognized and a simple  
28 message preceding ~~or following~~ the name, such as “DEDICATED TO” ~~or~~ “Memorial Parkway.”  
29 Additional legend, such as biographical information, shall not be displayed on memorial or dedication  
30 signs. Decorative or graphical elements, pictographs, logos, or symbols shall not be displayed on  
31 memorial or dedication signs. All letters and numerals displayed on memorial or dedication signs shall  
32 be as provided in the “Standard Highway Signs ~~and Markings~~” book publication (see Section 1A.11).  
33 The route number or officially mapped name of the highway shall not be displayed on the memorial or  
34 dedication sign.

35 Memorial or dedication signs shall not imply that a highway has been officially renamed.

36 Memorial or dedication names shall not appear on supplemental signs or on any other information  
37 sign on or along the highway or its intersecting routes.

38 **Option:**

39 ~~The lettering for the name of the person or entity being recognized may be composed of a combination of~~  
40 ~~lower-case letters with initial upper-case letters.~~ Relocated above and changed to **Guidance**

41 **Guidance:**

42 *Freeways and expressways should not be signed as memorial or dedicated highways.*

43 *When used, memorial or dedication signs should be located in accordance with the provisions for locating*  
44 *vanity signs (see Section 2A.03).*

45 **Support:**

46 Paragraph 35 of Section 2D.43 contains provisions regarding the use of memorial or dedication signing in  
47 conjunction with Street Name signs.

48 Named highways are officially designated and shown on official maps and serve the purpose of providing  
49 route guidance, primarily on unnumbered highways. A highway designated as a memorial or dedication is not  
50 considered to be a named highway. Section 2D.53-56 contains provisions for the signing of named highways.

51 Relocated to above

1 CHAPTER 2N. EMERGENCY MANAGEMENT ~~SIGNING~~SIGNS

2 Section 2N.01 Emergency Management

3 Guidance:

4 Contingency planning for an emergency evacuation should be considered by all State and local  
5 jurisdictions and should consider the use of all applicable roadways.

6 In the event of a disaster where highways that cannot be used will be closed, a successful contingency  
7 plan should account for the following elements: a controlled operation of certain designated highways, the  
8 establishment of traffic operations for the expediting of essential traffic, and the provision of emergency  
9 centers for civilian aid.

10 Section 2N.02 Design and Use of Emergency Management Signs

11 Standard:

12 Emergency Management signs shall be used to guide and control highway traffic during an  
13 emergency.

14 Signs normally in place that conflict with Emergency Management signs shall be removed or  
15 covered until such time as the Emergency Management signs are no longer necessary.

16 Except for Evacuation Route signs, Emergency Management signs that are no longer necessitated  
17 by the emergency shall be promptly removed and signs that normally provide guidance, warning or  
18 regulation that were removed or covered during the emergency shall be promptly displayed again. not  
19 permanently displace any of the standard signs that are normally applicable. Revised to improve clarity

20 Advance planning for transportation operations’ emergencies shall be the responsibility of State  
21 and local authorities.

22 Support: Standard changed to Support

23 The Federal Government ~~shall~~ provides guidance to the States as necessitated by changing circumstances.

24 Standard:

25 Except as provided in Section 2A.11, the sizes for Emergency Management signs shall be as shown  
26 in Table 2N-1.

27 Support:

28 Section 2A.11 contains information regarding the applicability of the various columns in Table 2N-1.

29 Option:

30 Signs larger than those shown in Table 2N-1 may be used (see Section 2A.11).

31 Guidance:

32 As conditions permit, the Emergency Management signs should be replaced or augmented by standard  
33 signs.

34 Except where specifically required elsewhere in this Chapter, the background of Emergency  
35 Management signs should be retroreflective.

36 Because Emergency Management signs might be needed in large numbers for temporary use during an  
37 emergency, consideration should be given to their fabrication from any light and economical material that  
38 can serve through the emergency period.

39 Option:

40 Any Emergency Management sign that is used to mark an area that is contaminated by biological or  
41 chemical warfare agents or radioactive fallout may be accompanied by the standard symbol that is illustrated  
42 in the upper left corner of the EM-~~7e4-1b~~ and EM-~~7d4-1c~~ signs in Figure 2N-1.

43 **Table 2N-1. Emergency Management Sign Sizes**

44 **Figure 2N-1. Emergency Management Signs**

45 Section 2N.03 Evacuation Route Signs (~~EM-1 and EM-1a~~ EM1 Series)

46 Standard:

47 ~~The Evacuation Route (EM-1 and EM-1a) signs shall display a blue circular symbol on a white~~  
48 ~~square sign without a border as shown in Figure 2N-1. The EM1-1 sign shall include a white directional~~  
49 ~~arrow (except as provided in Paragraph 3) and a white legend EVACUATION ROUTE within the blue~~

1 ~~circular symbol. The EM-1a sign shall include a white EVACUATION ROUTE legend and the tsunami~~  
2 ~~symbol within the blue circular symbol.~~

3 The ~~EM-1 and EM-1a~~ EM1 series signs and any plaques used to supplement the EM1 series signs  
4 shall be retroreflective.

5 An Advance Turn Arrow (M5 series) or Directional Arrow (M6 series) auxiliary ~~sign plaque as~~  
6 ~~shown in (see Figure 2ND-15), but with a white arrow on a blue background instead of a black arrow on a~~  
7 ~~white background,~~ shall be installed below the ~~EM-1a1-2 series~~ signs. ~~Instead of including a~~  
8 ~~directional arrow within the blue circular symbol on the EM-1 sign, an~~ The Advance Turn Arrow (~~M5-~~  
9 ~~series) or~~ and Directional Arrow (~~M6 series)~~ auxiliary sign plaques as shown in Figure 2D-5, but  
10 with shall have a white arrow and border on a blue background instead of a black arrow on a white  
11 background, may be installed below the when used with EM2-1-2 series signs. **Relocated from**  
12 **paragraph below and revised for clarification**

13 Option:

14 ~~Instead of including a directional arrow within the blue circular symbol on the EM-1 sign, an Advance~~  
15 ~~Turn Arrow (M5 series) or Directional Arrow (M6 series) auxiliary sign as shown in Figure 2D-5, but with a~~  
16 ~~white arrow on a blue background instead of a black arrow on a white background, may be installed below the~~  
17 ~~EM-1 sign.~~ **Relocated to paragraph above**

18 ~~If desired~~ Where different evacuation conditions use different evacuation routes in the same area, the word  
19 HURRICANE, or a word that describes some other type of evacuation route, may be added ~~as a third line of~~  
20 ~~text~~ above the ~~white~~ EVACUATION ROUTE legend within the blue circular symbol on the EM1-1 sign.

21 ~~An approved Emergency Management symbol with a diameter of 3.5 inches may appear near the bottom~~  
22 ~~of an Evacuation Route sign.~~

23 **Standard:**

24 The arrow designs, ~~if used,~~ on the EM1-1 sign shall include a straight, vertical arrow pointing  
25 upward, a straight horizontal arrow pointing to the left or right, or a bent arrow pointing to the left or  
26 right for advance warning of a turn.

27 Guidance **Standard changed to Guidance**

28 *If used, the Evacuation Route sign, with the appropriate arrow, shall-should be installed 150 to 300 feet in*  
29 *advance of, and at, any turn in an approved evacuation route. The sign shall-should also be installed*  
30 *elsewhere for straight-ahead confirmation where needed.*

31 **Standard**

32 **If used in urban areas, the Evacuation Route sign shall be mounted at the right-hand side of the**  
33 **roadway, not less than 7 feet above the top of the curb, and at least 1 foot back from the face of the**  
34 **curb. If used in rural areas, the Evacuation Route sign shall be mounted at the right-hand side of the**  
35 **roadway, not less than 7 feet above the pavement and not less than 6 feet or more than 10 feet to the**  
36 **right of the right-hand roadway edge.**

37 **Evacuation Route signs shall not be placed where they will conflict with other signs. Where conflict**  
38 **in placement would occur between the Evacuation Route sign and a standard regulatory sign, the**  
39 **regulatory sign shall take precedence.**

40 Option:

41 In case of conflict with guide or warning signs, the Evacuation Route sign may take precedence.

42 *Guidance:*

43 *Placement of Evacuation Route signs should be made under the supervision of the officials having*  
44 *jurisdiction over the placement of other traffic signs. Coordination with Emergency Management authorities*  
45 *and agreement between contiguous political entities should occur to assure continuity of routes.*

46 *Use of the specific Evacuation Route (EM1-2 series) signs should be limited to areas where different*  
47 *evacuation conditions use different evacuation routes.*

#### 48 **Section 2N.04 AREA CLOSED Sign (EM-22-1)**

49 **Standard:** Guidance: **Standard changed to Guidance**

50 *The AREA CLOSED (EM-22-1) sign (see Figure 2N-1) shall-should be used to close a roadway in order*  
51 *to prohibit traffic from entering the area. It shall-should be installed on the shoulder as near as practical to*

1 the right-hand edge of the roadway, or preferably, on a portable mounting or barricade partly or entirely in  
2 the roadway.

3 *Guidance:*

4 For best visibility, particularly at night, the sign height should not exceed 4 feet measured vertically from  
5 the pavement to the bottom of the sign. Unless adequate advance warning signs are used, it should not be  
6 placed to create a complete and unavoidable blocked route. Where feasible, the sign should be located at an  
7 intersection that provides a detour route.

8 **Section 2N.05 TRAFFIC CONTROL POINT Sign (EM-32-2)**

9 **Standard:** *Guidance:* **Standard changed to Guidance**

10 The TRAFFIC CONTROL POINT (EM-32-2) sign (see Figure 2N-1) ~~shall~~ *should* be used to designate a  
11 location where an official traffic control point has been set up to impose such controls as are necessary to  
12 limit congestion, expedite emergency traffic, exclude unauthorized vehicles, or protect the public.

13 The sign ~~shall~~ *should* be installed in the same manner as the AREA CLOSED sign (see Section 2N.04),  
14 and at the point where traffic must stop to be checked.

15 ~~The standard~~ A STOP (R1-1) sign ~~shall~~ (see Section 2B.05) *should* be used in conjunction with the  
16 TRAFFIC CONTROL POINT sign. ~~The TRAFFIC CONTROL POINT sign shall consist of a black legend and~~  
17 ~~border on a retroreflectorized white background.~~

18 *Guidance:*

19 The TRAFFIC CONTROL POINT sign should be mounted directly below the STOP sign.

20 **Standard:**

21 **The TRAFFIC CONTROL POINT sign shall be retroreflective.**

22 **Section 2N.06 MAINTAIN TOP SAFE SPEED Sign (EM-42-3)**

23 Option:

24 The MAINTAIN TOP SAFE SPEED (EM-42-3) sign (see Figure 2N-1) may be used on highways where  
25 conditions are such that it is prudent to evacuate or traverse an area as quickly as possible.

26 Where an existing Speed Limit (R2-1) sign is in a suitable location, the MAINTAIN TOP SAFE SPEED  
27 sign may ~~conveniently~~ be mounted directly over the face of the speed limit sign that it supersedes.

28 Support:

29 Since any speed zoning would be impractical under such emergency conditions, no minimum speed limit  
30 can be prescribed by the MAINTAIN TOP SAFE SPEED sign in numerical terms. Where traffic is  
31 supervised by a traffic control point, official instructions will usually be given verbally, and the sign will serve  
32 as an occasional reminder of the urgent need for maintaining the proper speed.

33 *Guidance:*

34 The sign should be installed as needed, in the same manner as other standard speed signs.

35 **Standard:**

36 **If used in rural areas, the MAINTAIN TOP SAFE SPEED sign shall be mounted on the right-hand**  
37 **side of the road at a horizontal distance of not less than 6 feet or more than 10 feet from the roadway**  
38 **edge, and at a minimum height, measured vertically from the bottom of the sign to the elevation of the**  
39 **near edge of the traveled way, of 5 feet. If used in urban areas, the minimum height, measured**  
40 **vertically from the bottom of the sign to the top of the curb, or in the absence of curb, measured**  
41 **vertically from the bottom of the sign to the elevation of the near edge of the traveled way, shall be 7**  
42 **feet, and the nearest edge of the sign shall be not less than 1 foot back from the face of the curb.**

43 **Section 2N.07 ROAD (AREA) USE PERMIT REQUIRED FOR THRU TRAFFIC Sign (EM-**  
44 **52-4)**

45 Support:

46 The intent of the ROAD (AREA) USE PERMIT REQUIRED FOR THRU TRAFFIC (EM-52-4) sign (see  
47 Figure 2N-1) is to notify road users of the presence of the traffic control point so that those who do not have  
48 priority permits issued by designated authorities can take another route, or turn back, without making a  
49 needless trip and without adding to the screening load at the post. Local traffic, without permits, can proceed  
50 as far as the traffic control post.

1 **Standard:**

2 **If used, the ROAD (AREA) USE PERMIT REQUIRED FOR THRU TRAFFIC (EM-52-4) sign**  
3 **shall be used at an intersection that is an entrance to a route on which a traffic control point is located.**

4 **If used, the sign shall be installed in a manner similar to that of the MAINTAIN TOP SAFE SPEED**  
5 **sign (see Section 2N.06).**

6 **Section 2N.08 Emergency Aid Center Signs (EM-63-1 Series)**

7 **Standard:**

8 **In the event of emergency, State and local authorities shall establish various centers for civilian**  
9 **relief, communication, medical service, and similar purposes. To guide the public to such centers a**  
10 **series of directional signs shall be used.**

11 **Emergency Aid Center (EM-63-1 series) signs (see Figure 2N-1) shall ~~carry~~ display the designation**  
12 **of the center and an arrow indicating the direction to the center. They shall be installed as needed, at**  
13 **intersections and elsewhere, on the right-hand side of the roadway, in urban areas at a minimum**  
14 **height, measured vertically from the bottom of the sign to the top of the curb, or in the absence of curb,**  
15 **measured vertically from the bottom of the sign to the elevation of the near edge of the traveled way, of**  
16 **7 feet, and not less than 1 foot back from the face of the curb, and in rural areas at a minimum height,**  
17 **measured vertically from the bottom of the sign to the elevation of the near edge of the traveled way, of**  
18 **5 feet, and at a horizontal distance of not less than 6 feet or more than 10 feet from the roadway edge.**

19 **Emergency Aid Center signs shall ~~carry~~ display one of the following legends, as appropriate, or**  
20 **others designating similar emergency facilities:**

- 21 **A. MEDICAL CENTER (EM-6a3-1),**
- 22 **B. WELFARE CENTER (EM-6b3-1a),**
- 23 **C. REGISTRATION CENTER (EM-6e3-1b), or**
- 24 **D. DECONTAMINATION CENTER (EM-6d3-1c).**

25 **The Emergency Aid Center sign shall be a horizontally oriented rectangle. Except as provided in**  
26 **Paragraph 5, the ~~identifying word and the word CENTER, the directional arrow, and the~~ Emergency**  
27 **Aid Center signs shall have a black legend and border ~~shall be black~~ on a white background.**

28 **Option:**

29 **When Emergency Aid Center signs are used in an incident situation, such as during the aftermath of a**  
30 **nuclear or biological attack, the background color may be fluorescent pink (see Chapter 6I).**

31 **Section 2N.09 Shelter Directional Signs (EM-74-1 Series)**

32 **Standard:**

33 **Shelter Directional (EM-74-1 series) signs (see Figure 2N-1) shall be used to direct the public to**  
34 **selected shelters that have been licensed and marked for emergency use.**

35 **The installation of Shelter Directional signs shall comply with established signing standards. Where**  
36 **used, the signs shall not be installed in competition with other necessary highway guide, warning, and**  
37 **regulatory signs.**

38 **The Shelter Directional sign shall be a horizontally oriented rectangle. Except as provided in**  
39 **Paragraph 4, the ~~identifying word and the word SHELTER, the directional arrow, the distance to the~~**  
40 **shelter, and the Shelter Directional signs shall have a black legend and border ~~shall be black~~ on a white**  
41 **background.**

42 **Option:**

43 **When Shelter Directional signs are used in an incident situation, such as during the aftermath of a nuclear**  
44 **or biological attack, the background color may be fluorescent pink (see Chapter 6I).**

45 **The distance to the shelter may be omitted from the sign when appropriate.**

46 **Shelter Directional signs may ~~carry~~ display one of the following legends, or others designating similar**  
47 **emergency facilities:**

- 48 **A. EMERGENCY (EM-7a4-1),**
- 49 **B. HURRICANE (EM-7b4-1a),**
- 50 **C. FALLOUT (EM-7e4-1b), or**
- 51 **D. CHEMICAL (EM-7d4-1c).**

1           If appropriate, the name of the facility may be used.

2           The Shelter Directional signs may be installed on the Interstate Highway System or any other major  
3 highway system when it has been determined that a need exists for such signs as part of a State or local shelter  
4 plan.

5           The Shelter Directional signs may be used to identify different routes to a shelter to provide for rapid  
6 movement of large numbers of persons.

7           *Guidance:*

8           *The Shelter Directional sign should be used sparingly and only in conjunction with approved plans of*  
9 *State and local authorities.*

10          *The Shelter Directional sign should not be posted more than 5 miles from a shelter.*

1 CHAPTER 3A. GENERAL

2 ~~Section 3A.01 Functions and Limitations Deleted (not needed)~~

3 Support:

4 ~~Markings on highways and on private roads open to public travel have important functions in~~  
5 ~~providing guidance and information for the road user. Major marking types include pavement and curb~~  
6 ~~markings, delineators, colored pavements, channelizing devices, and islands. In some cases, markings~~  
7 ~~are used to supplement other traffic control devices such as signs, signals, and other markings. In other~~  
8 ~~instances, markings are used alone to effectively convey regulations, guidance, or warnings in ways not~~  
9 ~~obtainable by the use of other devices.~~

10 ~~Markings have limitations. Visibility of the markings can be limited by snow, debris, and water on~~  
11 ~~or adjacent to the markings. Marking durability is affected by material characteristics, traffic volumes,~~  
12 ~~weather, and location. However, under most highway conditions, markings provide important~~  
13 ~~information while allowing minimal diversion of attention from the roadway.~~

14 Section ~~3A.02~~ 3A.01 **Standardization of Application**

15 Support:

16 Markings are used to supplement other traffic control devices such as signs, signals, and other  
17 markings. In other instances, markings are used alone to effectively convey regulations, guidance, or  
18 warnings in ways not obtainable by the use of other devices.

19 Markings can take many forms including road surface markings, curb markings, delineators,  
20 colored pavements, and channelizing devices.

21 Standard:

22 **Each standard marking shall be used only to convey the meaning prescribed for that marking**  
23 **in this Manual, including wWhen used for applications not described in this Manual, ~~markings~~**  
24 **~~shall conform in all respects to the principles and standards set forth in this Manual.~~**

25 *Guidance:*

26 *Before any new highway, private road open to public travel (see definition in Section 1A.13), paved*  
27 *detour, or temporary route is opened to public travel, all necessary markings should be in place.*

28 **Relocated to Part 1**

29 Standard:

30 Except as provided in Chapter 3H, ~~M~~markings that must be visible at night shall be  
31 retroreflective unless ~~the markings are adequately visible under street or highway~~  
32 ~~lighting, ambient illumination assures demonstrates that the markings are adequately visible.~~ All  
33 markings on Interstate highways shall be retroreflective.

34 **Markings that are no longer applicable for roadway conditions or restrictions and that might**  
35 **cause confusion for the road user shall be removed or obliterated to be unidentifiable as a**  
36 **marking as soon as practical.**

37 Option:

38 Until they can be removed or obliterated, markings that are no longer applicable for roadway  
39 conditions or restrictions may be temporarily masked with non-reflective, preformed tape that is  
40 approximately the same color as the pavement surface.

41 Section ~~3A.04~~ 3A.02 **Materials**

42 Support:

43 ~~Pavement and curb markings are commonly placed by using paints or thermoplastics; however,~~  
44 ~~other suitable marking materials, including raised pavement markers and colored pavements, are also~~

1 used. ~~Delineators and channelizing devices are visibly placed in a vertical position similar to signs~~  
2 ~~above the roadway.~~ **Not needed**

3 ~~Some marking systems consist of clumps or droplets of material with visible open spaces of bare~~  
4 ~~pavement between the material droplets. These marking systems can function in a manner that is~~  
5 ~~similar to the marking systems that completely cover the pavement surface and are suitable for use as~~  
6 ~~pavement markings if they meet the other pavement marking requirements of the highway agency.~~

7 **Moved to the end of this section and rewritten as an Option**

8 *Guidance:*

9 *The materials used for markings should provide the specified color throughout their useful life.*

10 *Consideration should be given to selecting pavement marking materials that will minimize tripping*  
11 *or loss of traction for road users, including pedestrians, bicyclists, and motorcyclists.*

12 ~~*Delineators should not present a vertical or horizontal clearance obstacle for pedestrians.*~~ **Moved**  
13 **to new Section 3G.04**

14 Option:

15 Marking systems that consist of clumps or droplets of material with visible open spaces of bare  
16 pavement between the material droplets, which can function in a manner that is similar to the marking  
17 systems that completely cover the pavement surface, may be used as pavement markings if they meet  
18 the other pavement marking requirements of the highway agency. **Moved from Paragraph 2 of this**  
19 **section and rewritten as an Option**

## 20 Section ~~3A.05~~ 3A.03 Colors

21 **Standard:**

22 **Markings shall be yellow, white, red, blue, or purple. The colors for markings shall conform**  
23 **to the standard highway colors. ~~Black in conjunction with one of the colors mentioned in the first~~**  
24 **~~sentence of this paragraph shall be a usable color.~~**

25 **Option:**

26 Black markings may be used in combination with the colors mentioned in ~~the first sentence of~~  
27 Paragraph 1 ~~where to enhance the contrast with~~ a light-colored pavement ~~does not provide sufficient~~  
28 ~~contrast with the markings.~~ **Moved from Paragraph 8 of this section, with Paragraph 9**  
29 **incorporated**

30 **Standard:**

31 **When used, yellow markings for longitudinal lines shall delineate:**

- 32 **A. The separation of traffic traveling in opposite directions,**
- 33 **B. The left-hand edge of the roadways of divided highways and one-way streets or ramps, or**
- 34 **C. The separation of two-way left-turn lanes and reversible lanes from other lanes.**

35 **When used, white markings for longitudinal lines shall delineate: **The sequence of this****  
36 **paragraph and the previous paragraph were reversed**

- 37 **A. The separation of traffic flows in the same direction, or**
- 38 **B. The right-hand edge of the roadway.**

39 **When used, red raised pavement markers or delineators shall delineate:**

- 40 **A. Truck escape ramps, or**
- 41 **B. One-way roadways, ramps, or travel lanes that shall not be entered or used in the**  
42 **direction from which the markers are visible.**

43 **When used, blue markings shall supplement white markings for parking spaces for persons**  
44 **with disabilities.**

1 When used, purple markings ~~shall supplement lane line or edge line markings for toll plaza~~  
2 ~~approach lanes that are restricted to use only by vehicles with registered electronic toll collection~~  
3 ~~accounts, shall be in accordance with the provisions of Chapters 3F and 3H.~~ Moved part of the  
4 Standard to new Chapter 3F and new Chapter 3H

5 ~~Option:~~Standard: Changed from Option to Standard

6 ~~Colors used for~~ When pavement markings that simulate official route shield signs (see Section  
7 2D.11) may be are used (see Section 3B.22), ~~as colors of symbol markings to simulate route shields~~  
8 ~~on the pavement (see Section 3B.20) the colors shall be the same as those that are used for the~~  
9 ~~official route signs (see Section 2D.11).~~ Rewritten as a Standard statement

10 ~~Black may be used in combination with the colors mentioned in the first sentence of Paragraph 1~~  
11 ~~where a light colored pavement does not provide sufficient contrast with the markings.~~ Moved to  
12 follow Paragraph 1 of this section

13 Support:

14 ~~When used in combination with other colors, black is not considered a marking color, but only a~~  
15 ~~contrast enhancing system for the markings.~~ Incorporated into the relocated Paragraph 8 of this  
16 section

17 Provisions regarding colored pavements are contained in Chapter 3H.

## 18 Section ~~3A.06~~3A.04 Functions, Widths, and Patterns of Longitudinal Pavement 19 Markings

20 Standard:

21 The general functions of longitudinal lines shall be as follows:

22 A. A double line indicates maximum or special restrictions.

23 B. A solid line discourages or prohibits crossing (depending on the specific application).

24 C. A broken line indicates a permissive condition, ~~and~~

25 D. A dotted lane line provides ~~guidance or~~ warning of a downstream change in lane function.

26 E. A dotted line used as a lane line or edge line extension guides vehicles through an  
27 intersection, a taper area, or an interchange ramp area.

28 The widths and patterns of longitudinal lines shall be as follows:

29 A. Normal width line—~~4 to 6 inches wide, 6 inches wide for freeways, expressways, and~~  
30 ramps; 6 inches for all other roadways with speed limits > 40 mph, 4 to 6 inches for all other  
31 roadways.

32 B. Wide line—~~at least twice the width of a normal line~~ at least 8 inches in width if 4 inch or 5  
33 inch normal width lines are used and at least 10 inches in width if 6 inch normal width lines are  
34 used.

35 C. Double line—two parallel lines separated by a discernible space. The pavement surface  
36 shall be visible between the lines in the same way that it is visible outside the lines, except where  
37 contrast markings are used in combination with the double line (see Section 3A.03).

38 D. Broken line—normal width line segments separated by gaps.

39 E. Dotted line—noticeably shorter line segments separated by shorter gaps than used for a  
40 broken line. The width of a dotted line extension shall be at least the same as the width of the line  
41 it extends.

42 Guidance:

43 The discernible space separating the parallel lines of a double line should not exceed that which is  
44 necessary to be recognized as a double line rather than two separate, disassociated single lines.

1 Support:

2 The width of the line indicates the degree of emphasis.

3 Wide edge lines have been shown to be beneficial when applied in combination with horizontal  
4 alignment warning signs to enhance safety around curves and locations with a history of run off the  
5 road crashes (see Section 3B.09).

6 *Guidance:*

7 *Broken lines should consist of 10-foot line segments and 30-foot gaps, or dimensions in a similar*  
8 *ratio of line segments to gaps as appropriate for traffic speeds and need for delineation, except within*  
9 *the circulatory roadway of a circular intersection as provided in Section 3D.02.*

10 ~~Support:~~

11 ~~Patterns for dotted lines depend on the application (see Sections 3B.04 and 3B.08.)~~ Incorporated  
12 into existing Paragraph 6 and edited

13 ~~Guidance:~~

14 *A dotted line used as a lane line (see Section 3B.07) should consist of 3-foot line segments and 9-*  
15 *foot gaps. A dotted line for line extensions within an intersection, ~~or~~ taper area, or interchange ramp*  
16 *area (see Section 3B.11) should consist of 2-foot line segments and 2- to 6-foot gaps. The sequence of*  
17 *these sentences was reversed*

18 **Section ~~3A.03~~ 3A.05 Maintaining Minimum Pavement Marking Retroreflectivity**

19 (This section reserved for future text based on FHWA rulemaking)

20

1 CHAPTER 3B. PAVEMENT AND CURB MARKINGS

2 Section 3B.01 Yellow Center Line Pavement Markings and Warrants

3 Standard:

4 Center line pavement markings, when used, shall be the pavement markings used to delineate  
5 the separation of traffic lanes that have opposite directions of travel on a roadway and shall be  
6 yellow.

7 Option:

8 Center line pavement markings may be placed at a location that is not the geometric center of the  
9 roadway.

10 On roadways without continuous center line pavement markings, short sections may be marked  
11 with center line pavement markings to control the position of traffic at specific locations, such as  
12 around curves, over hills, on approaches to grade crossings, at grade crossings, and at bridges.

13 Standard:

14 The center line markings on two-lane, two-way roadways shall be one of the following as  
15 shown in Figure 3B-1:

16 A. Two-direction passing zone markings consisting of a normal width broken yellow line  
17 where crossing the center line markings for passing with care is permitted for traffic traveling in  
18 either direction;

19 B. One-direction no-passing zone markings consisting of a double yellow line, one of which is  
20 a normal width broken yellow line and the other is a normal width solid yellow line, where  
21 crossing the center line markings for passing with care is permitted for the traffic traveling  
22 adjacent to the broken line, but is prohibited for traffic traveling adjacent to the solid line; or

23 C. Two-direction no-passing zone markings consisting of two normal width solid yellow lines  
24 where crossing the center line markings for passing is prohibited for traffic traveling in either  
25 direction.

26 A single solid yellow line shall not be used as a center line marking on a two-way roadway.

27 Except where a reversible lane (see Section 3B.04) or a two-way left-turn lane (see Section  
28 3B.05) is present, the center line markings on undivided two-way roadways with four or more  
29 lanes for moving motor vehicle traffic always available shall be the two-direction no-passing zone  
30 markings consisting of ~~a solid-double~~ normal width double solid yellow lines as shown in Figure  
31 3B-2.

32 Guidance:

33 *On two-way roadways with three through lanes for moving motor vehicle traffic, two lanes should*  
34 *be designated for traffic in one direction by using one- or two-direction no-passing zone markings as*  
35 *shown in Figure 3B-3.*

36 **Figure 3B-1. Examples of Two-Lane, Two-Way Marking Applications**

37 **Figure 3B-2. Examples of Four-or-More Lane, Two-Way Marking Applications**

38 **Figure 3B-3. Examples of Three-Lane, Two-Way Marking Applications**

39 Section 3B.02 Warrants for Yellow Center Lines **New section comprised of Paragraphs 9**  
40 **through 13 of existing Section 3B.01**

41 Standard:

42 Center line markings shall be placed on all paved urban arterials and collectors that have a  
43 traveled way of 20 feet or more in width and an ADT of 6,000 vehicles per day or greater. Center

1 **line markings shall also be placed on all paved two-way streets or highways that have three or**  
2 **more lanes for moving motor vehicle traffic.**

3 *Guidance:*

4 *Center line markings should be placed on paved urban arterials and collectors that have a traveled*  
5 *way of 20 feet or more in width and an ADT of 4,000 vehicles per day or greater. Center line markings*  
6 *should also be placed on all rural arterials and collectors that have a traveled way of 18 feet or more*  
7 *in width and an ADT of 3,000 vehicles per day or greater. Center line markings should also be placed*  
8 *on other traveled ways where an engineering study indicates such a need.*

9 *Engineering judgment should be used in determining whether to place center line markings on*  
10 *traveled ways that are less than 16 feet wide because of the potential for traffic encroaching on the*  
11 *pavement edges, traffic being affected by parked vehicles, and traffic encroaching into the opposing*  
12 *traffic lane.*

13 *Option:*

14 Center line markings may be placed on other paved two-way traveled ways that are 16 feet or more  
15 in width.

16 If a traffic count is not available, the ADTs described in this Section may be estimates that are  
17 based on engineering judgment.

### 18 **Section ~~3B.02~~3B.03 No-Passing Zone Pavement Markings and Warrants**

19 **Standard:**

20 **No-passing zones shall be marked by either the one direction no-passing zone pavement**  
21 **markings or the two-direction no-passing zone pavement markings described in Section 3B.01**  
22 **and shown in Figures 3B-1 and 3B-3.**

23 ~~When center line markings are used, no passing zone markings shall be used on two-way~~  
24 ~~roadways at lane-reduction transitions (see Section 3B.09) and on approaches to obstructions that~~  
25 ~~must be passed on the right (see Section 3B.10).~~

26 No-passing zone markings shall be used on: **Changed to list form and edited**

27 A. Two-way roadways at lane-reduction transitions (see Section 3B.12),

28 B. Approaches to obstructions that must be passed on the right (see Section 3B.13-), and

29 C. Approaches to grade crossings (see Section 8C.02). Incorporated from Paragraph 8 below

30 **On two-way, two- or three-lane roadways where center line markings are installed, no-**  
31 **passing zones shall be established at vertical and horizontal curves and other locations where an**  
32 **engineering study indicates that passing must be prohibited because of inadequate sight distances**  
33 **or other special conditions.**

34 **On roadways with center line markings, no-passing zone markings shall be used at horizontal**  
35 **or vertical curves where the passing sight distance is less than the minimum shown in Table 3B-1**  
36 **for the 85<sup>th</sup>-percentile speed or the ~~posted or statutory~~ speed limit. ~~The passing sight distance on~~**  
37 **~~a vertical curve is the distance at which an object 3.5 feet above the pavement surface can be seen~~**  
38 **~~from a point 3.5 feet above the pavement (see Figure 3B-4). Similarly, the passing sight distance~~**  
39 **~~on a horizontal curve is the distance measured along the center line (or right hand lane line of a~~**  
40 **~~three-lane roadway) between two points 3.5 feet above the pavement on a line tangent to the~~**  
41 **~~embankment or other obstruction that cuts off the view on the inside of the curve (see Figure 3B-~~**  
42 **~~4).~~ Changed to Support**

43 **Support:**

44 The passing sight distance on a vertical curve is the distance at which an object 3.5 feet above the  
45 pavement surface can be seen from a point 3.5 feet above the pavement (see Figure 3B-4). Similarly,  
46 the passing sight distance on a horizontal curve is the distance measured along the center line (or right-

1 [hand lane line of a three-lane roadway\) between two points 3.5 feet above the pavement on a line](#)  
2 [tangent to the embankment or other obstruction that cuts off the view on the inside of the curve \(see](#)  
3 [Figure 3B-4\).](#)

4 The upstream end of a no-passing zone at point “a” in Figure 3B-4 is that point where the sight  
5 distance first becomes less than that specified in Table 3B-1. The downstream end of the no-passing  
6 zone at point “b” in Figure 3B-4 is that point at which the sight distance again becomes greater than the  
7 minimum specified.

8 ~~The values of the minimum passing sight distances that are shown in Table 3B-1 are for operational~~  
9 ~~use in marking no-passing zones and are less than the values that are suggested for geometric design by~~  
10 ~~the AASHTO Policy on Geometric Design of Streets and Highways (see Section 1A.11).~~

11 *Guidance:*

12 *Where the distance between successive no-passing zones is less than 400 feet, no-passing markings*  
13 *should connect the zones.*

14 **Standard:**

15 ~~Where center line markings are used, no-passing zone markings shall be used on approaches~~  
16 ~~to grade crossings in compliance with Section 8B.27. **Incorporated into Paragraph 2 of this**~~  
17 ~~section~~

18 *Support:Option:*

19 ~~In addition to pavement markings, No- no-passing zone signs (see Sections ~~2B.28 2B.38, 2B.29~~~~  
20 ~~2B.39, and ~~2C.45 2C.53) are sometimes may be~~ used to emphasize the existence and extent of a no-~~  
21 ~~passing zone.~~

22 *Support:*

23 ~~Section 11-307 of the “Uniform Vehicle Code (UVC)” contains further information regarding~~  
24 ~~required road user behavior in no-passing zones. The UVC can be obtained from the National~~  
25 ~~Committee on Uniform Traffic Laws and Ordinances at the address shown on Page i. **Not needed**~~

26 **Standard:**

27 **On three-lane roadways where the direction of travel in the center lane transitions from one**  
28 **direction to the other, a no-passing buffer zone, [consisting of a flush median island \(see Section](#)**  
29 **[3J.03\) at least 50 feet in length,](#) shall be provided in the center lane as shown in Figure 3B-5. A**  
30 **lane-reduction transition (see Section ~~3B.09 3B.12~~) shall be provided [at approaching](#) each end of**  
31 **the buffer zone.**

32 ~~The buffer zone shall be a flush median island formed by two sets of double yellow center line~~  
33 ~~markings that is at least 50 feet in length. **Incorporated into previous paragraph**~~

34 *Option:*

35 ~~Yellow diagonal crosshatch markings (see Section 3B.24) may be placed in the flush median area~~  
36 ~~between the two sets of no-passing zone markings as shown in Figure 3B-5. **Not needed because it**~~  
37 ~~has been incorporated into new Section 3J.03~~

38 *Guidance:*

39 ~~For three-lane roadways having a posted or statutory speed limit of 45 mph or greater, the lane~~  
40 ~~transition taper length should be computed by the formula  $L = WS$ . For roadways where the posted or~~  
41 ~~statutory speed limit is less than 45 mph, the formula  $L = WS^2/60$  should be used to compute the taper~~  
42 ~~length. **Not needed, information is provided in new Section 3B.12**~~

43 *Support:*

44 ~~Under both formulas, L equals the taper length in feet, W equals the width of the center lane or~~  
45 ~~offset distance in feet, and S equals the 85<sup>th</sup> percentile speed or the posted or statutory speed limit,~~  
46 ~~whichever is higher. **Not needed, information is provided in new Section 3B.12**~~

1 *Guidance:*

2 *The minimum lane transition taper length should be 100 feet in urban areas and 200 feet in rural*  
3 *areas.* **Not needed, information is provided in new Section 3B.12**

4 **Table 3B-1. Minimum Passing Sight Distances for No-Passing Zone Markings**

5 **Figure 3B-4. Method of Locating and Determining the Limits of No-Passing Zones at**  
6 **Curves**

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

9 **Section ~~3B.03~~3B.04. ~~Other~~ Yellow ~~Longitudinal~~ Pavement Markings for Reversible**  
10 **Lanes** **Existing Section 3B.03 was separated into two new Sections**

11 **Standard:**

12 If reversible lanes are used, the lane line pavement markings on each side of reversible lanes  
13 shall consist of a normal width broken double yellow line to delineate the edge of a lane in which  
14 the direction of travel is reversed from time to time, such that each of these markings serve as the  
15 center line markings of the roadway during some period (see Figure 3B-6).

16 Signs (see Section ~~2B.26~~ 2B.35), lane-use control signals (see Chapter ~~4M~~ 4T), or both shall be  
17 used to supplement reversible lane pavement markings.

18 Support:

19 Section 3E.02 contains additional applications of pavement markings for counter-flow preferential  
20 lanes that also operate as reversible lanes.

21 **Standard:**

22 ~~If a continuous flush median island formed by pavement markings separating travel in~~  
23 ~~opposite directions is used, two sets of solid double yellow lines shall be used to form the island as~~  
24 ~~shown in Figures 3B-2 and 3B-5. Other markings in the median island area shall also be yellow,~~  
25 ~~except crosswalk markings which shall be white (see Section 3B.18).~~ **This Paragraph relocated to**  
26 **Section 3J.03 and edited**

27 **Figure 3B-6. Example of Reversible Lane Marking Application**

28 **Section 3B.05 Pavement Markings for Two-Way Left-Turn Lanes**

29 **Standard:**

30 If a two-way left-turn lane that is never operated as a reversible lane is used, the lane line  
31 pavement markings on each side of the two-way left-turn lane shall consist of a normal width  
32 broken yellow line and a normal width solid yellow line to delineate the edges of a lane that can be  
33 used by traffic in either direction as part of a left-turn maneuver. These markings shall be placed  
34 with the broken line toward the two-way left-turn lane and the solid line toward the adjacent  
35 traffic lane as shown in Figure 3B-7. **Paragraph relocated from Section 3B.03**

36 *Guidance:*

37 *White two-way left-turn lane-use arrows (see Figure 3B-7) should be used in conjunction with the*  
38 *longitudinal two-way left-turn markings at the locations described in Section 3B.20.* **Incorporated into**  
39 **the following paragraph**

40 *A two-way left-turn lane-use arrow pavement marking, with opposing arrows spaced as shown in*  
41 *Figure 3B-7, White two-way left-turn lane-use arrows should be used at or just downstream from the*  
42 *beginning of a two-way left-turn lane.* **Paragraph relocated from Section 3B.20 and edited**

43 **Option:**

1 Additional two-way left-turn lane-use arrow markings may be used at other locations along a two-  
2 way left-turn lane where engineering judgment determines that such additional markings are needed to  
3 emphasize the proper use of the lane. **Paragraph relocated from Section 3B.20**

4 **Standard:**

5 **A single-direction lane-use arrow shall not be used in a lane bordered on both sides by yellow**  
6 **two-way left-turn lane longitudinal markings.** **Paragraph relocated from Section 3B.20**

7 Guidance:

8 *Signs should be used in conjunction with the two-way left turn markings (see Section ~~2B.24~~ 2B.33).*

9 *Two-way left-turn lane markings should not extend to intersections.*

10 Support:

11 Two-way left-turn lanes can be transitioned to exclusive left turn lanes as shown in Figure 3B-7 or  
12 painted medians where they approach an intersection.

13 Section 8A.06 contains information for discontinuing a two-way left turn lane through a highway-  
14 rail grade crossing.

15 **Figure 3B-7. Example of Two-Way Left-Turn Lane Marking Application**

16 **Section ~~3B.04~~ 3B.06 White Lane Line Pavement Markings and Warrants**

17 **Paragraphs 6-19 and 23 were relocated to new Section 3B.07**

18 **Standard:**

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

21 **Lane line markings shall be used on all freeways and Interstate highways.**

22 Guidance:

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

27 *A. On all roadways that are intended to operate with two or more adjacent traffic lanes in the same*  
28 *direction of travel, except as otherwise required for reversible lanes.*

29 *B. At congested locations where the roadway will accommodate more traffic lanes with lane line*  
30 *markings than without the markings.*

31 Support:

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

33 **Standard:**

34 **Except as provided in Paragraph ~~6~~ 1 of Section 3B.07, where crossing the lane line markings**  
35 **with care is ~~permitted~~ not discouraged or prohibited, the lane line markings shall consist of a**  
36 **normal width broken white line.**

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

39 Guidance:

40 *A solid white lane line marking should be used on approaches to:*

41 *A. Intersections to separate a through lane from a mandatory turn lane.*

42 *B. Intersections to separate contiguous mandatory turn lanes from each other.*

43 *C. Toll collection points to separate toll lanes, payment methods, channelized movements, or*  
44 *obstructions.*

1 Option:

2 Solid white lane line markings may be used:

3 A. On approaches to intersections to separate contiguous through lanes.

4 B. To separate through traffic lanes from auxiliary lanes, such as an added uphill truck lane.

5 C. On approaches to crosswalks across multi-lane roadways

6 Option:

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

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

12 Support:

13 Section 3B.09 contains information about the lane line markings that are to be used for transition  
14 areas where the number of through lanes is reduced. **Not needed, as it is an exact duplicate of**  
15 **Paragraph 19 in this section**

16 Guidance:

17 *On approaches to intersections, a solid white lane line marking should be used to separate a*  
18 *through lane from an added mandatory turn lane.* **Moved to earlier in this Section**

19 Option:

20 On approaches to intersections, solid white lane line markings may be used to separate adjacent  
21 through lanes or adjacent mandatory turn lanes from each other. **Relocated to earlier in this Section.**  
22 **The second half of this statement was moved and upgraded to a Guidance statement.**

23 Where the median width allows the left-turn lanes to be separated from the through lanes to give  
24 drivers on opposing approaches a less obstructed view of opposing through traffic, white pavement  
25 markings may be used to form channelizing islands as shown in Figure 2B-17. **Incorporated into**  
26 **Paragraph 1 of new Section 3B.08**

27 Solid white lane line markings may be used to separate through traffic lanes from auxiliary lanes,  
28 such as an added uphill truck lane or a preferential lane (see Section 3D.02). **Relocated to earlier in**  
29 **this Section**

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

31 A curved transition may be used where an edge line, channelizing line, or dotted extension line  
32 changes direction.

33 Support:

34 Examples of locations where a curved transition can have value include freeway exit and entrance  
35 ramps, and turn lanes.

36 Standard:

37 Where crossing the lane line markings is prohibited, the lane line markings shall consist of a  
38 **double** solid ~~double~~white line (see Figure 3B-12).

39 **Figure 3B-8. Examples of Dotted Line and Channelizing Line Applications for Exit**  
40 **Ramp Markings (2 sheets)**

41 **Figure 3B-9. Examples of Dotted Line and Channelizing Line Applications for**  
42 **Entrance Ramp Markings (2 sheets)**

43 **Figure 3B-10. Examples of Applications of Freeway and Expressway Lane-Drop**  
44 **Markings (5 sheets)**

1 **Figure 3B-11. Examples of Applications of Conventional Road Lane-Drop Markings**  
2 **(2 sheets)**

3 **Figure 3B-12. Example of Solid Double White Lines Used to Prohibit Lane Changing**

4 **Figure 3B-13. Examples of Line Extensions through Intersections (2 sheets)**

5 **Section 3B.07 White Lane Line Markings for Non-Continuing Lanes** This section  
6 **contains paragraphs 6-19 and 23 from existing Section 3B.04**

7 **Standard:**

8 **A normal width** dotted white line marking shall be used as the lane line to separate a through  
9 lane that continues beyond the interchange or intersection from an adjacent **deceleration or**  
10 **acceleration** lane. ~~for any of the following conditions:~~

11 ~~A. A deceleration or acceleration lane,~~

12 ~~B. A through lane that becomes a mandatory exit or turn lane,~~

13 ~~C. An auxiliary lane 2 miles or less in length between an entrance ramp and an exit ramp, or~~

14 ~~D. An auxiliary lane 1 mile or less in length between two adjacent intersections.~~

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

19 **Option:**

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

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

26 **Standard:**

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

32 **Option:**

33 For entrance ramps with a parallel acceleration lane, a normal width dotted white line  
34 extension **shall may** be installed from the downstream end of the dotted white lane line to the  
35 downstream end of the acceleration taper, as shown in Drawing A of Figure 3B-9.

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

40 **Standard:**

41 A wide dotted white lane line shall be used:

42 A. As a lane drop marking in advance of lane drops at exit ramps to distinguish a lane drop  
43 from a normal exit ramp (see Drawings A, B, and C of Figure 3B-10),

44 B. In advance of freeway route splits with dedicated lanes (see Drawing D of Figure 3B-10),

1 C. In advance of freeway route splits with an option lane (see Drawing E of Figure 3B-10).

2 ~~C-D.~~ To separate a through lane that continues beyond an interchange from an adjacent  
3 continuous auxiliary lane between an entrance ramp and an exit ramp (see Drawing ~~E~~ F of  
4 Figure 3B-10),

5 ~~D-E.~~ As a lane drop marking in advance of lane drops at intersections to distinguish a lane  
6 drop from an intersection through lane (see Drawing A of Figure 3B-11), and

7 ~~E-F.~~ To separate a through lane that continues beyond an intersection from an adjacent  
8 auxiliary lane between two intersections (see Drawing B of Figure 3B-11).

9 *Guidance:*

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

12 *On the approach to a multi-lane exit ramp having an optional exit lane that also carries through*  
13 *traffic, lane line markings should be used as illustrated in Drawing B of Figure 3B-10. In this case, if*  
14 *the right-most exit lane is an added lane such as a parallel deceleration lane, the lane drop marking*  
15 *should begin at the upstream end of the full-width deceleration lane, as shown in Drawing C of Figure*  
16 *3B-8.*

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

22 *The dotted white lane lines that are used for lane drop markings and that are used as a lane line*  
23 *separating through lanes from auxiliary lanes should consist of line segments that are 3 feet in length*  
24 *separated by 9-foot gaps.*

25 *Support:*

26 Sections ~~3B.25~~ 3B.21 and 3B.23 contains information regarding other markings that are associated  
27 with lane drops, such as ~~lane-use arrow markings and~~ ONLY word pavement markings and lane-use  
28 arrows.

29 Section ~~3B.13~~ 3B.12 contains information about the lane line markings that are to be used for  
30 transition areas where the number of through lanes is reduced at a location that is not at an interchange  
31 or intersection.

32 *Option:*

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

35 **Section ~~3B.05~~ 3B.08 ~~Other White Longitudinal Pavement Markings~~ Channelizing Lines**

36 Support:

37 ~~Option:~~

38 Channelizing lines ~~may be~~ are used to form ~~channelizing islands where traffic traveling in the same~~  
39 ~~direction is permitted on both sides of the island, such as at the~~ neutral areas where traffic traveling in  
40 the same general direction is permitted on both sides of exit ramps including entrance and entrance  
41 ramps, access and egress points to and from managed lanes, toll-plaza bypasses, and left turn lanes  
42 separated from through lanes (see Figure 2B-11). **Text from existing Section 3B.04 and from two**  
43 **paragraphs below**

44 Chapter 3J contains information for the application of channelizing lines used in conjunction with  
45 islands.

46 **Standard:**

1 ~~A-Except as provided in Paragraph 6 of Section 3J.05, a channelizing line shall be a solid wide~~  
2 ~~or double white line. Moved from Paragraph 1 of this section~~

3 ~~Other pavement markings in the channelizing island area shall be white. Replaced by new~~  
4 ~~paragraph below~~

5 Support:

6 Examples of channelizing line applications are shown in Figures 3B-8, 3B-9, ~~and 3B-10, and in~~  
7 Drawing C of Figure 3B-15, ~~and Figures 3J-1 through 3J-3.~~

8 ~~Channelizing lines at exit ramps as shown in Figures 3B-8 and 3B-10 define the neutral area, direct~~  
9 ~~exiting traffic at the proper angle for smooth divergence from the main lanes into the ramp, and reduce~~  
10 ~~the probability of colliding with objects adjacent to the roadway. Incorporated into Paragraph 1~~  
11 ~~above~~

12 ~~Channelizing lines at entrance ramps as shown in Figures 3B-9 and 3B-10 promote orderly and~~  
13 ~~efficient merging with the through traffic. Incorporated into Paragraph 1 above~~

14 **Standard:**

15 For all exit ramps and for entrance ramps with parallel acceleration lanes, channelizing lines  
16 shall be placed on both sides of the neutral area (see of Figures 3B-8 and 3B-10 and Drawing A of  
17 Figure 3B-9).

18 For entrance ramps with tapered acceleration lanes, channelizing lines shall be placed along  
19 both sides of the neutral area to a point at least one-half of the distance to the theoretical gore (see  
20 Drawing C of Figure 3B-9).

21 Channelizing lines shall be placed on both sides of the neutral area for bifurcations created  
22 from open-road tolling lanes that bypass a conventional toll plaza.

23 Where neutral areas are formed at access and egress points to and from a managed-lane  
24 facility, channelizing lines shall be placed on both sides of the neutral area (see Figures 2G-8, 2G-  
25 9, 2G-22, 2G-23, and 2G-25).

26 Option:

27 For entrance ramps with tapered acceleration lanes, the channelizing lines may extend to the  
28 theoretical gore as shown in Drawing B of Figure 3B-9.

29 **Standard:**

30 Other pavement markings in the neutral area shall be white, such as chevron markings (see  
31 Section 3B.25) or retroreflective or internally illuminated raised pavement markers (see Sections  
32 3B.17 and 3B.19), shall be white. This paragraph replaces existing Paragraph 3 of this section

33 ~~White chevron crosshatch markings (see Section 3B.24) may be placed in the neutral area of exit~~  
34 ~~ramp and entrance ramp gores for special emphasis as shown in Figures 3B-8 and 3B-10 and Drawing~~  
35 ~~A of Figure 3B-9. The channelizing lines and the optional chevron crosshatch markings at exit ramp~~  
36 ~~and entrance ramp gores may be supplemented with white retroreflective or internally illuminated~~  
37 ~~raised pavement markers (see Sections 3B.11 and 3B.13) for enhanced nighttime visibility. This~~  
38 ~~paragraph relocated to Section 3B.25 and edited~~

39 **Support:**

40 Pavement markings within the neutral area include chevron markings (see Section 3B.25),  
41 retroreflective raised pavement markers (see Section 3B.17), and internally illuminated raised pavement  
42 markers (see Section 3B.19).

43 ~~Section 3B.25 contains information on chevron markings for the neutral area of exit and entrance~~  
44 ~~ramps.~~

45 **Section 3B.06-3B.09 Edge Line Pavement Markings** ~~The sequence of paragraphs 2, 3,~~  
46 ~~and 4 has been revised~~

1 **Standard:**

2 If used, edge line pavement markings shall delineate the right or left edges of a roadway.

3 ~~If used, right edge line pavement markings shall consist of a normal solid white line to~~  
4 ~~delineate the right-hand edge of the roadway.~~

5 Except as provided in Paragraph 9 of Section 3E.04, right edge line pavement markings, if  
6 used, shall consist of a normal width solid white line to delineate the right-hand edge of the  
7 roadway.

8 Guidance:

9 Regardless of the width of the normal line used on the roadway, edge lines on two-lane roadways  
10 should be at least 6 inches wide.

11 Standard:

12 If used on the roadways of divided highways or one-way streets, or on any ramp in the  
13 direction of travel, left edge line pavement markings shall consist of a normal width solid yellow  
14 line to delineate the left-hand edge of a roadway or to indicate driving or passing restrictions left  
15 of these markings, except as provided in Paragraph 9 of Section 3E.04.

16 ~~Except for dotted edge line extensions (see Section 3B.08), edge line markings shall not be~~  
17 ~~continued through intersections or major driveways.~~ **Changed to Guidance, edited and relocated**  
18 **below**

19 Guidance:

20 ~~Edge line markings should not be broken for minor driveways.~~ **Relocated to new Section 3B.11**

21 Guidance: **Changed from Standard, edited, and relocated from above**

22 Edge line markings should not be continued through intersections or major driveways, except for  
23 the following situations:

24 a. Dotted edge line extensions (see Section 3B.08), or

25 b. Through that part of an intersection with no intersection approach (such as the top of a T-  
26 intersection).

27 Support:

28 ~~Edge line markings have unique value as visual references to guide road users during adverse~~  
29 ~~weather and visibility conditions.~~ **Not needed**

30 Section 3B.11 contains information on the use and application of edge lines through intersections,  
31 interchanges, and driveways.

32 Option:

33 Wide solid edge line markings may be used for greater emphasis.

34 ~~Section 3B.07~~ **3B.10** Warrants for Use of Edge Lines

35 **Standard:**

36 Edge line markings shall be placed on paved streets or highways with the following  
37 characteristics:

38 A. Freeways,

39 B. Expressways, and

40 C. Rural arterials with a traveled way of 20 feet or more in width and an ADT of 6,000  
41 vehicles per day or greater.

42 Guidance:

43 Edge line markings should be placed on paved streets or highways with the following  
44 characteristics:

1 A. Rural arterials and collectors with a traveled way of 20 feet or more in width and an ADT of  
2 3,000 vehicles per day or greater.

3 B. On other paved streets and highways where an engineering study indicates a need for edge line  
4 markings.

5 Edge line markings should not be placed where an engineering study or engineering judgment  
6 indicates that providing them is likely to decrease safety.

7 Option:

8 Edge line markings may be placed on streets and highways with or without center line markings.

9 Edge line markings may be excluded, based on engineering judgment, for reasons such as if the  
10 traveled way edges are delineated by curbs, parking, or other markings.

11 If a bicycle lane is marked on the outside portion of the traveled way, the edge line that would mark  
12 the outside edge of the bicycle lane may be omitted.

13 Edge line markings may be used where edge delineation is desirable to minimize unnecessary  
14 driving on paved shoulders or on refuge areas that have lesser structural pavement strength than the  
15 adjacent roadway.

### 16 Section ~~3B.08~~ 3B.11 ~~Extensions~~ Application of Pavement Markings Through 17 Intersections or Interchanges

18 Support:

19 Section 8C.05 contains information about the extension of edge lines through grade crossing areas.  
20 Section 9E.03 contains information for the extensions of bicycle lanes through intersections.

21 In accordance with Definition 101 in Section 1C.02, driveway connections can be considered as  
22 intersections.

23 **Standard:**

24 ~~Except as provided in Paragraph 2, pavement~~ **Pavement** markings extended into or continued  
25 through an intersection or interchange area shall be the same color ~~and at least the same width as~~  
26 ~~the line markings they extend (see Figure 3B-13).~~ **Reduced a portion of Standard to Guidance**

27 Guidance:

28 Pavement markings extended into or continued through an intersection or interchange area should  
29 be at least the same width as the line markings they extend. (See Figure 3B-13) **Text from Paragraph 1**  
30 **that has been reduced to Guidance**

31 ~~Option:~~

32 ~~A normal line may be used to extend a wide line through an intersection.~~ **Redundant with**  
33 **Guidance above**

34 ~~Guidance:~~

35 *Where highway design or reduced visibility conditions make it desirable to provide control or to*  
36 *guide vehicles through an intersection, or interchange, such as at offset, skewed, complex, or multi-*  
37 *legged intersections, on curved roadways, where multiple turn lanes are used, or where offset left turn*  
38 *lanes might cause driver confusion, dotted lane line extension markings consisting of 2-foot line*  
39 *segments and 2- to 6-foot gaps should be used to extend longitudinal line markings through an*  
40 *intersection or interchange area.*

41 *Where greater restriction is ~~required~~ ~~desired~~ preferred, solid lane lines or channelizing lines should*  
42 *be extended into or continued through intersections ~~or major driveways~~.*

43 **Standard:**

44 Extensions of center lines through intersections shall be dotted lines.

45 Option:

1 Dotted edge line extensions may be placed through intersections ~~or major driveways.~~ **Relocated**  
2 **from earlier in this Section**

3 **Standard:**

4 **Solid lines shall not be used to extend edge lines into or through intersections or major**  
5 **driveways except through that part of an intersection with no intersecting approach (such as at**  
6 **the top of a T-intersection).**

7 *Guidance:*

8 *Edge line markings should be discontinued across intersecting approaches at intersections or*  
9 *interchanges.* **Relocated from Section 3B.06 , reduced to Guidance, and edited**

10 *Driveways that do not meet the definition of an intersection should have edge line markings*  
11 *maintained across the intersecting approach of the driveway.* **Relocated from Section 3B.06 and**  
12 **edited**

13 *Where a double line is extended through an intersection, a single line of equal width to one of the*  
14 *lines of the double line should be used.*

15 *To the extent possible, pavement marking extensions through intersections should be designed in a*  
16 *manner that minimizes potential confusion for drivers in adjacent or opposing lanes.* **Not needed**

17 **Section ~~3B.09~~3B.12 Lane-Reduction Transitions ~~Markings~~**

18 **Support:**

19 A lane-~~Lane-~~reduction ~~transition markings are used is~~ where the number of through lanes is  
20 reduced at a location that is not at an interchange or intersection because of narrowing of the roadway  
21 or because of a section of on-street parking in what would otherwise be a through lane. ~~Lane-reduction~~  
22 ~~transition markings are not used for lane drops.~~

23 Section 3B.07 contains information on pavement markings for lane drops and splits. Section 2C.48  
24 contains information for warning signing used for lane reductions.

25 **Standard:**

26 ~~Except as provided in Paragraph 3, where pavement markings are used, lane-reduction~~  
27 ~~transition markings shall be used to guide traffic through transition areas where the number of~~  
28 ~~through lanes is reduced, as shown in Figure 3B-14. On two-way roadways, no-passing zone~~  
29 ~~markings shall be used to prohibit passing in the direction of the convergence, and shall continue~~  
30 ~~through the transition area.~~

31 Lane-reduction transitions (see Figure 3B-14) shall include the following elements:

32 A. A no-passing zone (see Section 3B.03) to prohibit passing in the direction of the  
33 convergence and through the transition area except where not applicable such as one-way streets,  
34 expressways, and freeways, and

35 B. An edge line (see Section 3B.09) in the direction of the convergence and through the  
36 transition area, except as provided in Paragraph 11.

37 *Guidance:*

38 *Except as provided in Paragraph ~~3~~ 11 for low-speed urban roadways, the edge line marking ~~shown~~*  
39 *in Figure 3B-14 should be installed from the location of the Lane Ends warning sign to beyond the*  
40 *beginning of the narrower roadway.* **Paragraph relocated from later in Section and edited**

41 **Option:**

42 On ~~low-speed urban~~ roadways with operating speeds less than 25 mph where curbs clearly define  
43 the roadway edge in the lane-reduction transition, or where a through lane becomes a parking lane, the  
44 edge line ~~and/or delineators shown in Figure 3B-14~~ may be omitted as determined by engineering  
45 judgment.

46 *Guidance:*

1 Lane-reduction transitions should include the following elements:

2 A. Delineators installed adjacent to the lane or lanes reduced for the full length of the transition  
3 and should be so placed and spaced (see Section 3G.04) to show the reduction except as provided in  
4 Paragraph 11 and except as provided in Paragraph 2 of Section 3G.03 for freeways and expressways,  
5 and

6 B. Lane-reduction arrow markings (see Drawing F in Figure 3B-21) on the roadway with a speed  
7 limit of 45 mph or more, and

8 C. A termination of the broken white lane line at a point that is one-quarter of the advance  
9 warning distance (see Section 2C.04) between the Lane Ends sign (see Section 2C.47) and the point  
10 where the transition taper begins.

11 For roadways having a ~~posted or statutory~~ speed limit of 45 mph or greater, the transition taper  
12 length for a lane-reduction transition should be computed by the formula  $L = WS$ , where  $L$  equals the  
13 taper length in feet,  $W$  equals the width of the offset distance in feet, and  $S$  equals the 85<sup>th</sup>-percentile  
14 speed or the ~~posted or statutory~~ speed limit, whichever is higher. For roadways where the ~~posted or~~  
15 ~~statutory~~ speed limit is less than 45 mph, the formula  $L = WS^2/60$  should be used to compute the taper  
16 length.

17 The minimum lane transition taper length should be 100 feet in urban areas and 200 feet in rural  
18 areas. Relocated Guidance from existing Section 3B.02

19 ~~Support:~~

20 ~~Under both formulas,  $L$  equals the taper length in feet,  $W$  equals the width of the offset distance in~~  
21 ~~feet, and  $S$  equals the 85<sup>th</sup> percentile speed or the posted or statutory speed limit, whichever is higher.~~  
22 Incorporated into previous Guidance above

23 ~~Guidance:~~

24 ~~Where observed speeds exceed ~~posted or statutory~~ speed limits, longer tapers should be used.~~

25 ~~Option:~~

26 The minimum taper length may be less than 100 feet on roadways where the operating speed is less  
27 than 25 mph.

28 On new construction, where no ~~posted or statutory~~ speed limit has been established, the design  
29 speed may be used in the transition taper length formula.

30 On low-speed urban roadways where curbs clearly define the roadway edge in the lane-reduction  
31 transition, or where a through lane becomes a parking lane, delineators may be omitted as determined  
32 by engineering judgment.

33 Where a lane-reduction transition occurs on a roadway with a speed limit of less than 45 mph, lane-  
34 reduction arrow markings may be used. This paragraph relocated from Paragraph 34 in Section  
35 3B.20 and edited to be consistent with Note 1 of existing Figure 3B-14

36 Lane-reduction arrow markings may be used in long acceleration lanes based on engineering  
37 judgment. This paragraph relocated from Paragraph 35 in Section 3B.20

38 ~~Guidance:~~

39 ~~Lane line markings should be discontinued one-quarter of the distance between the Lane Ends sign~~  
40 ~~(see Section 2C.42) and the point where the transition taper begins. Incorporated into Item C of~~  
41 Guidance above

42 ~~Support:~~

43 ~~Pavement markings at lane reduction transitions supplement the standard signs. Incorporated into~~  
44 Paragraph 2 See Section 3B.20 for provisions regarding use of lane reduction arrows.

45 **Figure 3B-14. Examples of Applications of Lane-Reduction Transition Markings**  
46 **Section 3B.10 3B.13 Approach Markings for Obstructions**

1 **Standard:**

2 Pavement markings shall be used to guide traffic away from fixed obstructions within a paved  
3 roadway. Approach markings for bridge supports, refuge islands, median islands, toll plaza  
4 islands, and raised channelization islands shall consist of a tapered line or lines extending from  
5 the center line or the lane line to a point 1 to 2 feet to the right-hand side, or to both sides, of the  
6 approach end of the obstruction (see Figure 3B-15).

7 ~~Support:~~

8 ~~See Chapter 3E for additional information on approach markings for toll plaza islands.~~ **Not needed**

9 *Guidance:*

10 For roadways having a ~~posted or statutory~~ speed limit of 45 mph or greater, the taper length of the  
11 tapered line markings should be computed by the formula  $L = WS$ , where  $L$  equals the taper length in  
12 feet,  $W$  equals the width of the offset distance in feet, and  $S$  equals the 85th-percentile speed or the  
13 ~~posted or statutory~~ speed limit, whichever is higher. For roadways where the ~~posted or statutory~~ speed  
14 limit is less than 45 mph, the formula  $L = WS^2/60$  should be used to compute the taper length.

15 ~~Support:~~

16 ~~Under both formulas,  $L$  equals the taper length in feet,  $W$  equals the width of the offset distance in  
17 feet, and  $S$  equals the 85<sup>th</sup>-percentile speed or the posted or statutory speed limit, whichever is higher.~~

18 **Incorporated into previous paragraph**

19 ~~Guidance:~~

20 *The minimum taper length should be 100 feet in urban areas and 200 feet in rural areas.*

21 Option:

22 The minimum taper length may be less than 100 feet on roadways where the operating speed is less  
23 than 25 mph.

24 ~~Support:~~

25 ~~Examples of approach markings for obstructions in the roadway are shown in Figure 3B-15.~~ **Not**  
26 **needed**

27 **Standard:**

28 **If traffic is required to pass only to the right of the obstruction, the markings shall consist of a**  
29 **two-direction no-passing zone marking at least twice the length of the diagonal portion as**  
30 **determined by the appropriate taper formula (see Drawing A of Figure 3B-15).**

31 *Option:*

32 If traffic is required to pass only to the right of the obstruction, yellow diagonal ~~crosshatch~~  
33 markings (see Section ~~3B.24~~ 3B.25) may be placed in the flush median area (see Section 3J.03)  
34 between the no-passing zone markings as shown in Drawings A and B of Figure 3B-15. ~~Other~~  
35 ~~markings, such as yellow delineators, yellow channelizing devices, yellow raised pavement markers,~~  
36 ~~and white crosswalk pavement markings, may also be placed in the flush median area.~~ **The cross**  
37 **reference to new Section 3J.03 replaces this sentence**

38 **Standard:**

39 **If traffic can pass either to the right or left of the obstruction, the markings shall consist of**  
40 **two channelizing lines diverging from the lane line, one to each side of the obstruction. In**  
41 **advance of the point of divergence, a wide solid white line or normal width double solid ~~double~~**  
42 **white line shall be extended in place of the broken lane line for a distance equal to the length of**  
43 **the diverging lines (see Drawing C of Figure 3B-15).**

44 *Option:*

45 If traffic can pass either to the right or left of the obstruction, additional white chevron ~~crosshatch~~  
46 markings (see Section ~~3B.24~~ 3B.25) may be placed in the flush ~~median~~ neutral area between the

1 channelizing lines as shown in Drawing C of Figure 3B-15. Other markings, such as white delineators,  
2 white channelizing devices, white raised pavement markers, and white crosswalk markings may also be  
3 placed in the flush ~~median-neutral~~ area.

4 **Figure 3B-15. Examples of Applications of Markings for Obstructions in the**  
5 **Roadway (2 sheets)**

6 **Section ~~3B.11~~ 3B.14 Raised Pavement Markers – General**

7 Support:

8 Section 9A.03 contains information for the application of raised pavement markers to bicycle  
9 facilities.

10 **Standard:**

11 **The color of raised pavement markers under both daylight and nighttime conditions shall**  
12 **conform to the color of the marking for which they serve as a positioning guide, or for which they**  
13 **supplement or substitute.**

14 **Option:**

15 The side of a raised pavement marker that is visible to traffic proceeding in the wrong direction  
16 may be red (see Section 3A.05).

17 Retroreflective or internally illuminated raised pavement markers may be used in the roadway  
18 immediately adjacent to curbed approach ends of raised medians and curbs of islands, or on top of such  
19 curbs (see Section ~~3B.23~~ 3J.04).

20 ~~Support:~~

21 ~~Retroreflective and internally illuminated raised pavement markers are available in mono-~~  
22 ~~directional and bidirectional configurations. The bidirectional marker is capable of displaying the~~  
23 ~~applicable color for each direction of travel. **Not needed**~~

24 ~~Blue raised pavement markers are sometimes used in the roadway to help emergency personnel~~  
25 ~~locate fire hydrants. **Not needed**~~

26 **Standard:**

27 **When used, internally illuminated raised pavement markers shall be steadily illuminated and**  
28 **shall not be flashed.**

29 **Support:**

30 Flashing raised pavement markers are considered to be In-Roadway Lights (see Chapter ~~4N~~ 4U).

31 *Guidance:*

32 ~~Non-retroreflective raised pavement markers should not be used alone, without supplemental~~  
33 ~~retroreflective or internally illuminated markers, as a substitute for other types of pavement markings.~~

34 **Relocated to new Section 3B.17**

35 ~~Directional configurations should be used to maximize correct information and to minimize~~  
36 ~~confusing information provided to the road user. Directional configurations also should be used to~~  
37 ~~avoid confusion resulting from visibility of markers that do not apply to the road user. **Not needed**~~

38 *The spacing of raised pavement markers used to supplement or substitute for other types of*  
39 *longitudinal markings should correspond with the pattern of broken lines for which the markers*  
40 *supplement or substitute.*

41 **Standard:**

42 **The value of N cited in Sections ~~3B.12~~ 3B.14 through ~~3B.14~~ 3B.17 for the spacing of raised**  
43 **pavement markers shall equal the length of one line segment plus one gap of the broken lines**  
44 **used on the highway.**

45 **Option:**

1 For additional emphasis, retroreflective raised pavement markers may be spaced closer than  
2 described in Sections ~~3B.12~~ [3B.14](#) through ~~3B.14~~ [3B.17](#), as determined by engineering judgment or  
3 engineering study.

4 **Support:**

5 ~~Figures 9-20 through 9-22 in the “Traffic Control Devices Handbook” (see Section 1A.11) contain~~  
6 ~~additional information regarding the spacing of raised pavement markers on longitudinal markings.~~

7 **Not needed**

8 **Section ~~3B.12~~[3B.15](#) Raised Pavement Markers as Vehicle Positioning Guides with Other**  
9 **Longitudinal Markings**

10 Option:

11 Retroreflective or internally illuminated raised pavement markers may be used as positioning  
12 guides with longitudinal line markings without necessarily conveying information to the road user  
13 about passing or lane-use restrictions. In such applications, markers may be positioned in line with or  
14 immediately adjacent to a single line marking, or positioned between the two lines of a double center  
15 line or double lane line marking.

16 *Guidance:*

17 *Except as otherwise provided in Paragraphs 3 and 4, the spacing for such applications should be*  
18 *2N, where N equals the length of one line segment plus one gap (see Section ~~3B.11~~ [3B.14](#)).*

19 Option:

20 Where it is desired to alert the road user to changes in the travel path, such as on sharp curves or on  
21 transitions that reduce the number of lanes or that shift traffic laterally, the spacing may be reduced to N  
22 or less.

23 On freeways and expressways, the spacing may be increased to 3N for relatively straight and level  
24 roadway segments where engineering judgment indicates that such spacing will provide adequate  
25 delineation under wet night conditions.

26 **Section ~~3B.13~~ [3B.16](#) Raised Pavement Markers Supplementing Other Markings**

27 *Guidance:*

28 *The use of retroreflective or internally illuminated raised pavement markers for supplementing*  
29 *longitudinal line markings should comply with the following:*

30 *A. Lateral Positioning*

31 *1. When supplementing double line markings, pairs of raised pavement markers placed laterally in*  
32 *line with or immediately outside of the two lines should be used.*

33 *2. When supplementing wide line markings, pairs of raised pavement markers placed laterally*  
34 *adjacent to each other should be used.*

35 *B. Longitudinal Spacing*

36 *1. When supplementing solid line markings, raised pavement markers at a spacing no greater than*  
37 *N (see Section ~~3B.11~~ [3B.14](#)) should be used, except that when supplementing channelizing lines or edge*  
38 *line markings, a spacing of no greater than N/2 should be used.*

39 *2. When supplementing broken line markings, a spacing no greater than 3N should be used.*  
40 *However, when supplementing broken line markings identifying reversible lanes, a spacing of no*  
41 *greater than N should be used.*

42 *3. When supplementing dotted lane line markings, a spacing appropriate for the application should*  
43 *be used.*

44 *4. When supplementing longitudinal line extension markings through at-grade intersections, one*  
45 *raised pavement marker for each short line segment should be used.*

1 5. When supplementing line extensions through freeway interchanges, a spacing of no greater than  
2 N should be used.

3 Raised pavement markers should not supplement right-hand edge lines unless an engineering study  
4 or engineering judgment indicates the benefits of enhanced delineation of a curve or other location  
5 would outweigh possible impacts on bicycles using the shoulder, and the spacing of raised pavement  
6 markers on the right-hand edge is close enough to ~~avoid~~ minimize misinterpretation as a broken line  
7 during wet night conditions.

8 Option:

9 Raised pavement markers also may be used to supplement other markings such as channelizing  
10 islands, gore areas, approaches to obstructions, or wrong-way arrows.

11 To improve the visibility of horizontal curves, center lines may be supplemented with  
12 retroreflective or internally illuminated raised pavement markers for the entire curved section as well as  
13 for a distance in advance of the curve that approximates 5 seconds of travel time.

#### 14 **Section ~~3B.14~~ 3B.17 Raised Pavement Markers Substituting for Pavement Markings**

15 Option:

16 Retroreflective or internally illuminated raised pavement markers, or non-retroreflective raised  
17 pavement markers supplemented by retroreflective or internally illuminated markers, may be  
18 substituted for markings of other types.

19 *Guidance:*

20 *If used, the pattern of the raised pavement markers should simulate the pattern of the markings for*  
21 *which they substitute.*

22 **Standard:**

23 Non-retroreflective raised pavement markers ~~should~~ shall not be used alone, without  
24 supplemental retroreflective or internally illuminated markers, as a substitute for other types of  
25 pavement markings. **Paragraph relocated from existing Section 3B.11**

26 **Standard:**

27 If raised pavement markers are used to substitute for broken line markings, a group of three  
28 to five markers equally spaced at a distance no greater than N/8 (see Section ~~3B.11~~ 3B.14) shall be  
29 used. If N is other than 40 feet, the markers shall be equally spaced over the line segment length  
30 (at 1/2 points for three markers, at 1/3 points for four markers, and at 1/4 points for five  
31 markers). At least one retroreflective or internally illuminated marker per group shall be used or  
32 a retroreflective or internally illuminated marker shall be installed midway in each gap between  
33 successive groups of non-retroreflective markers.

34 When raised pavement markers substitute for solid line markings, the markers shall be  
35 equally spaced at no greater than N/4, with retroreflective or internally illuminated units at a  
36 spacing no greater than N/2.

37 *Guidance:*

38 *Raised pavement markers should not substitute for right-hand edge line markings unless an*  
39 *engineering study or engineering judgment indicates the benefits of enhanced delineation of a curve or*  
40 *other location would outweigh possible impacts on bicycles using the shoulder, and the spacing of*  
41 *raised pavement markers on the right-hand edge line is close enough to ~~avoid~~ minimize*  
42 *misinterpretation as a broken line during wet night conditions.*

43 **Standard:**

44 When raised pavement markers substitute for dotted lines, they shall be spaced at no greater  
45 than N/4, with not less than one raised pavement marker per dotted line segment. At least one  
46 raised marker every N shall be retroreflective or internally illuminated.

1 Option:

2 When substituting for wide lines, raised pavement markers may be placed laterally adjacent to each  
3 other to simulate the width of the line.

4 ~~Section 3B.15 Transverse Markings~~ **Not needed**

5 **Standard:**

6 ~~Transverse markings, which include shoulder markings, word and symbol markings, arrows,~~  
7 ~~stop lines, yield lines, crosswalk lines, speed measurement markings, speed reduction markings,~~  
8 ~~speed hump markings, parking space markings, and others, shall be white unless otherwise~~  
9 ~~provided in this Manual.~~

10 *Guidance:*

11 ~~Because of the low approach angle at which pavement markings are viewed, transverse lines~~  
12 ~~should be proportioned to provide visibility at least equal to that of longitudinal lines.~~

13 **Section 3B.23-3B.18 Curb Markings for Parking Regulations** Paragraphs 7 through 11  
14 **from existing Section 3B.23 are relocated to Section 3J.04 and edited**

15 **Support:**

16 ~~Curb markings are most often used to indicate parking regulations or to delineate the curb.~~ **Not**  
17 **needed**

18 ~~Support:~~ *Guidance:*

19 ~~Except as provided in Paragraph 4, since yellow and white curb markings are frequently used for curb~~  
20 ~~delineation and visibility, it is advisable to establish~~ parking regulations *should be established*  
21 ~~through the installation of standard signs (see Sections 2B.46-2B.56 through 2B.48-2B.57).~~ **Relocated**  
22 **from later in Section and changed to Guidance**

23 *Where curbs are marked to convey parking regulations in areas where curb markings are*  
24 *frequently obscured by snow and ice accumulation, signs shall* should *be used with the curb markings*  
25 *except as provided in Paragraph 4.*

26 *Guidance:*

27 *Except as provided in Paragraph 4, when curb markings are used without signs to convey parking*  
28 *regulations, a legible word marking regarding the regulation (such as “No Parking” or “No*  
29 *Standing”)* *should be placed on the curb.*

30 Option:

31 Curb markings without word markings or signs may be used to convey a general prohibition by  
32 statute of parking within a specified distance of a STOP sign, YIELD sign, driveway, fire hydrant, or  
33 crosswalk.

34 Local highway agencies may prescribe special colors for curb markings to supplement standard  
35 signs for parking regulation.

36 ~~Option:~~

37 ~~Retroreflective or internally illuminated raised pavement markers of the appropriate color may be~~  
38 ~~placed on the pavement in front of the curb and/or on the top of curbed noses of raised medians and~~  
39 ~~curbs of islands, as a supplement to or substitute for retroreflective curb markings used for delineation.~~  
40 **Not needed since it is a duplicate provision of Paragraph 3 in existing Section 3I.05**

41 **Section 3B.16-3B.19 Stop and Yield Lines** **The sequence of several paragraphs in this**  
42 **section has been revised**

43 Option:

1 Stop lines may be used to indicate the point behind which vehicles are required to stop in  
2 compliance with a STOP (R1-1) sign, a Stop Here For Pedestrians (R1-5b or R1-5c) sign, or some other  
3 traffic control device that requires vehicles to stop, except YIELD signs that are not associated with  
4 passive grade crossings.

5 **Standard:**

6 **Stop lines shall consist of solid white lines extending across approach lanes to indicate the**  
7 **point at which the stop is intended or required to be made.**

8 **Except as provided in Section ~~8B.28~~ 8C.03, stop lines shall not be used at locations where**  
9 **drivers are required to yield in compliance with a YIELD (R1-2) sign, ~~or~~ a Yield Here To**  
10 **Pedestrians (R1-5 or R1-5a) sign or at locations on uncontrolled approaches where drivers or**  
11 **bicyclists are required by State law to yield to pedestrians.**

12 *Guidance:*

13 *Stop lines should be used to indicate the point behind which vehicles are required to stop in*  
14 *compliance with a traffic control signal.*

15 *Stop lines at midblock signalized locations should be placed at least 40 feet in advance of the*  
16 *nearest signal indication (see Section ~~4D.14~~ 4D.07).*

17 *Stop lines should be 12 to 24 inches wide.*

18 Support:

19 Section 4J.02 contains information regarding the use and application of stop lines in conjunction  
20 with a pedestrian hybrid beacon.

21 ~~Option:~~

22 ~~Yield lines may be used to indicate the point behind which vehicles are required to yield in~~  
23 ~~compliance with a YIELD (R1-2) sign, or a Yield Here To Pedestrians (R1-5 or R1-5a) sign, or a~~  
24 ~~Bicycles Yield to Peds (R9-6) sign. **This paragraph changed to the following Standard and edited**~~

25 **Standard:**

26 **If used, a yield line pavement marking shall not be installed without a Yield (R1-2) sign, a**  
27 **Yield Here To Pedestrians (R1-5 or R1-5a) sign, a Bicycles Yield to Peds (R9-6) Sign (see Figure**  
28 **3B-16), or some other traffic control device that requires vehicles to yield. **This paragraph****  
29 **changed from the previous Option to Standard and edited**

30 **Yield lines shall not be used at locations where drivers are required to stop in compliance**  
31 **with a STOP (R1-1) sign, a Stop Here For Pedestrians (R1-5b or R1-5c) sign, a traffic control**  
32 **signal, or some other traffic control device.**

33 **Yield lines (see ~~Figure 3B-16~~) shall consist of a row of solid white isosceles triangles pointing**  
34 **toward approaching vehicles extending across approach lanes to indicate the point at which the**  
35 **yield is intended or required to be made.**

36 *Guidance:*

37 *The individual triangles comprising the yield line should have a base of 12 to 24 inches wide and a*  
38 *height equal to 1.5 times the base. The space between the triangles should be 3 to 12 inches.*

39 *If used, stop and yield lines should be placed a minimum of 4 feet in advance of the nearest*  
40 *crosswalk line at controlled intersections, except for yield lines at roundabouts as provided for in*  
41 *Section ~~3C.04~~ 3D.04 and at midblock crosswalks. In the absence of a marked crosswalk, the stop line*  
42 *or yield line should be placed at the desired stopping or yielding point, but should not be placed more*  
43 *than 30 feet or less than 4 feet from the nearest edge of the intersecting traveled way.*

44 ~~*If yield or stop lines are used at a crosswalk that crosses an uncontrolled multi-lane approach, the*~~  
45 ~~*yield lines or stop lines should be placed 20 to 50 feet in advance of the nearest crosswalk line, and*~~

1 ~~parking should be prohibited in the area between the yield or stop line and the crosswalk (see Figure~~  
2 ~~3B-17).~~ **Relocated below and edited; a portion changed to a Standard**

3 **Standard:**

4 If yield (stop) lines are used at a crosswalk that crosses an uncontrolled multi-lane approach,  
5 Yield Here To (Stop Here For) Pedestrians (R1-5 series) signs (see Section ~~2B.11~~ **2B.20**) shall be  
6 used.

7 **When used to supplement a Yield Here To (Stop Here For) Pedestrians (R1-5 series) sign in**  
8 **advance of a crosswalk that crosses an uncontrolled multi-lane approach, the yield (stop) line**  
9 **shall be placed 20 to 50 feet in advance of the nearest crosswalk line.** **Relocated from Guidance**  
10 **above and changed to a Standard**

11 Guidance:

12 *If yield or stop lines are used in advance of a crosswalk that crosses an uncontrolled multi-lane*  
13 *approach, parking should be prohibited in the area between the yield or stop line and the crosswalk*  
14 *(see Drawing B of Figure 3B-16).* **Relocated from above**

15 Support:

16 Section 9B.12 contains information for providing signing applicable to bicycles also subject to a  
17 yielding requirement at a crosswalk that crosses an uncontrolled approach.

18 Guidance:

19 *Yield (stop) lines and Yield Here To (Stop Here For) Pedestrians signs should not be used in*  
20 *advance of crosswalks that cross an approach to or departure from a ~~roundabout~~ circular intersection.*

21 Support:

22 ~~Section 8B.28~~ **8C.03** contains information regarding the use of stop lines and yield lines at grade  
23 crossings.

24 ~~When drivers yield or stop too close to crosswalks that cross uncontrolled multi-lane approaches,~~  
25 ~~they place pedestrians at risk by blocking other drivers' views of pedestrians and by blocking~~  
26 ~~pedestrians' views of vehicles approaching in the other lanes.~~ **Not needed**

27 Option:

28 Stop and yield lines may be staggered longitudinally on a lane-by-lane basis (see Drawing D of  
29 Figure 3B-13).

30 Support:

31 Staggered stop lines and staggered yield lines can improve the driver's view of pedestrians, provide  
32 better sight distance for turning vehicles, and increase the turning radius for left-turning vehicles.

33 **Figure 3B-16. Examples of Yield Lines at Unsignalized Midblock Crosswalks**

34 **Section 3B.20 ~~Pavement~~ Word, Symbol, and Arrow Pavement Markings – General**  
35 **Several paragraphs within existing Section 3B.20 were rearranged, and Sections 3B.24**  
36 **through 3B.28 were created from Section 3B.20. Paragraphs 34 and 35 were relocated to**  
37 **Section 3B.12 and edited**

38 Support:

39 ~~Word, symbol, and arrow markings on the pavement are used for the purpose of guiding, warning,~~  
40 ~~or regulating traffic. These pavement markings can be helpful to road users in some locations by~~  
41 ~~supplementing signs and providing additional emphasis for important regulatory, warning, or guidance~~  
42 ~~messages, because the markings do not require diversion of the road user's attention from the roadway~~  
43 ~~surface. Symbol messages are preferable to word messages. Examples of standard word and arrow~~  
44 ~~pavement markings are shown in Figures 3B-23 and 3B-24.~~

45 Option:

1 Word, symbol, and arrow markings, ~~including those contained in the “Standard Highway Signs and~~  
2 ~~Markings” book (see Section 1A.11),~~ may be used as determined by engineering judgment to  
3 supplement signs and/or to provide additional emphasis for regulatory, warning, or guidance messages  
4 provided by other devices. ~~Among the word, symbol, and arrow markings that may be used are the~~  
5 ~~following:~~

6 ~~A. Regulatory:~~

7 ~~1. STOP~~

8 ~~2. YIELD~~

9 ~~3. RIGHT (LEFT) TURN ONLY~~

10 ~~4. 25 MPH~~

11 ~~5. Lane use and wrong way arrows~~

12 ~~6. Diamond symbol for HOV lanes~~

13 ~~7. Other preferential lane word markings~~

14 ~~B. Warning:~~

15 ~~1. STOP AHEAD~~

16 ~~2. YIELD AHEAD~~

17 ~~3. YIELD AHEAD triangle symbol~~

18 ~~4. SCHOOL XING~~

19 ~~5. SIGNAL AHEAD~~

20 ~~6. PED XING~~

21 ~~7. SCHOOL~~

22 ~~8. R X R~~

23 ~~9. BUMP~~

24 ~~10. HUMP~~

25 ~~11. Lane reduction arrows~~

26 ~~C. Guide:~~

27 ~~1. Route numbers (route shield pavement marking symbols and/or words such as I 81, US 40,~~  
28 ~~STATE 135, or ROUTE 10)~~

29 ~~2. Cardinal directions (NORTH, SOUTH, EAST, or WEST)~~

30 ~~3. TO~~

31 ~~4. Destination names or abbreviations thereof~~ **Not needed as the general details are**  
32 **included in the SHSM**

33 Support:

34 For arrow pavement markings in the vicinity of highway-rail grade crossings, see Section 8C.04.

35 **Standard:**

36 ~~Word, symbol, and arrow markings shall be white, except as otherwise provided in this~~  
37 ~~Section.~~ **Not needed**

38 **Pavement marking letters, numerals, symbols, and arrows shall be installed in accordance**  
39 **with the design details in the Pavement Markings chapter of the “Standard Highway Signs and**  
40 **Markings” book (see Section ~~1A.11~~ 1A.05).**

41 *Guidance:*

42 Word, symbol and/or arrow ~~Word and symbol~~ markings that are grouped together to formulate one  
43 interrelated message should not exceed three lines of information.

1 Except for the two opposing white arrows of a two-way left-turn lane marking (see Figure 3B-7)  
2 and the pavement word marking messages described in Items B and D of Paragraph 2 of Section 3B.,  
3 ~~the longitudinal space between word, or symbol, and/or message markings, including~~ arrow markings  
4 that are used together to formulate one interrelated message should be at least four times the height of  
5 the characters for low-speed roads, but not more than ten times the height of the characters under any  
6 conditions.

7 ~~The number of different word and symbol markings used should be minimized to provide effective~~  
8 ~~guidance and avoid misunderstanding.~~ **Not needed**

9 Except for the SCHOOL word marking (see Section ~~7C.03~~ 7C.02), pavement word, symbol, and  
10 arrow markings should be no more than one lane in width.

11 Pavement word, symbol, and arrow markings should be proportionally scaled to fit within the width  
12 of the facility upon which they are applied.

13 Option:

14 On narrow, low-speed shared-use paths, the pavement words, symbols, and arrows may be smaller  
15 than suggested, but to the relative scale.

16 On roadways where the operating speed is less than 25 mph, word, symbol, and arrow markings  
17 may be reduced in size no less than ¼ size, but in relative proportion to the associated full-size word,  
18 symbol, or arrow.

19 **Section 3B.21 Word Pavement Markings** **Contains paragraphs 5,7, 14, 15, 26, 32, and 33**  
20 **from existing Section 3B.20**

21 Guidance:

22 Letters and numerals should be 6 feet or more in height except as provided in Section 9E.15 for a  
23 bicycle detector symbol.

24 If a pavement marking word message consists of more than one line of information, it should read  
25 in the direction of travel. The first word of the message should be nearest to the road user.

26 **Standard:**

27 ~~Except at the ends of aisles in parking lots, the word STOP shall not be used on the pavement~~  
28 ~~unless accompanied by a stop line (see Section 3B.19 3B.16) and STOP sign (see Section 2B.05~~  
29 ~~2B.04). At the ends of aisles in parking lots, the word STOP shall not be used on the pavement~~  
30 ~~unless accompanied by a stop line.~~

31 The word STOP shall not be placed on the pavement in advance of a stop line, unless every  
32 vehicle is required to stop at all times.

33 Guidance:

34 Where through lanes approaching an intersection become mandatory turn lanes, ONLY word  
35 pavement markings (see Figure 3B-17) should be used in addition to the required lane-use arrow  
36 markings (see Section 3B.23) and signs (see Sections 2B.29 and 2B.30). ~~These markings and signs~~  
37 ~~should be placed well in advance of the turn and should be repeated as necessary to prevent~~  
38 ~~entrapment and to help the road user select the appropriate lane in advance of reaching a queue of~~  
39 ~~waiting vehicles (see Drawing A of Figure 3B-11).~~ **Not needed**

40 Option:

41 The ONLY word marking (see Figure ~~3B-18~~) may be used to supplement the lane-use arrow  
42 markings in lanes that are designated for the exclusive use of a single movement (see Figure ~~3B-25~~)  
43 such as turn bays. ~~or to supplement a preferential lane word or symbol marking (see Section 3D.01).~~

44 The ONLY word marking may be used to supplement a preferential lane word or symbol marking  
45 (see Section ~~3D.03~~ 3E.03).

46 **Standard:**

1 The ONLY word marking shall not be used in a lane that is shared by more than one  
2 movement.

3 **Figure 3B-17. Example of Elongated Letters for Word Pavement Markings**

4 **Section 3B.22 Symbol Pavement Markings** Contains paragraphs 12, 16, 17, 18, and 19  
5 from existing Section 3B.20

6 Support:

7 [Section 3E.03](#) contains information on the diamond shape symbol for high-occupancy vehicle  
8 (HOV) lanes.

9 ~~Section 9E.01~~ Chapter 9E contains information on symbol markings that can be used for bicycle  
10 lanes. ~~Section 9E.16 contains information on the bicycle detector symbol.~~

11 Option:

12 Pavement markings simulating Interstate, U.S., State, and other official highway route shield signs  
13 (see Figure 2D-53) with appropriate route numbers, but elongated for proper proportioning when  
14 viewed as a marking, may be used to guide road users to their destinations (see Figure ~~3B-25~~3B-18).

15 Guidance:

16 *If route shield markings are provided to guide road users, those route shield markings should be*  
17 *provided in option lanes if markings are provided in any lanes.*

18 *If two route shield markings are provided in an option lane, they should be placed together in*  
19 *sequence and not divided around an optional lane arrow.*

20 Support:

21 [Section 9E.14](#) contains information on route markers for designated bicycle routes that can be used  
22 on shared-use paths.

23 Guidance:

24 *The International Symbol of Accessibility parking space marking (see Figure ~~3B-22~~3B-19) should*  
25 *be placed in each parking space designated for use by persons with disabilities.*

26 Option:

27 A blue background with white border may supplement the wheelchair symbol as shown in Figure  
28 ~~3B-22~~ 3B-19.

29 A yield-ahead triangle symbol (~~see Figure 3B-26~~) or YIELD AHEAD word pavement marking may  
30 be used on approaches to intersections where the approaching traffic will encounter a YIELD sign at  
31 the intersection.

32 **Standard:**

33 The yield-ahead triangle symbol or YIELD AHEAD word pavement marking shall not be  
34 used unless a YIELD sign (see Section ~~2B.08~~ 2B.05) is in place at the intersection. The yield-  
35 ahead symbol marking shall be as shown in Figure ~~3B-26~~ 3B-20.

36 **Figure 3B-18. Examples of Elongated Route Shields for Pavement Markings**

37 **Figure 3B-19. International Symbol of Accessibility Parking Space Marking**

38 **Figure 3B-20. Yield Ahead Triangle Symbols**

39 Option:

40 [A pedestrian symbol pavement marking may be used on portions of facilities such as shared-use](#)  
41 [paths that are reserved exclusively for pedestrian use.](#)

42 **Section 3B.23 Lane-Use Arrows** Contains paragraphs 20, 21, 22, 23, 25, 26, 27, and 31  
43 from existing Section 3B.20

1 Support:

2 Lane-use arrow markings (see Figure ~~3B-24~~ [3B-21](#)) are used to indicate the mandatory or  
3 permissible movements in certain lanes (see Figure ~~3B-27~~ [3B-22](#)) and in two-way left-turn lanes (see  
4 Figure 3B-7).

5 [Section 8C.04](#) contains information about the placement of lane-use arrow markings in the vicinity  
6 of grade crossings.

7 Guidance:

8 Lane-use arrow markings ~~(see Figure 3B-24)~~ should be used in lanes and [turn bays](#) designated for  
9 the exclusive use of a turning movement. ~~including turn bays, except where engineering judgment  
10 determines that physical conditions or other markings (such as a dotted extension of the lane line  
11 through the taper into the turn bay) clearly discourage unintentional use of a turn bay by through  
12 vehicles.~~ Lane-use arrow markings should also be used in lanes from which movements are allowed  
13 that are contrary to the normal rules of the road (see Drawing B of Figure 3B-13). **The last sentence  
14 of this paragraph was placed in a new paragraph**

15 When used in turn lanes, at least two arrows should be used, one at or near the upstream end of the  
16 full-width turn lane and one an appropriate distance upstream from the stop line or intersection (see  
17 Drawing A of Figure 3B-11).

18 Where opposing offset channelized left-turn lanes exist, lane-use arrow markings should be placed  
19 near the downstream terminus of the offset left-turn lanes to reduce wrong-way movements (see Figure  
20 ~~2B-17~~ [1](#)).

21 Option:

22 An additional arrow or arrows may be used in a turn lane. When arrows are used for a short turn  
23 lane, the second (downstream) arrow may be omitted based on engineering judgment.

24 Support:

25 An arrow at the downstream end of a turn lane can help to prevent wrong way movements.

26 **Standard:**

27 Where through lanes approaching an intersection become mandatory turn lanes, [turn](#) lane-  
28 use arrow markings (see [Drawing A of Figure 3B-11](#) and Figure ~~3B-24~~ [3B-21](#)) shall be used and  
29 shall be accompanied by standard signs.

30 Guidance:

31 Where through lanes approaching an intersection become mandatory turn lanes, *ONLY* word  
32 markings (see Figure ~~3B-23~~ [3B-17](#)) should be used in addition to the required [turn](#) lane-use arrow  
33 markings and signs (see Sections ~~2B-19~~ [2B.29](#) and ~~2B-20~~ [2B.30](#)). These markings and signs should be  
34 placed well in advance of the turn and should be repeated as necessary to [provide the through motorist  
35 advance notification to vacate the lane](#) ~~prevent entrapment and to help the road user select the  
36 appropriate lane in advance of~~ [prior to](#) reaching a [point where roadway geometrics or a queue of  
37 waiting vehicles forces the motorist to make an unintended turn](#) ~~(see Drawing A of Figure 3B-11 3B-  
38 11).~~

39 Option:

40 On freeways or expressways where a through lane becomes a mandatory exit lane, lane-use arrow  
41 markings may be used on the approach to the exit in the dropped lane and in an adjacent optional  
42 through-or-exit lane if one exists.

43 ~~Lane-use, lane-reduction, and wrong-way arrow markings shall be designed as shown in  
44 Figure 3B-24 and in the “Standard Highway Signs and Markings” book (see Section 1A.11).~~ **Not  
45 needed**

46 **Figure 3B-21. Examples of Standard Arrows for Pavement Markings**

1 **Figure 3B-22. Examples of Lane-Use Control Word and Arrow Pavement Markings**

2 **Section 3B.24 Wrong-Way Arrows** **Contains paragraphs 36 and 37 from existing Section**  
3 **3B.20**

4 *Guidance:*

5 *Where crossroad channelization or ramp geometrics do not make wrong-way movements difficult,*  
6 *the appropriate lane-use arrow should be placed in each lane of an exit ramp near the crossroad*  
7 *terminal where it will be clearly visible to a potential wrong-way road user (see Figure ~~2B-18~~2B-12).*

8 *Option:*

9 The wrong-way arrow markings shown in Drawing D in Figure ~~3B-24~~ 3B-21 may be placed near  
10 the downstream terminus of a ramp as shown in Figures ~~2B-18~~2B-12 and ~~2B-19~~2B-13A, or at other  
11 locations where lane-use arrows are not appropriate, to indicate the correct direction of traffic flow and  
12 to discourage drivers from traveling in the wrong direction.

13 **Section ~~3B.24~~ 3B.25 Chevron and Diagonal ~~Crosshatch~~ Markings**

14 *Option:*

15 ~~Chevron and diagonal crosshatch markings may be used to discourage travel on certain paved~~  
16 ~~areas, such as shoulders, gore areas, flush median areas between solid double yellow center line~~  
17 ~~markings or between white channelizing lines approaching obstructions in the roadway (see Section~~  
18 ~~3B.10 and Figure 3B-15), between solid double yellow center line markings forming flush medians or~~  
19 ~~channelized travel paths at intersections (see Figures 3B-2 and 3B-5), buffer spaces between~~  
20 ~~preferential lanes and general purpose lanes (see Figures 3D-2 and 3D-4), and at grade crossings (see~~  
21 ~~Part 8).~~

22 *Support:*

23 Chevron or diagonal markings are used to discourage travel on certain paved areas, such as  
24 shoulders, neutral areas, and flush median areas.

25 *Guidance:*

26 *Chevron markings should be used:*

27 *A. On approaches to obstructions in the roadway (see Section 3B.13), or*

28 *B. For channelized travel paths on approaches to intersections (see Figure 2B-12), or*

29 *C. In buffer spaces between preferential lanes and general-purpose lanes (see Drawing A of*  
30 *Figure 3E-2), or*

31 *D. In the neutral area of exit ramp and entrance ramp gores (see Figure 3B-8, Drawing A of*  
32 *Figure 3B-9, and Figure 3B-10), or*

33 *E. In the neutral area of bifurcations created from open-road tolling lanes that bypass a*  
34 *conventional toll plaza, or*

35 *F. In neutral areas, where used, at access and egress points to and from a managed-lane facility*  
36 *(see Figures 2G-9, 2G-10, 2G-22, 2G-23, and 2G-25) and,*

37 *G. In neutral areas of islands (see Figures 3J-1 through 3J-3).*

38 *Option:*

39 Chevron markings may be supplemented with white retroreflective or internally illuminated raised  
40 pavement markers (see Sections 3B.15 and 3B.17) for enhanced nighttime visibility.

41 Chevron markings may be used at other locations for special emphasis where traffic flows in the  
42 same general direction as determined by engineering judgment.

43 **Standard:**

1 When ~~chevron crosshatch~~ markings are used in paved areas that separate traffic flows in the  
2 same general direction, they shall be white ~~and they shall be shaped as chevron markings~~, with  
3 the point of each chevron facing toward approaching traffic, as shown in Figure 3B-8, Drawing A  
4 of Figure 3B-9, Figure 3B-10, ~~and~~ Drawing C of Figure 3B-15 and Figures 3J-1 through 3J-3.

5 Guidance:

6 *Diagonal markings for opposing directions of traffic should be used:*

7 *A. On approaches to obstructions in the roadway (see Figure 3B-15), or*

8 *B. In flush median areas between double solid yellow center line markings (see Figure 3B-5), or*

9 *C. In buffer spaces between preferential lanes and general-purpose lanes (see Drawing D of*  
10 *Figure 3E-4).*

11 Option:

12 Diagonal markings may be used on paved shoulders on paved shoulders or in no-parking zones.

13 Diagonal markings may be used at other locations for special emphasis where traffic flows in the  
14 opposite direction as determined by engineering judgment.

15 Standard:

16 When ~~diagonal crosshatch~~ markings are used in paved areas that separate opposing  
17 directions of traffic, they shall be yellow diagonal markings that slant away from traffic in the  
18 adjacent travel lanes, as shown in Figures 3B-2 and 3B-5 and Drawings A and B of Figure 3B-15.

19 When ~~diagonal crosshatch~~ markings are used on paved shoulders or in on-street no-parking  
20 zones (see Figure 3B-24), they shall be diagonal markings that slant away from traffic in the  
21 adjacent travel lane. The diagonal markings shall be yellow when used on the left-hand shoulders  
22 of the roadways of divided highways and on the left-hand shoulders of one-way streets or ramps.  
23 The diagonal markings shall be white when used on right-hand shoulders.

24 Guidance:

25 Except as provided in Paragraph 13, ~~The chevrons and diagonal lines used for crosshatch~~  
26 ~~chevrons and diagonal~~ markings should be at least 12 inches wide for roadways having a ~~posted or~~  
27 ~~statutory~~ speed limit of 45 mph or greater, ~~and~~ at least 8 inches wide for roadways having ~~posted or~~  
28 ~~statutory~~ speed limit of less than 45 mph, ~~and~~ at least 4 inches wide on roadways where the operating  
29 speed is less than 25 mph. The longitudinal spacing of the chevrons or diagonal lines should be  
30 determined by engineering judgment considering factors such as speeds and desired visual impacts.  
31 The chevrons and diagonal lines should form an angle of approximately 30 to 45 degrees with the  
32 longitudinal lines that they intersect.

33 Diagonal markings used in on-street no-parking zones should be white.

34 Option:

35 The lines used for diagonal markings in no-parking zones may be 4 inches wide (see Figure 3B-24).

36 **Section ~~3B.17~~ 3B.26 Do Not Block Intersection Markings**

37 Option:

38 Do Not Block Intersection markings may be used to mark the edges of an intersection area that is in  
39 close proximity to a signalized intersection, railroad crossing, or other nearby traffic control that might  
40 cause vehicles to stop within the intersection and impede other traffic entering the intersection. If  
41 authorized by law, Do Not Block Intersection markings with appropriate signs may also be used at  
42 other locations.

43 Standard:

44 **If used, Do Not Block Intersection markings (see Figure ~~3B-18~~ 3B-23) shall consist of one of**  
45 **the following alternatives:**

- 1 A. Wide solid white lines that outline the intersection area that vehicles must not block;
- 2 B. Wide solid white lines that outline the intersection area that vehicles must not block and a
- 3 white word message such as DO NOT BLOCK or KEEP CLEAR;
- 4 C. Wide solid white lines that outline the intersection area that vehicles must not block and
- 5 white cross-hatching within the intersection area; or
- 6 D. A white word message, such as DO NOT BLOCK or KEEP CLEAR, within the
- 7 intersection area that vehicles must not block.

8 Do Not Block Intersection markings shall be accompanied by one or more DO NOT BLOCK  
9 INTERSECTION (DRIVEWAY) (CROSSING) (R10-7) signs (see Section ~~2B.53~~ 2B.63), one or  
10 more DO NOT STOP ON TRACKS (R8-8) signs (see Section ~~8B.09~~ 8B.07), or one or more  
11 similar signs.

12 **Figure 3B-23. Do Not Block Intersection Markings**

13 ~~Section 3B.19-3B.27~~ **Parking Space Markings** **The sequence of some of the paragraphs**  
14 **has been revised**

15 **Support:**

16 ~~Marking of parking space boundaries encourages more orderly and efficient use of parking spaces~~  
17 ~~where parking turnover is substantial. Parking space markings tend to prevent encroachment into fire~~  
18 ~~hydrant zones, bus stops, loading zones, approaches to intersections, curb ramps, and clearance spaces~~  
19 ~~for islands and other zones where parking is restricted. The first two sentences are not needed~~  
20 ~~Examples of parking space markings are shown in Figure 3B-21. The last sentence was edited and~~  
21 ~~relocated to later in the section~~

22 **Standard:**

23 On-street parking space markings shall be white.

24 **Support:**

25 Examples of on-street parking space markings are shown in Figure 3B-24.

26 **Option:**

27 Blue lines may supplement white parking space markings of each parking space designated for use  
28 only by persons with disabilities (see Figure 3B-24).

29 **Support:**

30 Additional parking space markings for the purpose of designating spaces for use only by persons  
31 with disabilities are discussed in Section ~~3B.20-3B.22~~ and illustrated in Figure ~~3B-22-3B-19~~. ~~The~~  
32 ~~design and layout of accessible parking spaces for persons with disabilities is provided in the~~  
33 ~~“Americans with Disabilities Act Accessibility Guidelines (ADAAG)” (see Section 1A.11). Not~~  
34 ~~needed~~

35 **Figure 3B-24. Examples of Parking Space Markings**

36 ~~Section 3B.21~~ **Speed Measurement Markings** **Section deleted**

37 **Section ~~3B.22~~ 3B.28 Speed Reduction Markings**

38 **Support:**

39 Speed reduction markings (see Figure ~~3B-28~~ 3B-25) are transverse markings that are placed on the  
40 roadway within a lane (along both edges of the lane) in a pattern of progressively reduced spacing to  
41 give drivers the impression that their speed is increasing. These markings might be placed in advance  
42 of an unexpectedly severe horizontal or vertical curve or other roadway feature where drivers need to  
43 decelerate prior to reaching the feature and where the desired reduction in speeds has not been achieved  
44 by the installation of warning signs and/or other traffic control devices.

1 [Speed Reduction Markings have been shown to enhance safety around curves and locations with a](#)  
2 [history of run off the road crashes when applied in combination with horizontal alignment warning](#)  
3 [signs \(See Section 2C.05\).](#)

4 *Guidance:*

5 *If used, speed reduction markings should be reserved for unexpected curves and should not be used*  
6 *on long tangent sections of roadway or in areas frequented mainly by local or familiar drivers, (e.g.,*  
7 *school zones). If used, speed reduction markings should supplement the appropriate warning signs and*  
8 *other traffic control devices and should not substitute for these devices.*

9 **Standard:**

10 ~~If used, S~~ speed reduction markings shall be a series of white transverse lines on both sides of  
11 the lane that are perpendicular to the center line, edge line, or lane line. ~~The longitudinal spacing~~  
12 ~~between the markings shall be progressively reduced from the upstream to the downstream end~~  
13 ~~of the marked portion of the lane.~~ The second sentence was reduced to a Guidance statement and  
14 made into its own paragraph

15 *Guidance:*

16 *The longitudinal spacing between the markings should be progressively reduced from the upstream*  
17 *to the downstream end of the marked portion of the lane.*

18 *Speed reduction markings should not be greater than 12 inches in width, and should not extend*  
19 *more than 18 inches into the lane.*

20 **Standard:**

21 Speed reduction markings shall ~~not~~ be used [only](#) in lanes that ~~do not~~ have a longitudinal line  
22 (center line, edge line, or lane line) on both sides of the lane.

23 **Figure 3B-25. Example of the Application of Speed Reduction Markings**

#### 24 Section ~~3B.25~~ [3B.29](#) Speed Hump Markings

25 **Standard:**

26 If speed hump markings are used, they shall be a series of white markings placed on a speed  
27 hump to identify its location. If markings are used for a speed hump that does not also function  
28 as a crosswalk or speed table, the markings shall comply with Option A, B, or C shown in Figure  
29 ~~3B-29~~ [3B-26](#). If markings are used for a speed hump that also functions as a crosswalk or speed  
30 table, the markings shall comply with Option A or B shown in Figure ~~3B-30~~ [3B-27](#).

31 Option:

32 [Where used, center line markings, lane line markings, and edge lines may be discontinued on the](#)  
33 [profile of the speed hump.](#)

34 **Standard:**

35 [Where a speed hump specifically incorporates a crossing movement for pedestrians, bicycles,](#)  
36 [equestrians, etc. and functions as a raised crosswalk, crosswalk markings \(see Chapter 3C\) shall](#)  
37 [be provided.](#)

38 **Figure 3B-26. Pavement Markings for Speed Humps without Crosswalks**

39 **Figure 3B-27. Pavement Markings for Speed Tables or Speed Humps with**  
40 **Crosswalks**

#### 41 Section ~~3B.26~~ [3B.30](#) Advance Speed Hump Markings

42 Option:

1 Advance speed hump markings (see Figure ~~3B-31~~3B-28) may be used in advance of speed humps  
2 or other engineered vertical roadway deflections such as dips where added visibility is desired or where  
3 such deflection is not expected.

4 Advance word pavement ~~wording~~ markings such as BUMP or HUMP (see Section 3B.20) may be  
5 used on the approach to a speed hump either alone or in conjunction with advance speed hump  
6 markings. Appropriate advance warning signs may be used in compliance with Section ~~2C.29~~2C.28.

7 **Standard:**

8 **If advance speed hump markings are used, they shall be a series of eight white 12-inch**  
9 **transverse lines that become longer and are spaced closer together as the vehicle approaches the**  
10 **speed hump or other deflection. If advance markings are used, they shall comply with the**  
11 **detailed design shown in Figure ~~3B-31~~3B-28.**

12 **Guidance:**

13 If used, advance speed hump markings should be installed in each approach lane.

14 **Figure 3B-28. Advance Warning Markings for Speed Humps**

15 **Section 3B.31 Markings for Diamond Interchange with Transposed Alignment**  
16 **Crossroad**

17 **Support:**

18 Markings used in a diamond interchange with transposed alignment crossroad can be advantageous  
19 for minimizing wrong-way movements. The potential for wrong-way movements is greatest at the  
20 intersections where the alignment becomes transposed.

21 **Standard:**

22 **On the transposed alignment, each direction shall be considered a one-way roadway whereas**  
23 **the edge line convention shall be in accordance with Section 3B.09. Both yellow and white edge**  
24 **lines shall be used.**

25 **A lane-use arrow (see Section 3B.23) shall be used in each approach lane at the crossing point.**

26 **Support:**

27 Section 3C.11 contains information on crosswalks and pedestrian movements for diamond  
28 interchanges with a transposed alignment crossroad.

29 **Standard:**

30 **Flush median islands (see Section 3J.03) shall not be used to divide the inverted flow of traffic.**

31 **Guidance:**

32 Edge line and lane lines extensions (see Section 3B.11) should be provided through the crossing  
33 points.

34 **Support:**

35 Figure 3B-29 illustrates an example of pavement markings for a diamond interchange with a  
36 transposed alignment crossroad.

37 **Figure 3B-29. Example of Pavement Markings for a Diamond Interchange with a**  
38 **Transposed Alignment Crossroad**

1 CHAPTER 3C. CROSSWALKS

2 Section ~~3B.18~~ 3C.01 Crosswalk Markings General

3 Standard:

4 Crosswalk markings shall be provided at non-intersection crosswalk locations.

5 Support:

6 Crosswalk markings provide guidance for pedestrians who are crossing roadways by defining and  
7 delineating paths on approaches to and within signalized intersections, and on approaches to other  
8 intersections where traffic stops.

9 In conjunction with signs and other measures, crosswalk markings help to alert road users of a  
10 designated pedestrian crossing point across roadways at locations that are not controlled by traffic  
11 control signals or STOP or YIELD signs.

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

13 Option:

14 ~~For added visibility, the area of the crosswalk may be marked with white diagonal lines at a 45-~~  
15 ~~degree angle to the line of the crosswalk or with white longitudinal lines parallel to traffic flow as~~  
16 ~~shown in Figure 3B-19. **This paragraph relocated to Section 3C.07 and edited**~~

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

22 Guidance:

23 ~~If used, the diagonal or longitudinal lines should be 12 to 24 inches wide and separated by gaps of~~  
24 ~~12 to 60 inches. The design of the lines and gaps should avoid the wheel paths if possible, and the gap~~  
25 ~~between the lines should not exceed 2.5 times the width of the diagonal or longitudinal lines. **This**~~  
26 ~~**paragraph relocated to new Sections 3C.06, 3C.07, and 3C.08**~~

27 Support:

28 Detectable warning surfaces mark boundaries between pedestrian and vehicular ways where there is  
29 no raised curb. Detectable warning surfaces are required by 49 CFR, Part 37 and by the Americans with  
30 Disabilities Act (ADA) where curb ramps are constructed at the junction of sidewalks and the roadway,  
31 for marked and unmarked crosswalks. Detectable warning surfaces contrast visually with adjacent  
32 walking surfaces, either light-on-dark, or dark-on-light. The "Americans with Disabilities Act  
33 Accessibility Guidelines for Buildings and Facilities (ADAAG)" (see Section ~~1A.11~~ 1A.05) contains  
34 specifications for design and placement of detectable warning surfaces.

35 Provisions for aesthetic treatments for the interior portion of a legally established crosswalk are  
36 contained in Section 3H.03.

37 Standard:

38 If paving materials are used to function as the white transverse lines to establish a marked  
39 crosswalk, white additives shall be part of the mixture to produce a white surface. The white  
40 paving materials shall be retroreflective.

41 Section 3C.02 Application of Crosswalk Markings **Contains paragraphs 7, 8, 9, and 10 from**  
42 **existing Section 3B.18**

43 Support:

44 Chapter ~~4F-4J~~ contains information on Pedestrian Hybrid Beacons. Section ~~4L-03~~ 4S.03 contains  
45 information regarding Warning Beacons to provide active warning of a pedestrian's presence. Section  
46 ~~4N-02~~ 4U.02 contains information regarding In-Roadway Warning Lights at crosswalks. Chapter 7C

1 contains information on school crosswalks. Chapter 7D contains information regarding school crossing  
2 supervision.

3 *Guidance:*

4 *Crosswalk ~~lines-markings~~ should not be used indiscriminately. An engineering study should be*  
5 *performed before a marked crosswalk is installed at a location away from a traffic control signal or an*  
6 *approach controlled by a STOP or YIELD sign. ~~The engineering study should consider the number of~~*  
7 *lanes, the presence of a median, the distance from adjacent signalized intersections, the pedestrian*  
8 *volumes and delays, the average daily traffic (ADT), the posted or statutory speed limit or 85th-*  
9 *percentile speed, the geometry of the location, the possible consolidation of multiple crossing points,*  
10 *the availability of street lighting, and other appropriate factors.*

11 The following criteria should be considered in an engineering study for the installation of a marked  
12 crosswalk:

13 A. Total number of approach lanes,

14 B. The presence of a median,

15 C. The distance from adjacent signalized intersections where crosswalks are provided,

16 D. Pedestrian volumes,

17 E. Pedestrian ages,

18 F. Pedestrian delays,

19 G. Average daily traffic (ADT),

20 H. Speed limit or the 85<sup>th</sup>-percentile speed,

21 I. The geometry of the crossing location,

22 J. The possible consolidation of multiple crossing points,

23 K. The availability of street lighting, and

24 L. Other appropriate factors.

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

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

31 *B. The roadway has four or more lanes of travel with a raised median or pedestrian refuge island*  
32 *and an ADT of 15,000 vehicles per day or greater, or*

33 C. The posted speed limit is 40 mph or greater, or

34 D. A crash study reveals that multiple-threat crashes are the predominant crash type on a multi-  
35 lane approach or when adequate visibility cannot be provided by parking prohibitions.

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

39 **Section 3C.03 Design of Crosswalk Markings Contains paragraphs 4, 11, 12, and 17**  
40 **from existing Section 3B.18**

41 *Support:*

42 *Section ~~3B.21-3B.19~~ contains information regarding placement of stop line markings near*  
43 *crosswalk markings.*

44 **Standard:**

1 ~~When crosswalk lines are used, they shall consist of solid white lines that mark the crosswalk.~~  
2 ~~They shall not be less than 6 inches or greater than 24 inches in width.~~ Crosswalk markings shall  
3 be white. When used, transverse lines shall not be less than 6 inches or greater than 24 inches in  
4 width.

5 Support:

6 The allowable upper limit approaching 24 inches for the width of the transverse lines is normally  
7 applied where no stop or yield line is used in advance of the crosswalk or when approach speeds exceed  
8 35 miles per hour.

9 Crosswalk markings are classified as basic or high visibility. Basic crosswalk markings consist of  
10 two transverse lines. High visibility markings consist of longitudinal lines parallel to traffic flow with  
11 or without transverse lines. Figure 3C-1 presents examples of crosswalk markings.

12 Standard:

13 Except as provided in Paragraph 5, the minimum width of a marked crosswalk shall be 6 feet.

14 At a non-intersection crosswalk where the posted speed limit is 40 mph or greater, the  
15 minimum width of the crosswalk shall be 8 feet.

16 Guidance:

17 *Because non-intersection pedestrian crossings are generally unexpected by the road user, warning*  
18 *signs (see Section ~~2C.50-2C.55~~) and high visibility crosswalk markings (such as shown in Figure 3C-1)*  
19 *should be installed for all ~~marked~~ crosswalks at non-intersection locations ~~and adequate visibility~~*  
20 *should be provided by parking prohibitions.*

21 Option:

22 Added visibility may be provided by parking prohibitions on the approach to marked crosswalks.

23 Standard:

24 Where curb ramps are provided, crosswalk markings shall be located so that the curb ramps  
25 are within the extension of the crosswalk markings.

26 Guidance:

27 Transverse crosswalk markings should extend across the full width of pavement or to the edge of  
28 the intersecting crosswalk to discourage diagonal walking between crosswalks.

29 **Section 3C.04 Basic Crosswalks**

30 Support:

31 The basic crosswalk marking design is limited to two parallel transverse lines (See Figure 3C-1).

32 Option:

33 Basic crosswalk markings may be used if an engineering study determines that establishing a  
34 crosswalk would be beneficial to:

35 A. Define where the channelization of pedestrians or other non-motorized users is necessary to  
36 facilitate crossing the roadway.

37 B. Alert motorists to the location of where pedestrians and other non-motorized users may be  
38 expected when crossing the roadway.

39 C. Establish a crosswalk at a controlled intersection.

40 D. Fulfill a legal need to mark the crosswalk.

41 **Figure 3C-1. Examples of Crosswalk Markings**

42 **Section 3C.05 High-Visibility Crosswalks**

43 Option:

1 High-visibility crosswalk markings may be used where additional conspicuity is desired for a  
2 crosswalk over basic transverse crosswalk markings.

3 Support:

4 High-visibility crosswalk markings are limited to the Longitudinal Bar, Perpendicular, and Double  
5 Paired designs (See Figure 3C-1).

6 High-visibility crosswalk markings can provide benefits to crosswalk operations including:

7 A. Providing greater detection distances for the approaching motorist.

8 B. Establishing a crosswalk where substantial numbers of pedestrians cross without any other  
9 traffic control device.

10 C. Establishing a crosswalk at an uncontrolled intersection.

11 D. Emphasizing the location where a high number of conflicts between turning motorists and users  
12 of the crosswalk are expected.

13 E. Improving visibility of the crosswalk location for otherwise difficult to detect pedestrians or  
14 other non-motorized users of the crosswalk.

15 F. Establishing a school crossing.

16 **Standard:**

17 **The minimum number of individual longitudinal elements to establish a high-visibility**  
18 **crosswalk shall be three. For the double-paired crosswalk design (see Section 3C.08), a coupling**  
19 **set of two longitudinal bars shall be considered to be one individual longitudinal element.**

20 **The dimensions of the individual longitudinal element and the lateral spacing between**  
21 **subsequent individual longitudinal elements for a high-visibility crosswalk shall be uniform when**  
22 **establishing the crosswalk.**

23 **The dimensions of the individual longitudinal element and the lateral spacing between**  
24 **subsequent individual longitudinal elements for a high-visibility crosswalk shall be uniform on**  
25 **both sides of a median refuge island if one is present.**

26 Guidance:

27 The dimensions of the individual longitudinal element and the lateral spacing between subsequent  
28 individual longitudinal elements for a high-visibility crosswalk should be uniform when establishing  
29 separate crosswalks on multiple approaches to the same intersection.

30 The individual longitudinal elements of a high-visibility crosswalk should be angled such that they  
31 are parallel to approaching traffic.

### 32 **Section 3C.06 Longitudinal Bar Crosswalks**

33 Support:

34 The longitudinal bar crosswalk marking design provides for improved detection and recognition  
35 over the basic crosswalk for people with low vision and cognitive impairments.

36 **Standard:**

37 **The width of an individual longitudinal bar shall not be less than 12 inches or greater than 24**  
38 **inches.**

39 **The lateral spacing between subsequent longitudinal bars shall not be less than 12 inches or**  
40 **greater than 60 inches. The lateral spacing of the longitudinal bars shall not exceed 2.5 times the**  
41 **width of a longitudinal bar.**

### 42 **Section 3C.07 Perpendicular Crosswalks**

43 Support:

44 Perpendicular crosswalks implement a pattern where interior longitudinal bars are perpendicular to  
45 the transverse lines used to define the limits of the crosswalk.

1 Since the longitudinal component of the perpendicular crosswalk marking design is similar to the  
2 benefits provided by the longitudinal bar crosswalk design, the perpendicular crosswalk design is  
3 normally used to discourage or prohibit diagonal walking between crosswalks.

4 **Standard:**

5 The transverse lines used to establish the limits of the perpendicular crosswalk shall not be  
6 less than 6 inches or greater than 24 inches in width.

7 The width of an individual interior longitudinal bar shall not be less than 12 inches or greater  
8 than 24 inches.

9 The lateral spacing between subsequent interior longitudinal bars shall not be less than 12  
10 inches or greater than 60 inches. The lateral spacing of the interior longitudinal bars shall not  
11 exceed 2.5 times the width of an interior longitudinal bar.

12 **Option:**

13 Where it may be necessary to alleviate a parallax phenomenon due to approaching roadway  
14 geometry that curves or to accommodate low approach angles of the approaching motorist, the interior  
15 longitudinal bars may be rotated up to 45 degrees to the transverse lines to remain parallel to  
16 approaching traffic.

17 **Section 3C.08 Longitudinal Bar Pair Crosswalks**

18 **Support:**

19 Longitudinal bar pair crosswalks can provide the same benefits as other high visibility crosswalk  
20 designs with the opportunity for less maintenance.

21 Longitudinal bar pair crosswalks can be useful in locations that are susceptible to slip and fall  
22 incidents exacerbated by extreme or inclement weather, or in locations where high motorcycle or  
23 bicycle use is expected in order to maximize wheel traction with the road surface.

24 **Standard:**

25 The width of an individual longitudinal bar that establishes one-half of the bar pair shall not  
26 be less than 8 inches or greater than 12 inches. The lateral space between successive individual  
27 longitudinal bars within the same bar pair shall be equal to the width of one longitudinal bar.

28 The lateral spacing between each of the longitudinal bars in a bar pair shall not be less than  
29 24 inches or greater than 60 inches, or 2.5 times the width of the total width of a bar pair.

30 Longitudinal bar pair crosswalks shall not be installed with accompanying transverse lines.

31 **Section ~~3C.05~~ 3C.09 Crosswalk Markings at ~~Roundabouts~~ Circular Intersections**

32 **Standard:**

33 Crosswalk markings shall not be provided ~~Pedestrian crosswalks shall not be marked to or~~  
34 ~~from the central island of roundabouts.~~

35 **Guidance:**

36 *If pedestrian facilities are provided, crosswalks (~~see Section 3B.18~~) should be marked across*  
37 *roundabout entrances and exits to indicate where pedestrians are intended to cross.*

38 *Crosswalks should be a minimum of 20 feet from the edge of the circulatory roadway.*

39 **Support:**

40 ~~Various arrangements of crosswalks at roundabouts are illustrated in the figures in this Chapter.~~

41 **Not needed**

42 Chapter 3D provides figures that illustrate examples of crosswalk markings in circular  
43 intersections.

1 **Section 3C.10 Crosswalks for Exclusive Pedestrian Phases that Permit Diagonal**  
2 **Crossings**

3 Option:

4 When an exclusive pedestrian phase that permits diagonal crossing of an intersection is provided at  
5 a traffic control signal, a marking as shown in Figure ~~3B-20~~ 3C-2 may be used for the crosswalk.

6 **Paragraph 16 from existing Section 3B.18**

7 Guidance:

8 *The segments of the crosswalk marking that facilitate the diagonal crossing should not use high-*  
9 *visibility crosswalk markings.*

10 **Figure 3C-2. Example of Crosswalk Markings for an Exclusive Pedestrian Phase that**  
11 **Permits a Diagonal Crossing**

12 **Section 3C.11 Crosswalks at Diamond Interchanges with a Transposed Alignment**  
13 **Crossroad**

14 Support:

15 Pedestrian crossing movements at a diamond interchange with a transposed alignment crossroad are  
16 provided at the crossover points where motor vehicle traffic becomes inverted.

17 Pedestrian crossing movements provided downstream on the ramp terminals can violate driver  
18 expectancy. Devices such as the pedestrian hybrid beacon and the rectangular-rapid flashing beacon do  
19 not alleviate these deficiencies in this setting.

20 Pedestrian crossing movements provided downstream on the ramp terminals can disorient  
21 pedestrians with limited vision or cognitive impairments by subjecting the pedestrian to cross the same  
22 ramp twice.

23 Guidance:

24 *Crossings for pedestrians at diamond interchanges with a transposed alignment crossroad should*  
25 *be consolidated and provided where pedestrian desire lines have been demonstrated or established.*

26 *The most direct pedestrian paths should be provided to minimize pedestrians whom may cross*  
27 *outside of crosswalks where drivers are less likely to expect them.*

28 Option:

29 Where the pedestrian movement is facilitated using the median on a shared-use path, Destination  
30 Guide signs for shared-use paths may be used (see Section 9D.12).

31 Support:

32 Figure 3B-29 illustrates the location of pedestrian crossings at diamond interchanges with a  
33 transposed alignment crossroad.

34 **Section ~~3I.06~~ 3C.12 Pedestrian Islands and Medians**

35 Support:

36 Raised islands or medians of sufficient width that are placed in the center area of a street or  
37 highway can serve as a place of refuge for pedestrians who are attempting to cross at a midblock or  
38 intersection location. Center islands or medians allow pedestrians to find an adequate gap in one  
39 direction of traffic at a time, as the pedestrians are able to stop, if necessary, in the center island or  
40 median area and wait for an adequate gap in the other direction of traffic before crossing the second  
41 half of the street or highway. The minimum widths for accessible refuge islands and for design and  
42 placement of detectable warning surfaces are provided in the “Americans with Disabilities Act  
43 Accessibility Guidelines for Buildings and Facilities (ADAAG)” (see Section ~~1A.11~~ 1A.05).  
44

1 CHAPTER ~~3C-3D~~. ROUNDABOUT-CIRCULAR INTERSECTION MARKINGS

2 Section ~~3C.01- 3D.01~~ General

3 Support:

4 A roundabout (see definition in Section 1A.13) is a specific type of circular intersection designed to  
5 control speeds and having specific traffic control features. **Not needed**

6 Guidance:

7 Pavement markings and signing for a roundabout should be integrally designed to correspond to  
8 the geometric design and intended lane use of a roundabout.

9 Markings on the approaches to a roundabout and on the circulatory roadway should be compatible  
10 with each other to provide a consistent message to road users ~~and should facilitate movement through~~  
11 ~~the roundabout such that vehicles do not have to change lanes within the circulatory roadway in order~~  
12 ~~to exit the roundabout in a given direction.~~ The markings should supplement the signing, both  
13 conveying the optional and mandatory movements such that road users will know to choose the proper  
14 lane in the approach to the roundabout and remain in that lane throughout departure from the  
15 circulatory roadway.

16 Support:

17 Figure ~~3C-13D-1~~ provides an example of the pavement markings for approach and circulatory  
18 roadways at a roundabout. ~~Figure 3C-2 shows the options that are available for lane use pavement~~  
19 ~~marking arrows on approaches to roundabouts.~~ Figures ~~3C-3 3D-2~~ through ~~3C-14 3D-8~~ illustrate  
20 examples of markings for roundabouts of various geometric and lane-use configurations. **First two**  
21 **sentences are not needed**

22 Traffic control signals, ~~or~~ pedestrian hybrid beacons, and rectangular rapid flashing beacons (see  
23 Part 4) are sometimes used at roundabouts to facilitate the crossing of pedestrians ~~or to meter traffic~~.

24 Section ~~8C.12 8A.12~~ contains information about roundabouts that contain or are in close proximity  
25 to grade crossings.

26 Section ~~9C.04 9E.05~~ contains information regarding bicycle lane markings at roundabouts. **This**  
27 **paragraph relocated from existing Section 3C.02**

28 **Figure 3D-1. Example of Markings for Approach and Circulatory Roadways at a**  
29 **Roundabout**

30 **Figure 3D-2. Example of Markings for a One-Lane Roundabout**

31 **Figure 3D-3. Example of Markings for a Two-Lane Roundabout with One- and Two-**  
32 **Lane Approaches (2 sheets)**

33 **Figure 3D-4. Example of Markings for a Two-Lane Roundabout with One-Lane**  
34 **Exits**

35 **Figure 3D-5. Example of Markings for a Two-Lane Roundabout with Two-Lane**  
36 **Exits**

37 **Figure 3D-6. Example of Markings for a Two-Lane Roundabout with a Double Left**  
38 **Turn**

39 **Figure 3D-7. Example of Markings for a Two-Lane Roundabout with a Double Right**  
40 **Turn**

41 **Figure 3D-8. Example of Markings for a Diamond Interchange with Two Circular-**  
42 **Shaped Roundabout Ramp Terminals**

43 Section ~~3C.02-3D.02~~ White Lane Line Pavement Markings for Roundabouts

44 Standard:

1 Multi-lane approaches to roundabouts shall have lane lines.

2 A through lane on a roadway that becomes a dropped lane (mandatory [left-turn](#) or [right-turn](#)  
3 lane) at a roundabout shall be marked with a dotted white lane line in accordance with Section  
4 ~~3B.04~~ [3B.07](#).

5 *Guidance:*

6 *Multi-lane roundabouts should have lane line markings within the circulatory roadway to*  
7 *[continuously](#) channelize traffic [in the circulatory roadway and through the departure movement.](#) ~~to the~~*  
8 *~~appropriate exit lane.~~*

9 **Standard:**

10 Continuous concentric lane lines shall not be used within the circulatory roadway of  
11 roundabouts.

12 Option:

13 [If broken lane line markings are used in the circulatory roadway of multi-lane roundabouts, the](#)  
14 [spacing of a broken lane line may be altered to reduce the gap between 10-ft lane lines \(down to a 10-ft](#)  
15 [space between lines\).](#)

16 [A buffer space, also referred to as striped islands, may be used on the approaches to multilane](#)  
17 [roundabouts including the circulatory roadway to separate traffic lanes, discourage lane changing,](#)  
18 [and/or compensate for off-tracking of larger trucks and vehicles.](#)  
19 [roundabouts.](#)

20 Support:

21 [Reducing the spacing between lines of a broken lane line allows better delineation of the lower radius](#)  
22 [curves typically found in circular intersections.](#)

23 ~~Support:~~

24 ~~Section 9C.04 contains information regarding bicycle lane markings at roundabouts.~~ **This**  
25 **Paragraph relocated to new Section 3D.01**

26 **Section ~~3C.03~~ [3D.03](#) Edge Line Pavement Markings for Roundabout Circulatory**  
27 **Roadways**

28 *Guidance:*

29 *A white edge line should be used on the outer (right-hand) side of the circulatory roadway.*

30 *Where a white edge line is used for the circulatory roadway, it should be as follows (see Figure ~~3C-~~*  
31 *~~3D-1~~):*

32 *A. A solid line adjacent to the splitter island, and*

33 *B. A wide dotted line across the lane(s) entering the roundabout.*

34 **Standard:**

35 **Edge lines and edge line extensions shall not be placed across the exits from the circulatory**  
36 **roadway at roundabouts.**

37 Option:

38 A yellow edge line may be placed around the inner (left-hand) edge of the circulatory roadway (see  
39 Figure ~~3C-1~~ [3D-1](#)) and may be used to channelize traffic (see Drawing B of Figure ~~3C-4~~ [3D-3](#)).

40 **Section ~~3C.04~~ [3D.04](#) Yield Lines for Roundabouts**

41 Standard:

42 [A yield line \(see Section 3B.19\) shall be used at multilane roundabout entries to indicate the](#)  
43 [point in each entry lane behind which vehicles are required to yield to all circulating lanes at the](#)  
44 [entrance to a roundabout \(see Figure 3D-2\).](#)

1 Support:

2 See Section 2B.09 regarding the TO ALL LANES (R1-2bP) plaque use beneath the YIELD sign.

3 Option:

4 A yield line may be used at single-lane roundabout entries to indicate the point behind which  
5 vehicles are required to yield at the entrance to a roundabout.

6 ~~Option:~~

7 ~~A yield line (see Section 3B.16 3B.19) may be used to indicate the point behind which vehicles are~~  
8 ~~required to yield at the entrance to a roundabout (see Figures 3C-1 3D-1 and 3D-2).~~

9 ~~Section 3C.05 Crosswalks Markings at Roundabouts~~ Relocated to new Section 3C.05

10 Section ~~3C.06~~ 3D.05 ~~Word, and Symbol, and Arrow~~ Pavement Markings for

11 Roundabouts Paragraphs 1, 4, 5, and 6 relocated to new Section 3D.06

12 Option:

13 YIELD (word) and YIELD AHEAD (symbol or word) pavement markings (see Figure ~~3C-1~~ 3D-1)  
14 may be used on approaches to roundabouts.

15 Word and/or route shield pavement markings may be used on an approach to or within the  
16 circulatory roadway of a roundabout to provide route and/or destination guidance information to road  
17 users (see Figure ~~3C-14~~ 3D-8).

18 Section 3D.06 Arrow Pavement Markings for Roundabouts Contains paragraphs 1, 4, 5,

19 and 6 from existing Section 3C.06

20 Guidance:

21 Lane-use arrow pavement markings should not be used on single-lane approaches to circular  
22 intersections.

23 On two-lane approaches to circular intersections, where the left-hand lane on the approach is for  
24 left turns, and the right-hand lane contains an optional movement for through- and right-turns, lane-  
25 use arrow pavement markings should not be used in the right-hand lane containing the optional  
26 movement.

27 Lane-use arrows should be used on approaches to circular intersections with dual left or dual right  
28 turns.

29 Standard:

30 Lane-use arrow pavement markings shall not be provided between a crosswalk and a wide  
31 dotted line across the lane(s) entering the circular roadway.

32 Option:

33 ~~Lane-use arrows may be used on any approach to and within the circulatory roadway of any~~  
34 ~~roundabout.~~

35 Where ~~if~~ lane-use arrows are used on ~~the~~ approaches to a roundabout, ~~lane-use arrows~~ they may be  
36 either normal or ~~fish hook elongated~~ arrows, ~~either with or without~~ with an oval symbolizing the central  
37 island, ~~as shown in Figure 3C-2~~.

38 Guidance:

39 If lane-use arrows are used on the approaches to a roundabout, the style used should match the  
40 style of lane-use arrows (normal or elongated) used on the regulatory lane-use signs on the approach.

41 If lane-use arrow pavement markings are used, within the circulatory roadway of multi-lane  
42 roundabouts, normal lane-use arrows (see Section ~~3B-20~~ 3B.23 and Figure ~~3B-24~~ 3B.21) should be  
43 used, with an oval symbolizing the central island.

1 *On multi-lane approaches with double left-turn and/or double right-turn lanes, lane-use arrows as*  
2 *shown in Figures 3C-7 and 3C-8 should be used.*

3 Support:

4 Details and sizes of the standard and elongated arrows that can be used for circular intersections are  
5 contained in the “Standard Highway Signs and Markings” book.

6 **Section ~~3C.07~~ 3D.07 Markings for Other Circular Intersections**

7 Support:

8 ~~Other circular intersections include, but are not limited to, rotaries, traffic circles, and residential~~  
9 ~~traffic-calming designs.~~ **Incorporated into the next paragraph**

10 Option:

11 The markings shown in this Chapter may be used at other circular intersections, such as rotaries,  
12 traffic circles, and residential traffic calming designs, if engineering judgment indicates that their  
13 presence will benefit drivers, pedestrians, or other road users.

14



1       3. ~~A wide broken single white line along both edges of the buffer space, or a wide broken~~  
2 ~~single white lane line within the allocated buffer space (resulting in wider lanes), where crossing~~  
3 ~~the buffer space is permitted (see Drawing C in Figure 3D-2).~~

4       D. ~~Buffer-separated (right hand side) preferential lane—the longitudinal pavement~~  
5 ~~markings for a full-time or part-time preferential lane on the right hand side of and separated~~  
6 ~~from the other travel lanes by a neutral buffer space shall consist of a normal solid single white~~  
7 ~~line at the right hand edge of the preferential travel lane(s) if warranted (see Section 3B.07) and~~  
8 ~~one of the following at the left hand edge of the preferential travel lane(s) (see Drawing D in~~  
9 ~~Figure 3D-2):~~

10       1. ~~A wide solid double white line along both edges of the buffer space where crossing the~~  
11 ~~buffer space is prohibited.~~

12       2. ~~A wide solid single white line along both edges of the buffer space where crossing of the~~  
13 ~~buffer space is discouraged.~~

14       3. ~~A wide broken single white line along both edges of the buffer space, or a wide broken~~  
15 ~~single white line within the allocated buffer space (resulting in wider lanes), where crossing the~~  
16 ~~buffer space is permitted.~~

17       4. ~~A wide dotted single white lane line within the allocated buffer space (resulting in wider~~  
18 ~~lanes) where crossing the buffer space is permitted for any vehicle to perform a right-turn~~  
19 ~~maneuver.~~

20       E. ~~Contiguous (left hand side) preferential lane—the longitudinal pavement markings for a~~  
21 ~~full-time or part-time preferential lane on the left hand side of and contiguous to the other travel~~  
22 ~~lanes shall consist of a normal solid single yellow line at the left hand edge of the preferential~~  
23 ~~travel lane(s) and one of the following at the right hand edge of the preferential travel lane(s):~~

24       1. ~~—A wide solid double white lane line where crossing is prohibited (see Drawing A in~~  
25 ~~Figure 3D-3).~~

26       2. ~~—A wide solid single white lane line where crossing is discouraged (see Drawing B in~~  
27 ~~Figure 3D-3).~~

28       3. ~~—A wide broken single white lane line where crossing is permitted (see Drawing C in~~  
29 ~~Figure 3D-3).~~

30       F. ~~Contiguous (right hand side) preferential lane—the longitudinal pavement markings for a~~  
31 ~~full-time or part-time preferential lane on the right hand side of and contiguous to the other~~  
32 ~~travel lanes shall consist of a normal solid single white line at the right hand edge of the~~  
33 ~~preferential travel lane(s) if warranted (see Section 3B.07) and one of the following at the left-~~  
34 ~~hand edge of the preferential travel lane(s) (see Drawing D in Figure 3D-3):~~

35       1. ~~—A wide solid double white lane line where crossing is prohibited.~~

36       2. ~~—A wide solid single white lane line where crossing is discouraged.~~

37       3. ~~—A wide broken single white lane line where crossing is permitted.~~

38       4. ~~—A wide dotted single white lane line where crossing is permitted for any vehicle to~~  
39 ~~perform a right-turn maneuver.~~ **The same information that is shown in text format in Items A**  
40 **through F is already shown in a tabular format in Table 3E-1**

#### 41 **Table 3E-1. Standard Edge Line and Lane Line Markings for Preferential Lanes**

42       If there are two or more preferential lanes for traffic moving in the same direction, the lane  
43 lines between the preferential lanes shall be normal width broken white lines.

44       Preferential lanes for motor vehicles ~~shall also be marked with the appropriate word or~~  
45 ~~symbol pavement markings in accordance with Section 3D.01 and shall have appropriate~~  
46 ~~regulatory signs in accordance with Sections 2G.03 through 2G.07.~~

1 Support:

2 [Figure 3E-1 illustrates pavement markings used for barrier-separated preferential lanes.](#)

3 *Guidance:*

4 *Engineering judgment should determine the need for supplemental devices such as tubular*  
5 *markers, traffic cones, or other channelizing devices (see Chapter ~~3H-3I~~). **Paragraph 13 from***  
6 ***existing Section 3D.01***

7 *Where preferential lanes and other travel lanes are separated by a buffer space wider than 4 feet*  
8 *and crossing the buffer space is prohibited, chevron markings (see Section ~~3B.24-3B.25~~) should be*  
9 *placed in the buffer area (see Drawing A in Figure ~~3D-2-3E-2~~). The chevron spacing should be 100*  
10 *feet or greater.*

11 *The buffer space for a conventional road should be designed so that it is not misinterpreted as on-*  
12 *street parking, a bicycle lane, or any other type of lane.*

13 *Option:*

14 *If a full-time or part-time contiguous preferential lane is separated from the other travel lanes by a*  
15 *wide broken single white line (see Drawing C in Figure ~~3D-3-3E-3~~), the spacing or skip pattern of the*  
16 *line may be reduced and the width of the line may be increased.*

17 Support:

18 [Figure 3E-2 illustrates pavement markings used for buffer-separated preferential lanes. Figure 3E-](#)  
19 [3 illustrates pavement markings used for contiguous preferential lanes.](#)

20 *Guidance:*

21 *At direct exits from a preferential lane, dotted white line markings should be used to separate the*  
22 *tapered or parallel deceleration lane for the direct exit (including the taper) from the adjacent*  
23 *continuing preferential through lane, to reduce the chance of unintended exit maneuvers.*

24 **Standard:**

25 ~~**On a divided highway, a part-time counter-flow preferential lane that is contiguous to the**~~  
26 ~~**travel lanes in the opposing direction shall be separated from the opposing direction lanes by the**~~  
27 ~~**standard reversible lane longitudinal marking, a normal width broken double yellow line (see**~~  
28 ~~**Section 3B.03 and Drawing A of Figure 3D-4). If a buffer space is provided between the part-**~~  
29 ~~**time counter-flow preferential lane and the opposing direction lanes, a normal width broken**~~  
30 ~~**double yellow line shall be placed along both edges of the buffer space (see Drawing B of Figure**~~  
31 ~~**3D-4). Signs (see Section 2B.26-2B.36), lane-use control signals (see Chapter 4M-4T), or both**~~  
32 ~~**shall be used to supplement the reversible lane markings on a divided highway where a part-time**~~  
33 ~~**counter-flow preferential lane is present. The deleted information is being shown in a new Table**~~  
34 ~~**3E-2**~~

35 ~~**On a divided highway, a full-time counter-flow preferential lane that is contiguous to the**~~  
36 ~~**travel lanes in the opposing direction shall be separated from the opposing direction lanes by a**~~  
37 ~~**solid double yellow center line marking (see Drawing C of Figure 3D-4). If a buffer space is**~~  
38 ~~**provided between the full-time counter-flow preferential lane and the opposing direction lanes, a**~~  
39 ~~**normal width solid double yellow line shall be placed along both edges of the buffer space (see**~~  
40 ~~**Drawing D of Figure 3D-4). The deleted information is being shown in a new Table 3E-2**~~

41 **The longitudinal pavement markings used for preferential lanes that are adjacent to general**  
42 **purpose lanes where traffic is flowing in the opposite direction (see Figure 3E-4) shall be in**  
43 **accordance with Table 3E-2.**

44 **Table 3E-2. Longitudinal Pavement Markings Used for Preferential Lanes**

45 Support:

1 [Figure 3E-4 illustrates pavement markings used for counter-flow preferential lanes on divided](#)  
2 [highways or on transitions to and from other divided highways such as bridges and crossovers.](#)

3 Option:

4 Cones, tubular markers, or other channelizing devices (see Chapter [3H-3I](#)) may also be used [in](#)  
5 [addition to longitudinal markings](#) to separate the opposing lanes when a counter-flow preferential lane  
6 operation is in effect.

7 **Figure 3E-1. Markings for Barrier-Separated Preferential Lanes**

8 **Figure 3E-2. Markings for Buffer-Separated Preferential Lanes (2 sheets)**

9 **Figure 3E-3. Markings for Contiguous Preferential Lanes**

10 **Figure 3E-4. Markings for Counter-Flow Preferential Lanes on Divided Highways**

11 **Section ~~3D.01-3E.03~~ Preferential Lane Word and Symbol Markings** Paragraphs in this  
12 section were reordered, paragraph 1 was relocated to new Section 3E.01 and paragraph  
13 13 was relocated to new Section 3E.02

14 Support:

15 [Sections 3B.20 through 3B.22 contain information on general applications of word and symbol](#)  
16 [markings.](#)

17 Standard:

18 When a lane is assigned full or part time to a particular class or classes of vehicles, the  
19 preferential lane ~~word and symbol markings described in this Section and the preferential lane~~  
20 ~~longitudinal markings described in Section 3D.02~~ shall be [marked with one or more of the](#)  
21 [following word or symbol markings for the preferential lane use specified:](#) ~~used.~~

22 A. HOV lane—~~the preferential lane use marking for high-occupancy vehicle lanes shall~~  
23 ~~consist of~~ white lines formed in a diamond shape symbol or the word message HOV. The  
24 diamond shall be at least 2.5 feet wide and 12 feet in length. The lines shall be at least 6 inches in  
25 width.

26 B. [HOT Priced managed](#) lane or ETC Account-Only lane—except as provided in Paragraph  
27 8, ~~the preferential lane use marking for a HOT lane or an ETC Account-Only lane shall consist of~~  
28 a word marking [or pictograph](#) using the name of the ETC payment system required for use of the  
29 lane, such as E-Z PASS ONLY.

30 C. ~~Bicycle lane—the preferential lane use marking for a bicycle lane shall consist of a bicycle~~  
31 ~~symbol or the word marking BIKE LANE (see Chapter 9C and Figures 9C-1 and 9C-3 through~~  
32 ~~9C-6).~~

33 D-C. Bus only lane [or bus stop](#)—~~the preferential lane use marking for a bus only lane shall~~  
34 ~~consist of~~ the word marking BUS ONLY [or BUS STOP](#).

35 E-D. Taxi only lane [or taxi stand](#)—~~the preferential lane use marking for a taxi only lane~~  
36 ~~shall consist of~~ the word marking TAXI ONLY [or TAXI STAND](#).

37 F-E. Light rail transit lane—~~the preferential lane use marking for a light rail transit lane~~  
38 ~~shall consist of~~ the word marking LRT ONLY.

39 G-F. Other type of preferential lane—~~the preferential lane use markings shall consist of~~ a  
40 word marking appropriate to the restriction.

41 [Guidance:](#)

42 [If multiple preferential lane uses are allowed in a single lane, engineering judgment should be used](#)  
43 [to prioritize and select the preferential lane word or symbol markings to be installed contingent on](#)  
44 [characteristics and needs of the road user. Consideration should be given to preferential lane word or](#)  
45 [symbol markings that can also be supported or supplemented through regulatory signing rather than](#)

1 the selection of preferential lane word or symbol markings that would exist alone or otherwise  
2 encompass all allowable uses that cannot be disseminated by a regulatory sign(s).

3 **Standard:**

4 **Pavement word or symbol markings for motorcycles and Inherently Low Emission Vehicles**  
5 **(ILEV) shall not be used to mark the preferential lane if motorcycles and ILEVs are allowed to**  
6 **use the preferential lane.**

7 **Support:**

8 Motorcycles and Inherently Low Emission Vehicles (ILEV) that are allowed to use a preferential  
9 lane are granted an exception such as through an established High Occupancy Vehicle (HOV)  
10 regulation. Communicating that motorcycles and ILEVs are allowed to use the preferential lane is  
11 accomplished through regulatory signing (see Sections 2G.03 and 2G.04) that complements HOV  
12 signing.

13 **Standard:**

14 **Static or changeable message regulatory signs (see Sections 2G.03 to 2G.07) shall be used with**  
15 **preferential lane word or symbol markings.**

16 **All preferential lane word and symbol markings shall be white and shall be positioned**  
17 **laterally in the approximate center of the preferential lane.**

18 ~~**Where a preferential lane use exists contiguous to a general-purpose lane or is separated from**~~  
19 ~~**a general-purpose lane by a flush buffered space that can be traversed by motor vehicles, the**~~  
20 ~~**preferential lane shall be marked with one or more of the following symbol or word markings for**~~  
21 ~~**the preferential lane use specified:**~~

22 ~~**If two or more preferential lane uses are permitted in a single lane, the symbol or word**~~  
23 ~~**marking for each preferential lane use shall be installed.**~~

24 **Option:**

25 **Preferential lane-use symbol or word markings may be omitted at toll plazas where physical**  
26 **conditions preclude the use of the markings ~~(see Section 3E.01).~~**

27 **Guidance:**

28 *All longitudinal pavement markings, as well as word and symbol pavement markings, associated*  
29 *with a preferential lane ~~shall~~ should end at approximately where the Preferential Lane Ends (R3-12a or*  
30 *R3-12c) sign (see Section 2G.07) designating the downstream end of the preferential only lane*  
31 *restriction is installed. **Relocated from the beginning of this section and reduced to Guidance***

32 *The spacing of the markings should be based on engineering judgment that considers the prevailing*  
33 *operating speed, block lengths, distance from intersections, and other factors that affect clear*  
34 *communication to the road user.*

35 **Support:**

36 ~~**Markings spaced as close as 80 feet apart might be appropriate on city streets, while markings**~~  
37 ~~**spaced as far as 1,000 feet apart might be appropriate for freeways.**~~ **Not needed**

38 **Guidance:**

39 *In addition to a regular spacing interval, the preferential lane marking should be placed at*  
40 *strategic locations such as major decision points, direct exit ramp departures from the preferential*  
41 *lane, and along access openings to and from adjacent general-purpose lanes. At decision points, the*  
42 *preferential lane marking should be placed on all applicable lanes and should be visible to*  
43 *approaching traffic for all available departures. At direct exits from preferential lanes where extra*  
44 *emphasis is needed, the use of word markings (such as “EXIT” or “EXIT ONLY”) in the deceleration*  
45 *lane for the direct exit and/or on the direct exit ramp itself just beyond the exit gore should be*  
46 *considered.*

1 Option:

2 A numeral indicating the vehicle occupancy requirements established for a high-occupancy vehicle  
3 lane may be included in sequence after the diamond symbol or HOV word message.

4 **Section 3E.04 Markings for Part-Time Travel on a Shoulder**

5 **Support:**

6 Shoulders are sometimes used to add capacity to a roadway in peak hour conditions to provide for  
7 transit or HOV priority or to provide higher throughput at reduced speeds when open to all traffic.

8 A shoulder that has been opened to travel on a permanent, rather than part-time basis is considered  
9 to be a travel lane and is signed and marked in accordance with other provisions of this Manual.

10 **Standard:**

11 **When part-time travel on a shoulder is open to all traffic, pavement word and symbol**  
12 **markings shall not be used in the shoulder.**

13 **When a shoulder is assigned part-time to a particular class or classes of vehicles, the shoulder**  
14 **shall be marked with one or more pavement word markings that identify the special use of the**  
15 **shoulder such as BUS ONLY, TRANSIT ONLY, HOV, or instead of the HOV pavement word**  
16 **marking, white lines formed in a diamond shape symbol (see Section 3E.03). Pavement word or**  
17 **symbol marking shall be provided in the shoulder immediately after an exit ramp (see Figure 3E-**  
18 **5) or immediately departing an intersection at the full-width shoulder (see Figure 3E-6).**  
19 **Appropriate regulatory signing (see Section 2G.03) shall be installed with the pavement word or**  
20 **symbol markings.**

21 **The channelizing line emanating from the entrance ramp shall be dashed through the**  
22 **intersecting alignment of the shoulder to the theoretical gore (see Drawings A and B of Figure 3E-**  
23 **5). At exit ramps, the channelizing line proceeding from the theoretical gore across the**  
24 **intersecting alignment of the shoulder shall be dashed (see Figure 3E-5).**

25 **If used, the extension of the channelizing line at entrance ramps proceeding from the**  
26 **theoretical gore across the opening of the on-ramp alignment shall be dashed (see Drawing C of**  
27 **Figure 3E-5) where it is demonstrated that traffic entering from an on-ramp stops or yields to**  
28 **traffic on the shoulder of the highway mainline.**

29 **An additional outside solid edge line shall be provided on the shoulder in accordance with**  
30 **Sections 3B.09 and 3B.10.**

31 **Guidance:**

32 *Changes in edge line pattern or direction should occur at appropriate regulatory signs.*

33 **Option:**

34 At locations where traffic is allowed to enter, exit, or merge with the shoulder, a dashed edge line  
35 may be used either in a continuous manner or angled to the pavement edge (see Figure 3E-6).

36 When part-time travel on a shoulder is limited to transit vehicles only, a yield line pavement  
37 marking may be installed unaccompanied by a Yield sign on the shoulder where transit vehicles on the  
38 shoulder yield to traffic entering from an on-ramp (see Drawing A of Figure 3E-5).

39 Shoulders that allow only transit vehicles may use red colored pavement (see Section 3H.07).

40 **Standard:**

41 **If used, red colored pavement shall be discontinued on the shoulder through the influence**  
42 **area of the ramp (see Figure 3H-5).**

43 **Figure 3E-5. Markings for Part-Time Travel on Shoulder and Application of**  
44 **Pavement Word Markings**

45 **Figure 3E-6. Markings for Part-Time Travel on Shoulder Through an Intersection**  
46

1 CHAPTER ~~3E-3F~~. MARKINGS FOR TOLL PLAZAS

2 Section ~~3E.01-3F.01~~ Markings for Toll Plazas General

3 Support:

4 At toll plazas, pavement markings help road users identify the proper lane(s) to use for the type of  
5 toll payment they plan to use, to channelize movements into the various lanes, and to delineate  
6 obstructions in the roadway.

7 Section 3H.08 contains information on the use and application of purple colored pavement at toll  
8 plazas for vehicles with registered electronic toll collection (ETC) accounts.

9 Section 3F.02 Longitudinal Markings **Contains paragraphs 5-8 from existing Section**  
10 **3E.01**

11 Guidance:

12 Solid white lane line markings should be used to separate toll lanes, payment methods, or to  
13 channelize movements at toll plazas.

14 Solid white lane line markings should begin at the upstream end of the full-width toll lane and be  
15 continued to the toll plaza.

16 Option:

17 For a toll plaza approach lane that is restricted to use only by vehicles with registered ETC  
18 accounts, the solid white lane line or edge line on the right-hand side of the ETC Account-Only lane  
19 and the solid white lane line or solid yellow edge line on the left-hand side of the ETC Account-Only  
20 lane may be supplemented with purple solid longitudinal markings placed contiguous to the inside  
21 edges of the lines defining the lane.

22 **Standard:**

23 **If ~~used~~, the purple solid longitudinal markings described in ~~the previous~~ Paragraph ~~53~~ are**  
24 **used, the purple markings shall be a minimum of at least 3 inches in width wide, and a maximum**  
25 **width equal to the width of the line it supplements, and ETC Account-Only preferential lane**  
26 **word markings (see Section 3D.01) shall be installed within the lane.**

27 Guidance:

28 If the purple solid longitudinal markings described in Paragraph 3 are used, the purple markings  
29 should not be wider than the line they supplement.

30 **Standard:**

31 **Toll booths and the islands on which they are located are considered to be obstructions in the**  
32 **roadway and they shall be provided with markings that comply with the provisions of Section**  
33 **~~3B.10-3B.13~~ and Chapter ~~3G-3J~~.**

34 Option:

35 Longitudinal pavement markings may be omitted alongside toll booth islands between the approach  
36 markings and any departure markings.

37 Section 3F.03 Pavement Word and Symbol Markings

38 Support:

39 Section 3E.03 contains information on the use of pavement word and symbol markings for ETC  
40 Account-Only lanes not specific to toll plazas.

41 **Standard:**

42 **Except as provided in Paragraph 4, when a lane on the approach to a toll plaza is restricted to**  
43 **use only by vehicles with registered ETC accounts, the ETC Account-Only lane word markings or**

1 pictograph described in Section ~~3E.03 3D.01~~ and the preferential lane longitudinal markings  
2 ~~described in Section 3D.02~~ shall be used (see Figure 3H-6).

3 When one or more open road tolling (ORT) lanes that are restricted to use only by vehicles  
4 with registered ETC accounts bypass a mainline toll plaza on a separate alignment, ~~these~~  
5 pavement word markings ~~and longitudinal markings or pictographs~~ shall be used on the  
6 approach to the point where the ORT lanes diverge from the lanes destined for the mainline toll  
7 plaza (see Figure 3H-6). **Broken into 2 separate Paragraphs**

8 Option:

9 Preferential lane-use ~~symbol or word~~ markings may be omitted at toll plazas where physical  
10 conditions or preclude the use of the markings.

11 *Guidance:*

12 *If an ORT lane that is immediately adjacent to a mainline toll plaza is not separated from adjacent*  
13 *cash payment toll plaza lanes by a curb or barrier, then channelizing devices (see Section ~~3H.01~~*  
14 *3I.01), and/or longitudinal pavement markings that discourage or prohibit lane changing should be*  
15 *used to separate the ORT lane from the adjacent cash payment lane. This separation should begin on*  
16 *the approach to the mainline toll plaza at approximately the point where the vehicle speeds in the*  
17 *adjacent cash lanes drop below 30 mph during off-peak periods and should extend downstream beyond*  
18 *the toll plaza approximately to the point where the vehicles departing the toll plaza in the adjacent cash*  
19 *lanes have accelerated to 30 mph.*

20

1 **CHAPTER ~~3F~~3G. DELINEATORS**

2 **Section ~~3F.01~~ 3G.01 Delineators–General**

3 Support:

4 Delineators are particularly beneficial at locations where the alignment might be confusing or  
5 unexpected, such as at lane-reduction transitions and curves. Delineators are effective guidance devices  
6 at night and during adverse weather. An important advantage of delineators in certain locations is that  
7 they remain visible when the roadway is wet or snow covered.

8 Delineators are considered guidance devices to help road users navigate the roadway alignment,  
9 rather than warning devices.

10 Option:

11 Delineators may be used on long continuous sections of highway or through short stretches where  
12 there are changes in horizontal alignment.

13 **Section ~~3F.02~~ 3G.02 Delineator–Design**

14 **Standard:**

15 **Delineators shall consist of retroreflective devices that are capable of clearly retroreflecting**  
16 **light under normal atmospheric conditions from a distance of 1,000 feet when illuminated by the**  
17 **high beams of standard automobile lights.**

18 **Retroreflective elements for delineators shall have a minimum vertical and horizontal, or**  
19 **diametric dimension of 3 inches.**

20 Support:

21 Within a series of delineators along a roadway, delineators for a given direction of travel at a  
22 specific location are referred to as single delineators if they have one retroreflective element for that  
23 direction, double delineators if they have two identical retroreflective elements for that direction  
24 mounted together, or vertically elongated delineators if they have a single retroreflective element with  
25 an elongated vertical dimension to approximate the vertical dimension of two separate single  
26 delineators.

27 Option:

28 A vertically elongated delineator of appropriate size may be used in place of a double delineator.

29 **Section ~~3F.03~~ 3G.03 Delineator–Application**

30 **Standard:**

31 **The color of delineators shall comply with the color of edge lines stipulated in Sections ~~3B.06~~**  
32 **3A.03 and 3B.09.**

33 **A series of single delineators shall be provided on the right-hand side of freeways and**  
34 **expressways and on at least one side of interchange ramps, except when either Condition A or**  
35 **Condition B is met, as follows:**

36 **A. On tangent sections of freeways and expressways when both of the following conditions**  
37 **are met:**

38 **1. Raised pavement markers are used continuously on lane lines throughout all curves**  
39 **and on all tangents to supplement pavement markings, and**

40 **2. Roadside delineators are used to lead into all curves.**

41 **B. On sections of roadways where continuous lighting is in operation between interchanges.**

42 Option:

43 Delineators may be provided on other classes of roads. ~~A series of single delineators may be~~  
44 ~~provided on the left hand side of roadways.~~

1 A series of single delineators may be provided on the left-hand side of roadways. **The second**  
2 **sentence from the previous paragraph was provided in a separate paragraph**

3 **Standard:**

4 **Delineators on the left-hand side of a two-way roadway shall be white (see Figure 3F-1-3G-1).**

5 *Guidance:*

6 *A series of single delineators should be provided on the outside of curves on interchange ramps.*

7 *Where median crossovers are provided for official or emergency use on divided highways and*  
8 *where these crossovers are to be marked with pavement markings, a double yellow delineator should be*  
9 *placed on the left-hand side of the through roadway on the far side of the crossover for each roadway.*

10 *Double or vertically elongated delineators should be installed at approximately 100-foot intervals*  
11 *along acceleration and deceleration lanes.*

12 *A series of delineators should be used wherever guardrail or other longitudinal barriers are*  
13 *present along a roadway or ramp.*

14 *Option:*

15 Red delineators may be used on the reverse side of any delineator where it would be viewed by a  
16 road user traveling in the wrong direction on that particular ramp or roadway.

17 ~~Delineators of the appropriate color may be used to indicate a lane reduction transition where either~~  
18 ~~an outside or inside lane merges into an adjacent lane.~~ **This paragraph was relocated to the next**  
19 **paragraph and edited**

20 *Guidance:*

21 Except as provided in Paragraph 11 of Section 3B.12, delineators of the appropriate color should  
22 be used to indicate a lane-reduction transition where either an outside or inside lane merges into an  
23 adjacent lane.

24 *When used for lane-reduction transitions, the delineators should be installed adjacent to the lane or*  
25 *lanes reduced for the full length of the transition and should be so placed and spaced to show the*  
26 *reduction (see Section 3B.12 and Figure 3B-14).*

27 ~~*Support:*~~

28 ~~Delineators are not necessary for traffic moving in the direction of a wider pavement or on the side~~  
29 ~~of the roadway where the alignment is not affected by the lane reduction transition.~~ **Not needed**

30 ~~*Guidance:*~~

31 ~~*On a highway with continuous delineation on either or both sides, delineators should be carried*~~  
32 ~~*through transitions.*~~

33 ~~*Option:*~~

34 ~~*On a highway with continuous delineation on either or both sides, the spacing between a series of*~~  
35 ~~*delineators may be closer.*~~ **Moved to new Section 3G.04**

36 **Standard:**

37 **When used on a truck escape ramp, delineators shall be red.**

38 *Guidance:*

39 ~~*Red delineators should be placed on both sides of truck escape ramps. The delineators should be*~~  
40 ~~*spaced at 50-foot intervals for a distance sufficient to identify the ramp entrance. Delineator spacing*~~  
41 ~~*beyond the ramp entrance should be adequate for guidance according to the length and design of the*~~  
42 ~~*escape ramp.*~~ **Moved to Section 3G.04 and edited**

43 **Section 3F.04-3G.04 Delineator Placement and Spacing**

44 *Guidance:*

1 Except as provided in Paragraph 2, delineators should be mounted ~~on suitable supports~~ at a  
2 ~~mounting~~ height, measured vertically from the bottom of the lowest retroreflective device to the  
3 elevation of the near edge of the roadway, of approximately 4 feet.

4 Option:

5 When mounted on the face of or on top of guardrails or other longitudinal barriers, delineators may  
6 be mounted at a lower elevation than the normal delineator height recommended in Paragraph 21.

7 Guidance:

8 *Delineators should be placed 2 to 8 feet outside the outer edge of the shoulder, or if appropriate, in*  
9 *line with the roadside barrier that is 8 feet or less outside the outer edge of the shoulder.*

10 *Delineators should be placed at a constant distance from the edge of the roadway, except that*  
11 *where an obstruction intrudes into the space between the pavement edge and the extension of the line of*  
12 *the delineators, the delineators should be transitioned to be in line with or inside the innermost edge of*  
13 *the obstruction. If the obstruction is a guardrail or other longitudinal barrier, the delineators should*  
14 *be transitioned to be just behind, directly above (in line with), or on the innermost edge of the guardrail*  
15 *or longitudinal barrier.*

16 Delineators should not present a vertical or horizontal clearance obstacle for pedestrians. Moved  
17 from existing Section 3A.04

18 *Delineators should be spaced 200 to 530 feet apart on mainline tangent sections. Delineators*  
19 *should be spaced 100 feet apart on ramp tangent sections.*

20 Option:

21 On a highway with continuous delineation on either or both sides, the spacing between a series of  
22 delineators may be closer. Moved from existing Section 3F.03

23 When uniform spacing is interrupted by such features as driveways and intersections, delineators  
24 which would ordinarily be located within the features may be relocated in either direction for a distance  
25 not exceeding one quarter of the uniform spacing. Delineators still falling within such features may be  
26 eliminated.

27 Delineators may be transitioned in advance of a lane transition or obstruction as a guide for  
28 oncoming traffic.

29 Guidance:

30 *The spacing of delineators should be adjusted on approaches to and throughout horizontal curves*  
31 *so that several delineators are always simultaneously visible to the road user. The approximate*  
32 *spacing shown in Table ~~3F-1~~ 3G-1 should be used.*

33 The spacing between red delineators that are placed on both sides of a truck escape ramp should  
34 not exceed 50 feet for a distance that is sufficient to identify the ramp entrance. The spacing between  
35 red delineators that are placed beyond the ramp entrance should be such that adequate guidance is  
36 provided based on the length and design of the escape ramp. Moved from existing Section 3F.03 and  
37 edited

38 Option:

39 When needed for special conditions, delineators of the appropriate color may be mounted in a  
40 closely-spaced manner on the face of or on top of guardrails or other longitudinal barriers to form a  
41 continuous or nearly continuous “ribbon” of delineation.

42 Support:

43 Examples of delineator installations are shown in Figure ~~3F-1~~ 3G-1. Moved from Paragraph 6 of  
44 this section

45 **Table 3G-1. Approximate Spacing for Delineators on Horizontal Curves**

46 **Figure 3G-1. Examples of Delineator Placement**

1 CHAPTER ~~3G~~ 3H COLORED PAVEMENT

2 Section ~~3G.01~~ 3H.01 **General** Standardization of Application

3 Support:

4 Colored pavements consist of differently colored road paving materials, such as colored asphalt or  
5 concrete, or paint or other marking materials applied to the surface of a road or island to simulate a  
6 colored pavement.

7 ~~If non-retroreflective colored pavement, including bricks and other types of patterned surfaces, is  
8 used as a purely aesthetic treatment and is not intended to communicate a regulatory, warning, or  
9 guidance message to road users, the colored pavement is not considered to be a traffic control device,  
10 even if it is located between the lines of a crosswalk.~~ **Relocated to new Section 3H.03 and edited**

11 **Standard:**

12 ~~If colored pavement is used within the traveled way, on flush or raised islands, or on~~  
13 ~~shoulders to regulate, warn, or guide~~ or otherwise communicate with traffic or if ~~retroreflective~~  
14 ~~colored pavement~~ retroreflectivity is used, the colored pavement ~~is~~ shall be considered ~~to be a~~  
15 traffic control device and shall be limited to the ~~following~~ colors and applications: specified in this  
16 Chapter.

17 ~~A. Yellow pavement color shall be used only for flush or raised median islands separating~~  
18 ~~traffic flows in opposite directions or for left-hand shoulders of roadways of divided highways or~~  
19 ~~one-way streets or ramps.~~

20 ~~B. White pavement color shall be used for flush or raised channelizing islands where traffic~~  
21 ~~passes on both sides in the same general direction or for right-hand shoulders.~~

22 Except where provided in Paragraph 4 of Section 3H.07, colored pavements shall not be used  
23 as a traffic control device, unless the device is applicable at all times.

24 *Guidance:*

25 *Colored pavements used as traffic control devices should be used only where they contrast*  
26 *significantly with adjoining paved areas.*

27 Support:

28 The chromaticity coordinates that define the ranges of acceptable colors to be used in pavement  
29 marking applications are found in the Appendix to Subpart F of 23 CFR 655.

30 **Standard:**

31 Colored pavement shall be limited to uses only where it supplements other markings as  
32 provided in this Manual.

33 Support:

34 Longitudinal pavement markings, crosswalks, pavement marking symbols, and elongated route  
35 markers are not considered colored pavements.

36 **Standard:**

37 Colors other than those specified in this Chapter shall not be used for colored pavement.

38 Section 3H.02 Materials

39 Option:

40 Colored pavements may be retroreflective.

41 **Standard:**

42 The intentional non-use of retroreflectivity shall not exempt colored pavement from the  
43 provisions of this Manual.

44 *Guidance:*

1 *If marking materials applied to the roadway surface are used to simulate a colored pavement,*  
2 *consideration should be given to selecting pavement marking materials that will minimize loss of*  
3 *traction for pedestrians, bicyclists, etc. (see Paragraph 2 of Section 3A.02).*

4 Support:

5 Providing for retroreflectivity, such as incorporating glass beads, can increase the friction of  
6 pavement markings and can reduce the potential for slip and fall incidents.

7 Installation of colored pavement to one lane or an area or portion of a multi-lane traveled way can  
8 create differentials in skid resistance values between the colored pavement and the general-purpose  
9 lanes that might be unexpected by the road user.

10 The acceleration of heavy vehicles might cause abnormal wear to colored pavement especially at  
11 bus stops. The selection of the material properties for these areas is important.

12 **Section 3H.03 Aesthetic Treatments in Crosswalks**

13 Support:

14 If non-retroreflective colored pavement, ~~including bricks and other types of patterned surfaces,~~ is  
15 used as a purely aesthetic treatment within the criteria presented in this Section and is not intended to  
16 communicate a regulatory, warning, or guidance message to road users, the colored pavement is not  
17 considered to be a traffic control device, even if it is located between the lines of a crosswalk.

18 **Paragraph relocated from existing Section 3G.01**

19 Guidance:

20 *Since the right-of-way is dedicated exclusively to highway-related functions, a policy for using*  
21 *aesthetic treatments in crosswalks should consider whether their use or design is appropriate for the*  
22 *right-of-way.*

23 Colored pavement located between crosswalk lines should not use colors or patterns that degrade  
24 the contrast of white crosswalk lines, or that might be mistaken by road users as a traffic control  
25 application. **Paragraph relocated from existing Section 3G.01**

26 *Aesthetic treatments within crosswalks should only be used on roadways with a speed limit of 30*  
27 *mph or less.*

28 Support:

29 Examples of materials for the interior portions of a crosswalk include brick, paving bricks, paving  
30 stones, setts, cobbles, or other resources designed to simulate such paving. Examples of geometries for  
31 the interior portions of a crosswalk include honeycomb, lattice, mesh, grid, and regular polygon  
32 patterns. Examples of colors for the interior portions of a crosswalk incorporated into the material or  
33 geometry are brick red, rust, brown, burgundy, clay, tan, or similar earth tone equivalents (see Figure  
34 3H-1).

35 **Standard:**

36 **Patterns that constitute a purely aesthetic treatment for the interior portion of a crosswalk**  
37 **shall be devoid of advertising, pictographs, symbols, multiple color arrangements counter to**  
38 **Paragraph 4, and shall not implement elements of retroreflectivity.**

39 **Patterns that constitute a purely aesthetic treatment for the interior portion of a crosswalk**  
40 **shall not be designed to encourage other road users such as pedestrians to loiter in the crosswalk,**  
41 **engage in the pattern, or otherwise not encourage those users to vacate the street in an expedient**  
42 **manner.**

43 **Aesthetic treatments for the interior portions of crosswalks shall not be of a surface that can**  
44 **confuse vision-impaired pedestrians that rely on tactile treatments or cues for navigation.**

45 Option:

1 To create contrast, a gap of at least one-half of the width of the white transverse line used to  
2 establish the crosswalk may be used between the white transverse crosswalk line and the aesthetic  
3 treatment, such as unmarked pavement or a black contrast line.

4 **Figure 3H-1. Examples of Colors for the Interior Portions of Crosswalks**

5 **Section 3H.04 Yellow-Colored Pavement**

6 **Standard:**

7 **If used, yellow-colored pavement shall be limited to:**

8 **A. Flush or raised median islands separating traffic flows in opposite directions,**

9 **B. Left-hand shoulders of divided highways, and**

10 **C. Left-hand shoulders of one-way streets or ramps.**

11 **Yellow-colored pavement shall not be incorporated into elements of the roadway that**  
12 **function as reversible lanes or two-way left turn lanes.**

13 **Yellow-colored pavement shall not be used on channelizing islands where traffic travels in the**  
14 **same general direction on both sides.**

15 **Option:**

16 Yellow-colored pavement may be installed for the entire length of the roadway, island, or shoulder,  
17 or for only a portion or portions of the roadway, island or shoulder.

18 **Support:**

19 Examples of applications of yellow-colored pavement are shown in Figure 3H-2.

20 **Figure 3H-2. Examples of Application of Yellow-Colored Pavement**

21 **Section 3H.05 White-Colored Pavement**

22 **Standard:**

23 **If used, white-colored pavement shall be limited to:**

24 **A. Flush or raised channelizing islands where traffic passes on both sides in the same general**  
25 **direction,**

26 **B. Right-hand shoulders,**

27 **C. Exit gore areas, and**

28 **D. Entrance gore areas.**

29 **Guidance:**

30 When used on right-hand shoulders, white-colored pavement should be limited to areas not  
31 intended for use by motor vehicle traffic except those shoulders designated for emergency use.

32 **Option:**

33 White-colored pavement may be installed for the entire length of the roadway, island, or shoulder,  
34 or for only a portion or portions of the roadway, island or shoulder.

35 White-colored pavement may be used instead of chevron markings (see Sections 3B.13 and 3B.25)  
36 in neutral areas.

37 **Support:**

38 Examples of applications of white-colored pavement are shown in Figure 3H-3.

39 **Figure 3H-3. Examples of Application of White-Colored Pavement**

40 **Section 3H.06 Green-Colored Pavement for Bicycle Facilities**

41 **Support:**

1 Green-colored pavement is used to enhance the conspicuity of locations where bicyclists are  
2 expected to operate, and areas where bicyclists and other roadway traffic might have potentially  
3 conflicting weaving or crossing movements. Green- colored pavement is also used to enhance the  
4 conspicuity of word, symbol, and/or arrow pavement markings when these markings are used in certain  
5 bicycle facilities (see Figure 3H-4).

6 **Standard:**

7 **If used, green-colored pavement shall be limited to:**

8 **A. Bicycle lanes (See Section 9E.01),**

9 **B. Extensions of bicycle lanes through intersections (See Section 9E.03),**

10 **C. Extensions of bicycle lanes through areas where motor vehicles enter an exclusive turn**  
11 **lane in which motor vehicles must weave across bicycle traffic in bicycle lanes,**

12 **D. Two-stage turn boxes (See Section 9E.11),**

13 **E. Bicycle Box (see Section 9E.12),**

14 **F. Bicycle detector symbol (See Section 9E.16), and**

15 **G. Separated bicycle lanes within the roadway.**

16 **Green-colored pavement shall not be incorporated into shared-use paths, shared-lane**  
17 **markings, crosswalks, separated bicycle lanes on an independent alignment, or electric-vehicle**  
18 **parking stations or parking stalls.**

19 **Option:**

20 Green-colored pavement may be installed for the entire length of a bicycle lane or bicycle lane  
21 extension or for only a portion (or portions) of the bicycle lane or bicycle lane extension.

22 Green-colored pavement may be installed for the entire length of a physically-separated bikeway  
23 within the roadway or for only a portion (or portions) of the physically-separated bikeway.

24 **Standard:**

25 **Green-colored pavement shall not be used instead of dotted lines used to extend a bicycle lane**  
26 **or a separated bicycle lane within a roadway across an intersection, driveway, or ramp. The**  
27 **pattern of the green-colored pavement shall match the pattern of the dotted lines, thus filling in**  
28 **only the areas that are directly between a pair of dotted line segments.**

29 **Guidance:**

30 Appropriate regulatory (see Chapter 9B) or guide signing (see Chapter 9D) should be installed to  
31 provide related information to the presence of the colored pavement.

32 **Figure 3H-4. Examples of Green-Colored Pavement**

33 **Section 3H.07 Red-Colored Pavement for Public Transit Systems**

34 **Support:**

35 Red-colored pavement is used to enhance the conspicuity of locations, station stops or travel lanes  
36 in the roadway exclusively reserved for vehicles of public transit systems or multi-modal facilities  
37 where public transit is the primary mode. These public transit vehicles include buses, taxis, streetcars,  
38 trolleys, light-rail trains, and rapid transit fleets.

39 **Option:**

40 Red-colored pavement may be used where an engineering study determines that one or more of the  
41 following conditions are expected to result from its application:

42 **A. Increased travel speeds will be expected by the public transport vehicle after an exclusive lane**  
43 **or facility is provided.**

1 B. Reduced overall service time through the corridor will be expected by the public transport  
2 vehicle.

3 C. Decreased rates of illegal parking or occupation of the transit or multi-mode lane or facility will  
4 be expected.

5 **Standard:**

6 **If used, red-colored pavement shall be applied only in lanes, areas, or locations where**  
7 **general-purpose traffic is not allowed to use, queue, wait, idle, or otherwise occupy the lane, area**  
8 **or location where red-colored pavement is used.**

9 **Red-colored pavement shall be installed for the full width of the lane.**

10 **Option:**

11 Red-colored pavement may be used for full-time or part-time operations.

12 Red-colored pavement may be installed for the entire length of a restricted lane or for only a  
13 portion (or portions) of the restricted lane.

14 Red-colored pavement may be installed in a broken pattern where entrance into the transit lane is  
15 permitted by general traffic, for example where general traffic is allowed in a transit lane in advance of  
16 a turn.

17 **Standard:**

18 **Regulatory signs (see Sections 2B.02 and 2G.03) shall be used to establish the allowable use of**  
19 **the lane, area, or location. Regulatory signs shall also be used when it is determined that other**  
20 **vehicles will be allowed to enter the lane to turn or bypass queues.**

21 **Guidance:**

22 *If red-colored pavement is used on public transit facilities separated from the roadway or on*  
23 *facilities on an independent alignment, it should be used only at the entrances to those facilities from*  
24 *roadways open to public travel.*

25 **Support:**

26 Examples of applications of red-colored pavement are shown in Figure 3H-5.

27 **Figure 3H-5. Examples of Application of Red-Colored Pavement**

28 **Section 3H.08 Purple-Colored Pavement for Electronic Toll Collection (ETC) Account-**  
29 **Only Preferential Lanes**

30 **Standard:**

31 **Purple-colored pavement shall be limited to:**

32 **A. Lanes on the approach to a toll plaza where the lane is restricted to use only with a**  
33 **registered ETC account, and**

34 **B. Lanes or approaches to an open-road tolling (ORT) collection facility that bypasses the**  
35 **physical toll plaza, where the ORT facility is restricted for use only by vehicles with registered**  
36 **ETC accounts.**

37 **Purple-colored pavement shall not be used in an approach lane that also facilitates additional**  
38 **payment methods downstream.**

39 **If used approaching a physical toll plaza, purple-colored pavement shall be flanked by white**  
40 **solid longitudinal lines that establish the toll lane.**

41 **If used on an ORT collection facility that bypasses the physical toll plaza, purple-colored**  
42 **pavement shall be flanked by appropriate edge lines, and if applicable in multi-lane bypasses,**  
43 **appropriate longitudinal solid or broken white lane lines.**

44 **Option:**

1 [Purple-colored pavement may be installed for the entire length of a toll lane or ORT collection](#)  
2 [facility or for only a portion \(or portions\) of the toll lane or ORT collection facility.](#)

3 [Support:](#)

4 [Figure 3H-6 illustrates an example of purple-colored pavement for use at toll plazas.](#)

5 **Figure 3H-6. Examples of Application of Purple-Colored Pavement**  
6



1 *Tubular markers should be affixed to the pavement or other surface either directly or by means of*  
2 *an attachment system that is affixed to the pavement or other surface. Tubular markers should be*  
3 *normally spaced no greater than N as cited in Section 3B.11.*

4 Option:

5 Other spacing may be used based on engineering judgment.



1 **Figure 3J-1. Example of Markings for Approach End-Treatment to an Island**

2 **Section 3J.03 Islands Designated by Pavement Markings**

3 **Standard:**

4 Except as provided in Paragraph 2, islands formed by pavement markings only shall be  
5 established using channelizing lines, and shall be white when separating traffic flows in the same  
6 general direction or yellow when separating opposing directions of traffic.

7 If a continuous flush median island ~~formed by pavement markings~~ separating travel in  
8 opposite directions is used, two sets of solid double yellow lines shall be used to form the island (~~as~~  
9 ~~shown in see Figures 3B-2 and 3B-5~~). Other markings in the median island area, such as diagonal  
10 lines (see Section 3B.25), shall also be yellow, except crosswalk markings which shall be white (see  
11 Section 3B.18 see Chapter 3C). **Relocated from existing Section 3B.03 and edited**

12 If used, chevrons and diagonal markings (see Section 3B.25) within the island shall be the  
13 same color as the channelizing line.

14 **Option:**

15 Both chevrons and diagonal markings of the same color may be used within the same island based  
16 on engineering judgment.

17 **Support:**

18 Figure 3J-2 illustrates examples of islands designated by pavement markings.

19 **Figure 3J-2. Examples of Islands Designated by Pavement Markings**

20 **Section 3J.04 Curb Markings for Raised Islands** **Paragraphs 7 through 12 from existing**  
21 **Section 3B.23**

22 **Standard:**

23 **Where curbs are marked for delineation or visibility purposes, the colors shall comply with**  
24 **the general principles of markings (see Section ~~3A.05~~ 3A.03).**

25 **Guidance:**

26 *Retroreflective solid yellow curb markings should be placed on the approach ends of raised*  
27 *medians and curbs of islands that are located in the line of traffic flow where the curb serves to channel*  
28 *traffic to the right of the obstruction (see Figure 3J-3).*

29 *Retroreflective solid white curb markings should be used when traffic is permitted to pass on either*  
30 *side of the island (see Figure 3J-3).*

31 *The retroreflective area should be of sufficient length to denote the general alignment of the edge of*  
32 *the island along which vehicles travel, including the approach end, when viewed from the approach to*  
33 *the island.* **Paragraph 2 of existing Section 3I.04**

34 **Support- Option:**

35 Where the curbs of the islands become parallel to the direction of traffic flow or where the island is  
36 illuminated or marked with delineators, it is not necessary to mark the curb markings may be  
37 discontinued unless an based on engineering judgment or study indicates the need for this type of  
38 delineation.

39 Curb markings ~~curbs~~ at openings in a continuous median island need not be marked may be omitted  
40 unless an based on engineering judgment or study indicates the need for this type of marking.

41 **Figure 3J-3. Example of Markings for Approach End-Treatment to a Channelized**  
42 **Island**

43 **Section 3J.05 Pavement Markings for Raised Islands**

44 **Support:**

1 Pavement markings for raised islands include the approach-end treatment (see Section 3J.02),  
2 channelizing lines, edge lines, and chevron or diagonal markings.

3 Option:

4 Solid yellow edge lines may be used adjacent to raised islands separating travel in opposite  
5 directions (see Drawing A of Figure 3J-3).

6 Standard:

7 Except as provided in Paragraph 4 and 6, raised islands separating traffic flows in the same  
8 general direction shall be outlined with white channelizing lines (see Drawing A of Figure 3J-4).

9 Option:

10 Pavement markings for smaller raised islands may be omitted based on engineering judgment.

11 Guidance:

12 Smaller raised islands that do not apply channelizing lines, edge lines, or chevron or diagonal lines  
13 should be provided curb markings (see Section 3J.04).

14 Where traffic passes on the right of a raised island separating traffic flows in the same general  
15 direction, a yellow edge line may be used adjacent to raised islands of discernible size or length instead  
16 of continuing the white channelizing line from the approach-end treatment (see Drawing B of Figure  
17 3J-4).

18 Support:

19 Yellow edge lines adjacent to raised islands that separate traffic flows in the same general direction  
20 can be advantageous as a countermeasure for wrong-way entry or travel if the yellow edge line is of  
21 discernible length.

22 Option:

23 Chevron markings may be used in neutral areas formed by diverging channelizing lines at raised  
24 islands separating traffic flows in the same general direction.

25 Diagonal markings of an appropriate color may be used in buffer areas between the channelizing  
26 line and the raised island (see Figure 3J-5).

27 **Figure 3J-4. Examples of Pavement Markings for Raised Islands**

28 **Figure 3J-5. Example of Diagonal Color Pavement Markings for Channelizing Line**  
29 **and the Raised Island**

30 ~~Section 3I.03 Island Marking Application~~ **Section deleted; not needed**

31 ~~Section 3I.04 Island Marking Colors~~ **Section deleted; paragraphs 2 and 3 relocated to new**  
32 **Section 3J.04**

33 **Section 3I.05-3J.06 Island Delineation**

34 **Standard:**

35 **Delineators installed on islands shall be the same colors as the related channelizing or edge**  
36 **lines except that, when facing wrong-way traffic, they shall be red (see Section ~~3F.3~~ 3G-3).**

37 **Each roadway through an intersection shall be considered separately in positioning**  
38 **delineators to assure maximum effectiveness.**

39 **Option:**

40 **Retroreflective or internally illuminated raised pavement markers of the appropriate color may be**  
41 **placed on the pavement in front of the curb and/or on the top of curbed approach ends of raised medians**  
42 **and curbs of islands, as a supplement to or as a substitute for retroreflective curb markings.**

43 **Section 3J.07 Curb Extensions Designated by Pavement Markings**

1 Support:

2 Curb extensions are used to extend the sidewalk or other pedestrian space, shorten crossing  
3 distances for pedestrians, alter the roadway geometry for speed control or channelizing, and for other  
4 purposes.

5 Curb extensions are typically created by physical infrastructure including concrete or asphalt, but  
6 can also be designated by pavement markings.

7 For the purposes of this Section, the paved areas between the solid double line forming the curb  
8 extension (see Paragraph 4 of this Section) and the sidewalk or other roadside area are considered to be  
9 outside of the street.

10 Standard:

11 Curb extensions formed by pavement markings shall be established using solid double lines.  
12 The color of the solid double line shall comply with the general principles of markings (see  
13 Section 3A.03).

14 Guidance:

15 Physical separation or delineation should be provided where curb extensions are created by  
16 pavement markings and pedestrian travel can be expected within the area created by the curb  
17 extension.

18 Option:

19 Channelizing devices such as tubular markers (see Chapter 3I) may be used along the solid double  
20 line of a curb extension created by pavement markings.

21 Other methods of physical separation may be used beyond the solid double line outside of the limits  
22 of the street.

23 Guidance:

24 Diagonal markings (see Section 3B.24) or colored pavement (see Chapter 3H) should be used  
25 within the marked curb extension to emphasize that the area is outside of the street.

26 Support:

27 Curb extensions are distinct from areas within the street such as shoulders, flush medians, or gore  
28 areas where travel is discouraged by the presence of diagonal markings (see Section 3B.24). Curb  
29 extensions designate areas outside of the street where travel is prohibited.

30 Guidance:

31 Where pedestrian travel can be expected within curb extensions created by pavement markings,  
32 adequate provisions should be made for pedestrians with disabilities.

33 Support:

34 Additional information on the design and construction of accessible facilities is found in  
35 publications listed in Section 1A.05 (see Publications 12 and 42).

36 Figure 3J-6 illustrates examples of curb extensions designated by pavement markings.

37 **Figure 3J-6. Examples of Curb Extensions Designed by Pavement Markings**

38

1 **CHAPTER ~~3J~~3K. RUMBLE STRIP MARKINGS**

2 **Section ~~3J.01~~3K.01 Longitudinal Rumble Strip Markings**

3 Support:

4 Longitudinal rumble strips consist of a series of rough-textured or slightly raised or depressed road  
5 surfaces intended to alert inattentive drivers through vibration and sound that their vehicle has left the  
6 travel lane. Shoulder rumble strips are typically installed along the shoulder near the travel lane. On  
7 divided highways, rumble strips are sometimes installed on the median side (left-hand side) shoulder as  
8 well as on the outside (right-hand side) shoulder. On two-way roadways, rumble strips are sometimes  
9 installed along the center line.

10 This Manual contains no provisions regarding the design and placement of longitudinal rumble  
11 strips. The provisions in this Manual address the use of markings in combination with a longitudinal  
12 rumble strip. Figure ~~3J-1~~3K-1 illustrates markings used with or near longitudinal rumble strips.

13 **Sentence moved from existing Paragraph 6 of this section**

14 [Longitudinal rumble strip markings have been shown to be beneficial when applied in combination](#)  
15 [with horizontal alignment warning signs to enhance safety around curves and locations with a history of](#)  
16 [run off the road crashes.](#)

17 Option:

18 An edge line or center line may be located over a longitudinal rumble strip to create a rumble stripe.

19 **Standard:**

20 **The color of an edge line or center line associated with a longitudinal rumble stripe shall be in**  
21 **accordance with Section ~~3A.05~~3A.03.**

22 **An edge line shall not be used in addition to a rumble stripe that is located along a shoulder.**

23 **Figure 3K-1. Examples of Longitudinal Rumble Strip Markings**

24 **Section ~~3J.02~~3K.02 Transverse Rumble Strip Markings**

25 Support:

26 Transverse rumble strips consist of intermittent narrow, transverse areas of rough-textured or  
27 slightly raised or depressed road surface that extend across the travel lanes to alert drivers to unusual  
28 vehicular traffic conditions. Through noise and vibration, they attract the attention of road users to  
29 features such as unexpected changes in alignment and conditions requiring a reduction in speed or a  
30 stop.

31 This Manual contains no provisions regarding the design and placement of transverse rumble strips  
32 that approximate the color of the pavement. The provisions in this Manual address the use of markings  
33 in combination with a transverse rumble strip.

34 **Standard:**

35 **Except as otherwise provided in Section ~~6F.87~~6M.06 for TTC zones, if the color of a**  
36 **transverse rumble strip used within a travel lane is not the color of the pavement, the color of the**  
37 **transverse rumble strip shall be either black or white.**

38 *Guidance:*

39 *White transverse rumble strips used in a travel lane should not be placed in locations where they*  
40 *could be confused with other transverse markings such as stop lines or crosswalks.*

1 CHAPTER 4A. GENERAL

2 Section 4A.01 Types

3 Support:

4 The following types and uses of highway traffic signals are discussed in Part 4: traffic control signals;   
5 [bicycle signal faces](#); pedestrian signals ~~heads~~; hybrid beacons; [rectangular rapid flashing beacons](#); emergency-   
6 vehicle [traffic control](#) signals; traffic control signals for one-lane, two-way facilities; traffic control signals for   
7 freeway entrance ramps; ~~traffic control signals for~~ movable bridges [traffic signals](#); toll plaza traffic signals;   
8 flashing beacons; lane-use control signals; and in-roadway [warning](#) lights.

9 ~~Section 4A.02 Definitions Relating to Highway Traffic Signals~~

10 ~~Support:~~

11 ~~Definitions and acronyms pertaining to Part 4 are provided in Sections 1A.13 and 1A.14.~~

12 Section ~~4D.04~~ 4A.02 Meanings of Vehicular Signal Indications Paragraphs in this Section were   
13 relocated to new Sections 4A.03 and 4A.04

14 Support:

15 The “Uniform Vehicle Code” (see Section 1A.~~05~~11) is the primary source for the standards for the   
16 meanings of vehicular signal indications to both vehicle operators and pedestrians as provided in ~~this~~ Sections   
17 [4A.04 and 4A.05](#), and the standards for the meanings of separate pedestrian signal head indications as   
18 provided in Section ~~4E.02~~ [4A.06](#).

19 The physical area that is defined as being “within the intersection” is dependent upon the conditions that   
20 are described in the definition of intersection in Section ~~1A.13~~ [1C.02](#).

21 Section 4A.03 Meanings of Steady Vehicular Signal Indications Text was relocated from Items A,   
22 B, and C in Paragraph 3 in existing Section 4D.04

23 Standard:

24 The following meanings shall be given to [steady](#) highway traffic signal indications for vehicles and   
25 pedestrians:

26 A. Steady green signal indications shall have the following meanings:

- 27 1. Vehicular traffic facing a CIRCULAR GREEN signal indication is permitted to proceed   
28 straight through or turn right or left or make a U-turn movement except as such movement   
29 is modified by lane-use signs, turn prohibition signs, lane markings, roadway design,   
30 separate turn signal indications, or other traffic control devices.

31 Such vehicular traffic, including vehicles turning right or left or making a U-turn   
32 movement, shall yield the right-of-way to:

- 33 (a) Pedestrians lawfully within an associated crosswalk, and   
34 (b) Other vehicles lawfully within the intersection.

35 In addition, vehicular traffic turning left or making a U-turn movement to the left shall   
36 yield the right-of-way to other vehicles approaching from the opposite direction so closely as   
37 to constitute an immediate hazard during the time when such turning vehicle is moving   
38 across or within the intersection.

- 39 2. Vehicular traffic facing a GREEN ARROW signal indication, displayed alone or in   
40 combination with another signal indication, is permitted to cautiously enter the intersection   
41 only to make the movement indicated by such arrow, or such other movement as is   
42 permitted by other signal indications displayed at the same time.

43 Such vehicular traffic, including vehicles turning right or left or making a U-turn   
44 movement, shall yield the right-of-way to:

- 45 (a) Pedestrians lawfully within an associated crosswalk, and   
46 (b) Other vehicles lawfully within the intersection.

- 47 3. Pedestrians facing a CIRCULAR GREEN signal indication, unless otherwise directed by a   
48 pedestrian signal indication or other traffic control device, are permitted to proceed across   
49 the roadway within any marked or unmarked associated crosswalk. The pedestrian shall

yield the right-of-way to vehicles lawfully within the intersection or so close as to create an immediate hazard at the time that the green signal indication is first displayed.

4. Pedestrians facing a GREEN ARROW signal indication, unless otherwise directed by a pedestrian signal indication or other traffic control device, shall not cross the roadway.

**B. Steady yellow signal indications shall have the following meanings:**

1. Vehicular traffic facing a steady CIRCULAR YELLOW signal indication is thereby warned that the related green movement or the related flashing arrow movement is being terminated or that a steady red signal indication will be displayed immediately thereafter when vehicular traffic shall not enter the intersection. The rules set forth concerning vehicular operation under the movement(s) being terminated shall continue to apply while the steady CIRCULAR YELLOW signal indication is displayed.
2. Vehicular traffic facing a steady YELLOW ARROW signal indication is thereby warned that the related GREEN ARROW movement or the related flashing arrow movement is being terminated. The rules set forth concerning vehicular operation under the movement(s) being terminated shall continue to apply while the steady YELLOW ARROW signal indication is displayed.
3. Pedestrians facing a steady CIRCULAR YELLOW or YELLOW ARROW signal indication, unless otherwise directed by a pedestrian signal indication or other traffic control device shall not 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, unless entering the intersection to make another movement permitted by another signal indication, shall stop at a clearly marked stop line; but if there is no stop line, traffic shall stop before entering the crosswalk on the near side of the intersection; or if there is no crosswalk, then before entering the intersection; and shall remain stopped until a signal indication to proceed is displayed, or as provided below.

Except when a traffic control device is in place prohibiting a turn on red or a steady RED ARROW signal indication is displayed, vehicular traffic facing a steady CIRCULAR RED signal indication is permitted to enter the intersection to turn right, or to turn left from a one-way street into a one-way street, after stopping. The right to proceed with the turn shall be subject to the rules applicable after making a stop at a STOP sign.

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 or other traffic control device permitting the movement indicated by such RED ARROW is displayed.

When a traffic control device is in place permitting a turn on a steady RED ARROW signal indication, vehicular traffic facing a steady RED ARROW signal indication is permitted to enter the intersection to make the movement indicated by the arrow signal indication, after stopping. The right to proceed with the turn shall be limited to the direction indicated by the arrow and shall be subject to the rules applicable after making a stop at a STOP sign.

3. Unless otherwise directed by a pedestrian signal indication or other traffic control device, pedestrians facing a steady CIRCULAR RED or steady RED ARROW signal indication shall not enter the roadway.

**Section 4A.04 Meanings of Flashing Vehicular Signal Indications Text was relocated from Items D, E, and F in Paragraph 3 in existing Section 4D.04**

**Standard:**

**The following meanings shall be given to flashing highway traffic signal indications for vehicles and pedestrians:**

- A. A flashing green signal indication has no meaning and shall not be used.

1 **B. Flashing yellow signal indications shall have the following meanings:**

- 2 1. Vehicular traffic, on an approach to an intersection, facing a flashing **CIRCULAR**  
3 **YELLOW** signal indication is permitted to cautiously enter the intersection to proceed  
4 straight through or turn right or left or make a U-turn except as such movement is modified  
5 by lane-use signs, turn prohibition signs, lane markings, roadway design, separate turn  
6 signal indications, or other traffic control devices.

7 Such vehicular traffic, including vehicles turning right or left or making a U-turn, shall  
8 yield the right-of-way to:

- 9 (a) Pedestrians lawfully within an associated crosswalk, and  
10 (b) Other vehicles lawfully within the intersection.

11 In addition, vehicular traffic turning left or making a U-turn to the left shall yield the  
12 right-of-way to other vehicles approaching from the opposite direction so closely as to  
13 constitute an immediate hazard during the time when such turning vehicle is moving across  
14 or within the intersection.

- 15 2. Vehicular traffic, on an approach to an intersection, facing a flashing **YELLOW ARROW**  
16 signal indication, displayed alone or in combination with another signal indication, is  
17 permitted to cautiously enter the intersection only to make the movement indicated by such  
18 arrow, or other such movement as is permitted by other signal indications displayed at the  
19 same time.

20 Such vehicular traffic, including vehicles turning right or left or making a U-turn, shall  
21 yield the right-of-way to:

- 22 (a) Pedestrians lawfully within an associated crosswalk, and  
23 (b) Other vehicles lawfully within the intersection.

24 In addition, vehicular traffic turning left or making a U-turn to the left shall yield the  
25 right-of-way to other vehicles approaching from the opposite direction so closely as to  
26 constitute an immediate hazard during the time when such turning vehicle is moving across  
27 or within the intersection.

- 28 3. Pedestrians facing any flashing yellow signal indication at an intersection, unless otherwise  
29 directed by a pedestrian signal indication or other traffic control device, are permitted to  
30 proceed across the roadway within any marked or unmarked associated crosswalk.  
31 Pedestrians shall yield the right-of-way to vehicles lawfully within the intersection at the  
32 time that the flashing yellow signal indication is first displayed.

- 33 4. When a flashing **CIRCULAR YELLOW** signal indication(s) is displayed as a beacon (see  
34 Chapter 4S) to supplement another traffic control device, road users are notified that there  
35 is a need to pay extra attention to the message contained thereon or that the regulatory or  
36 warning requirements of the other traffic control device, which might not be applicable at  
37 all times, are currently applicable.

38 **C. Flashing red signal indications shall have the following meanings:**

- 39 1. Vehicular traffic, on an approach to an intersection, facing a flashing **CIRCULAR RED**  
40 signal indication shall stop at a clearly marked stop line; but if there is no stop line, before  
41 entering the crosswalk on the near side of the intersection; or if there is no crosswalk, at the  
42 point nearest the intersecting roadway where the driver has a view of approaching traffic on  
43 the intersecting roadway before entering the intersection. The right to proceed shall be  
44 subject to the rules applicable after making a stop at a **STOP** sign.

- 45 2. Vehicular traffic, on an approach to an intersection, facing a flashing **RED ARROW** signal  
46 indication if intending to turn in the direction indicated by the arrow shall stop at a clearly  
47 marked stop line; but if there is no stop line, before entering the crosswalk on the near side  
48 of the intersection; or if there is no crosswalk, at the point nearest the intersecting roadway  
49 where the driver has a view of approaching traffic on the intersecting roadway before  
50 entering the intersection. The right to proceed with the turn shall be limited to the direction  
51 indicated by the arrow and shall be subject to the rules applicable after making a stop at a  
52 **STOP** sign.

- 1 3. Pedestrians facing any flashing red signal indication at an intersection, unless otherwise  
2 directed by a pedestrian signal indication or other traffic control device, are permitted to  
3 proceed across the roadway within any marked or unmarked associated crosswalk.  
4 Pedestrians shall yield the right-of-way to vehicles lawfully within the intersection at the  
5 time that the flashing red signal indication is first displayed.  
6 4. When a flashing CIRCULAR RED signal indication(s) is displayed as a beacon (see Chapter  
7 4S) to supplement another traffic control device, road users are notified that there is a need  
8 to pay extra attention to the message contained thereon or that the regulatory requirements  
9 of the other traffic control device, which might not be applicable at all times, are currently  
10 applicable. Use of this signal indication shall be limited to supplementing STOP (R1-1), DO  
11 NOT ENTER (R5-1), or WRONG WAY (R5-1a) signs, and to applications where  
12 compliance with the supplemented traffic control device requires a stop at a designated  
13 point.

14 **Section 4A.05 Meanings of Bicycle Symbol Signal Indications** Added to reflect Interim  
15 **Approval 16**

16 **Standard:**

17 The following meanings shall be given to bicycle traffic signal indications for bicyclists:

- 18 A. Bicyclists facing a steady GREEN BICYCLE signal indication are permitted to cautiously enter  
19 the intersection only to make the movement indicated by the lane-use arrow(s) displayed on the  
20 Bicycle Signal sign (see Section 9B.22) that is located immediately adjacent to the signal face.  
21 Bicyclists proceeding into the intersection during the display of the steady GREEN BICYCLE  
22 signal indication shall yield the right-of-way to pedestrians lawfully within an associated  
23 crosswalk, and to other vehicles lawfully within the intersection.  
24 B. Bicyclists facing a steady YELLOW BICYCLE signal indication are thereby warned that the  
25 related green movement is being terminated and that a steady RED BICYCLE signal indication  
26 will be displayed immediately thereafter when bicyclists shall not enter the intersection. The  
27 rules set forth concerning bicycle operation under the movement being terminated shall  
28 continue to apply while the steady YELLOW BICYCLE signal indication is displayed.  
29 C. Bicyclists facing a steady RED BICYCLE signal indication shall not enter the intersection to  
30 make the movement indicated by the lane-use arrow(s) displayed on the Bicycle Signal (RX-XX)  
31 sign that is located immediately adjacent to the signal face and, unless entering the intersection  
32 to make another movement permitted by another bicycle symbol signal indication, shall stop at  
33 a clearly marked stop line; but if there is no stop line, before entering the crosswalk on the near  
34 side of the intersection; or if there is no crosswalk, then before entering the intersection; and  
35 shall remain stopped until a GREEN BICYCLE signal indication permitting the movement  
36 indicated by such RED BICYCLE signal indication is displayed.

37 Except when a traffic control device is in place prohibiting a turn on red, bicyclists facing a  
38 steady RED BICYCLE signal indication are permitted to enter the intersection to turn right if  
39 there are no approach lanes for motor vehicle traffic to their right, or to turn left from a one-  
40 way street into a one-way street if there are no approach lanes for motor vehicle traffic to their  
41 left, after stopping. The right to proceed with the turn shall be subject to the rules applicable  
42 after making a stop at a STOP sign.

- 43 D. A flashing GREEN BICYCLE signal indication has no meaning and shall not be used.  
44 E. Bicyclists facing a flashing YELLOW BICYCLE signal indication are permitted to cautiously  
45 enter the intersection only to make the movement indicated by the lane-use arrow(s) displayed  
46 on the Bicycle Signal sign (see Section 9B.22) that is located immediately adjacent to the signal  
47 face. Bicyclists proceeding into the intersection during the display of the flashing YELLOW  
48 BICYCLE signal indication shall yield the right-of-way to pedestrians lawfully within an  
49 associated crosswalk, and to other vehicles lawfully within the intersection.  
50 F. Bicyclists facing a flashing RED BICYCLE signal indication shall stop at a clearly marked stop  
51 line; but if there is no stop line, before entering the crosswalk on the near side of the  
52 intersection; or if there is no crosswalk, at the point nearest the intersecting roadway where the  
53 bicyclist has a view of approaching traffic on the intersecting roadway before entering the  
54 intersection. The right to proceed in the direction indicated by the lane-use arrow(s) displayed

1 on the Bicycle Signal (RX-XX) sign that is located immediately adjacent to the signal face shall  
2 be subject to the rules applicable after making a stop at a STOP sign.

3 **Section ~~4E.02~~ 4A.06 Meanings of Pedestrian Signal ~~Head~~ Indications**

4 **Standard:**

5 Pedestrian signal ~~head~~ indications shall have the following meanings:

- 6 A. A flashing WALKING PERSON (symbolizing WALK) signal indication has no meaning and  
7 shall not be used. **Text was relocated from below, formerly Item D**
- 8 B. Pedestrians facing a steady WALKING PERSON (symbolizing WALK) signal indication ~~means~~  
9 ~~that a pedestrian facing the signal indication is~~ shall be permitted to start to cross the roadway  
10 in the direction of the signal indication, possibly in conflict with turning vehicles. ~~The~~  
11 Pedestrians shall yield the right-of-way to vehicles lawfully within the intersection at the time  
12 that the WALKING PERSON (symbolizing WALK) signal indication is first shown.
- 13 C. Pedestrians facing a flashing UPRAISED HAND (symbolizing DONT WALK) signal indication  
14 ~~means that a pedestrian~~ shall not start to cross the roadway in the direction of the signal  
15 indication, ~~but that~~ Any pedestrian who has already started to cross the roadway on a steady  
16 WALKING PERSON (symbolizing WALK) signal indication shall continue to proceed to the  
17 far side of the traveled way of the street or highway, unless otherwise directed by a traffic  
18 control device to proceed only to the median of a divided highway or only to ~~some other~~ a safety  
19 ~~island or pedestrian refuge area.~~
- 20 D. Pedestrians facing a steady UPRAISED HAND (symbolizing DONT WALK) signal indication  
21 ~~means that a pedestrian~~ shall not enter the roadway in the direction of the signal indication.

22 **Section ~~4D.33~~ 4A.07 Lateral Offset of Signal Supports and Cabinets**

23 *Guidance:*

24 *The following items should be considered when placing signal supports and cabinets:*

- 25 A. Reference should be made to the American Association of State Highway and Transportation Officials  
26 (AASHTO) "Roadside Design Guide" (see Section 1A.~~0511~~) and to the U.S. Department of Justice  
27 2010 ADA Standards for Accessible Design, September 15, 2010 and Code of Federal Regulations.  
28 Title 28, Parts 35 and 36. Americans with Disabilities Act of 1990 ~~"Americans with Disabilities Act~~  
29 ~~Accessibility Guidelines for Buildings and Facilities (ADAAG)"~~ (see Section 1A.~~0511~~).
- 30 B. Signal supports should be placed as far as practical from the edge of the traveled way without  
31 adversely affecting the visibility of the signal indications.
- 32 C. Where supports cannot be located based on the recommended AASHTO clearances, consideration  
33 should be given to the use of appropriate safety devices.
- 34 D. No part of a concrete base for a signal support should extend more than 4 inches above the ground  
35 level at any point. This limitation does not apply to the concrete base for a rigid support.
- 36 E. In order to minimize hindrance to the passage of persons with physical disabilities, a signal support  
37 or controller cabinet should not obstruct the sidewalk, or access from the sidewalk to the crosswalk.
- 38 F. Controller cabinets should be located as far as practical from the edge of the roadway.
- 39 G. On medians, the minimum clearances provided in Items A through E for signal supports should be  
40 obtained if practical.

41 **Section ~~4D.34~~ 4A.08 Use of Signs at Signalized Locations**

42 **Support:**

43 Traffic signal signs are sometimes used at highway traffic signal locations to instruct or guide pedestrians,  
44 bicyclists, or motorists. Among the signs typically used at or on the approaches to signalized locations are  
45 movement prohibition signs (see Section 2B.~~4826~~), lane control signs (see Sections ~~2B.19 to 2B.22~~ 2B.27 to  
46 2B.29), pedestrian crossing signs (see Section 2B.~~5458~~), pedestrian actuation signs (see Section 2B.~~5259~~),  
47 traffic signal signs (see Sections 2B.~~5360~~ and 2C.~~4844~~), Signal Ahead warning signs (see Section 2C.36),  
48 Street Name signs (see Section 2D.~~4345~~), and Advance Street Name signs (see Section 2D.~~4446~~).

49 *Guidance:*

50 *Regulatory, warning, and guide signs should be used at highway traffic ~~control~~ signal locations as*  
51 *provided in Part 2 and as specifically provided elsewhere in Part 4.*

1 ~~Traffic signal signs should be located adjacent to the signal face to which they apply.~~ **This text was**  
2 **relocated to new Section 2B.63**

3 Support:

4 Section 2B.19-27 contains information regarding the use of overhead lane control signs on signalized  
5 approaches where lane drops, multiple-lane turns involving ~~shared~~ combined through-and-turn lanes, or other  
6 lane-use regulations that would be unexpected by unfamiliar road users are present.

7 ~~Standard~~ **Guidance:** **Standard changed to Guidance**

8 *If used, illuminated traffic signal signs ~~shall~~ should be designed and mounted in such a manner as to*  
9 *avoid glare and reflections that seriously detract from the signal indications. Highway traffic ~~control~~ signal*  
10 *faces ~~shall~~ should be given dominant position and brightness to maximize their priority in the overall display.*

11 **Standard:**

12 **The minimum vertical clearance and horizontal offset of the total assembly of traffic signal signs**  
13 **(see Section 2B.5360) shall comply with the provisions of Sections 4D.15-08 and 4D.1609.**

14 **STOP signs shall not be used in conjunction with any highway traffic ~~control~~ signal operation,**  
15 **except in either of the following cases:**

16 **A. If the signal indication for an approach is a flashing red at all times, or**

17 **B. If a minor street or driveway is located within or adjacent to ~~the~~ an area controlled by ~~the~~ a**  
18 **traffic control signal, but does not require separate traffic signal control because an extremely**  
19 **low potential for conflict exists.**

## 20 **Section ~~4D.35~~ 4A.09 Use of Pavement Markings at Signalized Locations**

21 Support:

22 Pavement markings (~~see Part 3~~) that clearly communicate the operational plan of an intersection to road  
23 users play an important role in the effective operation of highway traffic ~~control~~ signals. By designating the  
24 number of lanes, the use of each lane, the length of additional lanes on the approach to an intersection, and the  
25 proper stopping points, the engineer can design the signal phasing and timing to best match the goals of the  
26 operational plan.

27 *Guidance:*

28 *Pavement markings should be used at highway traffic ~~control~~ signal locations as provided in Part 3. If*  
29 *the road surface will not retain pavement markings, signs should be installed to provide the needed road user*  
30 *information.*

## 31 **Section ~~4D.02~~ 4A.10 Responsibility for Operation and Maintenance**

32 *Guidance:*

33 *Prior to installing any highway traffic ~~control~~ signal, the responsibility for the maintenance of the signal*  
34 *and all of the appurtenances, hardware, software, and the timing plan(s) should be clearly established by the*  
35 *~~The responsible agency should provide for the maintenance of the highway traffic control signal and all of its~~*  
36 *~~appurtenances in a competent manner.~~* **Revised to reflect Official Change Request (60)**

37 *To this end the agency should:*

- 38 A. *Keep every controller assembly in effective operation in accordance with its predetermined timing*  
39 *schedule; check the operation of the controller assembly frequently enough to verify that it is*  
40 *operating in accordance with the predetermined timing schedule; and establish a policy to maintain a*  
41 *record of all timing changes and that only authorized persons are permitted to make timing changes;*
- 42 B. *Clean the optical system of the signal sections and replace the light sources as frequently as*  
43 *experience proves necessary;*
- 44 C. *Clean and service equipment and other appurtenances as frequently as experience proves necessary;*
- 45 D. *Provide for alternate operation of the traffic control signal during a period of failure, using flashing*  
46 *mode or manual control, or manual traffic direction by proper authorities as might be required by*  
47 *traffic volumes or congestion, or by erecting other traffic control devices;*
- 48 E. *Have properly skilled maintenance personnel available without undue delay for all signal*  
49 *malfunctions and signal indication failures;*

- 1 F. Provide spare equipment to minimize the interruption of highway traffic ~~control~~-signal operation as a
- 2 result of equipment failure;
- 3 G. Provide for the availability of properly skilled maintenance personnel for the repair of all
- 4 components; and
- 5 H. Maintain the appearance of the signal displays and equipment.
- 6

1 CHAPTER 4B. TRAFFIC CONTROL SIGNALS—GENERAL

2 Section 4B.01 General

3 Support:

4 Words such as pedestrians and bicyclists are used redundantly in selected Sections of Part 4 to encourage  
5 sensitivity to these elements of “traffic.”

6 Standards for traffic control signals are important because traffic control signals need to attract the  
7 attention of a variety of road users, including those who are older, those with impaired vision, as well as those  
8 who are fatigued or distracted, or who are not expecting to encounter a signal at a particular location.

9 Section 4B.02 Basis of Installation ~~or Removal~~ of Traffic Control Signals

10 ~~Guidance:~~

11 ~~The selection and use of traffic control signals should be based on an engineering study of roadway, traffic,~~  
12 ~~and other conditions.~~

13 Support:

14 A careful analysis of traffic operations, pedestrian and bicyclist needs, and other factors at a large number  
15 of signalized and unsignalized locations, coupled with engineering judgment, has provided a series of signal  
16 warrants, described in Chapter 4C, that define the minimum conditions under which installing traffic control  
17 signals might be justified. **The sequence of Paragraphs 1 and 2 was reversed**

18 ~~Guidance:~~

19 ~~Engineering judgment should be applied in the review of operating traffic control signals to determine~~  
20 ~~whether the type of installation and the timing program meet the current requirements of all forms of~~  
21 ~~traffic.~~

22 ~~If changes in traffic patterns eliminate the need for a traffic control signal, consideration should be given~~  
23 ~~to removing it and replacing it with appropriate alternative traffic control devices, if any are needed.~~

24 ~~If the engineering study indicates that the traffic control signal is no longer justified, and a decision is~~  
25 ~~made to remove the signal, removal should be accomplished using the following steps:~~

- 26 ~~A. Determine the appropriate traffic control to be used after removal of the signal.~~
- 27 ~~B. Remove any sight distance restrictions as necessary.~~
- 28 ~~C. Inform the public of the removal study.~~
- 29 ~~D. Flash or cover the signal heads for a minimum of 90 days, and install the appropriate stop control or~~  
30 ~~other traffic control devices.~~
- 31 ~~E. Remove the signal if the engineering data collected during the removal study period confirms that the~~  
32 ~~signal is no longer needed.~~

33 ~~Option:~~

34 ~~Because Items C, D, and E in Paragraph 5 are not relevant when a temporary traffic control signal~~  
35 ~~(see Section 4D.32) is removed, a temporary traffic control signal may be removed immediately after Items A~~  
36 ~~and B are completed.~~

37 ~~Instead of total removal of a traffic control signal, the poles, controller cabinet, and cables may remain in~~  
38 ~~place after removal of the signal heads for continued analysis.~~

39 ~~The ~~selection and use~~ design (including the phasing, operation, and timing) of new~~ traffic control signals  
40 ~~should be based on an engineering study of roadway, traffic, and other conditions.~~

41 ~~Traffic control signals should not be installed or operated for the purpose of penalizing drivers who are~~  
42 ~~speeding, especially in conjunction with signs that have a legend that informs drivers that speeding triggers a~~  
43 ~~red light.~~

44 Section 4B.03 Basis of Removal of Traffic Control Signals **Text was relocated from Section 4B.02**

45 ~~Guidance:~~

46 ~~Engineering judgment should be applied in the review of operating traffic control signals to determine~~  
47 ~~whether the type of installation and the timing program meet the current requirements of all forms of traffic.~~

48 ~~If changes in traffic patterns eliminate the need for a traffic control signal, consideration should be given~~  
49 ~~to removing it and replacing it with appropriate alternative traffic control devices, if any are needed.~~

1 *If the engineering study indicates that the traffic control signal is no longer justified, and a decision is*  
2 *made to remove the signal, removal should be accomplished using the following steps:*

- 3 A. *Determine the appropriate traffic control to be used after removal of the signal.*
- 4 B. *Remove any sight-distance restrictions as necessary.*
- 5 C. *Inform the public of the removal study.*
- 6 D. *Flash or cover the signal heads for a minimum of 90 days, and install the appropriate stop control or*  
7 *other traffic control devices.*
- 8 E. *Remove the signal if the engineering data collected during the removal study period confirms that the*  
9 *signal is no longer needed.*

10 Option:

11 Because Items C, D, and E in Paragraph 3 are not relevant when a temporary traffic control signal (see  
12 Section 4D.10) is removed, a temporary traffic control signal may be removed immediately after Items A and  
13 B are completed.

14 Instead of total removal of a traffic control signal, the poles, controller cabinet, and cables may remain in  
15 place after removal of the signal heads for continued analysis.

## 16 **Section ~~4B.03~~ 4B.04 Advantages and Disadvantages of Traffic Control Signals**

17 Support:

18 When properly used, traffic control signals are valuable devices for the control of vehicular and pedestrian  
19 traffic. They ~~assign the right of way to~~ control the various traffic movements by alternating between directing  
20 them to stop and permitting them to proceed and thereby profoundly influence traffic flow.

21 Traffic control signals that are properly designed, located, operated, and maintained will have one or more  
22 of the following advantages:

- 23 A. They provide for the orderly movement of traffic.
- 24 B. They increase the traffic-handling capacity of the intersection if:
  - 25 1. Proper physical layouts and control measures are used, and
  - 26 2. The signal operational parameters are reviewed and updated (if needed) on a regular basis (as  
27 engineering judgment determines that significant traffic flow and/or land use changes have  
28 occurred) to maximize the ability of the traffic control signal to satisfy current traffic demands.
- 29 C. They reduce the frequency and severity of certain types of crashes, especially right-angle collisions.
- 30 D. They are coordinated to provide for continuous or nearly continuous movement of traffic at a definite  
31 speed along a given route under favorable conditions.
- 32 E. They are used to interrupt heavy traffic at intervals to permit other traffic, vehicular or pedestrian, to  
33 cross.

34 Traffic control signals are often considered a panacea for all traffic problems at intersections. This belief  
35 has led to traffic control signals being installed at many locations where they are not needed, adversely  
36 affecting the safety and efficiency of vehicular, bicycle, and pedestrian traffic.

37 Traffic control signals, even when justified by traffic and roadway conditions, can be ill-designed,  
38 ineffectively placed, improperly operated, or poorly maintained. Improper or unjustified traffic control  
39 signals can result in one or more of the following disadvantages:

- 40 A. Excessive delay,
- 41 B. Excessive disobedience of the signal indications,
- 42 C. Increased use of less adequate routes as road users attempt to avoid the traffic control signals, and
- 43 D. Significant increases in the frequency of collisions (especially rear-end collisions).

## 44 **Section ~~4B.04~~ 4B.05 Alternatives to Traffic Control Signals**

45 *Guidance:*

46 *Since vehicular delay and the frequency of some types of crashes are sometimes ~~greater~~ higher under*  
47 *traffic signal control than under STOP sign control, consideration should be given to providing alternatives to*  
48 *traffic control signals even if one or more of the signal warrants has been satisfied.*

49 Option:

50 These alternatives may include, but are not limited to, the following:

- 1 A. Installing signs along the major street to warn road users approaching the intersection;
- 2 B. Relocating the stop line(s) and making other changes to improve the sight distance at the intersection;
- 3 C. Installing measures designed to reduce speeds on the approaches;
- 4 D. Installing a flashing beacon at the intersection to supplement STOP sign control;
- 5 E. Installing flashing beacons on warning signs in advance of a STOP sign controlled intersection on
- 6 major- and/or minor-street approaches;
- 7 F. Adding one or more lanes on a minor-street approach to reduce the number of vehicles per lane on the
- 8 approach;
- 9 G. Revising the geometrics at the intersection to channelize vehicular movements and reduce the time
- 10 required for a vehicle to complete a movement, which could also assist pedestrians;
- 11 H. Revising the geometrics at the intersection to add pedestrian median refuge islands and/or curb
- 12 extensions;
- 13 I. Installing roadway lighting if a disproportionate number of crashes occur at night;
- 14 J. Restricting one or more turning movements, perhaps on a time-of-day basis, if alternate routes are
- 15 available;
- 16 K. If the warrant is satisfied, installing multi-way STOP sign control;
- 17 L. Installing a pedestrian hybrid beacon (see Chapter 4J) or In-Roadway Warning Lights (see Chapter
- 18 4U) if pedestrian safety is the major concern;
- 19 M. Installing a roundabout [to reduce vehicular conflicts](#); and
- 20 N. Employing other alternatives, depending on conditions at the intersection.

21 Support:

22 [Where installation of a roundabout as an alternative to a traffic control signal is in close proximity to a](#)

23 [grade crossing, refer to Section 8C.12 for additional information.](#)

24 ~~Section 4B.05 Adequate Roadway Capacity~~ **Section deleted; content not specific to traffic control**

25 **devices**

26

1 CHAPTER 4C. TRAFFIC CONTROL SIGNAL NEEDS STUDIES

2 Section 4C.01 Studies and Factors for Justifying Traffic Control Signals

3 Standard:

4 Except for temporary traffic control signals (see Section 4D.10), before a traffic control signal is  
5 installed at a particular location, an engineering study of traffic conditions, pedestrian characteristics,  
6 and physical characteristics of the location shall be performed to determine whether installation of a  
7 traffic control signal is justified at ~~a particular~~ that location.

8 The investigation of the need for a traffic control signal shall include an analysis of factors related  
9 to the existing operation and safety at the study location and the potential to improve these conditions,  
10 and the applicable factors contained in the following traffic signal warrants:

- 11 Warrant 1, Eight-Hour Vehicular Volume
- 12 Warrant 2, Four-Hour Vehicular Volume
- 13 Warrant 3, Peak Hour
- 14 Warrant 4, Pedestrian Volume
- 15 Warrant 5, School Crossing
- 16 Warrant 6, Coordinated Signal System
- 17 Warrant 7, Crash Experience
- 18 Warrant 8, Roadway Network
- 19 Warrant 9, Intersection Near a Grade Crossing

20 The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a  
21 traffic control signal.

22 Support:

23 ~~Sections 8C.09 and 8C.10~~ Sections 8D.08 and 8D.14 contain information regarding the use of traffic  
24 control signals instead of gates and/or flashing-light signals at highway ~~light rail transit~~ grade crossings ~~and~~  
25 ~~highway light rail transit grade crossings~~, respectively.

26 Guidance:

27 When considering the installation of a traffic control signal, alternatives to traffic control signals,  
28 including those listed in Section 4B.05, should also be considered.

29 A traffic control signal should not be installed unless one or more of the factors described in this Chapter  
30 are met.

31 A traffic control signal should not be installed unless an engineering study indicates that installing a  
32 traffic control signal will improve the overall safety and/or operation of the intersection.

33 A traffic control signal should not be installed if it will seriously disrupt progressive traffic flow.

34 The study should consider the effects of the right-turn vehicles from the minor-street approaches.  
35 Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted  
36 from the minor-street traffic count when evaluating the count against the signal warrants listed in Paragraph  
37 2.

38 Engineering judgment should also be used in applying various traffic signal warrants to cases where  
39 major-street approaches consist of one lane plus one left-turn or right-turn lane. The site-specific traffic  
40 characteristics should dictate whether a ~~major-street~~ major-street approach is considered as one lane or two lanes. For  
41 example, for a ~~major-street~~ major-street approach with one lane for through and right-turning traffic plus a left-turn  
42 lane, if engineering judgment indicates that it should be considered a one-lane approach because the traffic  
43 using the left-turn lane is minor, the total traffic volume approaching the intersection should be applied  
44 against the signal warrants as a one-lane approach. The major-street approach should be considered two  
45 lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length  
46 to accommodate all left-turn vehicles.

47 Similar engineering judgment and rationale should be applied to a minor-street approach with one  
48 through/left-turn lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn  
49 traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in  
50 the minor-street volume if the movement enters the major street with minimal conflict. The minor-street  
51 approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn

1 *lane considered. If a minor-street approach has an exclusive left-turn lane, the approach should either be*  
2 *analyzed as a two-lane approach based on the sum of the traffic volumes using both lanes or as a one-lane*  
3 *approach based on only the traffic volume in the approach lane with the highest volume.*

4 *At a location that is under development or construction ~~and~~ or at a location where it is not possible to*  
5 *obtain a traffic count that would represent future traffic conditions, hourly volumes should be estimated as*  
6 *part of an engineering study for comparison with traffic signal warrants. Except for locations where the*  
7 *engineering study uses the satisfaction of Warrant 8 to justify a signal, a traffic control signal installed under*  
8 *projected conditions should have an engineering study done within 1 year of putting the signal into steady*  
9 *(stop-and-go) operation to determine if the signal is justified. If not justified, the signal should be taken out of*  
10 *steady (stop-and-go) operation or removed.*

11 Option:

12 For signal warrant analysis, a location with a wide median, ~~even if the median width is greater than 30-~~  
13 ~~feet, should~~ may be ~~considered~~ analyzed as one intersection or as two intersections based on engineering  
14 judgment.

15 ~~Option:~~

16 At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis  
17 may be performed in a manner that considers the higher of the major-street left-turn volumes as the “minor-  
18 street” volume and the corresponding single direction of opposing traffic on the major street as the “major-  
19 street” volume.

20 For signal warrants requiring conditions to be present for a certain number of hours in order to be  
21 satisfied, any four ~~sequential~~ consecutive 15-minute periods may be considered as 1 hour if the separate 1-  
22 hour periods used in the warrant analysis do not overlap each other and both the major-street volume and the  
23 minor-street volume are for the same specific one-hour periods.

24 For signal warrant analysis, bicyclists may be counted as either vehicles or pedestrians.

25 Support:

26 When performing a signal warrant analysis, bicyclists riding in the street with other vehicular traffic are  
27 usually counted as vehicles and bicyclists who are clearly using pedestrian facilities are usually counted as  
28 pedestrians.

29 Option:

30 Engineering study data may include the following:

- 31 A. The number of vehicles entering the intersection in each hour from each approach during 12 hours of  
32 an average day. It is desirable that the hours selected contain the greatest percentage of the 24-hour  
33 traffic volume.
- 34 B. Vehicular volumes for each traffic movement from each approach, classified by vehicle type (heavy  
35 trucks, passenger cars and light trucks, public-transit vehicles, and, in some locations, bicycles),  
36 during each 15-minute period of the 2 hours in the morning and 2 hours in the afternoon during which  
37 total traffic entering the intersection is greatest.
- 38 C. Pedestrian volume counts on each crosswalk during the same periods as the vehicular counts in Item  
39 B and during hours of highest pedestrian volume. Where young, elderly, and/or persons with physical  
40 or visual disabilities need special consideration, the pedestrians and their crossing times may be  
41 classified by general observation.
- 42 D. Information about nearby facilities and activity centers that serve the young, elderly, and/or persons  
43 with disabilities, including requests from persons with disabilities for accessible crossing  
44 improvements at the location under study. These persons might not be adequately reflected in the  
45 pedestrian volume count if the absence of a signal restrains their mobility.
- 46 E. The posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on the uncontrolled approaches to the  
47 location.
- 48 F. A condition diagram showing details of the physical layout, including such features as intersection  
49 geometrics, channelization, grades, sight-distance restrictions, transit stops and routes, parking  
50 conditions, pavement markings, roadway lighting, driveways, nearby railroad crossings, distance to  
51 nearest traffic control signals, utility poles and fixtures, and adjacent land use.

1 G. A collision diagram showing crash experience by type, location, direction of movement, severity,  
2 weather, time of day, date, and day of week for at least 1 year.

3 The following data, which are desirable for a more precise understanding of the operation of the  
4 intersection, may be obtained during the periods described in Item B of Paragraph 17:

- 5 A. Vehicle-hours of stopped time delay determined separately for each approach.
- 6 B. The number and distribution of acceptable gaps in vehicular traffic on the major street for entrance  
7 from the minor street.
- 8 C. The posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on controlled approaches at a point  
9 near to the intersection but unaffected by the control.
- 10 D. Pedestrian delay time for at least two 30-minute peak pedestrian delay periods of an average weekday  
11 or like periods of a Saturday or Sunday.
- 12 E. Queue length on stop-controlled approaches.

### 13 **Section 4C.02 Warrant 1, Eight-Hour Vehicular Volume**

14 Support:

15 The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large  
16 volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

17 The Interruption of Continuous Traffic, Condition B, is intended for application at locations where  
18 Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor  
19 intersecting street suffers excessive delay or conflict in entering or crossing the major street.

20 It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then Warrant 1 is  
21 satisfied and analyses of Condition B and the combination of Conditions A and B are not needed. Similarly, if  
22 Condition B is satisfied, then Warrant 1 is satisfied and an analysis of the combination of Conditions A and B  
23 is not needed.

24 ~~Standard~~ Guidance: **Standard changed to Guidance; revised to reflect Official Interpretation 4(09)-59(I)**

25 *The need for a traffic control signal ~~shall~~ should be considered if an engineering study finds that one of*  
26 *the following conditions exist for each of any 8 hours of an average day:*

- 27 A. *The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on*  
28 *the major-street and the ~~higher volume~~ more critical minor-street approaches, respectively, to the*  
29 *intersection; or*
- 30 B. *The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on*  
31 *the major-street and the ~~higher volume~~ more critical minor-street approaches, respectively, to the*  
32 *intersection.*

#### 33 **Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume**

34 Standard:

35 ~~In applying each condition the~~ These major-street and minor-street volumes shall be for the same 8  
36 hours for each condition; however, the 8 hours that are selected for the Condition A analysis shall not  
37 be required to be the same 8 hours that are selected for the Condition B analysis. **Second sentence**  
38 **changed to Support and moved to next paragraph**

39 Support:

40 On the minor street, the ~~higher~~ more critical volume ~~shall is~~ not be required to be on the same approach  
41 during each of these 8 hours. The more critical minor-street volume is the one that meets the warranting  
42 criteria for that approach, and in the case of a one-lane minor-street approach that is opposite from a multi-  
43 lane minor-street approach might not have the higher volume. **Revised to reflect Official Interpretation**  
44 **4(09)-59(I)**

45 Option:

46 If the posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on the major street exceeds 40 mph, or if  
47 the intersection lies within the built-up area of an isolated community having a population of less than 10,000,  
48 the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

49 Guidance:

1 The combination of Conditions A and B is intended for application at locations where Condition A is not  
2 satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other  
3 alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

4 **Standard:** Standard changed to Guidance; revised to reflect Official Interpretation 4(09)-59(I)

5 The need for a traffic control signal ~~shall~~ *should* be considered if an engineering study finds that both of  
6 the following conditions exist for each of any 8 hours of an average day:

- 7 A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on  
8 the major-street and the ~~higher volume~~ *more critical* minor-street approaches, respectively, to the  
9 intersection; and  
10 B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on  
11 the major-street and the ~~higher volume~~ *more critical* minor-street approaches, respectively, to the  
12 intersection.

13 **Standard:**

14 These major-street and minor-street volumes shall be for the same 8 hours for each condition;  
15 however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in  
16 Condition B. **The second sentence was changed to Support and moved to the next paragraph**

17 **Support:**

18 On the minor street, the ~~higher~~ *more critical* volume ~~shall is~~ not ~~be~~ required to be on the same approach  
19 during each of the 8 hours. The more critical minor-street volume is the one that meets the warranting criteria  
20 for that approach, and in the case of a one-lane minor-street approach that is opposite from a multi-lane minor-  
21 street approach might not have the higher volume. **Revised to reflect Official Interpretation 4(09)-59(I)**

22 Option:

23 If the posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on the major street exceeds 40 mph, or if  
24 the intersection lies within the built-up area of an isolated community having a population of less than 10,000,  
25 the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

## 26 **Section 4C.03 Warrant 2, Four-Hour Vehicular Volume**

27 **Support:**

28 The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume  
29 of intersecting traffic is the principal reason to consider installing a traffic control signal.

30 **Standard:** **Guidance:** Standard changed to Guidance; revised to reflect Official Interpretation 4(09)-59(I)

31 The need for a traffic control signal ~~shall~~ *should* be considered if an engineering study finds that, for each  
32 of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street  
33 (total of both approaches) and the corresponding vehicles per hour on the ~~higher volume~~ *more critical* minor-  
34 street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing  
35 combination of approach lanes. **The second sentence was changed to Support and moved to the next**

36 **paragraph**

37 **Support:**

38 On the minor street, the ~~higher~~ *more critical* volume ~~shall is~~ not ~~be~~ required to be on the same approach  
39 during each of these 4 hours. The more critical minor-street volume is the one that meets the warranting  
40 criteria for that approach, and in the case of a one-lane minor-street approach that is opposite from a multi-  
41 lane minor-street approach might not have the higher volume. **Revised to reflect Official Interpretation**

42 **4(09)-59(I)**

43 Option:

44 If the posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on the major street exceeds 40 mph, or if  
45 the intersection lies within the built-up area of an isolated community having a population of less than 10,000,  
46 Figure 4C-2 may be used in place of Figure 4C-1.

47 **Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume**

48 **Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)**

## 49 **Section 4C.04 Warrant 3, Peak Hour**

1 Support:

2 The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a  
3 minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing  
4 the major street.

5 ~~Standard~~ Guidance: **Standard changed to Guidance**

6 This signal warrant ~~shall~~ should be applied only in unusual cases, such as office complexes,  
7 manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge  
8 large numbers of vehicles over a short time.

9 **Standard changed to Guidance; revised to reflect Official Interpretation 4(09)-59(I)**

10 The need for a traffic control signal ~~shall~~ should be considered if an engineering study finds that the  
11 criteria in either of the following two categories are met:

- 12 A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute  
13 periods) of an average day:
- 14 1. The total stopped time delay experienced by the traffic on one minor-street approach (one  
15 direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane  
16 approach or 5 vehicle-hours for a two-lane approach; and
  - 17 2. The volume on the same minor-street approach (one direction only) equals or exceeds 100  
18 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes;  
19 and
  - 20 3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for  
21 intersections with three approaches or 800 vehicles per hour for intersections with four or more  
22 approaches.
- 23 B. The plotted point representing the vehicles per hour on the major street (total of both approaches)  
24 and the corresponding vehicles per hour on the ~~higher volume~~ more critical minor-street approach  
25 (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls  
26 above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

27 **Figure 4C-3. Warrant 3, Peak Hour**

28 Option:

29 If the posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on the major street exceeds 40 mph, or if  
30 the intersection lies within the built-up area of an isolated community having a population of less than 10,000,  
31 Figure 4C-4 may be used in place of Figure 4C-3 to evaluate the criteria in the second category of the  
32 Standard.

33 **Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**

34 If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the  
35 traffic control signal may be operated in the flashing mode during the hours that the volume criteria of this  
36 warrant are not met.

37 *Guidance:*

38 *If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the*  
39 *traffic control signal should be traffic-actuated.*

40 **Section 4C.05 Warrant 4, Pedestrian Volume**

41 Support:

42 The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major  
43 street is so heavy that pedestrians experience excessive delay in crossing the major street.

44 ~~Standard~~ Guidance: **Standard changed to Guidance**

45 The need for a traffic control signal at an intersection or midblock crossing ~~shall~~ should be considered if  
46 an engineering study finds that one of the following criteria is met:

- 47 A. For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on  
48 the major street (total of both approaches) and the corresponding pedestrians per hour crossing the  
49 major street (total of all crossings) all fall above the curve in Figure 4C-5; or

- 1 B. For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing  
2 the vehicles per hour on the major street (total of both approaches) and the corresponding  
3 pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure  
4 4C-7.

5 **Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume**

6 Option:

7 If the posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on the major street exceeds 35 mph, or if  
8 the intersection lies within the built-up area of an isolated community having a population of less than 10,000,  
9 Figure 4C-6 may be used in place of Figure 4C-5 to evaluate Criterion A in Paragraph 2, and Figure 4C-8 may  
10 be used in place of Figure 4C-7 to evaluate Criterion B in Paragraph 2.

11 **Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)**

12 **Figure 4C-7. Warrant 4, Pedestrian Peak Hour**

13 **Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)**

14 Where there is a divided street having a median of sufficient width for pedestrians to wait, the criteria in  
15 Items A and B of Paragraph 2 may be applied separately to each direction of vehicular traffic. Added to  
16 reflect Official Interpretation 4(09)-25(I).

17 ~~Standard~~ Guidance: Standard changed to Guidance

18 *The Pedestrian Volume signal warrant ~~shall~~ should not be applied at locations where the distance to the*  
19 *nearest traffic control signal or STOP sign controlling the street that pedestrians desire to cross is less than*  
20 *300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.*

21 **Standard:**

22 **If this warrant is met and a traffic control signal is justified by an engineering study, the traffic**  
23 **control signal shall be equipped with pedestrian signal heads complying with the provisions set forth in**  
24 **Chapter ~~4E~~ 4I.**

25 *Guidance:*

26 *If this warrant is met and a traffic control signal is justified by an engineering study, then:*

- 27 A. *If it is installed at an intersection or major driveway location, the traffic control signal should also*  
28 *control the minor-street or driveway traffic, should be traffic-actuated, and should include pedestrian*  
29 *detection.*
- 30 B. *If it is installed at a non-intersection crossing, the traffic control signal should be installed at least*  
31 *100 feet from side streets or driveways that are controlled by STOP or YIELD signs, and should be*  
32 *pedestrian-actuated. If the traffic control signal is installed at a non-intersection crossing, at least*  
33 *one of the signal faces should be over the traveled way for each approach, parking and other sight*  
34 *obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the*  
35 *crosswalk or site accommodations should be made through curb extensions or other techniques to*  
36 *provide adequate sight distance, and the installation should include suitable standard signs and*  
37 *pavement markings.*
- 38 C. *Furthermore, if it is installed within a signal system, the traffic control signal should be coordinated.*

39 Option:

40 The criterion for the pedestrian volume crossing the major street may be reduced as much as 50 percent if  
41 the 15<sup>th</sup>-percentile crossing speed of pedestrians is less than 3.5 feet per second.

42 A traffic control signal may not be needed at the study location if adjacent coordinated traffic control  
43 signals consistently provide gaps of adequate length for pedestrians to cross the street.

44 **Section 4C.06 Warrant 5, School Crossing**

45 Support:

46 The School Crossing signal warrant is intended for application where the fact that schoolchildren cross the  
47 major street is the principal reason to consider installing a traffic control signal. For the purposes of this  
48 warrant, the word "schoolchildren" includes elementary through high school students.

49 ~~Standard~~ Guidance: Standard changed to Guidance

1 The need for a traffic control signal ~~shall~~ should be considered when an engineering study of the  
2 frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of  
3 schoolchildren at an established school crossing across the major street shows that the number of adequate  
4 gaps in the traffic stream during the period when the schoolchildren are using the crossing is less than the  
5 number of minutes in the same period (~~see Section 7A.03~~) and there are a minimum of 20 schoolchildren  
6 during the highest crossing hour.

7 Before a decision is made to install a traffic control signal, consideration ~~shall~~ should be given to the  
8 implementation of other remedial measures, such as warning signs and flashers, school speed zones, school  
9 crossing guards, or a grade-separated crossing.

10 The School Crossing signal warrant ~~shall~~ should not be applied at locations where the distance to the  
11 nearest traffic control signal along the major street is less than 300 feet, unless the proposed traffic control  
12 signal will not restrict the progressive movement of traffic.

13 **Standard:**

14 **If this warrant is met and a traffic control signal is justified by an engineering study, the traffic**  
15 **control signal shall be equipped with pedestrian signal heads complying with the provisions set forth in**  
16 **Chapter 4I.**

17 **Guidance:**

18 *If this warrant is met and a traffic control signal is justified by an engineering study, then:*

- 19 A. *If it is installed at an intersection or major driveway location, the traffic control signal should also*  
20 *control the minor-street or driveway traffic, should be traffic-actuated, and should include pedestrian*  
21 *detection.*
- 22 B. *If it is installed at a non-intersection crossing, the traffic control signal should be installed at least*  
23 *100 feet from side streets or driveways that are controlled by STOP or YIELD signs, and should be*  
24 *pedestrian-actuated. If the traffic control signal is installed at a non-intersection crossing, at least*  
25 *one of the signal faces should be over the traveled way for each approach, parking and other sight*  
26 *obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the*  
27 *crosswalk or site accommodations should be made through curb extensions or other techniques to*  
28 *provide adequate sight distance, and the installation should include suitable standard signs and*  
29 *pavement markings.*
- 30 C. *Furthermore, if it is installed within a signal system, the traffic control signal should be coordinated.*

31 **Section 4C.07 Warrant 6, Coordinated Signal System**

32 **Support:**

33 Progressive movement in a coordinated signal system sometimes necessitates installing traffic control  
34 signals at intersections where they would not otherwise be needed in order to maintain proper platooning of  
35 vehicles.

36 ~~Standard~~ **Guidance:** **Standard changed to Guidance**

37 *The need for a traffic control signal ~~shall~~ should be considered if an engineering study finds that one of*  
38 *the following criteria is met:*

- 39 A. *On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic*  
40 *control signals are so far apart that they do not provide the necessary degree of vehicular platooning.*
- 41 B. *On a two-way street, adjacent traffic control signals do not provide the necessary degree of*  
42 *platooning and the proposed and adjacent traffic control signals will collectively provide a*  
43 *progressive operation.*

44 ~~Guidance:~~

45 *The Coordinated Signal System signal warrant should not be applied where the resultant spacing of*  
46 *traffic control signals would be less than 1,000 feet.*

47 **Section 4C.08 Warrant 7, Crash Experience**

48 **Support:**

49 The Crash Experience signal warrant conditions are intended for application where the severity and  
50 frequency of crashes are the principal reasons to consider installing a traffic control signal.

1 ~~Standard~~ Guidance: **Standard changed to Guidance**

2 The need for a traffic control signal ~~shall~~ should be considered if an engineering study finds that all of the  
3 following criteria are met:

- 4 A. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the  
5 crash frequency; and
- 6 B. ~~Five or more reported crashes, of types susceptible to correction by a traffic control signal, have~~  
7 ~~occurred within a 12-month period, each crash involving personal injury or property damage. At~~  
8 ~~least one of the following conditions applies to the reported crash history (where each reported crash~~  
9 ~~considered is related to the intersection and apparently ~~exceeding~~ exceeds the applicable~~  
10 ~~requirements for a reportable crash):~~ **Revised to reflect Interim Approval 19 and Official Change**  
11 **Request 4(09)-42**
- 12 1. The number of reported angle crashes and pedestrian crashes within a one-year period equals or  
13 exceeds the threshold number in Table 4C-2 for total angle crashes and pedestrian crashes (all  
14 severities); or
  - 15 2. The number of reported fatal-and-injury angle crashes and pedestrian crashes within a one-year  
16 period equals or exceeds the threshold number in Table 4C-2 for total fatal-and-injury angle  
17 crashes and pedestrian crashes ; or
  - 18 3. The number of reported angle crashes and pedestrian crashes within a three-year period equals  
19 or exceeds the threshold number in Table 4C-3 for total angle crashes and pedestrian crashes (all  
20 severities); or
  - 21 4. The number of reported fatal-and-injury angle crashes and pedestrian crashes within a three-year  
22 period equals or exceeds the threshold number in Table 4C-3 for total fatal-and-injury angle  
23 crashes and pedestrian crashes; and
- 24 C. For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent  
25 columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent  
26 columns of Condition B in Table 4C-1 exists on the major-street and the ~~higher volume~~ more critical  
27 minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less  
28 than 80 percent of the requirements specified in the Pedestrian Volume warrant. **Revised to reflect**  
29 **Official Interpretation 4(09)-59(I)**

30 **Table 4C-2. Minimum Number of Reported Crashes in a One-Year Period - Urban Area**

31 **Table 4C-3. Minimum Number of Reported Crashes in a Three-Year Period - Urban Area**

32 **Standard:**

33 **These major-street and minor-street volumes shall be for the same 8 hours.** **The second sentence**  
34 **was changed to Support and moved to the next paragraph**

35 **Support:**

36 On the minor street, the ~~higher~~ more critical volume ~~shall is~~ not be required to be on the same approach  
37 during each of these 8 hours. The more critical minor-street volume is the one that meets the warranting  
38 criteria for that approach, and in the case of a one-lane minor-street approach that is opposite from a multi-  
39 lane minor-street approach might not have the higher volume. **Revised to reflect Official Interpretation**  
40 **4(09)-59(I)**

41 **Option:**

42 If the posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on the major street exceeds 40 mph, or if  
43 the intersection lies within the built-up area of an isolated community having a population of less than  
44 10,000;

45 A. ~~†~~The traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent  
46 columns.

47 B. Tables 4C-4 and 4C-5 may be used in place of Tables 4C-2 and 4C-3. **Text added to reflect Interim**  
48 **Approval IA-19 and Official Change Request 4(09)-42**

49 **Table 4C-4. Minimum Number of Reported Crashes in a One-Year Period - Rural Area**

50 **Table 4C-5. Minimum Number of Reported Crashes in a Three-Year Period - Rural Area**

1 **Section 4C.09 Warrant 8, Roadway Network**

2 Support:

3 Installing a traffic control signal at some intersections might be justified to encourage concentration and  
4 organization of traffic flow on a roadway network.

5 ~~Standard~~ Guidance: **Standard changed to Guidance**

6 *The need for a traffic control signal ~~shall~~ should be considered if an engineering study finds that the*  
7 *common intersection of two or more major routes meets one or both of the following criteria:*

- 8 A. *The intersection has a total existing, or immediately projected, entering volume of at least 1,000*  
9 *vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes,*  
10 *based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average*  
11 *weekday; or*
- 12 B. *The intersection has a total existing or immediately projected entering volume of at least 1,000*  
13 *vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday).*

14 *A major route as used in this signal warrant ~~shall~~ should have at least one of the following*  
15 *characteristics: **Standard changed to Guidance***

- 16 A. *It is part of the street or highway system that serves as the principal roadway network for through*  
17 *traffic flow.*
- 18 B. *It includes rural or suburban highways outside, entering, or traversing a city.*
- 19 C. *It appears as a major route on an official plan, such as a major street plan in an urban area traffic*  
20 *and transportation study.*

21 **Section 4C.10 Warrant 9, Intersection Near a Grade Crossing**

22 Support:

23 The Intersection Near a Grade Crossing signal warrant is intended for use at a location where none of the  
24 conditions described in the other eight traffic signal warrants are met, but the proximity ~~to the intersection~~ of a  
25 grade crossing on an ~~intersection~~ approach controlled by a STOP or YIELD sign at a highway-highway  
26 intersection is the principal reason to consider installing a traffic control signal.

27 *Guidance:*

28 *This signal warrant should be applied only after adequate consideration has been given to other*  
29 *alternatives or after a trial of an alternative has failed to alleviate the safety concerns associated with the*  
30 *grade crossing. Among the alternatives that should be considered or tried are:*

- 31 A. *Providing additional pavement that would enable vehicles to clear the track or that would provide*  
32 *space for an evasive maneuver, or*
- 33 B. *Reassigning the stop controls at the highway-highway intersection to make the approach across the*  
34 *track a non-stopping approach.*

35 ~~Standard~~ Standard changed to Guidance

36 *The need for a traffic control signal ~~shall~~ should be considered if an engineering study finds that both of*  
37 *the following criteria are met:*

- 38 A. *A grade crossing exists on an approach controlled by a STOP or YIELD sign at a highway-highway*  
39 *intersection and the center of the track nearest to the intersection is within 140 feet of the stop line or*  
40 *yield line on the approach; and*
- 41 B. *During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point*  
42 *representing the vehicles per hour on the major street (total of both approaches) of the highway-*  
43 *highway intersection and the corresponding vehicles per hour on the minor-street approach that*  
44 *crosses the track (one direction only, approaching the intersection) falls above the applicable curve in*  
45 *Figure 4C-9 or 4C-10 for the existing combination of approach lanes over the track and the distance*  
46 *D, which is the clear storage distance as defined in Section ~~1A.13~~ 1C.02.*

47 **Figure 4C-9. Warrant 9, Intersection Near a Grade Crossing (One Approach Lane at the**  
48 **Track Crossing)**

49 **Figure 4C-10. Warrant 9, Intersection Near a Grade Crossing (Two or More Approach Lanes**  
50 **at the Track Crossing)**

1 ~~Guidance:~~

2 The following considerations apply when plotting the traffic volume data on Figure 4C-9 or 4C-10:

- 3 A. Figure 4C-9 should be used if there is only one lane approaching the highway-highway intersection at  
4 the track crossing location and Figure 4C-10 should be used if there are two or more lanes  
5 approaching the highway-highway intersection at the track crossing location.  
6 B. After determining the actual distance  $D$ , the curve for the distance  $D$  that is nearest to the actual  
7 distance  $D$  should be used. For example, if the actual distance  $D$  is 95 feet, the plotted point should  
8 be compared to the curve for  $D = 90$  feet.  
9 C. If the rail traffic arrival times are unknown, the highest traffic volume hour of the day should be used.

10 Option:

11 The traffic volume on the minor-street approach ~~volume to the highway-highway intersection~~ may be  
12 multiplied by up to three adjustment factors as provided in Paragraphs 6 through 8.

13 Because the curves are based on an average of four occurrences of rail traffic per day, the vehicles per  
14 hour on the minor-street approach may be multiplied by the adjustment factor shown in Table 4C-6 ~~4C-2~~ for  
15 the appropriate number of occurrences of rail traffic per day.

16 **Table 4C-6. Warrant 9, Adjustment Factor for Daily Frequency of Rail Traffic**

17 Because the curves are based on typical vehicle occupancy, if at least 2% of the vehicles crossing the track  
18 are buses carrying at least 20 people, the vehicles per hour on the minor-street approach may be multiplied by  
19 the adjustment factor shown in Table 4C-7 ~~4C-3~~ for the appropriate percentage of high-occupancy buses.

20 **Table 4C-7. Warrant 9, Adjustment Factor for Percentage of High-Occupancy Buses**

21 Because the curves are based on tractor-trailer trucks comprising 10% of the vehicles crossing the track,  
22 the vehicles per hour on the minor-street approach may be multiplied by the adjustment factor shown in Table  
23 4C-8 ~~4C-4~~ for the appropriate distance and percentage of tractor-trailer trucks.

24 **Table 4C-8. Warrant 9, Adjustment Factor for Percentage of Tractor-Trailer Trucks**

25 Standard:

26 If this warrant is met and a traffic control signal at the highway-highway intersection is justified by  
27 an engineering study, then:

- 28 A. The traffic control signal shall have actuation on the minor street;  
29 B. Preemption control shall be provided in accordance with Sections 4D.27, 8C.09, and 8C.10  
30 4F.19 and 8D.09; and  
31 C. The grade crossing shall have flashing-light signals (see Section 8C 8D.02).

32 Guidance:

33 If this warrant is met and a traffic control signal at the highway-highway intersection is justified by an  
34 engineering study, the grade crossing should have automatic gates (see Section 8C 8D.03).

35

1 **CHAPTER 4D. DESIGN OF TRAFFIC CONTROL SIGNALS ~~FEATURES~~**

2 **Section 4D.01 General**

3 Support:

4 The features of traffic control signals of interest to road users are the location, design, and meaning of the  
5 signal indications. Uniformity in the design features that affect the traffic to be controlled, as set forth in this  
6 Manual, is especially important for the safety and efficiency of operations.

7 Traffic control signals can be operated in pretimed, semi-actuated, or full-actuated modes. For isolated  
8 (non-interconnected) signalized locations on rural high-speed highways, full-actuated mode with advance  
9 vehicle detection on the high-speed approaches is typically used. These features are designed to reduce the  
10 frequency with which the onset of the yellow change interval is displayed when high-speed approaching  
11 vehicles are in the “dilemma zone” such that the drivers of these high-speed vehicles find it difficult to decide  
12 whether to stop or proceed.

13 **Standard:**

14 The design and operation of traffic control signals shall take into consideration the needs of all  
15 modes of traffic. **Added to reflect Official Change Request 4(09)-69**

16 **When a traffic control signal is not in operation, such as before it is placed in service, during**  
17 **seasonal shutdowns, or when it is not desirable to operate the traffic control signal, the signal faces shall**  
18 **be covered, turned, or taken down to clearly indicate that the traffic control signal is not in operation.**

19 **Guidance:** **Added to reflect Official Interpretation 4(09)-1(I)**

20 If a cover is placed over a traffic control signal face that is not in operation and that has a yellow  
21 retroreflective strip along the perimeter of its signal backplate (see Paragraph 22 in Section 4D.05), the  
22 entire signal face, including the backplate, should be covered. If a traffic control signal face that is not in  
23 operation and that has a yellow retroreflective strip along the perimeter of its signal backplate is turned, the  
24 turned signal face should be oriented such that the yellow backplate border will not reflect light back to road  
25 users on any of the approaches to the intersection.

26 Support:

27 Seasonal shutdown is a condition in which a permanent traffic control signal is turned off or otherwise  
28 made non-operational during a particular season when its operation is not justified. This might be applied in a  
29 community where tourist traffic during most of the year justifies the permanent signalization, but a seasonal  
30 shutdown of the signal during an annual period of lower tourist traffic would reduce delays; or where a major  
31 traffic generator, such as a large factory, justifies the permanent signalization, but the large factory is shut  
32 down for an annual factory vacation for a few weeks in the summer.

33 **Standard:**

34 **A traffic control signal shall control traffic only at the intersection or midblock location where the**  
35 **signal faces are placed.**

36 **Guidance:** **Standard changed to Guidance**

37 *Midblock crosswalks ~~shall~~ should not be signalized if they are located within 300 feet from the nearest*  
38 *traffic control signal, unless the proposed traffic control signal will not restrict the progressive movement of*  
39 *traffic.*

40 ~~Guidance:~~

41 *A midblock crosswalk location should not be controlled by a traffic control signal if the crosswalk is*  
42 *located within 100 feet from side streets or driveways that are controlled by STOP signs or YIELD signs.*

43 *Engineering judgment should be used to determine the proper phasing and timing for a traffic control*  
44 *signal. Since traffic flows and patterns change, phasing and timing should be reevaluated regularly and*  
45 *updated if needed.*

46 *Traffic control signals within 1/2 mile of one another along a major route or in a network of intersecting*  
47 *major routes should be coordinated, preferably with interconnected controller units. Where traffic control*  
48 *signals that are within 1/2 mile of one another along a major route have a jurisdictional boundary or a*  
49 *boundary between different signal systems between them, coordination across the boundary should be*  
50 *considered.*

1 Support:

2 Signal coordination need not be maintained between control sections that operate on different cycle  
3 lengths.

4 For coordination with grade crossing signals and movable bridge signals, see Sections ~~4D.27, 4J.03,~~  
5 ~~8C.09, and 8C.10~~ 4F.19, 4Q.03, 8D.09.

6 ~~Section 4D.02 Responsibility for Operation and Maintenance~~ Text was relocated to new Section  
7 ~~4A.09~~

8 Section ~~4D.03~~ 4D.02 Provisions for Pedestrians Revisions throughout Section to reflect Official  
9 Change Request 4(09)-69

10 Support:

11 Chapter ~~4E~~ 4I contains additional information regarding pedestrian signals and Chapter ~~4F~~ 4J contains  
12 additional information regarding pedestrian hybrid beacons.

13 Standard:

14 ~~The design and operation of traffic control signals shall take into consideration the needs of~~  
15 ~~pedestrian as well as vehicular traffic.~~

16 Pedestrian signal heads shall be used in conjunction with vehicular traffic control signals under  
17 any of the following conditions, unless the crossing is prohibited or as provided in the Option in  
18 Paragraph 05a:

- 19 A. If ~~the basis for a~~ traffic ~~control~~ signal ~~is~~ installation was justified by an engineering study and  
20 meetings either Warrant 4, Pedestrian Volume or Warrant 5, School Crossing (see Chapter  
21 4C);  
22 B. If an exclusive pedestrian signal phase is provided ~~or made available for pedestrian movements~~  
23 ~~in one or more directions,~~ with all conflicting vehicular movements being stopped;  
24 C. At an established signalized school crossing ~~at any signalized location;~~  
25 D. Where there are existing pedestrian accommodations and engineering judgment determines  
26 that multi-phase signal indications (as with split-phase timing) would tend to confuse or cause  
27 conflicts with pedestrians using a crosswalk guided only by vehicular signal indications;

28 Text was relocated from existing Section 4E.03 and revised based on Official Change Request 4(09)-  
29 69

30 Guidance:

31 Pedestrian signal heads should be installed at each marked crosswalk at a location controlled by a  
32 traffic control signal.

33 ~~If engineering judgment indicates the need for provisions for a given pedestrian movement, signal~~  
34 ~~faces conveniently visible to pedestrians shall be provided by pedestrian signal heads (see Chapter 4I)~~  
35 ~~or a vehicular signal face(s) for a concurrent vehicular movement.~~

36 Guidance:

37 Accessible pedestrian signals (see Chapter ~~4E.09 through 4E.13~~ 4K) that provide information in non-  
38 visual formats (such as audible tones, speech messages, and/or vibrating surfaces) should be provided ~~where~~  
39 ~~determined appropriate by engineering judgment~~ based on the results of an engineering study considering the  
40 factors listed in Section 4K.01.

41 Where pedestrian movements regularly occur, pedestrians should be provided with sufficient time to cross  
42 the roadway by adjusting the traffic control signal operation and timing to provide sufficient crossing time  
43 every cycle or by providing pedestrian detectors.

44 If it is necessary or desirable to prohibit certain pedestrian movements at a traffic control signal location,  
45 No Pedestrian Crossing (R9-3) signs (see Section ~~2B.51~~ 2B.61) should be used if it is not practical to provide  
46 a barrier or other physical feature to physically ~~prevent~~ discourage the pedestrian movements.

47 Pedestrian signal heads may be used under other conditions based on engineering judgement.

48 This text was relocated from existing Section 4E.03

49 Section 4D.03 Provisions for Bicyclists Added to reflect Interim Approval 16

50 Option:

1 [Where it is desired to provide separate signal indications to control bicycle movements at a traffic control](#)  
2 [signal, bicycle signal faces may be used \(see Chapter 4H\).](#)

3 ~~Section 4D.04 Meaning of Vehicular Signal Indications~~ Relocated to new Sections 4A.02 through  
4 ~~4A.04~~

5 ~~Section 4D.05 Application of Steady Signal Indications~~ Relocated to new Section 4F.01

6 ~~Section 4D.06 Signal Indications – Design, Illumination, Color, and Shape~~ Relocated to new  
7 ~~Section 4E.01~~

8 ~~Section 4D.07 Size of Vehicular Signal Indications~~ Relocated to new Section 4E.02

9 ~~Section 4D.08 Positions of Signal Indications Within a Signal Face – General~~ Relocated to new  
10 ~~Section 4E.03~~

11 ~~Section 4D.09 Positions of Signal Indications Within a Vertical Signal Face~~ Relocated to new  
12 ~~Section 4E.04~~

13 ~~Section 4D.10 Positions of Signal Indications Within a Horizontal Signal Face~~ Relocated to new  
14 ~~Section 4E.05~~

15 **Section ~~4D.11~~ 4D.04 Number of Signal Faces on an Approach**

16 **Standard:**

17 The signal faces for each approach to an intersection or a midblock location shall be provided as  
18 follows:

- 19 A. If a signalized [motor vehicle](#) through movement exists on an approach, a minimum of two  
20 primary signal faces shall be provided for the through movement. If a signalized [motor vehicle](#)  
21 through movement does not exist on an approach, a minimum of two primary signal faces shall  
22 be provided for the signalized [motor vehicle](#) turning movement that is considered to be the  
23 major movement from the approach (also see Section ~~4D.25~~ 4F.16).
- 24 B. See Sections ~~4D.17 through 4D.20~~ 4F.02 through 4F.08 for left-turn (and U-turn to the left)  
25 signal faces.
- 26 C. See Sections ~~4D.21 through 4D.24~~ 4F.09 through 4F.15 for right-turn (and U-turn to the right)  
27 signal faces.

28 **Option:**

29 Where a movement (or a certain lane or lanes) at the intersection never conflicts with any other signalized  
30 vehicular or pedestrian movement, a continuously-displayed single-section GREEN ARROW signal  
31 indication may be used to inform road users that the movement is free-flow and does not need to stop.

32 **Support:**

33 In some circumstances where the through movement never conflicts with any other signalized vehicular or  
34 pedestrian movement at the intersection, such as at T-intersections with appropriate geometrics and/or  
35 pavement markings and signing, an engineering study might determine that the through movement (or certain  
36 lanes of the through movement) can be free-flow and not signalized.

37 **Guidance:**

38 *If two or more left-turn lanes are provided for a separately controlled protected only mode left-turn*  
39 *movement, or if a left-turn movement represents the major movement from an approach, two or more primary*  
40 *left-turn signal faces should be provided.*

41 *If two or more right-turn lanes are provided for a separately controlled right-turn movement, or if a right-*  
42 *turn movement represents the major movement from an approach, two or more primary right-turn signal*  
43 *faces should be provided.*

44 **Support:**

45 Locating primary signal faces overhead on the far side of the intersection has been shown to provide safer  
46 operation by reducing intersection entries late in the yellow interval and by reducing red signal violations, as  
47 compared to post-mounting signal faces at the roadside or locating signal faces overhead within the

1 intersection on a diagonally-oriented mast arm or span wire. On approaches with two or more lanes for the  
2 through movement, one signal face per through lane, centered over each through lane, has also been shown to  
3 provide safer operation.

4 *Guidance:*

5 *If the posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on an approach to a signalized location*  
6 *is 45 mph or higher, signal faces should be provided as follows for all new or reconstructed signal*  
7 *installations (see Figure 4D-1~~4D-3~~):*

- 8 A. *The minimum number and location of primary (non-supplemental) signal faces for through traffic*  
9 *should be provided in accordance with Table 4D-1.*
- 10 B. *If the number of overhead primary signal faces for through traffic is equal to the number of through*  
11 *lanes on an approach, one overhead signal face should be located approximately over the center of*  
12 *each through lane.*
- 13 C. *Except for shared left-turn and right-turn signal faces, any primary signal face required by Sections*  
14 *~~4D.17 through 4D.25~~ 4F.02 through 4F.16 for an exclusive turn lane should be located overhead*  
15 *approximately over the center of each exclusive turn lane.*
- 16 D. *All primary signal faces should be located on the far side of the intersection.*
- 17 E. *In addition to the primary signal faces, one or more supplemental pole-mounted or overhead signal*  
18 *faces should be considered to provide added visibility for approaching traffic that is traveling behind*  
19 *large vehicles.*
- 20 F. *All signal faces should have backplates.*

21 **Table 4D-1. Recommended Minimum Number of Primary Signal Faces for Through**  
22 **Traffic on Approaches with Posted, Statutory, or 85th-Percentile Speed of 45 mph or**  
23 **Higher**

24 **Figure 4D-1. Recommended Vehicular Signal Faces for Approaches with Posted,**  
25 **Statutory, or 85th Percentile Speed of 45 mph or Higher**

26 *This layout of signal faces should also be considered for any major urban or suburban arterial street with*  
27 *four or more lanes and for other approaches with speeds of less than 45 mph.*

28 **Section ~~4D.12~~ 4D.05 Visibility, Aiming, and Shielding of Signal Faces**

29 ~~Standard~~ **Guidance:** **Standard changed to Guidance**

30 *The ~~primary~~ most important consideration in signal face placement, aiming, and adjustment ~~shall~~ should*  
31 *be to optimize the visibility of signal indications to approaching traffic.*

32 *Road users approaching a signalized intersection or other signalized area, such as a midblock crosswalk,*  
33 *~~shall~~ should be given a clear and unmistakable indication of ~~their right-of-way assignment~~ whether they are*  
34 *being directed to stop or permitted to proceed.*

35 *The geometry of each intersection to be signalized, including vertical grades, horizontal curves, and*  
36 *obstructions as well as the lateral and vertical angles of sight toward a signal face, as determined by typical*  
37 *driver-eye position, ~~shall~~ should be considered in determining the vertical, longitudinal, and lateral position*  
38 *of the signal face.*

39 ~~Guidance:~~

40 *The two primary signal faces required as a minimum for each approach should be continuously visible to*  
41 *traffic approaching the traffic control signal, from a point at least the minimum sight distance provided in*  
42 *Table 4D-2 in advance of and measured to the stop line. This range of continuous visibility should be*  
43 *provided unless precluded by a physical obstruction or unless another signalized location is within this range.*

44 **Table 4D-2. Minimum Sight Distance for Signal Visibility**

45 *There should be legal authority to prohibit the display of any unauthorized sign, signal, marking, or*  
46 *device that interferes with the effectiveness of any official traffic control device (see Section 11-205 of the*  
47 *“Uniform Vehicle Code”).*

48 *At signalized midblock crosswalks, at least one of the signal faces should be over the traveled way for*  
49 *each approach.*

50 ~~Standard:~~ **Standard changed to Guidance**

1 *If approaching traffic does not have a continuous view of at least two signal faces for at least the*  
2 *minimum sight distance shown in Table 4D-2, a sign (see Section ~~2C.36~~ 2C.37) ~~shall~~ should be installed to*  
3 *warn approaching traffic of the traffic control signal.*

4 Option:

5 If a sign is installed to warn approaching road users of the traffic control signal, the sign may be  
6 supplemented by a Warning Beacon (see Section ~~4L.03~~ 4S.03).

7 A Warning Beacon used in this manner may be interconnected with the traffic signal controller assembly  
8 in such a manner as to flash yellow during the period when road users passing this beacon at the legal speed  
9 for the roadway might encounter a red signal indication (or a queue resulting from the display of the red signal  
10 indication) upon arrival at the signalized location.

11 If the sight distance to the signal faces for an approach is limited by horizontal or vertical alignment,  
12 supplemental signal faces aimed at a point on the approach at which the signal indications first become visible  
13 may be used.

14 *Guidance:*

15 *Supplemental signal faces should be used if engineering judgment has shown that they are needed to*  
16 *achieve intersection visibility both in advance and immediately before the signalized location.*

17 *If supplemental signal faces are used, they should be located to provide optimum visibility for the*  
18 *movement to be controlled.*

19 **~~Standard:~~ Standard changed to Guidance**

20 *In cases where irregular street design necessitates placing signal faces for different street approaches*  
21 *with a comparatively small angle between their respective signal indications, each signal indication ~~shall~~*  
22 *should, to the extent practical, be visibility-limited by signal visors, signal louvers, or other means so that an*  
23 *approaching road user's view of the signal indication(s) controlling movements on other approaches is*  
24 *minimized.*

25 **Standard:**

26 **Signal visors exceeding 12 inches in length shall not be used on free-swinging signal faces.**

27 *Guidance:*

28 *Signal visors should be used on signal faces to aid in directing the signal indication specifically to*  
29 *approaching traffic, as well as to reduce "sun phantom," which can result when external light enters the lens.*

30 *The use of signal visors, or the use of signal faces or devices that direct the light without a reduction in*  
31 *intensity, should be considered as an alternative to signal louvers because of the reduction in light output*  
32 *caused by signal louvers.*

33 Option:

34 Special signal faces, such as visibility-limited signal faces, may be used such that the road user does not  
35 see signal indications intended for other approaches before seeing the signal indications for their own  
36 approach, if simultaneous viewing of both signal indications could cause the road user to be misdirected.

37 *Guidance:*

38 *If the posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on an approach to a signalized location*  
39 *is 45 mph or higher, signal backplates should be used on all of the signal faces that face the approach. Signal*  
40 *backplates should also be considered for use on signal faces on approaches with posted or statutory speed*  
41 *limits or 85<sup>th</sup>-percentile speeds of less than 45 mph where sun glare, bright sky, and/or complex or confusing*  
42 *backgrounds indicate a need for enhanced signal face target value.*

43 Support:

44 The use of backplates enhances the contrast between the traffic signal indications and their surroundings  
45 for both day and night conditions, which is also helpful to older drivers.

46 **Standard:**

47 **If backplates are used, ancillary legends of any kind that identify the purpose or operation of the**  
48 **signal face shall not be placed on the backplate.**

1 The inside of signal visors (hoods), the entire surface of louvers and fins, and the front surface of  
2 backplates shall have a dull black finish to minimize light reflection and to increase contrast between  
3 the signal indication and its background.

4 Option:

5 A yellow retroreflective strip with a minimum width of 1 inch and a maximum width of 3 inches may be  
6 placed along the perimeter of the face of a signal backplate to project a rectangular appearance at night.

#### 7 Section ~~4D.13~~ 4D.06 **Lateral Positioning of Signal Faces**

8 **Standard:**

9 At least one and preferably both of the minimum of two primary signal faces required for the  
10 through movement (or the major turning movement if there is no through movement) on the approach  
11 shall be located between two lines intersecting with the center of the approach at a point 10 feet behind  
12 the stop line, one making an angle of approximately 20 degrees to the right of the center of the  
13 approach extended, and the other making an angle of approximately 20 degrees to the left of the center  
14 of the approach extended. The signal face that satisfies this requirement shall simultaneously satisfy the  
15 longitudinal placement requirement described in Section ~~4D.14~~ 4D.07 (see Figure ~~4D-2~~ ~~4D-4~~).

#### 16 **Figure 4D-2. Lateral and Longitudinal Location of Primary Signal Faces**

17 If both of the minimum of two primary signal faces required for the through movement (or the  
18 major turning movement if there is no through movement) on the approach are post-mounted, they  
19 shall both be on the far side of the intersection, one on the right and one on the left of the approach  
20 lane(s).

21 The required signal faces for through traffic on an approach shall be located not less than 8 feet  
22 apart measured horizontally perpendicular to the approach between the centers of the signal faces.

23 If more than one separate turn signal face is provided for a turning movement and if one or both of  
24 the separate turn signal faces are located over the roadway, the signal faces shall be located not less  
25 than 8 feet apart measured horizontally perpendicular to the approach between the centers of the signal  
26 faces.

27 *Guidance:*

28 Separate turn signal faces should be located at least 3 feet from the nearest traffic signal face for a  
29 different movement on the same approach measured either horizontally perpendicular to the approach  
30 between the centers of the signal faces or vertically from the center of the lowest signal indication of the top  
31 signal face to the center of the highest signal indication of the bottom signal face. If horizontally-arranged or  
32 clustered signal faces are used, the minimum 3-foot horizontal separation between the two signal faces should  
33 be measured from the center of the right-most signal indication in the signal face on the left to the center of  
34 the left-most signal indication in the signal face on the right.

35 *If a signal face controls a specific lane or lanes of an approach, its position should make it readily visible*  
36 *to road users making that movement.*

37 **Support:**

38 Section ~~4D.11~~ 4D.04 contains additional provisions regarding lateral positioning of signal faces for  
39 approaches having a posted or statutory speed limit or an 85<sup>th</sup>-percentile speed of 45 mph or higher.

40 ~~Standard~~ Guidance: **Standard changed to Guidance**

41 *If an exclusive left-turn, right-turn, or U-turn lane is present on an approach and if a primary separate*  
42 *turn signal face controlling that lane is mounted over the roadway, the primary separate turn signal face ~~shall~~*  
43 *should not be positioned any further to the right than the extension of the right-hand edge of the exclusive turn*  
44 *lane or any further to the left than the extension of the left-hand edge of the exclusive turn lane.*

45 **Support: Standard changed to Support**

46 Supplemental turn signal faces mounted over the roadway ~~shall are~~ not ~~be~~ subject to the positioning  
47 ~~requirements~~ recommendations in the previous paragraph.

48 *Guidance:*

49 *For new or reconstructed signal installations, on an approach with an exclusive turn lane(s) for a*  
50 *permissive left-turn (or U-turn to the left) movement ~~and with opposing vehicular traffic~~, signal faces that*

1 display a CIRCULAR GREEN signal indication should not be post-mounted on the far-side median or  
2 mounted overhead above the exclusive turn lane(s) or the extension of the lane(s).

3 **Standard:**

4 If supplemental post-mounted signal faces are used, the following limitations shall apply:

- 5 A. Left-turn arrows and U-turn arrows to the left shall not be used in near-right signal faces that  
6 are located to the right of the through and/or right-turn lanes.
- 7 B. Right-turn arrows and U-turn arrows to the right shall not be used in far-left signal faces that  
8 are located to the left of the through and/or left-turn lanes. A far-side median-mounted signal  
9 face shall be considered a far-left signal face for this application.

10 **Section ~~4D.14~~ 4D.07 Longitudinal Positioning of Signal Faces**

11 **Standard:**

12 Except where the width of an intersecting roadway or other conditions make it physically  
13 impractical, the signal faces for each approach to an intersection or a midblock location shall be  
14 provided as follows:

- 15 A. A signal face installed to satisfy the requirements for primary left-turn signal faces (see Sections  
16 4F.02 through 4F.08) and primary right-turn signal faces (see Sections 4F.09 through 4F.15),  
17 and at least one and preferably both of the minimum of two primary signal faces required for  
18 the through movement (or the major turning movement if there is no through movement) on the  
19 approach shall be located:

- 20 1. No less than 40 feet beyond the stop line, and
- 21 2. No more than 180 feet beyond the stop line unless a supplemental near-side signal face is  
22 provided, ~~and~~
- 23 ~~3. As near as practical to the line of the driver's normal view, if mounted over the roadway.~~

- 24 B. The primary signal faces that are used to ~~satisfies~~ satisfy ~~this the~~ requirement s of Item A shall  
25 simultaneously satisfy the lateral placement requirement described in Section 4D.06 (see Figure  
26 4D-2-4D-4).

27 **Guidance:** Standard changed to Guidance

28 ~~B.~~ *Where the nearest signal face is located between 150 and 180 feet beyond the stop line, engineering*  
29 *judgment of the conditions, including the worst-case visibility conditions, ~~shall~~ should be used to determine if*  
30 *the provision of a supplemental near-side signal face would be beneficial.* This text was relocated from  
31 Item B of the previous paragraph

32 *Supplemental near-side signal faces should be located as near as practical to the stop line.*

33 **Support:**

34 Section 4D.04 contains additional provisions regarding longitudinal positioning of signal faces for  
35 approaches having a posted or 85<sup>th</sup>-percentile speed of 45 mph or higher. Text relocated from above

36 **Section ~~4D.15~~ 4D.08 Mounting Height of Signal Faces**

37 **Standard:**

38 The bottom of the signal housing and any related attachments to a vehicular signal face located over  
39 any portion of a highway that can be used by motor vehicles shall be at least 15 feet above the  
40 pavement.

41 The bottom of the signal housing (including brackets) of a vehicular signal face that is vertically  
42 arranged and not located over a roadway:

- 43 A. Shall be a minimum of 8 feet ~~and a maximum of 19 feet~~ above the sidewalk or, if there is no  
44 sidewalk, above the pavement grade at the center of the roadway.
- 45 B. Shall be a minimum of 4.5 feet ~~and a maximum of 19 feet~~ above the median island grade of a  
46 center median island if located on the near side of the intersection. Revised to reflect Official  
47 Change Request 4(09)-42(C)

48 The bottom of the signal housing (including brackets) of a vehicular signal face that is horizontally  
49 arranged and not located over a roadway:

- 1 A. Shall be a minimum of 8 feet ~~and a maximum of 22 feet~~ above the sidewalk or, if there is no  
2 sidewalk, above the pavement grade at the center of the roadway.  
3 B. Shall be a minimum of 4.5 feet ~~and a maximum of 22 feet~~ above the median island grade of a  
4 center median island if located on the near side of the intersection. **Revised to reflect Official**  
5 **Change Request 4(09)-42(C)**

6 Guidance:

7 *The top of the signal housing of a vehicular signal face located over any portion of a highway that can be*  
8 *used by motor vehicles ~~shall should~~ not be more than 25.6 feet above the pavement.* **Text relocated from**  
9 **above; Standard changed to Guidance**

10 *For viewing distances between 40 and 53 feet from the stop line, the maximum mounting height to the top*  
11 *of the signal housing of a vehicular signal face located over any portion of a highway that can be used by*  
12 *motor vehicles ~~shall should~~ be as shown in Figure 4D-3 ~~4D-5~~.* **Text relocated from above; Standard**  
13 **changed to Guidance**

14 **Figure 4D-3. Maximum Mounting Height of Signal Faces Located Between 40 Feet and 53**  
15 **Feet from Stop Line**

16 *The bottom of the signal housing (including brackets) of a vehicular signal face that is vertically arranged*  
17 *and not located over a roadway:* **Added to reflect Official Change Request 4(09)-42**

- 18 A. *Should be a maximum of 19 feet above the sidewalk or, if there is no sidewalk, above the pavement*  
19 *grade at the center of the roadway.*  
20 B. *Should be a maximum of 19 feet above the median island grade of a center median island if located*  
21 *on the near side of the intersection.*

22 *The bottom of the signal housing (including brackets) of a vehicular signal face that is horizontally*  
23 *arranged and not located over a roadway:* **Added to reflect Official Change Request 4(09)-42**

- 24 A. *Should be a maximum of 22 feet above the sidewalk or, if there is no sidewalk, above the pavement*  
25 *grade at the center of the roadway.*  
26 B. *Should be a maximum of 22 feet above the median island grade of a center median island if located*  
27 *on the near side of the intersection.*

28 **Section ~~4D-16~~ 4D.09 Lateral Offset (Clearance) of Signal Faces**

29 ~~Standard~~ *Guidance:* **Standard changed to Guidance**

30 *Signal faces mounted at the side of a roadway with curbs at less than 15 feet from the bottom of the*  
31 *housing and any related attachments ~~shall should~~ have a horizontal offset of not less than 2 feet from the face*  
32 *of a vertical curb, or if there is no curb, not less than 2 feet from the edge of a shoulder.*

33 **Section ~~4D-32~~ 4D.10 Temporary and Portable Traffic Control Signals**

34 Support:

35 A temporary traffic control signal is generally installed using methods that minimize the costs of  
36 installation, relocation, and/or removal. Typical temporary traffic control signals are for specific purposes,  
37 such as for one-lane, two-way facilities in temporary traffic control zones (see Chapter ~~4H~~ 4O), for a haul-  
38 road intersection, or for access to a site that will have a permanent access point developed at another location  
39 in the near future. Portable traffic signals are temporary traffic signals. **Added to reflect Official Change**  
40 **Request 4(09)-42**

41 Because a portable traffic control signals is considered to be a type of temporary traffic control signal, the  
42 provisions for temporary traffic control signals are also applicable to portable traffic control signals.

43 **Standard:**

44 **Advance signing shall be used when employing a temporary traffic control signal.**

45 **A temporary traffic control signal shall:**

- 46 **A. Meet the physical display and operational requirements of a conventional traffic control signal.**  
47 **B. Be removed when no longer needed.**

48 ~~C. Be placed in the flashing mode when not being used if it will be operated in the steady mode~~  
49 ~~within 5 working days; otherwise, it shall be removed.~~

1 C. **Except as provided in Paragraph 5**, be placed in the flashing mode during periods when it is not  
2 desirable to operate the signal **in the steady mode**, or the signal heads shall be covered, turned,  
3 or taken down to indicate that the signal is not in operation.

4 Option:

5 If the temporary traffic control signal is capable of being operated in a semi-actuated mode, such that  
6 green signal indications are continually shown to major-street traffic except when responding to a minor-street  
7 approach vehicle call, it may be operated in a semi-actuated mode instead of being placed in a flashing mode.

8 *Guidance:*

9 *A temporary traffic control signal should be used only if engineering judgment indicates that installing*  
10 *the signal will improve the overall safety and/or operation of the location.*

11 *The use of temporary traffic control signals by a work crew on a regular basis in their work area should*  
12 *be subject to the approval of the jurisdiction having authority over the roadway.*

13 *A temporary traffic control signal should not operate longer than 30 days unless associated with a longer-*  
14 *term temporary traffic control zone project.*

15 *For use of temporary traffic control signals in temporary traffic control zones, reference should be made*  
16 *to Section ~~6F.84~~ 6L.01.*

17

1 CHAPTER 4E. TRAFFIC CONTROL SIGNAL INDICATIONS

2 Section ~~4D.06~~ 4E.01 Signal Indications – Design, Illumination, Color, and Shape

3 Standard:

4 The illuminated part of each signal indication shall be circular or arrow, except those used for  
5 bicycle symbol signal indications, pedestrian signal heads, and lane-use control signals, ~~shall be circular~~  
6 ~~or arrow~~. Edited to reflect Official Change Request 4(09)-43

7 Letters or numbers (including those associated with countdown displays) shall not be displayed as  
8 part of a vehicular signal indication.

9 Strobes shall not be used within or adjacent to any signal indication.

10 Except for the flashing vehicular and pedestrian signal indications ~~and the preemption confirmation~~  
11 ~~lights~~ that are expressly allowed by the provisions of this Chapter Part, flashing displays shall not be  
12 used within or adjacent to any signal indications.

13 Each circular signal indication shall emit a single color: red, yellow, or green.

14 Except as provided in Paragraph 7, each arrow signal indication shall emit a single color: red,  
15 yellow, or green ~~except that the alternate display (dual arrow signal section) of a GREEN ARROW and~~  
16 ~~a YELLOW ARROW signal indication, both pointing in the same direction, shall be permitted,~~  
17 ~~provided that they are not displayed simultaneously.~~

18 A dual-arrow signal section that is capable of alternating between the display of a GREEN  
19 ARROW signal indication and the display of a YELLOW ARROW signal indication, both pointing in  
20 the same direction, shall be permitted provided that both colors are never displayed simultaneously.

21 The arrow, which shall show only one direction, shall be the only illuminated part of an arrow  
22 signal indication.

23 Arrows shall be pointed:

- 24 A. Vertically upward to indicate a straight-through movement, or
- 25 B. Horizontally in the direction of the turn to indicate a turn at approximately or ~~greater~~ more  
26 than a right angle, or
- 27 C. Upward with a slope at an angle approximately equal to that of the turn if the angle of the turn  
28 is substantially less than a right angle, or
- 29 D. In a manner that directs the driver through the turn if a U-turn arrow is used (see Figure 4E-1  
30 ~~4D-1~~).

31 **Figure 4E-1. Example of U-Turn Signal Face**

32 Except as provided in Paragraph ~~10~~ 11, the requirements of Chapters 1 and 2 of the publication  
33 entitled ~~“Vehicle Traffic Control Signal Heads Equipment and Materials Standards of the Institute of~~  
34 Transportation Engineers” (see Section ~~1A.11~~ 1A.05) that pertain to the aspects of the signal head  
35 design that affect the display of the signal indications shall be met for signal optical units that use  
36 incandescent lamps within optical assemblies that include lenses. Except as provided in Paragraph 11,  
37 the requirements of the publications entitled “Vehicle Traffic Control Signal Heads: Light Emitting  
38 Diode (LED) Circular Signal Supplement” and “Vehicle Traffic Control Signal Heads: Light Emitting  
39 Diode (LED) Vehicle Arrow Traffic Signal Supplement” (see Section 1A.05) that pertain to the aspects  
40 of the signal head design that affect the display of the signal indications shall be met for light emitting  
41 diode (LED) traffic signal modules. Edited to reflect Official Interpretation 4(9)-28

42 *Guidance:*

43 *The intensity and distribution of light from each illuminated signal lens or LED signal module should*  
44 *comply with the publications ~~entitled “Vehicle Traffic Control Signal Heads” and “Traffic Signal Lamps”~~*  
45 *(see Section ~~1A.11~~) specified in Paragraph 10, as appropriate.*

46 ~~Standard:~~

47 **Support:** Standard changed to Support; incorporated into existing Paragraph 12

48 References to signal lenses in this section ~~shall~~ are not ~~be used~~ intended to limit signal optical units to  
49 incandescent lamps within optical assemblies that include lenses. Research has resulted in signal optical units

1 that are not lenses, such as, but not limited to, light emitting diode (LED) traffic signal modules. Some units  
2 are practical for all signal indications, and some are practical for specific types such as visibility-limited signal  
3 indications.

4 *Guidance:*

5 *If a signal indication is so bright that it causes excessive glare during nighttime conditions, some form of*  
6 *automatic dimming should be used to reduce the brilliance of the signal indication.*

## 7 **Section ~~4D.07~~ 4E.02 Size of Vehicular Signal Indications**

8 **Standard:**

9 **There shall be two nominal diameter sizes for vehicular signal indications: 8 inches and 12 inches.**

10 **Twelve-inch signal indications shall be used for all arrow signal indications.**

11 **Except as provided in ~~Paragraph 3 below~~ the next paragraph, 12-inch signal indications shall be**  
12 **used for all circular signal ~~sections~~ indications in all new signal faces.**

13 **Option:**

14 Eight-inch circular signal indications may be used in new signal faces only for:

- 15 A. The green or flashing yellow signal indications in an emergency-vehicle traffic control signal (see  
16 ~~4G.02~~-Section 4N.02);
- 17 B. The circular indications in signal faces controlling the approach to the downstream location where  
18 two adjacent signalized locations are close to each other and it is not practical because of factors such  
19 as high approach speeds, horizontal or vertical curves, or other geometric factors to install visibility-  
20 limited signal faces for the downstream approach;
- 21 C. The circular indications in a signal face that is located less than 120 feet from the stop line on a  
22 roadway with a posted or statutory speed limit or operating speed of 30 mph or less;
- 23 D. The circular indications in a supplemental near-side signal face;
- 24 E. The circular indications in a supplemental signal face installed for the sole purpose of controlling  
25 pedestrian movements (see Section ~~4D.03~~-4D.02) rather than vehicular movements; ~~and~~
- 26 F. The circular indications in a signal face installed for the sole purpose of controlling a bikeway or a  
27 bicycle movement; and
- 28 **G. The circular indications in a flashing beacon (see Chapter 4S). Added to reflect Official**  
29 **Interpretation 4(09)-7(I)**

30 Existing 8-inch circular signal indications that are not included in Items A through ~~F-G~~ in ~~Paragraph 3~~ the  
31 previous paragraph may be retained for the remainder of their useful service life.

32 Different sizes of signal indications may be used in the same signal face or signal head, provided that the  
33 signal face or signal head complies with the requirements contained in Paragraphs 2 through 4.

## 34 **Section ~~4D.08~~ 4E.03 Positions of Signal Indications Within a Signal Face – General**

35 **Support:**

36 Standardization of the number and arrangements of signal sections in vehicular traffic control signal faces  
37 enables road users who are color vision deficient to identify the illuminated color by its position relative to  
38 other signal sections.

39 **Standard:**

40 **Unless otherwise provided in this Manual for a particular application, each signal face at a**  
41 **signalized location shall have three, four, or five signal sections. Unless otherwise provided in this**  
42 **Manual for a particular application, if a vertical signal face includes a cluster (see Section ~~4D.09~~-4E.04),**  
43 **the signal face shall have at least three vertical positions.**

44 **A single-section signal face shall be permitted at a traffic control signal if it consists of a**  
45 **continuously-displayed GREEN ARROW signal indication that is being used to indicate a continuous**  
46 **movement.**

47 **The signal sections in a signal face shall be arranged in a vertical or horizontal straight line, except**  
48 **as otherwise provided in Section ~~4D.09~~-4E.04.**

1 The arrangement of adjacent signal sections in a signal face shall follow the relative positions listed  
2 in Sections ~~4D.09 or 4D.10~~ 4E.04 or 4E.05, as applicable.

3 If a signal section that displays a CIRCULAR YELLOW signal indication is used, it shall be located  
4 between the signal section that displays the red signal indication and all other signal sections.

5 If a U-turn arrow signal section is used in a signal face for a U-turn to the left, its position in the  
6 signal face shall be the same as stated in Sections ~~4D.09 and 4D.10~~ 4E.04 and 4E.05 for a left-turn arrow  
7 signal section of the same color. If a U-turn arrow signal section is used in a signal face for a U-turn to  
8 the right, its position in the signal face shall be the same as stated in Sections ~~4D.09 and 4D.10~~ 4E.04  
9 and 4E.05 for a right-turn arrow signal section of the same color.

10 A U-turn arrow signal indication pointing to the left shall not be used in a signal face that also  
11 contains a left-turn arrow signal indication. A U-turn arrow signal indication pointing to the right shall  
12 not be used in a signal face that also contains a right-turn arrow signal indication.

13 Option:

14 Within a signal face, two identical CIRCULAR RED or RED ARROW signal indications may be  
15 displayed immediately horizontally adjacent to each other in a vertical signal face (see Drawing A in Figure  
16 4E-2) or immediately horizontally adjacent to each other in a horizontal signal face (see Drawing B in Figure  
17 4E-2 ~~4D-2~~) for emphasis.

18 Horizontally-arranged and vertically-arranged signal faces may be used on the same approach provided  
19 they are separated to meet the lateral separation spacing required in Section ~~4D.13~~ 4D.06.

20 Support:

21 Figure ~~4E-24D-2~~ illustrates some of the typical arrangements of signal sections in signal faces that do not  
22 control separate turning movements. Figures 4F-1 through 4F-7 ~~4D-6 through 4D-12~~ illustrate the typical  
23 arrangements of signal sections in left-turn signal faces. Figures 4F-8 through 4F-14 ~~4D-13 through 4D-19~~  
24 illustrate the typical arrangements of signal sections in right-turn signal faces.

## 25 **Figure 4E-2. Typical Arrangements of Signal Sections in Signal Faces That Do Not Control** 26 **Turning Movements**

### 27 **Section ~~4D.09~~ 4E.04 Positions of Signal Indications Within a Vertical Signal Face**

28 **Standard:**

29 In each vertically-arranged signal face, all signal sections that display red signal indications shall be  
30 located above all signal sections that display yellow and green signal indications.

31 In vertically-arranged signal faces, each signal section that displays a YELLOW ARROW signal  
32 indication shall be located above the signal section that displays the GREEN ARROW signal indication  
33 to which it applies.

34 The relative positions of signal sections in a vertically-arranged signal face, from top to bottom,  
35 shall be as follows:

- 36 CIRCULAR RED
- 37 Steady and/or flashing left-turn RED ARROW
- 38 Steady and/or flashing right-turn RED ARROW
- 39 CIRCULAR YELLOW
- 40 CIRCULAR GREEN
- 41 Straight-through GREEN ARROW
- 42 Steady left-turn YELLOW ARROW
- 43 Flashing left-turn YELLOW ARROW
- 44 Left-turn GREEN ARROW
- 45 Steady right-turn YELLOW ARROW
- 46 Flashing right-turn YELLOW ARROW
- 47 Right-turn GREEN ARROW

48 If a dual-arrow signal section (~~capable of alternating between the display of a GREEN ARROW~~  
49 ~~and a YELLOW ARROW signal indication~~ see Section 4E.01) is used in a vertically-arranged signal  
50 face, the dual-arrow signal section shall occupy the same position relative to the other sections as the

1 **signal section that displays the GREEN ARROW signal indication in a vertically-arranged signal face**  
2 **would occupy.**

3 Option:

4 In a vertically-arranged signal face, signal sections that display signal indications of the same color may  
5 be arranged horizontally adjacent to each other at right angles to the basic straight line arrangement to form a  
6 clustered signal face (see Figures [4E-2, 4F-4, 4F-6, 4F-11, 4F-13, and 4F-15](#) ~~4D-2, 4D-9, 4D-11, 4D-16, and~~  
7 ~~4D-18~~).

8 **Standard:**

9 **Such clusters shall be limited to the following:**

- 10 **A. Two identical signal sections,**
- 11 **B. Two or three different signal sections that display signal indications of the same color, or**
- 12 **C. For only the specific case described in Section [4D.25](#) 4F.16 (see Drawing B of Figure [4F-15](#) ~~4D-~~**  
13 **~~20~~), two signal sections, one of which displays a GREEN ARROW signal indication and the**  
14 **other of which displays a flashing YELLOW ARROW signal indication.**

15 **Except as otherwise provided in Sections 4F.08 and 4F.15 for a three-section separate turn signal**  
16 **face with a flashing YELLOW ARROW signal indication, the signal section that displays a flashing**  
17 **yellow signal indication during steady mode operation:**

- 18 **A. Shall not be placed in the same vertical position as the signal section that displays a steady**  
19 **yellow signal indication, and**
- 20 **B. Shall be placed below the signal section that displays a steady yellow signal indication.**

21 Support:

22 Sections ~~4F.02 and 4G.04~~ 4J.02 and 4N.02 contain exceptions to the provisions of this Section that are  
23 applicable to hybrid beacons.

## 24 **Section ~~4D.10~~ 4E.05 Positions of Signal Indications Within a Horizontal Signal Face**

25 **Standard:**

26 **In each horizontally-arranged signal face, all signal sections that display red signal indications shall**  
27 **be located to the left of all signal sections that display yellow and green signal indications.**

28 **In horizontally-arranged signal faces, each signal section that displays a YELLOW ARROW signal**  
29 **indication shall be located to the left of the signal section that displays the GREEN ARROW signal**  
30 **indication to which it applies.**

31 **The relative positions of signal sections in a horizontally-arranged signal face, from left to right,**  
32 **shall be as follows:**

- 33 **CIRCULAR RED**
- 34 **Steady and/or flashing left-turn RED ARROW**
- 35 **Steady and/or flashing right-turn RED ARROW**
- 36 **CIRCULAR YELLOW**
- 37 **Steady left-turn YELLOW ARROW**
- 38 **Flashing left-turn YELLOW ARROW**
- 39 **Left-turn GREEN ARROW**
- 40 **CIRCULAR GREEN**
- 41 **Straight-through GREEN ARROW**
- 42 **Steady right-turn YELLOW ARROW**
- 43 **Flashing right-turn YELLOW ARROW**
- 44 **Right-turn GREEN ARROW**

45 **If a dual-arrow signal section (~~capable of alternating between the display of a GREEN ARROW~~**  
46 **~~and a YELLOW ARROW signal indication see Section 4E.01~~) is used in a horizontally-arranged signal**  
47 **face, the signal section that displays the dual left-turn arrow signal indication shall be located**  
48 **immediately to the right of the signal section that displays the CIRCULAR YELLOW signal indication,**  
49 **the signal section that displays the straight-through GREEN ARROW signal indication shall be located**  
50 **immediately to the right of the signal section that displays the CIRCULAR GREEN signal indication,**

1 and the signal section that displays the dual right-turn arrow signal indication shall be located to the  
2 right of all other signal sections.

3 ~~The signal section that displays a flashing yellow signal indication during steady mode operation:~~  
4 ~~A. Shall not be placed in the same horizontal position as the signal section that displays a steady~~  
5 ~~yellow signal indication, and~~  
6 ~~B. Shall be placed to the right of the signal section that displays a steady yellow signal indication.~~  
7

1 CHAPTER 4F. STEADY (STOP-AND-GO) OPERATION OF TRAFFIC CONTROL  
2 SIGNALS

3 Section ~~4D.05~~ 4F.01 Application of Steady and Flashing Signal Indications during Steady  
4 (Stop-and-Go) Operation

5 Standard:

6 When a traffic control signal is being operated in a steady (stop-and-go) mode, at least one  
7 indication in each signal face shall be displayed at any given time.

8 A signal face(s) that controls a particular vehicular movement during any interval of a cycle shall  
9 control that same movement during all intervals of the cycle.

10 Steady and flashing signal indications shall be applied as follows:

11 A. A steady CIRCULAR RED signal indication:

- 12 1. Shall be displayed when it is intended to prohibit traffic, except pedestrians directed by a  
13 pedestrian signal head, from entering the intersection or other controlled area. Turning  
14 after stopping is permitted as stated in Item C.1 in Paragraph ~~3-1~~ of Section ~~4D.04~~4A.03.  
15 2. Shall be displayed with the appropriate GREEN ARROW signal indications when it is  
16 intended to permit traffic to make a specified turn or turns, and to prohibit traffic from  
17 proceeding straight ahead through the intersection or other controlled area, except in  
18 protected only mode operation (see Sections ~~4D.19 and 4D.23~~4F.06 and 4F.13), or in  
19 protected/permissive mode operation with separate turn signal faces (see Sections ~~4D.20 and~~  
20 ~~4D.24~~4F.08 and 4F.15).

21 B. A steady CIRCULAR YELLOW signal indication:

- 22 1. Shall be displayed following a CIRCULAR GREEN or straight-through GREEN ARROW  
23 signal indication in the same signal face.  
24 2. Shall not be displayed in conjunction with the change from the CIRCULAR RED signal  
25 indication to the CIRCULAR GREEN signal indication.  
26 3. Shall be followed by a CIRCULAR RED signal indication except that, when entering  
27 preemption operation, the return to the previous CIRCULAR GREEN signal indication  
28 shall be permitted following a steady CIRCULAR YELLOW signal indication (see Section  
29 ~~4D.27~~4F.19).  
30 4. Shall not be displayed to an approach from which drivers are turning left permissively using  
31 a shared signal face or making a U-turn to the left permissively using a shared signal face  
32 unless one of the following conditions exists:  
33 (a) A steady CIRCULAR YELLOW signal indication is also simultaneously being displayed  
34 to the opposing approach;  
35 (b) An engineering study has determined that, because of unique intersection conditions, the  
36 condition described in Item (a) cannot reasonably be implemented without causing  
37 significant operational or safety problems and that the volume of impacted left-turning  
38 or U-turning traffic is relatively low, and those left-turning or U-turning drivers are  
39 advised that a steady CIRCULAR YELLOW signal indication is not simultaneously  
40 being displayed to the opposing traffic if this operation occurs continuously by the  
41 installation ~~near the left most signal head~~ of a W25-1 sign (see Section ~~2C.48~~2C.46) with  
42 the legend ONCOMING TRAFFIC HAS EXTENDED GREEN; or  
43 (c) Drivers are advised of the operation if it occurs only occasionally, such as during a  
44 preemption sequence, by the installation ~~near the left most signal head~~ of a W25-2 sign  
45 (see Section ~~2C.48~~2C.46) with the legend ONCOMING TRAFFIC MAY HAVE  
46 EXTENDED GREEN.

47 C. A steady CIRCULAR GREEN signal indication shall be displayed only when it is intended to  
48 permit traffic to proceed in any direction that is lawful and practical.

49 D. A steady RED ARROW signal indication shall be displayed when it is intended to prohibit  
50 traffic, except pedestrians directed by a pedestrian signal head, from entering the intersection  
51 or other controlled area to make the indicated turn. Except as described in Item C.2 in

1 Paragraph ~~3~~1 of Section ~~4D.04~~4A.03, turning on a steady RED ARROW signal indication shall  
2 not be permitted.

3 E. A flashing RED ARROW signal indication shall be displayed as part of a steady (stop-and-go)  
4 mode of operation only when it is intended to permit traffic, after coming to a full stop, to  
5 cautiously enter the intersection to make a turn in the direction indicated by the arrow after  
6 yielding to pedestrians, if any, and/or to opposing traffic, if any.

7 F. A steady YELLOW ARROW signal indication:

- 8 1. Shall be displayed in the same direction as a GREEN ARROW signal indication following a  
9 GREEN ARROW signal indication in the same signal face, unless:
- 10 (a) The GREEN ARROW signal indication and a CIRCULAR GREEN (or straight-  
11 through GREEN ARROW) signal indication terminate simultaneously in the same  
12 signal face, or  
13 (b) The green arrow is a straight-through GREEN ARROW (see Item B.1).
- 14 2. Shall be displayed in the same direction as a flashing YELLOW ARROW signal indication  
15 or flashing RED ARROW signal indication following a flashing YELLOW ARROW signal  
16 indication or flashing RED ARROW signal indication in the same signal face, when the  
17 flashing arrow indication is displayed as part of a steady mode operation, if the signal face  
18 will subsequently display a steady red signal indication.
- 19 3. Shall not be displayed in conjunction with the change from a steady RED ARROW, flashing  
20 RED ARROW, or flashing YELLOW ARROW signal indication to a GREEN ARROW  
21 signal indication, except when entering preemption operation as provided in Item 5(a).
- 22 4. Shall not be displayed when any conflicting vehicular movement has a green or yellow signal  
23 indication (except for the situation regarding U-turns to the left provided in Paragraph 4) or  
24 any conflicting pedestrian movement has a WALKING PERSON (symbolizing WALK) or  
25 flashing UPRaised HAND (symbolizing DONT WALK) signal indication, except that a  
26 steady left-turn (or U-turn to the left) YELLOW ARROW signal indication used to  
27 terminate a flashing left-turn (or U-turn to the left) YELLOW ARROW or a flashing left-  
28 turn (or U-turn to the left) RED ARROW signal indication in a signal face controlling a  
29 permissive left-turn (or U-turn to the left) movement as described in Sections 4F.04 and  
30 4F.08 shall be permitted to be displayed when a CIRCULAR YELLOW signal indication is  
31 displayed for the opposing through movement. Vehicles departing in the same direction  
32 shall not be considered in conflict if, for each turn lane with moving traffic, there is a  
33 separate ~~departing~~ departure lane, and pavement markings or raised channelization clearly  
34 indicate which departure lane to use.
- 35 5. Shall not be displayed to terminate a flashing arrow signal indication on an approach from  
36 which drivers are turning left permissively or making a U-turn to the left permissively  
37 unless one of the following conditions exists:
- 38 (a) A steady CIRCULAR YELLOW signal indication is also simultaneously being displayed  
39 to the opposing approach;
- 40 (b) An engineering study has determined that, because of unique intersection conditions, the  
41 condition described in Item (a) cannot reasonably be implemented without causing  
42 significant operational or safety problems and that the volume of impacted left-turning  
43 or U-turning traffic is relatively low, and those left-turning or U-turning drivers are  
44 advised that a steady CIRCULAR YELLOW signal indication is not simultaneously  
45 being displayed to the opposing traffic if this operation occurs continuously by the  
46 installation ~~near the left most signal head~~ of a W25-1 sign (see Section ~~2C.48~~ 2C.46) with  
47 the legend ONCOMING TRAFFIC HAS EXTENDED GREEN; or
- 48 (c) Drivers are advised of the operation if it occurs only occasionally, such as during a  
49 preemption sequence, by the installation ~~near the left most signal head~~ of a W25-2 sign  
50 (see Section ~~2C.48~~ 2C.46) with the legend ONCOMING TRAFFIC MAY HAVE  
51 EXTENDED GREEN.
- 52 6. Shall be terminated by a RED ARROW signal indication for the same direction or a  
53 CIRCULAR RED signal indication except:

- 1 (a) When entering preemption operation, the display of a GREEN ARROW signal  
2 indication or a flashing arrow signal indication shall be permitted following a steady  
3 YELLOW ARROW signal indication.  
4 (b) When the movement controlled by the arrow is to continue on a permissive mode basis  
5 during an immediately following signal phase, the display of a CIRCULAR GREEN  
6 signal indication or flashing YELLOW ARROW signal indication shall be permitted  
7 following a steady YELLOW ARROW signal indication.

8 G. A flashing YELLOW ARROW signal indication shall be displayed as part of a steady (stop-  
9 and-go) mode of operation only when it is intended to permit traffic to cautiously enter the  
10 intersection to make a turn in the direction indicated by the arrow after yielding to pedestrians,  
11 if any, and/or to opposing traffic, if any.

12 H. A steady GREEN ARROW signal indication:

- 13 1. Shall be displayed only to allow vehicular movements, in the direction indicated, that are  
14 not in conflict with other vehicles moving on a green or yellow signal indication (except for  
15 the situation regarding U-turns provided in Paragraph 4 and straight-thru GREEN  
16 ARROWS provided in Paragraph 5), even if the other vehicles are required to yield the  
17 right-of-way to the traffic moving on the GREEN ARROW signal indication, and are not in  
18 conflict with pedestrians crossing in compliance with a WALKING PERSON (symbolizing  
19 WALK) or flashing UPRAISED HAND (symbolizing DONT WALK) signal indication.  
20 Vehicles departing in the same direction shall not be considered in conflict if, for each turn  
21 lane with moving traffic, there is a separate ~~departing~~ departure lane, and pavement  
22 markings or raised channelization clearly indicate which departure lane to use.  
23 2. Shall be displayed on a signal face that controls a left-turn movement when said movement  
24 is not in conflict with other vehicles moving on a green or yellow signal indication (except  
25 for the situation regarding U-turns provided in Paragraph 4) and is not in conflict with  
26 pedestrians crossing in compliance with a WALKING PERSON (symbolizing WALK) or  
27 flashing UPRAISED HAND (symbolizing DONT WALK) signal indication. Vehicles  
28 departing in the same direction shall not be considered in conflict if, for each turn lane with  
29 moving traffic, there is a separate ~~departing~~ departure lane, and pavement markings or  
30 raised channelization clearly indicate which departure lane to use.  
31 3. Shall not be required on the stem of a T-intersection or for turns from a one-way street.

32 Option:

33 If U-turns are permitted from the approach and a right-turn GREEN ARROW signal indication is  
34 simultaneously being displayed to road users making a right turn from the conflicting approach to the left,  
35 road users making a U-turn may be advised of the operation by the installation ~~near the left turn signal face~~ of  
36 a U-TURN YIELD TO RIGHT TURN (R10-16) sign (see Section ~~2B-53~~ 2B.63).

37 ~~If not otherwise prohibited, a~~ A steady straight-through GREEN ARROW signal indication may be used  
38 instead of a CIRCULAR GREEN signal indication in a signal face to discourage wrong way turns under the  
39 following conditions, even if opposed by a simultaneous permissive left-turn movement:

40 A. on an approach intersecting a one-way street; ~~to discourage wrong way turns~~

41 B. on an approach intersecting an interchange exit ramp; or

42 C. on an approach with unique geometric design that prohibits turns.

43 If not otherwise prohibited, steady red, yellow, and green turn arrow signal indications may be used  
44 instead of steady circular red, yellow, and green signal indications in a signal face on an approach where all  
45 traffic is required to turn or where the straight-through movement is not physically possible.

46 Support:

47 Section ~~4D-25~~ 4F.16 contains information regarding the signalization of approaches that have a ~~shared~~  
48 combined left-turn/right-turn lane and no through movement.

49 **Standard:**

50 **If supplemental signal faces are used, the following limitations shall apply:**

- 51 **A. Left-turn arrows and U-turn arrows to the left shall not be used in near-right signal faces.**

1 B. Right-turn arrows and U-turn arrows to the right shall not be used in far-left signal faces. A  
2 far-side median-mounted signal face shall be considered a far-left signal for this application.

3 A straight-through RED ARROW signal indication or a straight-through YELLOW ARROW  
4 signal indication shall not be displayed on any signal face, either alone or in combination with any other  
5 signal indication.

6 The following combinations of signal indications shall not be simultaneously displayed on any one  
7 signal face:

- 8 A. ~~CIRCULAR RED with~~ CIRCULAR YELLOW with CIRCULAR RED;
- 9 B. CIRCULAR GREEN with CIRCULAR RED; or
- 10 C. Straight-through GREEN ARROW with CIRCULAR RED;

11 ~~Additionally~~ Except as provided in Paragraph 13, the above combinations shall not be  
12 simultaneously displayed on an approach as a result of the combination of displays from multiple signal  
13 faces unless the display is created by a signal face(s) devoted exclusively to the control of a right-turning  
14 movement and:

- 15 A. The signal face(s) controlling the right-turning movement is visibility-limited from the adjacent  
16 through movement or positioned to minimize potential confusion to approaching road users, or
- 17 B. A RIGHT TURN SIGNAL (R10-10) sign (see Sections ~~4D.21 through 4D.24~~ 4F.09, 4F.11, 4F.13,  
18 and 4F.15) is mounted adjacent to the signal face(s) controlling the right-turning movement.

19 Except as provided in Paragraph 13, the following combinations of signal indications shall not be  
20 simultaneously displayed on any one signal face or as a result of the combination of displays from  
21 multiple signal faces on an approach:

- 22 A. CIRCULAR GREEN with CIRCULAR YELLOW;
- 23 B. Straight-through GREEN ARROW with CIRCULAR YELLOW;
- 24 C. GREEN ARROW with YELLOW ARROW pointing in the same direction;
- 25 D. ~~RED ARROW with~~ YELLOW ARROW with RED ARROW pointing in the same direction; or
- 26 E. GREEN ARROW with RED ARROW pointing in the same direction.

27 If a separate signal face is provided at a pre-signal (see Section 8D.11) for a left-turn and/or right-  
28 turn lane that extends from the downstream signalized intersection back to and across a grade crossing,  
29 the following combinations of signal indications shall be permitted to be simultaneously displayed as a  
30 result of the combination of displays from multiple signal faces at the pre-signal:

- 31 A. Straight-through GREEN ARROW with CIRCULAR RED;
- 32 B. Straight-through GREEN ARROW with CIRCULAR YELLOW; and
- 33 C. CIRCULAR YELLOW with CIRCULAR RED.

34 Except as otherwise provided in Sections ~~4F.03 and 4G.04~~ 4F.08, 4F.15, 4J.03, and 4N.03, the same  
35 signal section shall not be used to display both a flashing yellow and a steady yellow indication during  
36 steady mode operation. Except as otherwise provided in Sections ~~4D.18, 4D.20, 4D.22, 4D.24~~ 4F.04,  
37 4F.08, 4F.11, and 4F.13, the same signal section shall not be used to display both a flashing red and a  
38 steady red indication during steady mode operation.

39 *Guidance:*

40 *No movement that creates an unexpected crossing of pathways of moving vehicles or pedestrians should*  
41 *be allowed during any green or yellow interval, except when all three of the following conditions are met:*

- 42 A. *The movement involves only slight conflict, and*
- 43 B. *Serious traffic delays are substantially reduced by permitting the conflicting movement, and*
- 44 C. *Drivers and pedestrians subjected to the unexpected conflict are effectively warned thereof by a sign.*

#### 45 **Section ~~4D.17~~ 4F.02 Signal Indications for Left-Turn Movements – General**

46 ~~Standard Support:~~ **Standard changed to Support**

47 In Sections ~~4D.17 4D.20~~ 4F.03 through 4F.08, provisions applicable to left-turn movements and left-turn  
48 lanes ~~shall are~~ also ~~apply~~ applicable to signal indications for U-turns to the left that are provided at locations  
49 where left turns are prohibited or not geometrically possible.

50 ~~Support:~~

1 Left-turning traffic is controlled by one of four modes as follows:

- 2 A. Permissive Only Mode—turns made on a CIRCULAR GREEN signal indication, a flashing left-turn  
3 YELLOW ARROW signal indication, or a flashing left-turn RED ARROW signal indication after  
4 yielding to pedestrians, if any, and/or opposing traffic, if any.
- 5 B. Protected Only Mode—turns made only when a left-turn GREEN ARROW signal indication is  
6 displayed.
- 7 C. Protected/Permissive Mode—both modes can occur on an approach during the same cycle.
- 8 D. Variable Left-Turn Mode—the operating mode changes among the protected only mode and/or the  
9 protected/permissive mode and/or the permissive only mode during different periods of the day or as  
10 traffic conditions change.

11 Option:

12 In areas having a high percentage of older drivers, special consideration may be given to the use of  
13 protected only mode left-turn phasing, when appropriate.

14 **Standard:**

15 **During a permissive left-turn movement, the signal faces for through and right-turning traffic on  
16 the opposing approach shall simultaneously display green or steady yellow signal indications. If  
17 pedestrians crossing the lane or lanes used by the permissive left-turn movement to depart the  
18 intersection are controlled by pedestrian signal heads, the signal indications displayed by those  
19 pedestrian signal heads shall not be limited to any particular display during the permissive left-turn  
20 movement.**

21 **During a protected left-turn movement, the signal faces for through traffic on the opposing  
22 approach shall simultaneously display steady CIRCULAR RED signal indications. During a protected  
23 left-turn movement, a GREEN ARROW or a YELLOW ARROW signal indication shall not  
24 simultaneously be displayed to right-turn traffic on the opposing approach, except where a separate  
25 departure lane is available for each left-turn and right-turn lane with moving traffic and pavement  
26 markings or raised channelization clearly indicate which departure lane to use (see Item H.1 in  
27 Paragraph 3 in Section 4F.01). If pedestrians crossing the lane or lanes used by the protected left-turn  
28 movement to depart the intersection are controlled by pedestrian signal heads, the pedestrian signal  
29 heads shall display a steady UPRAISED HAND (symbolizing DONT WALK) signal indication during  
30 the protected left-turn movement.**

31 **If a combined left-turn/through lane exists on an approach, ~~a protected-only mode left-turn~~  
32 ~~movement that does not begin and terminate at the same time as the adjacent through movement~~ a left-  
33 turn GREEN ARROW or left-turn YELLOW ARROW signal indication or a flashing left-turn RED  
34 ARROW signal indication shall not be ~~provided on~~ displayed to ~~an the~~ approach simultaneously with a  
35 CIRCULAR RED signal indication for the through movement ~~unless an exclusive left-turn lane exists,~~  
36 and a left-turn RED ARROW signal indication shall not be displayed to the approach simultaneously  
37 with a CIRCULAR GREEN or CIRCULAR YELLOW signal indication for the through movement.**

38 A yellow change interval for the left-turn movement shall not be displayed when the status of the  
39 left-turn operation is changing from permissive to protected within any given signal sequence.

40 If the operating mode changes among the protected only mode and/or the protected/permissive  
41 mode and/or the permissive only mode during different periods of the day or as traffic conditions  
42 change, the requirements in Sections ~~4D.18 through 4D.20~~ 4F.03 through 4F.08 that are appropriate to  
43 that mode of operation shall be met, subject to the following:

- 44 A. The CIRCULAR GREEN and CIRCULAR YELLOW signal indications shall not be displayed  
45 when operating in the protected only mode.
- 46 B. The left-turn GREEN ARROW and left-turn YELLOW ARROW signal indications shall not be  
47 displayed when operating in the permissive only mode.

48 Option: **Added to reflect Official Interpretation 4(09)-15(I) and Revised to reflect Official Change  
49 Request 4(09)-42**

50 When variable-mode left-turn phasing is used for an approach that includes both an exclusive left-turn  
51 lane and a combined left-and-through lane and a flashing yellow arrow is used as the permissive turn display,  
52 a five-section shared left-turn signal face containing both circular and arrow indications may be used in

1 [combination with one or more separate left-turn signal faces for the exclusive left-turn lane\(s\) on the same](#)  
2 [approach. The steady left-turn YELLOW ARROW signal indication and the flashing left-turn YELLOW](#)  
3 [ARROW signal indication may be displayed in the same section of the five-section shared left-turn signal](#)  
4 [face.](#)

5 Additional static signs or changeable message signs may be used to meet the requirements for the variable  
6 left-turn mode or to inform drivers that left-turn green arrows will not be available during certain times of the  
7 day.

8 Support:

9 Sections ~~4D.17 through 4D.20~~ 4F.03 through 4F.08 describe the use of the following two types of signal  
10 faces for controlling left-turn movements:

- 11 A. Shared signal face – This type of signal face controls both the left-turn movement and the adjacent  
12 movement (usually the through movement) and can serve as one of the two required primary signal  
13 faces for the adjacent movement. A shared signal face always displays the same color of circular  
14 indication that is displayed by the signal face or faces for the adjacent movement. If a shared signal  
15 face that provides protected/permissive mode left turns is mounted overhead ~~at the intersection for an~~  
16 [approach that includes an exclusive left-turn lane](#), it is usually positioned over or slightly to the right  
17 of the extension of the lane line separating the left-turn lane from the adjacent lane. [If a shared signal](#)  
18 [face that provides protected/permissive mode left turns is mounted overhead for an approach that does](#)  
19 [not include an exclusive left-turn lane, it is usually positioned over the center of the combined left-](#)  
20 [turn/straight-through lane.](#)
- 21 B. Separate left-turn signal face – This type of signal face controls only the left-turn movement and  
22 cannot serve as one of the two required primary signal faces for the adjacent movement (usually the  
23 through movement) because it displays signal indications that are applicable only to the left-turn  
24 movement. [This type of signal face is used only for an approach that has an exclusive left-turn](#)  
25 [lane\(s\).](#) If a separate left-turn signal face is mounted overhead at the intersection, it is positioned over  
26 the extension of the [exclusive](#) left-turn lane. In a separate left-turn signal face, a flashing left-turn  
27 YELLOW ARROW signal indication or a flashing left-turn RED ARROW signal indication is used to  
28 control permissive left-turning movements.

29 Section ~~4D.13~~ 4D.06 contains provisions regarding the lateral positioning of signal faces that control left-  
30 turn movements.

31 It is not necessary that the same mode of left-turn operation or same type of left-turn signal face be used  
32 on every approach to a signalized location. Selecting different modes and types of left-turn signal faces for  
33 the various approaches to the same signalized location is acceptable.

34 Option:

35 A signal face that is shared by left-turning and right-turning traffic may be provided for a ~~shared-~~  
36 [combined](#) left-turn/right-turn lane on an approach that has no through traffic (see Section ~~4D.25~~ 4F.16).

37 **Section ~~4D.18~~ 4F.03 Signal Indications for Permissive Only Mode Left-Turn Movements in a**  
38 **[Shared Signal Face](#) Paragraphs from this Section were relocated to new Section 4F.04**

39 Standard:

40 **If a shared signal face is provided for a permissive only mode left turn, it shall meet the following**  
41 **requirements (see Figure ~~4F-1~~ 4D-6):**

- 42 **A. It shall be capable of displaying the following signal indications: steady CIRCULAR RED,**  
43 **steady CIRCULAR YELLOW, and CIRCULAR GREEN. Only one of the three indications**  
44 **shall be displayed at any given time.**
- 45 **B. During the permissive left-turn movement, a CIRCULAR GREEN signal indication shall be**  
46 **displayed.**
- 47 **C. A permissive only shared signal face, regardless of where it is positioned and regardless of how**  
48 **many adjacent through signal faces are provided, shall always simultaneously display the same**  
49 **color of circular indication that the adjacent through signal face or faces display.**
- 50 **D. If the permissive only mode is not the only left-turn mode used for the approach, the signal face**  
51 **shall be the same shared signal face that is used for the protected/permissive mode (see Section\_**

1 ~~4D.20~~ 4F.07) except that the left-turn GREEN ARROW and left-turn YELLOW ARROW  
2 signal indications shall not be displayed when operating in the permissive only mode.

3 **Figure 4F-1. Typical Position and Arrangements of Shared Signal Faces for Permissive**  
4 **Only Mode Left Turns**

5 **Section 4F.04 Signal Indications for Permissive Only Mode Left-Turn Movements in a**  
6 **Separate Signal Face** Paragraphs were relocated from existing Section 4D.18

7 **Standard:**

8 **A separate left-turn signal face shall not be used for an approach that does not include an exclusive**  
9 **left-turn lane.**

10 If a separate left-turn signal face is being operated in a permissive only left-turn mode, a  
11 CIRCULAR GREEN signal indication shall not be used in that face.

12 If a separate left-turn signal face is being operated in a permissive only left-turn mode and a  
13 flashing left-turn YELLOW ARROW signal indication is provided, it shall meet the following  
14 requirements (see Figure ~~4F-2~~ ~~4D-7~~):

- 15 A. It shall be capable of displaying the following signal indications: steady left-turn RED ARROW,  
16 steady left-turn YELLOW ARROW, and flashing left-turn YELLOW ARROW. Only one of  
17 the three indications shall be displayed at any given time.
- 18 B. During the permissive left-turn movement, a flashing left-turn YELLOW ARROW signal  
19 indication shall be displayed.
- 20 C. A steady left-turn YELLOW ARROW signal indication shall be displayed following the flashing  
21 left-turn YELLOW ARROW signal indication.
- 22 D. It shall be permitted to display a flashing left-turn YELLOW ARROW signal indication for a  
23 permissive left-turn movement while the signal faces for the adjacent through movement  
24 display steady CIRCULAR RED signal indications and the opposing left-turn signal faces  
25 display left-turn GREEN ARROW signal indications for a protected left-turn movement.
- 26 E. During steady mode (stop-and-go) operation, the signal section that displays the steady left-turn  
27 YELLOW ARROW signal indication during change intervals shall not be used to display the  
28 flashing left-turn YELLOW ARROW signal indication for permissive left turns **unless a signal**  
29 **section capable of alternating between the display of a steady YELLOW ARROW and a**  
30 **flashing YELLOW ARROW signal indication is used.** Added to reflect Official Change Request  
31 **4(09)-42**
- 32 F. During flashing mode operation (see **Section** Chapter 4G), the display of a flashing left-turn  
33 YELLOW ARROW signal indication shall be only from the signal section that displays a steady  
34 left-turn YELLOW ARROW signal indication during steady mode (stop-and-go) operation.
- 35 G. If the permissive only mode is not the only left-turn mode used for the approach, the signal face  
36 shall be the same separate left-turn signal face with a flashing YELLOW ARROW signal  
37 indication that is used for the protected/permissive mode (see Section ~~4D.20~~ 4F.08) except that  
38 the left-turn GREEN ARROW signal indication shall not be displayed when operating in the  
39 permissive only mode.

40 **Figure 4F-2. Typical Position and Arrangements of Separate Signal Faces with Flashing**  
41 **Yellow Arrow for Permissive Only Mode Left Turns**

42 **Option:**

43 A separate left-turn signal face with a flashing left-turn RED ARROW signal indication during the  
44 permissive left-turn movement may be used for unusual geometric conditions, such as wide medians with  
45 offset left-turn lanes, but only when an engineering study determines that each and every vehicle must  
46 successively come to a full stop before making a permissive left turn.

47 **Standard:**

48 If a separate left-turn signal face is being operated in a permissive only left-turn mode and a  
49 flashing left-turn RED ARROW signal indication is provided, it shall meet the following requirements  
50 (see Figure ~~4F-3~~ ~~4D-8~~):

- 1 A. It shall be capable of displaying the following signal indications: steady or flashing left-turn  
2 RED ARROW, steady left-turn YELLOW ARROW, and left-turn GREEN ARROW. Only one  
3 of the three indications shall be displayed at any given time. The GREEN ARROW indication is  
4 required in order to provide a three-section signal face, but shall not be displayed during the  
5 permissive only mode.
- 6 B. During the permissive left-turn movement, a flashing left-turn RED ARROW signal indication  
7 shall be displayed, thus indicating that each and every vehicle must successively come to a full  
8 stop before making a permissive left turn.
- 9 C. A steady left-turn YELLOW ARROW signal indication shall be displayed following the flashing  
10 left-turn RED ARROW signal indication.
- 11 D. It shall be permitted to display a flashing left-turn RED ARROW signal indication for a  
12 permissive left-turn movement while the signal faces for the adjacent through movement  
13 display steady CIRCULAR RED signal indications and the opposing left-turn signal faces  
14 display left-turn GREEN ARROW signal indications for a protected left-turn movement.
- 15 E. A supplementary sign shall not be required. If used, it shall be a LEFT TURN YIELD ON  
16 FLASHING RED ARROW AFTER STOP (R10-27) sign (see Section ~~2B-27~~2B.63).

17 **Figure 4F-3. Typical Position and Arrangements of Separate Signal Faces with Flashing Red**  
18 **Arrow for Permissive Only Mode and Protected/Permissive Mode Left Turns**

19 Option:

20 The requirements of Item A in Paragraph 5 may be met by a vertically-arranged signal face with a  
21 horizontal cluster of two left-turn RED ARROW signal indications, the left-most of which displays a steady  
22 indication and the right-most of which displays a flashing indication (see Figure ~~4F-3~~4D-8).

23 **Section ~~4D-19~~4F.05 Signal Indications for Protected Only Mode Left-Turn Movements in a**  
24 **Shared Signal Face** Paragraphs from this Section were relocated to new Section 4F.06

25 Standard:

26 A shared signal face shall not be used for protected only mode left turns unless the CIRCULAR  
27 GREEN and left-turn GREEN ARROW signal indications always begin and terminate together. If a  
28 shared signal face is provided for a protected only mode left turn, it shall meet the following  
29 requirements (see Figure ~~4F-4~~4D-9):

- 30 A. It shall be capable of displaying the following signal indications: steady CIRCULAR RED,  
31 steady CIRCULAR YELLOW, CIRCULAR GREEN, and left-turn GREEN ARROW. Only  
32 one of the three colors shall be displayed at any given time.
- 33 B. During the protected left-turn movement, the shared signal face shall simultaneously display  
34 both a CIRCULAR GREEN signal indication and a left-turn GREEN ARROW signal  
35 indication.
- 36 C. The shared signal face shall always simultaneously display the same color of circular indication  
37 that the adjacent through signal face or faces display.
- 38 D. If the protected only mode is not the only left-turn mode used for the approach, the signal face  
39 shall be the same shared signal face that is used for the protected/permissive mode (see Section  
40 ~~4D-20~~4F.07).

41 **Figure 4F-4. Typical Positions and Arrangements of Shared Signal Faces for Protected Only**  
42 **Mode Left Turns**

43 Option:

44 A straight-through GREEN ARROW signal indication may be used instead of the CIRCULAR GREEN  
45 signal indication in Items A and B in Paragraph 1 on an approach where ~~right turns are prohibited and~~ a  
46 straight-through GREEN ARROW signal indication is also used instead of a CIRCULAR GREEN signal  
47 indication in the other signal face(s) for through traffic.

48 **Section 4F.06 Signal Indications for Protected Only Mode Left-Turn Movements in a Separate**  
49 **Signal Face** These paragraphs are from existing Section 4D.19

50 Standard:

1 A separate left-turn signal face shall not be used for an approach that does not include an exclusive  
2 left-turn lane.

3 If a separate left-turn signal face is provided for a protected only mode left turn, it shall meet the  
4 following requirements (see Figure ~~4F-5~~~~4D-10~~):

- 5 A. It shall be capable of displaying, the following signal indications: steady left-turn RED  
6 ARROW, steady left-turn YELLOW ARROW, and left-turn GREEN ARROW. Only one of  
7 the three indications shall be displayed at any given time. ~~A signal instruction sign shall not be~~  
8 ~~required with this set of signal indications. If used, it shall be a LEFT ON GREEN ARROW~~  
9 ~~ONLY (R10-5) sign (see Section 2B.63).~~ Deleted to reflect Official Change Request 4(09)-73(C)
- 10 B. During the protected left-turn movement, a left-turn GREEN ARROW signal indication shall  
11 be displayed.
- 12 C. A steady left-turn YELLOW ARROW signal indication shall be displayed following the left-  
13 turn GREEN ARROW signal indication.
- 14 D. If the protected only mode is not the only left-turn mode used for the approach, the signal face  
15 shall be the same separate left-turn signal face that is used for the protected/permissive mode  
16 (see Section 4F.08 and Figures ~~4F-3~~~~4D-8~~ and ~~4F-7~~~~4D-12~~) except that the flashing left-turn  
17 YELLOW ARROW or flashing left-turn RED ARROW signal indication shall not be displayed  
18 when operating in the protected only mode.

19 **Figure 4F-5. Typical Position and Arrangements of Separate Signal Faces for Protected**  
20 **Only Mode Left Turns**

21 Section ~~4D-20~~ 4F.07 Signal Indications for Protected/Permissive Mode Left-Turn Movements  
22 in a Shared Signal Face Paragraph in this Section were relocated to new Section 4F.08

23 Standard:

24 If a shared signal face is provided for a protected/permissive mode left turn, it shall meet the  
25 following requirements (see Figure ~~4F-6~~~~4D-11~~):

- 26 A. It shall be capable of displaying the following signal indications: steady CIRCULAR RED,  
27 steady CIRCULAR YELLOW, CIRCULAR GREEN, steady left-turn YELLOW ARROW, and  
28 left-turn GREEN ARROW. Only one of the three circular indications shall be displayed at any  
29 given time. Only one of the two arrow indications shall be displayed at any given time. If the  
30 left-turn GREEN ARROW signal indication and the CIRCULAR GREEN signal indication(s)  
31 for the adjacent through movement are always terminated together, the steady left-turn  
32 YELLOW ARROW signal indication shall not be required.
- 33 B. During the protected left-turn movement, the shared signal face shall simultaneously display a  
34 left-turn GREEN ARROW signal indication and a circular signal indication that is the same  
35 color as the signal indication for the adjacent through lane on the same approach as the  
36 protected left turn.
- 37 C. A steady left-turn YELLOW ARROW signal indication shall be displayed following the left-  
38 turn GREEN ARROW signal indication, unless the left-turn GREEN ARROW signal indication  
39 and the CIRCULAR GREEN signal indication(s) for the adjacent through movement are being  
40 terminated together. When the left-turn GREEN ARROW and CIRCULAR GREEN signal  
41 indications are being terminated together, the required display following the left-turn GREEN  
42 ARROW signal indication shall be either the display of a CIRCULAR YELLOW signal  
43 indication alone or the simultaneous display of the CIRCULAR YELLOW and left-turn  
44 YELLOW ARROW signal indications.
- 45 D. During the permissive left-turn movement, the shared signal face shall display only a  
46 CIRCULAR GREEN signal indication.
- 47 E. A protected/permissive shared signal face, regardless of where it is positioned and regardless of  
48 how many adjacent through signal faces are provided, shall always simultaneously display the  
49 same color of circular indication that the adjacent through signal face or faces display.
- 50 F. A supplementary sign shall not be required. If used, it shall be a LEFT TURN YIELD ON  
51 GREEN (symbolic circular green) (R10-12) sign (see Section **2B.63**).

1 **Figure 4F-6. Typical Position and Arrangements of Shared Signal Faces for**  
2 **Protected/Permissive Mode Left Turns**

3 **Section 4F.08 Signal Indications for Protected/Permissive Mode Left-Turn Movements in a**  
4 **Separate Signal Face** Paragraphs were relocated from existing Section 4D.20

5 **Standard:**

6 **A separate left-turn signal face shall not be used for an approach that does not include an exclusive**  
7 **left-turn lane.**

8 If a separate left-turn signal face is being operated in a protected/permissive left-turn mode, a  
9 CIRCULAR GREEN signal indication shall not be used in that face.

10 If a separate left-turn signal face is being operated in a protected/permissive left-turn mode and a  
11 flashing left-turn YELLOW ARROW signal indication is provided, it shall meet the following  
12 requirements (see Figure ~~4F-74D-12~~):

- 13 A. It shall be capable of displaying the following signal indications: steady left-turn RED ARROW,  
14 steady left-turn YELLOW ARROW, flashing left-turn YELLOW ARROW, and left-turn  
15 GREEN ARROW. Only one of the four indications shall be displayed at any given time.
- 16 B. During the protected left-turn movement, a left-turn GREEN ARROW signal indication shall  
17 be displayed.
- 18 C. A steady left-turn YELLOW ARROW signal indication shall be displayed following the left-  
19 turn GREEN ARROW signal indication. **It shall be permitted to display a steady left-turn RED**  
20 **ARROW signal indication immediately following the steady left-turn YELLOW ARROW**  
21 **signal indication to provide a red clearance interval.**
- 22 D. During the permissive left-turn movement, a flashing left-turn YELLOW ARROW signal  
23 indication shall be displayed.
- 24 E. A steady left-turn YELLOW ARROW signal indication shall be displayed following the flashing  
25 left-turn YELLOW ARROW signal indication if the permissive left-turn movement is being  
26 terminated and the separate left-turn signal face will subsequently display a steady left-turn  
27 RED ARROW indication.
- 28 F. It shall be permitted to display a flashing left-turn YELLOW ARROW signal indication for a  
29 permissive left-turn movement while the signal faces for the adjacent through movement  
30 display steady CIRCULAR RED signal indications and the opposing left-turn signal faces  
31 display left-turn GREEN ARROW signal indications for a protected left-turn movement.
- 32 G. When a permissive left-turn movement is changing to a protected left-turn movement, a left-  
33 turn GREEN ARROW signal indication shall be displayed immediately upon the termination of  
34 the flashing left-turn YELLOW ARROW signal indication. A steady left-turn YELLOW  
35 ARROW signal indication shall not be displayed between the display of the flashing left-turn  
36 YELLOW ARROW signal indication and the display of the steady left-turn GREEN ARROW  
37 signal indication.
- 38 H. The display shall be **either:**
- 39 1. A four-section signal face **with the steady left-turn YELLOW ARROW signal indication**  
40 **being displayed in a different section than the flashing left-turn YELLOW ARROW signal**  
41 **indication; except that or**
- 42 2. A three-section signal face ~~containing a dual arrow signal section shall be permitted where~~  
43 ~~signal head height limitations (or lateral positioning limitations for a horizontally mounted~~  
44 ~~signal face) will not permit the use of a four section signal face with the steady left-turn~~  
45 **YELLOW ARROW signal indication and the flashing left-turn YELLOW ARROW signal**  
46 **indication being displayed in the same section.** ~~The dual arrow signal section, where used,~~  
47 ~~shall display a GREEN ARROW for the protected left turn movement and a flashing~~  
48 ~~YELLOW ARROW for the permissive left turn movement.~~ Revised to reflect Interim  
49 **Approval 17**
- 50 I. During steady mode (stop-and-go) operation **where a four-section signal face is used,** the signal  
51 section that displays the steady left-turn YELLOW ARROW signal indication during change

1 intervals shall not be used to display the flashing left-turn YELLOW ARROW signal indication  
2 for permissive left turns.

- 3 J. During flashing mode operation (see Chapter 4G) where a four-section signal face is used, the  
4 display of a flashing left-turn YELLOW ARROW signal indication shall be only from the signal  
5 section that displays a steady left-turn YELLOW ARROW signal indication during steady  
6 mode (stop-and-go) operation.

7 **Figure 4F-7. Typical Position and Arrangements of Separate Signal Faces with Flashing  
8 Yellow Arrow for Protected/Permissive Mode and Protected Only Mode Left Turns**

9 If a separate left-turn signal face includes a dual-arrow signal section (capable of displaying a  
10 GREEN ARROW for the protected left-turn movement and a flashing YELLOW ARROW for the  
11 permissive left-turn movement) along with a steady left-turn YELLOW ARROW signal indication and  
12 a steady left-turn RED ARROW signal indication, it shall be considered to be a four-section signal face  
13 that is compliant with Item H.1 of the previous paragraph.

14 Option:

15 A separate left-turn signal face with a flashing left-turn RED ARROW signal indication during the  
16 permissive left-turn movement may be used for unusual geometric conditions, such as wide medians with  
17 offset left-turn lanes, but only when an engineering study determines that each and every vehicle must  
18 successively come to a full stop before making a permissive left turn.

19 **Standard:**

20 **If a separate left-turn signal face is being operated in a protected/permissive left-turn mode and a  
21 flashing left-turn RED ARROW signal indication is provided, it shall meet the following requirements  
22 (see Figure ~~4F-34D-8~~):**

- 23 A. It shall be capable of displaying the following signal indications: steady or flashing left-turn  
24 RED ARROW, steady left-turn YELLOW ARROW, and left-turn GREEN ARROW. Only one  
25 of the three indications shall be displayed at any given time.
- 26 B. During the protected left-turn movement, a left-turn GREEN ARROW signal indication shall  
27 be displayed.
- 28 C. A steady left-turn YELLOW ARROW signal indication shall be displayed following the left-  
29 turn GREEN ARROW signal indication.
- 30 D. During the permissive left-turn movement, a flashing left-turn RED ARROW signal indication  
31 shall be displayed.
- 32 E. A steady left-turn YELLOW ARROW signal indication shall be displayed following the flashing  
33 left-turn RED ARROW signal indication if the permissive left-turn movement is being  
34 terminated and the separate left-turn signal face will subsequently display a steady left-turn  
35 RED ARROW indication.
- 36 F. When a permissive left-turn movement is changing to a protected left-turn movement, a left-  
37 turn GREEN ARROW signal indication shall be displayed immediately upon the termination of  
38 the flashing left-turn RED ARROW signal indication. A steady left-turn YELLOW ARROW  
39 signal indication shall not be displayed between the display of the flashing left-turn RED  
40 ARROW signal indication and the display of the steady left-turn GREEN ARROW signal  
41 indication.
- 42 G. It shall be permitted to display a flashing left-turn RED ARROW signal indication for a  
43 permissive left-turn movement while the signal faces for the adjacent through movement  
44 display steady CIRCULAR RED signal indications and the opposing left-turn signal faces  
45 display left-turn GREEN ARROW signal indications for a protected left-turn movement.
- 46 H. A supplementary sign shall not be required. If used, it shall be a LEFT TURN YIELD ON  
47 FLASHING RED ARROW AFTER STOP (R10-27) sign (see Section 2B.63).

48 Option:

49 The requirements of Item A in Paragraph 5 may be met by a vertically-arranged signal face with a  
50 horizontal cluster of two left-turn RED ARROW signal indications, the left-most of which displays a steady  
51 indication and the right-most of which displays a flashing indication (see Figure ~~4F-34D-8~~).

52 **Section ~~4D-21~~ 4F.09 Signal Indications for Right-Turn Movements – General**

1 ~~Standard Support:~~ **Standard changed to Support**

2 In Sections ~~4F.10 through 4F.15~~ 4F.09 through 4F.14, provisions applicable to right-turn movements and  
3 right-turn lanes ~~shall are~~ also ~~apply~~ applicable to signal indications for U-turns to the right that are provided at  
4 locations where right turns are prohibited or not geometrically possible.

5 ~~Support:~~

6 Right-turning traffic is controlled by one of four modes as follows:

- 7 A. Permissive Only Mode—turns made on a CIRCULAR GREEN signal indication, a flashing right-turn  
8 YELLOW ARROW signal indication, or a flashing right-turn RED ARROW signal indication after  
9 yielding to pedestrians, if any.
- 10 B. Protected Only Mode—turns made only when a right-turn GREEN ARROW signal indication is  
11 displayed.
- 12 C. Protected/Permissive Mode—both modes occur on an approach during the same cycle.
- 13 D. Variable Right-Turn Mode—the operating mode changes among the protected only mode and/or the  
14 protected/permissive mode and/or the permissive only mode during different periods of the day or as  
15 traffic conditions change.

16 **Standard:**

17 During a permissive right-turn movement, the signal faces, if any, that exclusively control U-turn  
18 traffic that conflicts with the permissive right-turn movement (see Item H.1 in Section 4F.01) shall  
19 simultaneously display steady U-turn RED ARROW signal indications. If pedestrians crossing the lane  
20 or lanes used by the permissive right-turn movement to depart the intersection are controlled by  
21 pedestrian signal heads, the signal indications displayed by those pedestrian signal heads shall not be  
22 limited to any particular display during the permissive right-turn movement.

23 During a protected right-turn movement, a GREEN ARROW or a YELLOW ARROW signal  
24 indication ~~the signal faces for left turn traffic, if any, on the opposing approach~~ shall not simultaneously  
25 be displayed ~~a steady left turn GREEN ARROW or steady left turn YELLOW ARROW signal~~  
26 ~~indication, to left turn traffic on the opposing approach, except where a separate departure lane is~~  
27 available for each left-turn and right-turn lane with moving traffic and pavement markings or raised  
28 channelization clearly indicate which departure lane to use (see Item H.1 in Paragraph 3 in Section  
29 4F.01). ~~and~~ Signal faces, if any, that exclusively control U-turn traffic that conflicts with the protected  
30 right-turn movement (~~see Item F.1 in Section 4D.05~~) shall simultaneously display steady U-turn RED  
31 ARROW signal indications. If pedestrians crossing the lane or lanes used by the protected right-turn  
32 movement to depart the intersection are controlled by pedestrian signal heads, the pedestrian signal  
33 heads shall display a steady UPRAISED HAND (symbolizing DONT WALK) signal indication during  
34 the protected right-turn movement.

35 If a combined right-turn/through lane exists on an approach, a protected only mode right turn  
36 movement that does not begin and terminate at the same time as the adjacent through movement a  
37 right-turn GREEN ARROW or right-turn YELLOW ARROW signal indication or a flashing right-  
38 turn RED ARROW signal indication shall not be provided on displayed to an the approach  
39 simultaneously with a CIRCULAR RED signal indication for the through movement unless an exclusive  
40 right turn lane exists, and a right-turn RED ARROW signal indication shall not be displayed to the  
41 approach simultaneously with a CIRCULAR GREEN or CIRCULAR YELLOW signal indication for  
42 the through movement.

43 ~~A yellow change interval for the right turn movement shall not be displayed when the status of the~~  
44 ~~right turn operation is changing from permissive to protected within any given signal sequence.~~

45 If the operating mode changes among the protected only mode and/or the protected/permissive  
46 mode and/or the permissive only mode during different periods of the day or as traffic conditions  
47 change, the requirements in Sections 4F.09 through 4F.14 ~~4F.10 through 4F.15~~ that are appropriate to  
48 that mode of operation shall be met, subject to the following:

- 49 A. The CIRCULAR GREEN and CIRCULAR YELLOW signal indications shall not be displayed  
50 when operating in the protected only mode.
- 51 B. The right-turn GREEN ARROW and right-turn YELLOW ARROW signal indications shall  
52 not be displayed when operating in the permissive only mode.

1 Option: **Added to reflect Official Interpretation 4(09)-15(I)**

2 When variable-mode right-turn phasing is used for an approach that includes both an exclusive right-turn  
3 lane and a combined right-and-through lane and a flashing yellow arrow is used as the permissive turn  
4 display, a five-section shared right-turn signal face containing both circular and arrow indications may be used  
5 in combination with one or more separate right-turn signal faces for the exclusive right-turn lane(s) on the  
6 same approach. The steady right-turn YELLOW ARROW signal indication and the flashing right-turn  
7 YELLOW ARROW signal indication may be displayed in the same section of the five-section shared right-  
8 turn signal face.

9 Additional static signs or changeable message signs may be used to meet the requirements for the variable  
10 right-turn mode or to inform drivers that right-turn green arrows will not be available during certain times of  
11 the day.

12 Support:

13 Sections 4F.09 through 4F.14~~4F.10 through 4F.15~~ describe the use of the following two types of signal  
14 faces for controlling right-turn movements:

- 15 A. Shared signal face – This type of signal face controls both the right-turn movement and the adjacent  
16 movement (usually the through movement) and can serve as one of the two required primary signal  
17 faces for the adjacent movement. A shared signal face always displays the same color of circular  
18 indication that is displayed by the signal face or faces for the adjacent movement.
- 19 B. Separate right-turn signal face – This type of signal face controls only the right-turn movement and  
20 cannot serve as one of the two required primary signal faces for the adjacent movement (usually the  
21 through movement) because it displays signal indications that are applicable only to the right-turn  
22 movement. If a separate right-turn signal face is mounted overhead at the intersection, it is positioned  
23 over the extension of the exclusive right-turn lane. In a separate right-turn signal face, a flashing  
24 right-turn YELLOW ARROW signal indication or a flashing right-turn RED ARROW signal  
25 indication is used to control permissive right-turning movements.

26 Section 4D.06 contains provisions regarding the lateral positioning of signal faces that control right-turn  
27 movements.

28 It is not necessary that the same mode of right-turn operation or same type of right-turn signal face be  
29 used on every approach to a signalized location. Selecting different modes and types of right-turn signal faces  
30 for the various approaches to the same signalized location is acceptable.

31 Option:

32 A signal face that is shared by left-turning and right-turning traffic may be provided for a ~~shared-~~  
33 combined left-turn/right-turn lane on an approach that has no through traffic (see Section 4F.16).

34 **Section ~~4D.22~~ 4F.10 Signal Indications for Permissive Only Mode Right-Turn Movements in a**  
35 **Shared Signal Face Paragraphs in this Section were relocated to new Section 4F.11**

36 Standard:

37 **If a shared signal face is provided for a permissive only mode right turn, it shall meet the following**  
38 **requirements (see Figure ~~4F-8~~ 4D-13):**

- 39 A. **It shall be capable of displaying the following signal indications: steady CIRCULAR RED,**  
40 **steady CIRCULAR YELLOW, and CIRCULAR GREEN. Only one of the three indications**  
41 **shall be displayed at any given time.**
- 42 B. **During the permissive right-turn movement, a CIRCULAR GREEN signal indication shall be**  
43 **displayed.**
- 44 C. **A permissive only shared signal face, regardless of where it is positioned and regardless of how**  
45 **many adjacent through signal faces are provided, shall always simultaneously display the same**  
46 **color of circular indication that the adjacent through signal face or faces display.**
- 47 D. **If the permissive only mode is not the only right-turn mode used for the approach, the signal**  
48 **face shall be the same shared signal face that is used for the protected/permissive mode (see**  
49 **Section ~~4F.14~~ 4F.13) except that the right-turn GREEN ARROW and right-turn YELLOW**  
50 **ARROW signal indications shall not be displayed when operating in the permissive only mode.**

**Figure 4F-8. Typical Positions and Arrangements of Shared Signal Faces for Permissive Only Mode Right Turns**

**Section 4F.11 Signal Indications for Permissive Only Mode Right-Turn Movements in a Separate Signal Face** These paragraphs were relocated from existing Section 4D.22

**Standard:**

**A separate right-turn signal face shall not be used for an approach that does not include an exclusive right-turn lane.**

If a separate right-turn signal face is being operated in a permissive only right-turn mode, a CIRCULAR GREEN signal indication shall not be used in that face.

If a separate right-turn signal face is being operated in a permissive only right-turn mode and a flashing right-turn YELLOW ARROW signal indication is provided, it shall meet the following requirements (see Figure ~~4F-9~~~~4D-14~~):

- A. It shall be capable of displaying one of the following sets of signal indications:
  1. Steady right-turn RED ARROW, steady right-turn YELLOW ARROW, and flashing right-turn YELLOW ARROW. Only one of the three indications shall be displayed at any given time.
  2. Steady CIRCULAR RED, steady right-turn YELLOW ARROW, and flashing right-turn YELLOW ARROW. Only one of the three indications shall be displayed at any given time. If the CIRCULAR RED signal indication is sometimes displayed when the signal faces for the adjacent through lane(s) are not displaying a CIRCULAR RED signal indication, a RIGHT TURN SIGNAL (R10-10R) sign (see Section 2B.63) shall be used unless the CIRCULAR RED signal indication in the separate right-turn signal face is shielded, hooded, louvered, positioned, or designed such that it is not readily visible to drivers in the through lane(s).
- B. During the permissive right-turn movement, a flashing right-turn YELLOW ARROW signal indication shall be displayed.
- C. A steady right-turn YELLOW ARROW signal indication shall be displayed following the flashing right-turn YELLOW ARROW signal indication.
- D. When the separate right-turn signal face is providing a message to stop and remain stopped, a steady right-turn RED ARROW signal indication shall be displayed if it is intended that right turns on red not be permitted (except when a traffic control device is in place permitting a turn on a steady RED ARROW signal indication) or a steady CIRCULAR RED signal indication shall be displayed if it is intended that right turns on red be permitted.
- E. It shall be permitted to display a flashing right-turn YELLOW ARROW signal indication for a permissive right-turn movement while the signal faces for the adjacent through movement display steady CIRCULAR RED signal indications.
- F. During steady mode (stop-and-go) operation, the signal section that displays the steady right-turn YELLOW ARROW signal indication during change intervals shall not be used to display the flashing right-turn YELLOW ARROW signal indication for permissive right turns **unless a signal section capable of alternating between the display of a steady YELLOW ARROW and a flashing YELLOW ARROW signal indication is used.** Added to reflect Official Change Request **4(09)-42**
- G. During flashing mode operation (see Chapter 4G), the display of a flashing right-turn YELLOW ARROW signal indication shall be only from the signal section that displays a steady right-turn YELLOW ARROW signal indication during steady mode (stop-and-go) operation.
- H. If the permissive only mode is not the only right-turn mode used for the approach, the signal face shall be the same separate right-turn signal face with a flashing YELLOW ARROW signal indication that is used for the protected/permissive mode (see Section ~~4F.14~~~~4F.15~~) except that the right-turn GREEN ARROW signal indication shall not be displayed when operating in the permissive only mode.

1 **Figure 4F-9. Typical Position and Arrangements of Separate Signal Faces with Flashing**  
2 **Yellow Arrow for Permissive Only Mode Right Turns**

3 Option:

4 When an engineering study determines that each and every vehicle must successively come to a full stop  
5 before making a permissive right turn, a separate right-turn signal face with a flashing right-turn RED  
6 ARROW signal indication during the permissive right-turn movement may be used.

7 **Standard:**

8 **If a separate right-turn signal face is being operated in a permissive only right-turn mode and a**  
9 **flashing right-turn RED ARROW signal indication is provided, it shall meet the following requirements**  
10 **(see Figure ~~4F-104D-15~~):**

11 **A. It shall be capable of displaying one of the following sets of signal indications:**

- 12 1. **Steady or flashing right-turn RED ARROW, steady right-turn YELLOW ARROW, and**  
13 **right-turn GREEN ARROW. Only one of the three indications shall be displayed at any**  
14 **given time. The GREEN ARROW indication is required in order to provide a three-section**  
15 **signal face, but shall not be displayed during permissive only mode.**
- 16 2. **Steady CIRCULAR RED on the left and steady right-turn RED ARROW on the right of the**  
17 **top position, steady right-turn YELLOW ARROW in the middle position, and right-turn**  
18 **GREEN ARROW in the bottom position. Only one of the four indications shall be**  
19 **displayed at any given time. The GREEN ARROW indication is required in order to**  
20 **provide three vertical positions, but shall not be displayed during permissive only mode. If**  
21 **the CIRCULAR RED signal indication is sometimes displayed when the signal faces for the**  
22 **adjacent through lane(s) are not displaying a CIRCULAR RED signal indication, a RIGHT**  
23 **TURN SIGNAL (R10-10R) sign (see Section 2B.63) shall be used unless the CIRCULAR**  
24 **RED signal indication in the separate right-turn signal face is shielded, hooded, louvered,**  
25 **positioned, or designed such that it is not readily visible to drivers in the through lane(s).**

26 **B. During the permissive right-turn movement, a flashing right-turn RED ARROW signal**  
27 **indication shall be displayed, thus indicating that each and every vehicle must successively come**  
28 **to a full stop before making a permissive right turn.**

29 **C. A steady right-turn YELLOW ARROW signal indication shall be displayed following the**  
30 **flashing right-turn RED ARROW signal indication.**

31 **D. When the separate right-turn signal face is providing a message to stop and remain stopped, a**  
32 **steady right-turn RED ARROW signal indication shall be displayed if it is intended that right**  
33 **turns on red not be permitted (except when a traffic control device is in place permitting a turn**  
34 **on a steady RED ARROW signal indication) or a steady CIRCULAR RED signal indication**  
35 **shall be displayed if it is intended that right turns on red be permitted.**

36 **E. The display of a flashing right-turn RED ARROW signal indication for a permissive right-turn**  
37 **movement while the signal faces for the adjacent through movement display steady CIRCULAR**  
38 **RED signal indications and the opposing left-turn signal faces display left-turn GREEN**  
39 **ARROW signal indications for a protected left-turn movement shall be permitted.**

40 **F. A supplementary sign shall not be required. If used, it shall be a RIGHT TURN YIELD ON**  
41 **FLASHING RED ARROW AFTER STOP (R10-27) sign (see Section 2B.63).**

42 **Figure 4F-10. Typical Position and Arrangements of Separate Signal Faces with Flashing Red**  
43 **Arrow for Permissive Only Mode and Protected/Permissive Mode Right Turns**

44 Option:

45 The requirements of Item A.1 in Paragraph 5 may be met by a vertically-arranged signal face with a  
46 horizontal cluster of two right-turn RED ARROW signal indications, the left-most of which displays a steady  
47 indication and the right-most of which displays a flashing indication (see Figure ~~4F-104D-15~~).

48 **Section ~~4D-23~~ 4F.12 Signal Indications for Protected Only Mode Right-Turn Movements in a**  
49 **Shared Signal Paragraphs from this Section were relocated to new Section 4F.13**

50 **Standard:**

1 A shared signal face shall not be used for protected only mode right turns unless the CIRCULAR  
2 GREEN and right-turn GREEN ARROW signal indications always begin and terminate together. If a  
3 shared signal face is provided for a protected only right turn, it shall meet the following requirements  
4 (see Figure ~~4F-114D-16~~):

- 5 A. It shall be capable of displaying the following signal indications: steady CIRCULAR RED,  
6 steady CIRCULAR YELLOW, CIRCULAR GREEN, and right-turn GREEN ARROW. Only  
7 one of the three colors shall be displayed at any given time.
- 8 B. During the protected right-turn movement, the shared signal face shall simultaneously display  
9 both a CIRCULAR GREEN signal indication and a right-turn GREEN ARROW signal  
10 indication.
- 11 C. The shared signal face shall always simultaneously display the same color of circular indication  
12 that the adjacent through signal face or faces display.
- 13 D. If the protected only mode is not the only right-turn mode used for the approach, the signal face  
14 shall be the same shared signal face that is used for the protected/permissive mode (see Section  
15 4F.14).

16 **Figure 4F-11. Typical Positions and Arrangements of Shared Signal Faces for Protected Only**  
17 **Mode Right Turns**

18 Option:

19 A straight-through GREEN ARROW signal indication may be used instead of the CIRCULAR GREEN  
20 signal indication in Items A and B in Paragraph 1 on an approach where ~~left turns are prohibited and~~ a  
21 straight-through GREEN ARROW signal indication is also used instead of a CIRCULAR GREEN signal  
22 indication in the other signal face(s) for through traffic.

23 **Section 4F.13 Signal Indications for Protected Only Mode Right-Turn Movements in a**  
24 **Separate Signal Face** These paragraphs were relocated from existing Section 4D.23

25 Standard:

26 **A separate right-turn signal face shall not be used for an approach that does not include an**  
27 **exclusive right-turn lane.**

28 If a separate right-turn signal face is provided for a protected only mode right turn, it shall meet the  
29 following requirements (see Figure ~~4F-124D-17~~):

- 30 A. It shall be capable of displaying one of the following sets of signal indications:
  - 31 1. Steady right-turn RED ARROW, steady right-turn YELLOW ARROW, and right-turn  
32 GREEN ARROW. Only one of the three indications shall be displayed at any given time. ~~A~~  
33 ~~signal instruction sign shall not be required with this set of signal indications. If used, it~~  
34 ~~shall be a RIGHT ON GREEN ARROW ONLY (R10-5a) sign (see Section 2B.63).~~ Revised  
35 to reflect Official Change Request 4(09)-73(C)
  - 36 2. Steady CIRCULAR RED, steady right-turn YELLOW ARROW, and right-turn GREEN  
37 ARROW. Only one of three indications shall be displayed at any given time. If the  
38 CIRCULAR RED signal indication is sometimes displayed when the signal faces for the  
39 adjacent through lane(s) are not displaying a CIRCULAR RED signal indication, a RIGHT  
40 TURN SIGNAL (R10-10R) sign (see Section 2B.63) shall be used unless the CIRCULAR  
41 RED signal indication is shielded, hooded, louvered, positioned, or designed such that it is  
42 not readily visible to drivers in the through lane(s).
- 43 B. During the protected right-turn movement, a right-turn GREEN ARROW signal indication  
44 shall be displayed.
- 45 C. A steady right-turn YELLOW ARROW signal indication shall be displayed following the right-  
46 turn GREEN ARROW signal indication.
- 47 D. When the separate signal face is providing a message to stop and remain stopped, a steady  
48 right-turn RED ARROW signal indication shall be displayed if it is intended that right turns on  
49 red not be permitted (except when a traffic control device is in place permitting a turn on a  
50

1 steady RED ARROW signal indication) or a steady CIRCULAR RED signal indication shall be  
2 displayed if it is intended that right turns on red be permitted.

- 3 E. If the protected only mode is not the only right-turn mode used for the approach, the signal face  
4 shall be the same separate right-turn signal face that is used for the protected/permissive mode  
5 (see Section ~~4F-15~~4F.14 and Figure ~~4F-14~~4D-19) except that a flashing right-turn YELLOW  
6 ARROW or flashing right-turn RED ARROW signal indication shall not be displayed when  
7 operating in the protected only mode.

8 **Figure 4F-12. Typical Position and Arrangements of Separate Signal Faces for Protected Only**  
9 **Mode Right Turns**

10 **Section ~~4D-24~~4F.14 Signal Indications for Protected/Permissive Mode Right-Turn Movements**  
11 **in a Shared Signal Face Paragraphs in this Section were relocated in new Section 4F.15**

12 **Standard:**

13 If a shared signal face is provided for a protected/permissive mode right turn, it shall meet the  
14 following requirements (see Figure ~~4F-13~~4D-18):

- 15 A. It shall be capable of displaying the following signal indications: steady CIRCULAR RED,  
16 steady CIRCULAR YELLOW, CIRCULAR GREEN, steady right-turn YELLOW ARROW,  
17 and right-turn GREEN ARROW. Only one of the three circular indications shall be displayed  
18 at any given time. Only one of the two arrow indications shall be displayed at any given time. If  
19 the right-turn GREEN ARROW signal indication and the CIRCULAR GREEN signal  
20 indication(s) for the adjacent through movement are always terminated together, the steady  
21 right-turn YELLOW ARROW signal indication shall not be required.
- 22 B. During the protected right-turn movement, the shared signal face shall simultaneously display a  
23 right-turn GREEN ARROW signal indication and a circular signal indication that is the same  
24 color as the signal indication for the adjacent through lane on the same approach as the  
25 protected right turn.
- 26 C. A steady right-turn YELLOW ARROW signal indication shall be displayed following the right-  
27 turn GREEN ARROW signal indication, unless the right-turn GREEN ARROW signal  
28 indication and the CIRCULAR GREEN signal indication(s) for the adjacent through movement  
29 are being terminated together. When the right-turn GREEN ARROW and CIRCULAR  
30 GREEN signal indications are being terminated together, the required display following the  
31 right-turn GREEN ARROW signal indication shall be either the display of a CIRCULAR  
32 YELLOW signal indication alone or the simultaneous display of the CIRCULAR YELLOW  
33 and right-turn YELLOW ARROW signal indications.
- 34 D. During the permissive right-turn movement, the shared signal face shall display only a  
35 CIRCULAR GREEN signal indication.
- 36 E. A protected/permissive shared signal face, regardless of where it is positioned and regardless of  
37 how many adjacent through signal faces are provided, shall always simultaneously display the  
38 same color of circular indication that the adjacent through signal face or faces display.

39 **Figure 4F-13. Typical Positions and Arrangements of Shared Signal Faces for**  
40 **Protected/Permissive Mode Right Turns**

41 **Section 4F.15 Signal Indications for Protected/Permissive Mode Right-Turn Movements in a**  
42 **Separate Signal Face These paragraphs were relocated from existing Section 4D.24**

43 **Standard:**

44 A separate right-turn signal face shall not be used for an approach that does not include an  
45 exclusive right-turn lane.

46 If a separate right-turn signal face is being operated in a protected/permissive right-turn mode, a  
47 CIRCULAR GREEN signal indication shall not be used in that face.

48 If a separate right-turn signal face is being operated in a protected/permissive right-turn mode and  
49 a flashing right-turn YELLOW ARROW signal indication is provided, it shall meet the following  
50 requirements (see Figure ~~4F-14~~4D-19):

- 51 A. It shall be capable of displaying one of the following sets of signal indications:

- 1 1. Steady right-turn RED ARROW, steady right-turn YELLOW ARROW, flashing right-turn  
2 YELLOW ARROW, and right-turn GREEN ARROW. Only one of the four indications  
3 shall be displayed at any given time.
- 4 2. Steady CIRCULAR RED, steady right-turn YELLOW ARROW, flashing right-turn  
5 YELLOW ARROW, and right-turn GREEN ARROW. Only one of the four indications  
6 shall be displayed at any given time. If the CIRCULAR RED signal indication is sometimes  
7 displayed when the signal faces for the adjacent through lane(s) are not displaying a  
8 CIRCULAR RED signal indication, a RIGHT TURN SIGNAL (R10-10R) sign (see Section  
9 2B.63) shall be used unless the CIRCULAR RED signal indication in the separate right-turn  
10 signal face is shielded, hooded, louvered, positioned, or designed such that it is not readily  
11 visible to drivers in the through lane(s).
- 12 B. During the protected right-turn movement, a right-turn GREEN ARROW signal indication  
13 shall be displayed.
- 14 C. A steady right-turn YELLOW ARROW signal indication shall be displayed following the right-  
15 turn GREEN ARROW signal indication. It shall be permitted to display a steady right-turn  
16 RED ARROW signal indication immediately following the steady right-turn YELLOW  
17 ARROW signal indication to provide a red clearance interval.
- 18 D. During the permissive right-turn movement, a flashing right-turn YELLOW ARROW signal  
19 indication shall be displayed.
- 20 E. A steady right-turn YELLOW ARROW signal indication shall be displayed following the  
21 flashing right-turn YELLOW ARROW signal indication if the permissive right-turn movement  
22 is being terminated and the separate right-turn signal face will subsequently display a steady  
23 red indication.
- 24 F. When a permissive right-turn movement is changing to a protected right-turn movement:
  - 25 1. If a permissive left-turn movement from the opposing approach is being terminated  
26 simultaneously with the termination of the permissive right-turn movement, a steady right-  
27 turn YELLOW ARROW signal indication, and, if needed, a steady right-turn RED  
28 ARROW signal indication, shall be displayed following the flashing right-turn YELLOW  
29 ARROW signal indication.
  - 30 2. If a permissive left-turn movement from the opposing approach that is being terminated  
31 simultaneously with the termination of the permissive right-turn movement is not present,  
32 a right-turn GREEN ARROW signal indication shall be displayed immediately upon the  
33 termination of the flashing right-turn YELLOW ARROW signal indication. In this  
34 situation, a steady right-turn YELLOW ARROW signal indication shall not be displayed  
35 between the display of the flashing right-turn YELLOW ARROW signal indication and the  
36 display of the steady right-turn GREEN ARROW signal indication.
- 37 G. When the separate right-turn signal face is providing a message to stop and remain stopped, a  
38 steady right-turn RED ARROW signal indication shall be displayed if it is intended that right  
39 turns on red not be permitted (except when a traffic control device is in place permitting a turn  
40 on a steady RED ARROW signal indication) or a steady CIRCULAR RED signal indication  
41 shall be displayed if it is intended that right turns on red be permitted.
- 42 H. It shall be permitted to display a flashing right-turn YELLOW ARROW signal indication for a  
43 permissive right-turn movement while the signal faces for the adjacent through movement  
44 display steady CIRCULAR RED signal indications.
- 45 I. ~~A signal face containing a dual arrow signal section in place of separate flashing right-turn~~  
46 ~~YELLOW ARROW and right-turn GREEN ARROW signal sections shall be permitted where~~  
47 ~~signal head height limitations (or lateral positioning limitations for a horizontally mounted~~  
48 ~~signal face) are a concern. The dual arrow signal section, where used, shall display a GREEN~~  
49 ~~ARROW for the protected right-turn movement and a flashing YELLOW ARROW for the~~  
50 ~~permissive right-turn movement. The display shall be either:~~
  - 51 1. A four-section signal face with the steady right-turn YELLOW ARROW signal indication  
52 being displayed in a different section than the flashing right-turn YELLOW ARROW signal  
53 indication, or

1 2. A three-section signal face with the steady right-turn YELLOW ARROW signal indication  
2 and the flashing right-turn YELLOW ARROW signal indication being displayed in the same  
3 section. Added to reflect Interim Approval-17

- 4 J. During steady mode (stop-and-go) operation where a four-section signal face is used, the signal  
5 section that displays the steady right-turn YELLOW ARROW signal indication during change  
6 intervals shall not be used to display the flashing right-turn YELLOW ARROW signal  
7 indication for permissive right turns.  
8 K. During flashing mode operation (see Chapter 4G) where a four-section signal face is used, the  
9 display of a flashing right-turn YELLOW ARROW signal indication shall be only from the  
10 signal section that displays a steady right-turn YELLOW ARROW signal indication during  
11 steady mode (stop-and-go) operation.

12 **Figure 4F-14. Typical Position and Arrangements of Separate Signal Faces with Flashing**  
13 **Yellow Arrow for Protected/Permissive Mode and Protected Only Mode Right Turns**

14 If a separate right-turn signal face includes a dual-arrow signal section (capable of displaying a  
15 GREEN ARROW for the protected right-turn movement and a flashing YELLOW ARROW for the  
16 permissive right-turn movement) along with a steady right-turn YELLOW ARROW signal indication  
17 and a steady right-turn RED ARROW signal indication, it shall be considered to be a four-section  
18 signal face that is compliant with Item I.1 of the previous paragraph.

19 Option:

20 When an engineering study determines that each and every vehicle must successively come to a full stop  
21 before making a permissive right turn, a separate signal face that has a flashing right-turn RED ARROW  
22 signal indication during the permissive right-turn movement may be used.

23 **Standard:**

24 **If a separate right-turn signal face is being operated in a protected/permissive right-turn mode and**  
25 **a flashing right-turn RED ARROW signal indication is provided, it shall meet the following**  
26 **requirements (see Figure ~~4F-104D-15~~):**

- 27 A. It shall be capable of displaying one of the following sets of signal indications:
- 28 1. Steady or flashing right-turn RED ARROW, steady right-turn YELLOW ARROW, and  
29 right-turn GREEN ARROW. Only one of the three indications shall be displayed at any  
30 given time.
  - 31 2. Steady CIRCULAR RED on the left and steady or flashing right-turn RED ARROW on the  
32 right of the top position, steady right-turn YELLOW ARROW in the middle position, and  
33 right-turn GREEN ARROW in the bottom position. Only one of the four indications shall  
34 be displayed at any given time. If the CIRCULAR RED signal indication is sometimes  
35 displayed when the signal faces for the adjacent through lane(s) are not displaying a  
36 CIRCULAR RED signal indication, a RIGHT TURN SIGNAL (R10-10R) sign (see Section  
37 2B.63) shall be used unless the CIRCULAR RED signal indication in the separate right-turn  
38 signal face is shielded, hooded, louvered, positioned, or designed such that it is not readily  
39 visible to drivers in the through lane(s).
- 40 B. During the protected right-turn movement, a right-turn GREEN ARROW signal indication  
41 shall be displayed.
- 42 C. A steady right-turn YELLOW ARROW signal indication shall be displayed following the right-  
43 turn GREEN ARROW signal indication.
- 44 D. During the permissive right-turn movement, the separate right-turn signal face shall display a  
45 flashing right-turn RED ARROW signal indication.
- 46 E. A steady right-turn YELLOW ARROW signal indication shall be displayed following the  
47 flashing right-turn RED ARROW signal indication if the permissive right-turn movement is  
48 being terminated and the separate right-turn signal face will subsequently display a steady red  
49 indication.
- 50 F. When a permissive right-turn movement is changing to a protected right-turn movement, a  
51 right-turn GREEN ARROW signal indication shall be displayed immediately upon the  
52 termination of the flashing right-turn RED ARROW signal indication. A steady right-turn

1 YELLOW ARROW signal indication shall not be displayed between the display of the flashing  
2 right-turn RED ARROW signal indication and the display of the steady right-turn GREEN  
3 ARROW signal indication.

4 G. When the separate right-turn signal face is providing a message to stop and remain stopped, a  
5 steady right-turn RED ARROW signal indication shall be displayed if it is intended that right  
6 turns on red not be permitted (except when a traffic control device is in place permitting a turn  
7 on a steady RED ARROW signal indication) or a steady CIRCULAR RED signal indication  
8 shall be displayed if it is intended that right turns on red be permitted.

9 H. It shall be permitted to display a flashing right-turn RED ARROW signal indication for a  
10 permissive right-turn movement while the signal faces for the adjacent through movement  
11 display steady CIRCULAR RED signal indications and the opposing left-turn signal faces  
12 display left-turn GREEN ARROW signal indications for a protected left-turn movement.

13 I. A supplementary sign shall not be required. If used, it shall be a RIGHT TURN YIELD ON  
14 FLASHING RED ARROW AFTER STOP (R10-27) sign (see Section 2B.63).

15 Option:

16 The requirements of Item A.1 in Paragraph 5 may be met by a vertically-arranged signal face with a  
17 horizontal cluster of two right-turn RED ARROW signal indications, the left-most of which displays a steady  
18 indication and the right-most of which displays a flashing indication (see Figure ~~4F-104D-15~~).

19 **Section ~~4D.25~~ 4F.16 Signal Indications for Approaches with ~~Shared Left Turn/Right Turn~~  
20 ~~Lanes and No Through Movement~~ Section revised to reflect Official Change Request 4(09)-23**

21 Support:

22 This provisions of this section apply only to approaches where no through movement exists, such as the  
23 stem of a T-intersection or where the opposite approach is a one-way roadway in the opposing direction.

24 Standard:

25 A minimum of two primary signal faces shall be provided for the signalized turning movement that  
26 is considered to be the major movement from the approach (see Section 4D.04).

27 Option:

28 The required two primary signal faces and any supplemental primary signal faces may continuously  
29 display a steady CIRCULAR RED signal indication during times when the traffic control signal is being  
30 operated in the steady (stop-and-go) mode.

31 Standard:

32 CIRCULAR GREEN and CIRCULAR YELLOW signal indications shall not be displayed to an  
33 approach with no through movement if:

34 A. The posted or statutory speed limit on the approach is 35 mph or higher,

35 B. The one-way roadway that opposes the approach is an exit ramp from a freeway or expressway,  
36 or

37 C. The one-way roadway that opposes the approach has a posted or statutory speed limit of 35  
38 mph or higher.

39 Support:

40 A lane ~~that is shared by from which~~ left-turn and right-turn movements ~~can both be made~~ is sometimes  
41 provided on an approach that has no through movement, ~~such as the stem of a T intersection or where the~~  
42 ~~opposite approach is a one way roadway in the opposing direction~~ either as the only approach lane or as one  
43 of several approach lanes.

44 Option:

45 If all of the lanes on the approach are designated as exclusive turn lanes and no lane is designated as a  
46 combined left-turn/right-turn lane, the left-turn and right-turn movements may start and terminate  
47 independently, and the left-turn and right-turn movements each may be operated in one or more of the modes  
48 of operation as described in Sections 4F.02 through 4F.14.

49 Standard:

1 When a ~~shared-combined~~ left-turn/right-turn lane exists on an ~~signalized~~ approach, the left-turn  
2 and right-turn movements shall start and terminate simultaneously and the red signal indication used  
3 in each of the signal faces on the approach shall be a CIRCULAR RED.

4 Support:

5 This requirement for the use of CIRCULAR RED signal indications in signal faces for approaches having  
6 a ~~shared-combined~~ lane for left-turn and right-turn movements is a specific exception to other provisions in  
7 this Chapter that would otherwise require the use of RED ARROW signal indications.

8 **Standard:**

9 The signal faces provided for an approach with a ~~shared-combined~~ left-turn/right-turn lane and no  
10 through movement shall be one of the following:

- 11 A. Except as provided in Paragraph 6 of Section 4F.01 and Paragraph 4 of this Section, two or  
12 more signal faces, each capable of displaying CIRCULAR RED, CIRCULAR YELLOW, and  
13 CIRCULAR GREEN signal indications, shall be provided for the approach. This display shall  
14 be permissible regardless of the number of exclusive left-turn and/or right-turn lanes that exist  
15 on the approach in addition to the ~~shared-combined~~ left-turn/right-turn lane and regardless of  
16 whether or not there are pedestrian or opposing vehicular movements that conflict with the left-  
17 turn or right-turn movements. However, if there is an opposing approach and the signal  
18 phasing protects the left-turn movement on the approach with the ~~shared-combined~~ left-  
19 turn/right-turn lane from conflicts with the opposing vehicular movements and any signalized  
20 pedestrian movements, a left-turn GREEN ARROW signal indication shall also be included in  
21 the left-most signal face and shall be displayed simultaneously with the CIRCULAR GREEN  
22 signal indication.
- 23 B. If the approach has one or more exclusive turn lanes in addition to the ~~shared-combined~~ left-  
24 turn/right-turn lane and there is no conflict with a signalized vehicular or pedestrian movement,  
25 and GREEN ARROW signal indications are used in place of CIRCULAR GREEN signal  
26 indications on the approach, the signal faces for the approach shall be:
- 27 1. A signal face(s) capable of displaying CIRCULAR RED, YELLOW ARROW, and GREEN  
28 ARROW signal indications for the exclusive turn lane(s), with the arrows pointing in the  
29 direction of the turn, and
  - 30 2. A shared left-turn/right-turn signal face capable of displaying CIRCULAR RED, left-turn  
31 YELLOW ARROW, left-turn GREEN ARROW, right-turn YELLOW ARROW, and right-  
32 turn GREEN ARROW signal indications, in an arrangement of signal sections that complies  
33 with the provisions of Section ~~4E.04~~4E.03 or ~~4E.05~~4E.04.
- 34 C. If the approach has one or more exclusive turn lanes in addition to the ~~shared-combined~~ left-  
35 turn/right-turn lane and there is a conflict with a signalized vehicular or pedestrian movement,  
36 and flashing YELLOW ARROW signal indications are used in place of CIRCULAR GREEN  
37 signal indications on the approach, the signal faces for the approach shall be as described in  
38 Items B.1 and B.2, except that flashing YELLOW ARROW signal indications shall be used in  
39 place of the GREEN ARROW signal indications for the turning movement(s) that conflicts with  
40 the signalized vehicular or pedestrian movement.

41 Support:

42 Figure ~~4F-15~~ ~~4D-20~~ illustrates application of these Standards on approaches that have only a ~~shared-~~  
43 ~~combined~~ left-turn/right-turn lane, and on approaches that have one or more exclusive turn lanes in addition to  
44 the ~~shared-combined~~ left-turn/right-turn lane.

45 Option:

46 If the lane-use regulations on an approach are variable such that at certain times all of the lanes on the  
47 approach are designated as exclusive turn lanes and no lane is designated as a ~~shared-combined~~ left-turn/right-  
48 turn lane:

- 49 A. During the times that no lane is designated as a ~~shared-combined~~ left-turn/right-turn lane, the left-turn  
50 and right-turn movements may start and terminate independently, and the left-turn and right-turn  
51 movements may be operated in one or more of the modes of operation as described in Sections 4F.02  
52 through ~~4F.15~~4F.14; and

1 B. If a protected/permissive mode is used, the operation of the shared left-turn/right-turn signal face  
2 provided in Paragraph 9 may be modified ~~to include a dual arrow signal section capable of displaying~~  
3 ~~both a GREEN ARROW signal indication and a flashing YELLOW ARROW signal indication for a~~  
4 ~~turn movement(s) to display the steady left-turn (right-turn) YELLOW ARROW signal indication and~~  
5 ~~the flashing left-turn (right-turn) YELLOW ARROW signal indication in the same section in order to~~  
6 not exceed the maximum of five sections per signal face provided in Section 4E.03. **Revised to**  
7 **reflect Official Interpretation 4(09)-15(I)**

8 **Figure 4F-15. Signal Indications for Approaches with a Combined Left-Turn/Right-Turn**  
9 **Lane and No Through Movement**

10 **Section ~~4D.26~~ 4F.17 Yellow Change and Red Clearance Intervals**

11 **Support: The sequence of Paragraphs 1 and 2 was switched and Paragraph 2 changed from**  
12 **Standard to Support**

13 The exclusive function of the yellow change interval ~~shall be~~ is to warn traffic approaching a signalized  
14 location of an impending change in the right-of-way assignment that their permission to proceed is being  
15 terminated after which they will be directed to stop, or in the case of a protected/permissive turning movement  
16 that their protected movement is being terminated after which they will need to perform their turn in a  
17 permissive manner.

18 **Standard:**

19 A steady yellow signal indication shall be displayed following every CIRCULAR GREEN or  
20 GREEN ARROW signal indication and following every flashing YELLOW ARROW or flashing RED  
21 ARROW signal indication displayed as a part of a steady mode operation. This requirement shall not  
22 apply when a CIRCULAR GREEN, a flashing YELLOW ARROW, or a flashing RED ARROW signal  
23 indication is followed immediately by a GREEN ARROW signal indication.

24 The duration of the yellow change interval shall be determined using engineering practices.

25 **Support:**

26 Section 4F.01 contains provisions regarding the display of steady CIRCULAR YELLOW signal  
27 indications to approaches from which drivers are allowed to make permissive left turns.

28 **Guidance:**

29 *When indicated by the application of engineering practices, the yellow change interval should be followed*  
30 *by a red clearance interval to provide additional time before conflicting traffic movements, including*  
31 *pedestrians, are released.*

32 **Standard:**

33 When used, the duration of the red clearance interval shall be determined using engineering  
34 practices.

35 **Support:**

36 Engineering practices for determining the duration of yellow change and red clearance intervals can be  
37 found in ~~ITE's "Traffic Control Devices Handbook" and in ITE's "Manual of Traffic Signal Design"~~  
38 "Guidelines for Determining Traffic Signal Change and Clearance Intervals: A Recommended Practice of the  
39 Institute of Transportation Engineers" (see Section 1A.05).

40 **Standard:**

41 The durations of yellow change intervals and red clearance intervals shall be consistent with the  
42 determined values within the technical capabilities of the controller unit.

43 The duration of a yellow change interval shall not vary on a cycle-by-cycle basis within the same  
44 signal timing plan.

45 Except as provided in Paragraph 12, the duration of a red clearance interval shall not be decreased  
46 or omitted on a cycle-by-cycle basis within the same signal timing plan.

47 **Option:**

48 The duration of a red clearance interval may be extended from its predetermined value for a given cycle  
49 based upon the detection of a vehicle that is predicted to violate the red signal indication.

1 When an actuated signal sequence includes a signal phase for permissive/protected (lagging) left-turn  
2 movements in both directions, the red clearance interval may be shown during those cycles when the lagging  
3 left-turn signal phase is skipped and may be omitted during those cycles when the lagging left-turn signal  
4 phase is shown.

5 The duration of a yellow change interval or a red clearance interval may be different in different signal  
6 timing plans for the same controller unit.

7 *Guidance:*

8 *A yellow change interval should have a minimum duration of 3 seconds, and a maximum duration of 6*  
9 *seconds for through movements and 7 seconds for turning movements. ~~The longer intervals should be~~*  
10 *~~reserved for use on approaches with higher speeds.~~*

11 *~~Except when clearing a one-lane, two-way facility (see Section 4O.02) or when clearing an~~*  
12 *~~exceptionally wide intersection, a red clearance interval should have a duration not exceeding 6~~*  
13 *~~seconds.~~*

14 **Standard:**

15 **Except for warning beacons mounted on advance warning signs on the approach to a signalized**  
16 **location (see Section 2C.37), signal displays that are intended to provide a “pre-yellow warning”**  
17 **interval, such as flashing green signal indications, vehicular countdown displays, or other similar**  
18 **displays, shall not be used at a signalized location.**

19 **Support:**

20 The use of signal displays (other than warning beacons mounted on advance warning signs) that convey a  
21 “pre-yellow warning” have been found by research to increase the frequency of crashes.

22 **Section 4D.27 4F.18 Preemption and Priority Control of Traffic Control Signals – General**  
23 **Paragraphs from this Section were relocated to new Sections 4F.19 and 4F.20**

24 **Option:**

25 Traffic control signals may be designed and operated to respond to certain classes of approaching vehicles  
26 by altering the normal signal timing and phasing plan(s) during the approach and passage of those vehicles.  
27 The alternative plan(s) may be as simple as extending a currently displayed green interval or as complex as  
28 replacing the entire set of signal phases and timing.

29 **Support:**

30 Some types or classes of vehicles supersede others when a traffic control signal responds to more than one  
31 type or class. In general, a vehicle that is more difficult to control supersedes a vehicle that is easier to  
32 control.

33 **Option:**

34 Preemption or priority control of traffic control signals may also be a means of ~~assigning priority right-of-~~  
35 ~~way~~ indicating to specified classes of vehicles at certain non-intersection locations, such as on approaches to  
36 one-lane bridges and tunnels, movable bridges, highway maintenance and construction activities, metered  
37 freeway entrance ramps, and transit operations, that they are permitted to proceed.

38 *Guidance:*

39 *When a traffic control signal that is returning to a steady mode from a dark mode (typically upon*  
40 *restoration from a power failure) receives a preemption or priority request, care should be exercised to*  
41 *minimize the possibility of vehicles or pedestrians being misdirected into a conflict with the vehicle making*  
42 *the request.*

43 **Option:**

44 During the change from a dark mode to a steady mode under a preemption or priority request, the display  
45 of signal indications that could misdirect road users may be prevented by one or more of the following  
46 methods:

- 47 A. Having the traffic control signal remain in the dark mode,
- 48 B. Having the traffic control signal remain in the flashing mode,
- 49 C. Altering the flashing mode,

- 1 D. Executing the normal start-up routine before responding, or
- 2 E. Responding directly to initial or dwell period.

3 *Guidance:*

4 *Traffic control signals operating under preemption control or under priority control should be operated*  
5 *in a manner designed to keep traffic moving.*

6 *Traffic control signals that are designed to respond under preemption or priority control to more than one*  
7 *type or class of vehicle should be designed to respond in the relative order of importance or difficulty in*  
8 *stopping the type or class of vehicle. The order of priority should be: train, boat, heavy vehicle (fire vehicle,*  
9 *emergency medical service), light vehicle (law enforcement), light rail transit, rubber-tired transit.*

10 *Option:*

11 If engineering judgment indicates that light rail transit signal indications would reduce road user  
12 confusion that might otherwise occur if standard traffic signal indications were used to control these  
13 movements, light rail transit signal indications complying with Section 8C.11 [8D.15](#) and as illustrated in  
14 Figure ~~8C-3~~ [8D-4](#) may be used for preemption or priority control of the following exclusive movements at  
15 signalized intersections:

- 16 A. Public transit buses in “queue jumper” lanes, and
- 17 B. Bus rapid transit in semi-exclusive or mixed-use alignments.

18 **[Section 4F.19 Preemption Control of Traffic Control Signals](#)** **These paragraphs relocated from**  
19 **[existing Section 4D.27](#)**

20 *Support:*

21 Preemption control (see definition in Section 1C.02) is typically given to trains, boats, emergency  
22 vehicles, and light rail transit.

23 Examples of preemption control include the following:

- 24 A. The prompt displaying of green signal indications at signalized locations ahead of fire vehicles, law  
25 enforcement vehicles, ambulances, and other official emergency vehicles;
- 26 B. A special sequence of signal phases and timing to expedite and/or provide additional clearance time  
27 for vehicles to clear the tracks prior to the arrival of rail traffic; and
- 28 C. A special sequence of signal phases to display a steady red indication to prohibit turning movements  
29 toward the tracks during the approach or passage of rail traffic.

30 **Standard:**

31 **During the transition into preemption control:**

- 32 A. The yellow change interval, and any red clearance interval that follows, shall not be shortened  
33 or omitted.
- 34 B. The shortening or omission of any pedestrian walk interval ~~and/or pedestrian change interval~~  
35 shall be permitted.
- 36 **C. The shortening or omission of any pedestrian change interval shall be permitted only when the**  
37 **traffic control signal is being preempted because a boat is approaching a movable bridge or**  
38 **because rail traffic is approaching a grade crossing. Added to reflect Official Change Request**  
39 **4(09)-36**
- 40 D. The return to the previous green signal indication shall be permitted following a steady yellow  
41 signal indication in the same signal face, omitting the red clearance interval, if any.

42 **During preemption control and during the transition out of preemption control:**

- 43 A. The shortening or omission of any yellow change interval, and of any red clearance interval that  
44 follows, shall not be permitted.
- 45 B. A signal indication sequence from a steady yellow signal indication to a green signal indication  
46 shall not be permitted.

47 *Option:*

48 [A distinctive indication may be provided at the intersection to inform law enforcement personnel who are](#)  
49 [escorting traffic \(such as a parade or funeral procession\) that the traffic control signal has changed to a red](#)

1 [indication not because of normal cycling, but because it has been preempted by rail traffic approaching an](#)  
2 [adjacent grade crossing or by boat traffic approaching an adjacent moveable bridge.](#)

3 A distinctive indication may be provided at the intersection to show that an emergency vehicle has been  
4 given control of the traffic control signal (see Section 11-106 of the “Uniform Vehicle Code”). In order to  
5 assist in the understanding of the control of the traffic [control](#) signal, a common distinctive indication may be  
6 used where drivers from different agencies travel through the same intersection when responding to  
7 emergencies.

8 *Guidance:*

9 *Except for traffic control signals interconnected with light rail transit systems, traffic control signals with*  
10 *railroad preemption or coordinated with flashing-light signal systems should be provided with a back-up*  
11 *power supply. [The backup power supply should provide for a minimum operating period sufficient to allow](#)*  
12 *[the implementation of alternative traffic control measures during a power outage.](#)*

13 *If a traffic control signal [or hybrid beacon](#) is installed near or within a grade crossing or if a grade*  
14 *crossing with active traffic control devices is within or near a signalized highway intersection, Chapter 8D*  
15 *should be consulted. **Revised to reflect Official Change Request 4(09)-42***

16 *Support:*

17 [Section 8D.09 contains additional information regarding preemption for grade crossings. Section 8D.10](#)  
18 [contains information regarding prohibiting movements towards the grade crossing during preemption.](#)  
19 [Sections 8D.11 and 8D.12 contain additional information regarding pre-signals and queue cutter signals,](#)  
20 [respectively, for grade crossings.](#)

21 **[Section 4F.20 Priority Control of Traffic Control Signals](#)** **These paragraphs were relocated from**  
22 **[existing Section 4D.27](#)**

23 *Support:*

24 Priority control (see definition in Section 1C.02) is typically given to certain non-emergency vehicles such  
25 as light-rail transit vehicles operating in a mixed-use alignment and buses.

26 Examples of priority control include the following:

- 27 A. The displaying of early or extended green signal indications at an intersection to assist public transit  
28 vehicles in remaining on schedule, and  
29 B. Special phasing to assist public transit vehicles in entering the travel stream ahead of ~~the platoon of~~  
30 [other waiting](#) traffic.

31 **Standard:**

32 **During priority control and during the transition into or out of priority control:**

- 33 **A. The shortening or omission of any yellow change interval, and of any red clearance interval that**  
34 **follows, shall not be permitted.**  
35 **B. The shortening of any pedestrian walk interval below that time described in Section 4I.07 shall**  
36 **not be permitted.**  
37 **C. The omission of a pedestrian walk interval and its associated change interval shall not be**  
38 **permitted unless the associated vehicular phase is also omitted or the pedestrian phase is**  
39 **exclusive.**  
40 **D. The shortening or omission of any pedestrian change interval shall not be permitted.**  
41 **E. A signal indication sequence from a steady yellow signal indication to a green signal indication**  
42 **shall not be permitted.**

1 **CHAPTER 4G. FLASHING OPERATION OF TRAFFIC CONTROL SIGNALS**

2 **Section 4D.284G.01 Flashing Operation of Traffic Control Signals – General**

3 **Standard:**

4 The light source of a flashing signal indication shall be flashed continuously at a rate of not less than  
5 50 or more than 60 times per minute.

6 The displayed period of each flash shall be a minimum of 1/2 and a maximum of 2/3 of the total  
7 flash cycle.

8 Flashing signal indications shall comply with the requirements of other Sections of this Manual  
9 regarding visibility-limiting or positioning of conflicting signal indications, except that flashing yellow  
10 signal indications for through traffic shall not be required to be visibility-limited or positioned to  
11 minimize visual conflict for road users in separately controlled turn lanes.

12 Each traffic control signal shall be provided with an independent flasher mechanism that operates  
13 in compliance with this Section.

14 The flashing operation shall not be terminated by removal or turn off of the controller unit or of the  
15 conflict monitor (malfunction management unit) or both.

16 A manual switch ~~, a conflict monitor (malfunction management unit) circuit, and, if appropriate,~~  
17 ~~automatic means~~ shall be provided to initiate the flashing mode. If appropriate, a conflict monitor  
18 (malfunction management unit) circuit and/or an automatic means shall also be provided to initiate the  
19 flashing mode.

20 **Option:**

21 Based on engineering study or engineering judgment, traffic control signals may be operated in the  
22 flashing mode on a scheduled basis during one or more periods of the day rather than operated continuously in  
23 the steady (stop-and-go) mode.

24 **Support:**

25 Sections 4I.06~~4I.07~~ and 4K.04 contain information regarding the operation of pedestrian signal heads and  
26 accessible pedestrian signal detector push button locator tones, respectively, during flashing operation.

27 **Section 4D.29 4G.02 Flashing Operation – Transition Into Flashing Mode**

28 ~~Standard~~ **Option:** **Standard changed to Option**

29 The transition from steady (stop-and-go) mode to flashing mode, if initiated by a conflict monitor  
30 (malfunction management unit) or by a manual switch, ~~shall be permitted to~~ may be made at any time.

31 **Standard:**

32 **Programmed changes from steady (stop-and-go) mode to flashing mode shall be made under either**  
33 **of the following circumstances:**

- 34 A. At the end of the common major-street red interval (such as just prior to the start of the green  
35 in both directions on the major street), or  
36 B. Directly from a CIRCULAR GREEN signal indication to a flashing CIRCULAR YELLOW  
37 signal indication, or from a GREEN ARROW signal indication to a flashing YELLOW  
38 ARROW signal indication, or from a flashing YELLOW ARROW signal indication (see  
39 Sections 4F. 0304, 4F. 0506, 4F. 0608, 4F. 0911, 4F. 1113, and 4F. 1315) to a flashing YELLOW  
40 ARROW signal indication (in a different signal section if the signal face displays the steady  
41 YELLOW ARROW signal indication in a different section than the flashing YELLOW  
42 ARROW signal indication).

43 During programmed changes into flashing mode, no green signal indication or flashing yellow  
44 signal indication shall be terminated and immediately followed by a steady red or flashing red signal  
45 indication without first displaying the steady yellow signal indication.

46 **Section 4D.304G.03 Flashing Operation – Signal Indications During Flashing Mode**

47 **Guidance:**

1 When a traffic control signal is operated in the flashing mode, a flashing yellow signal indication should  
2 be used for the major street and a flashing red signal indication should be used for the other approaches  
3 unless flashing red signal indications are used on all approaches.

4 **Standard:**

5 When a traffic control signal is operated in the flashing mode, all of the green signal indications at  
6 the signalized location shall be dark (non-illuminated) and shall not be displayed in either a steady or  
7 flashing manner, except for single-section GREEN ARROW signal indications as provided elsewhere in  
8 this Section.

9 Flashing yellow signal indications shall be used on more than one approach to a signalized location  
10 only if those approaches do not conflict with each other.

11 Except as provided in Paragraph 5, when a traffic control signal is operated in the flashing mode,  
12 one and only one signal indication in every signal face at the signalized location shall be flashed.

13 **Option:**

14 If a signal face has two identical CIRCULAR RED or RED ARROW signal indications (see Section  
15 4E.04), both of those identical signal indications may be flashed simultaneously.

16 **Standard:**

17 No steady indications, other than a single-section signal face consisting of a continuously-displayed  
18 GREEN ARROW signal indication that is used alone to indicate a continuous movement in the steady  
19 (stop-and-go) mode, shall be displayed at the signalized location during the flashing mode. A single-  
20 section GREEN ARROW signal indication shall remain continuously-displayed when the traffic control  
21 signal is operated in the flashing mode.

22 If a signal face includes both circular and arrow signal indications of the color that is to be flashed,  
23 only the circular signal indication shall be flashed.

24 All signal faces that are flashed on an approach shall flash the same color, either yellow or red,  
25 except that separate turn signal faces (see Sections ~~4F.02~~4F.03 and ~~4F.09~~4F.10) shall be permitted to  
26 flash a RED ARROW signal indication when the adjacent through movement signal indications are  
27 flashed yellow. Shared signal faces (see Sections ~~4F.02~~4F.03 and ~~4F.09~~4F.10) for turn movements shall  
28 not be permitted to flash a CIRCULAR RED signal indication when the adjacent through movement  
29 signal indications are flashed yellow.

30 The appropriate RED ARROW or YELLOW ARROW signal indication shall be flashed when a  
31 signal face consists entirely of arrow indications. A signal face that consists entirely of arrow  
32 indications and that provides a protected only turn movement during the steady (stop-and-go) mode or  
33 that provides a flashing YELLOW ARROW or flashing RED ARROW signal indication for a  
34 permissive turn movement during the steady (stop-and-go) mode shall be permitted to flash the  
35 YELLOW ARROW signal indication during the flashing mode if the adjacent through movement  
36 signal indications are flashed yellow and if it is intended that a permissive turn movement not requiring  
37 a full stop by each turning vehicle be provided during the flashing mode.

38 **Section ~~4D.31~~4G.04 Flashing Operation – Transition Out of Flashing Mode**

39 **Standard:**

40 All changes from flashing mode to steady (stop-and-go) mode shall be made under one of the  
41 following procedures:

- 42 A. Yellow-red flashing mode: Changes from flashing mode to steady (stop-and-go) mode shall be  
43 made at the beginning of the major-street green interval (when a green signal indication is  
44 displayed to through traffic in both directions on the major street), or if there is no common  
45 major-street green interval, at the beginning of the green interval for the major traffic  
46 movement on the major street.
- 47 B. Red-red flashing mode: Changes from flashing mode to steady (stop-and-go) mode shall be  
48 made by changing the flashing red indications to steady red indications followed by appropriate  
49 green indications to begin the steady mode cycle. These green indications shall be the beginning  
50 of the major-street green interval (when a green signal indication is displayed to through traffic

1 in both directions on the major street) or if there is no common major-street green interval, at  
2 the beginning of the green interval for the major traffic movement on the major street.

3 *Guidance:*

4 The steady red clearance interval provided during the change from red-red flashing mode to steady (stop-  
5 and-go) mode should have a duration of 6 seconds.

6 When changing from the yellow-red flashing mode to steady (stop-and-go) mode at a location where there  
7 is a common major-street green interval, the flashing red signal indications for the minor street should  
8 immediately change to steady red signal indications, and the flashing yellow signal indications for the  
9 through movements on the major street should change to green signal indications in both directions (after the  
10 minor-street signal indications have been steady red for a short time, if desired), or the flashing yellow signal  
11 indications for the through movements on the major street should change to steady yellow signal indications  
12 followed by a steady red clearance interval before changing to green signal indications in both directions.

13 When changing from the yellow-red flashing mode to steady (stop-and-go) mode, ~~if~~ at a location where  
14 there is no common major-street green interval, ~~the provision of a steady red clearance interval for the other~~  
15 ~~approaches before changing from a flashing yellow or a flashing red signal indication to a green signal~~  
16 ~~indication on the major approach should be considered~~ the flashing red signal indications for the minor street  
17 should immediately change to steady red signal indications, and the flashing yellow signal indications for the  
18 through movements on the major street should change to steady yellow signal indications followed by a steady  
19 red clearance interval before changing to green signal indications for the major traffic movement on the  
20 major street.

21 **Standard:**

22 During programmed changes out of flashing mode, no flashing yellow signal indication shall be  
23 terminated and immediately followed by a steady red or flashing red signal indication without first  
24 displaying ~~the~~ a steady yellow signal indication.

25 *Option:*

26 Because special midblock signals that rest in flashing circular yellow in the position normally occupied by  
27 the green signal indication do not have a green signal indication in the signal face, these signals may go  
28 directly from flashing circular yellow (in the position normally occupied by the green signal indication) to  
29 steady yellow without going first to a green signal indication.

30 ~~Section 4D.32 Temporary and Portable Traffic Control Signals~~ This section was relocated to  
31 new Section 4D.10

32 ~~Section 4D.33 Lateral Offset of Signal Supports and Cabinets~~ This section was relocated to new  
33 Section 4A.06

34 ~~Section 4D.34 Use of Signs at Signalized Locations~~ This section was relocated to new Section  
35 4A.07

36 ~~Section 4D.35 Use of Pavement Markings at Signalized Locations~~ This section was relocated to  
37 new Section 4A.08

1 **CHAPTER 4H. BICYCLE SIGNALS**

2 **New Chapter added to reflect Interim Approval 16, Official Change Request 4(09)-43, and Official**  
3 **Change Request 4(09)-68**

4 **Section 4H.01 Use of Bicycle Signal Faces**

5 Option:

6 A bicycle signal face may be used to provide separate control of a bicycle movement for various  
7 situations, including the following:

- 8 A. To provide a leading or lagging bicycle interval.
- 9 B. To continue a through bicycle lane on the right-hand side of an exclusive right-turn lane (or on the  
10 left-hand side of an exclusive left-turn lane) that would otherwise be in non-compliance with  
11 Paragraph 1 of Section 9E.02 or Paragraph 7 of Section 9E.06.
- 12 C. To provide a bicycle interval for a counter-flow bicycle facility.
- 13 D. To provide for unusual or unexpected arrangements of the bicycle movement through complex  
14 intersections, conflict areas, or signal control.
- 15 E. Bicyclist non-compliance with the previous traffic control.

16 Guidance:

17 Agencies should exercise consistency with the decision to introduce bicycle signal faces to a roadway or  
18 bikeway network and use caution with any non-systematic policy to use bicycle signal faces.

19 Support:

20 The use of bicycle traffic signal faces containing bicycle symbol indications and bicycle signal faces  
21 containing circular indications in the same corridor or jurisdiction could create comprehension issues by the  
22 roadway user or violate bicyclist expectation.

23 A bicycle signal face may be used at a mid-block traffic control signal where there are no motor vehicle  
24 movements parallel to the bicycle crossing.

25 **Standard:**

26 **If used, a bicycle signal face shall only be used to control bicycle movements from a designated**  
27 **bicycle lane or from a separate facility, such as a shared use path.**

28 **If used, a bicycle signal face shall only be used to control bicycle movements where bicyclists**  
29 **moving on a GREEN BICYCLE or YELLOW BICYCLE signal indication are not in conflict with any**  
30 **simultaneous motor vehicle movement at the signalized location, including right (or left) turns on red**  
31 **from the same approach as the bicycle movement.**

32 Option:

33 A bicycle signal face may be used to control bicycle movements where bicycles moving on a GREEN  
34 BICYCLE or YELLOW BICYCLE signal indication are in conflict with a simultaneous permissive turning  
35 movement only if the bicycle movement is from a one-way bicycle lane in the same direction as the adjacent  
36 general purpose lane, a flashing yellow arrow indication is shown to vehicles turning across the bicycle  
37 movement, and lane extension markings are provided for the bicycle lane across the intersection.

38 Guidance:

39 If used where motor vehicle traffic can make the same movements as bicyclists, a bicycle signal face  
40 should only be used if the bicycle movement controlled by the bicycle signal face is sometimes allowed to  
41 proceed or sometimes required to stop at times when motor vehicle traffic, making the same movement and  
42 controlled by other vehicular signal faces, is required to stop or allowed to proceed, respectively.

43 **Section 4H.02 Prohibited Uses of Bicycle Signal Faces**

44 **Standard:**

45 **Bicycle signal faces shall not be used to control simultaneous bicycle movements from**  
46 **perpendicular or nearly perpendicular directions.**

47 **Bicycle signal faces shall not be used for controlling any bicycle movement that is sharing a lane**  
48 **with motor vehicle traffic.**

1 Bicycle signal faces shall not be used in any manner with respect to the design and operation of a  
2 hybrid beacon.

### 3 Section 4H.03 Warrants for Bicycle Signal Faces

#### 4 Standard:

5 New designs or installations for any traffic control signal shall be based on an engineering study in  
6 accordance with Paragraph 1 of Section 4C.01. For the purposes of an engineering study, the  
7 appropriate warrant(s) provided in Chapter 4C shall be followed.

#### 8 Guidance:

9 The decision as to whether to incorporate a bicycle signal face(s) into a new traffic control signal design  
10 should be made during the engineering study performed in accordance with Paragraph 1 of Section 4C.01.

11 Engineering judgment should be exercised in determining whether or not it would be advantageous or  
12 beneficial to install a bicycle signal face(s) at an existing traffic control signal.

#### 13 Support:

14 Retrofitting existing traffic signals with bicycle signal faces is analogous to retrofitting existing traffic  
15 signals with pedestrian signals where such a determination is not required through an engineering study.

16 For the purpose of warrant analyses, provisions for classifying bicycles are provided in Paragraph 15 of  
17 Section 4C.01 and Paragraph 2 of Section 9F.01.

### 18 Section 4H.04 Bicycle Signal Signs

#### 19 Support:

20 The primary purposes of the Bicycle Signal (R10-40, R10-40a, R10-41, R10-41a, R10-41b) sign (see  
21 Section 9B.22) are to inform road users that the signal indications in the bicycle signal face are intended only  
22 for bicyclists, and to inform bicyclists which specific bicycle movements are controlled by the bicycle signal  
23 face.

#### 24 Standard:

25 Except as provided in Paragraph 3, a Bicycle Signal (R10-40, R10-40a, R10-41, R10-41a, or R10-  
26 41b) sign shall be installed immediately adjacent to (including above or below) every bicycle signal face.  
27 The Bicycle Signal sign shall have a minimum size of 24 inches x 36 inches if it is placed next to an  
28 overhead-mounted bicycle signal face and shall have a minimum size of 12 inches x 21 inches if it is  
29 placed next to a post-mounted bicycle signal face.

#### 30 Option:

31 The Bicycle Signal sign may be omitted adjacent to a supplemental near-side bicycle signal face  
32 containing 4-inch indications.

### 33 Section 4H.05 Application of Bicycle Symbol Signal Indications during Steady (Stop-and-Go) 34 Operation

#### 35 Standard:

36 Steady bicycle symbol signal indications shall be applied as follows:

37 A. A steady RED BICYCLE signal indication shall be displayed when it is intended to prohibit  
38 bicycle traffic from entering the intersection or other controlled area. Turning after stopping  
39 shall be permitted as stated in Item C in Paragraph 1 of Section 4A.05.

40 B. A steady YELLOW BICYCLE signal indication shall be displayed following a GREEN  
41 BICYCLE signal indication in the same bicycle signal face. A YELLOW BICYCLE signal  
42 indication shall not be displayed in conjunction with the change from the RED BICYCLE signal  
43 indication to a GREEN BICYCLE signal indication. The YELLOW BICYCLE signal  
44 indication shall be followed by a RED BICYCLE signal indication.

45 C. A steady GREEN BICYCLE signal indication shall be displayed only when it is intended to  
46 permit bicyclists to make the movement(s) indicated by the lane-use arrow(s) displayed on the  
47 Bicycle Signal (R10-35 or R10-35a) sign that is located immediately adjacent to the bicycle  
48 signal face.

1 **Section 4H.06 Application of Bicycle Symbol Signal Indications during Flashing Operation**

2 **Standard:**

3 The mode of operation of the bicycle signal faces at a traffic control signal shall be the same as the  
4 mode of operation of the other traffic signal faces at the same signalized location. Bicycle signal faces  
5 shall operate in the steady (stop-and-go) mode when the other traffic signal faces are operating in the  
6 steady (stop-and-go) mode. Bicycle signal faces shall operate in the flashing mode when the other signal  
7 faces are operating in the flashing mode. Bicycle signal faces shall not be placed in a dark mode when  
8 other vehicular traffic signal faces are operating in the flashing mode.

9 Guidance:

10 When a traffic control signal is operated in the flashing mode, bicycle signal faces should display a  
11 flashing RED BICYCLE signal indication if the other vehicular signal faces on the same approach are  
12 displaying flashing red signal indications or if there are no other vehicular signal faces on the same  
13 approach.

14 When a traffic control signal is operated in the flashing mode, bicycle signal faces should display a  
15 flashing YELLOW BICYCLE signal indication if the other vehicular signal faces for the through lanes on the  
16 same approach are displaying flashing yellow signal indications unless it is determined by engineering  
17 judgment that a flashing RED BICYCLE signal indication would provide a safer operation.

18 Option:

19 A flashing YELLOW BICYCLE signal indication may be used to indicate the presence of turning  
20 vehicles, which would be operating under a flashing yellow arrow indication, as described in Section 4H.01  
21 paragraph 07.

22 **Section 4H.07 Layout of Bicycle Signal Faces**

23 **Standard:**

24 Bicycle signal faces shall consist of all bicycle symbol signal indications (see Figure 4H-1). Circular  
25 or arrow signal indications shall not be used in a bicycle signal face.

26 **Figure 4H-1. Example of Bicycle Signal Face**

27 Option:

28 Bicycle signal faces may be oriented vertically or horizontally.

29 **Standard:**

30 The layouts and arrangements of the bicycle signal face shall be in accordance with the following  
31 provisions:

32 A. Only the bicycle symbol shown on Page 6-7 in the 2004 Standard Highway Signs book shall be  
33 used for bicycle symbol signal indications and shall be proportioned to fit within the signal lens.  
34 The bicycle symbol shall only be positioned horizontally and shall face to the left.

35 B. The RED BICYCLE, YELLOW BICYCLE, and GREEN BICYCLE signal indications shall be  
36 in the same relative position to each other as specified for the CIRCULAR RED, CIRCULAR  
37 YELLOW, and CIRCULAR GREEN signal indications, respectively, in Sections 4E.04 and  
38 4E.05.

39 C. As a specific exception to Paragraph 5 of Section 4E.04, two YELLOW BICYCLE signal  
40 indications or two GREEN BICYCLE signal indications shall not be arranged horizontally  
41 adjacent to each other at right angles to the basic straight line arrangement to form a clustered  
42 signal face.

43 Option:

44 Backplates (see Paragraphs 19 and 20 in Section 4D.05) may be used with bicycle signal faces.

45 If a bicycle signal face having 4-inch signal indications is used, the accompanying visors may be omitted.

46 **Section 4H.08 Size of Bicycle Symbol Signal Indications**

47 **Standard:**

48 There shall be three nominal diameter sizes for bicycle signal indications: 4 inches, 8 inches, and 12  
49 inches.

1 All signal indications in a bicycle signal face shall be of the same size.

2 Four-inch signal indications shall not be used for any bicycle signal face other than a supplemental,  
3 post-mounted, near-side bicycle signal face.

#### 4 Section 4H.09 Placement of Bicycle Signal Faces

##### 5 Standard:

6 The provisions of Sections 4D.04 through 4D.07 shall apply to the placement of the bicycle signal  
7 faces except as follows:

- 8 A. As a specific exception to Item A in Paragraph 1 of Section 4D.04, a minimum of one primary  
9 bicycle signal face shall be provided to control traffic for the bicycle movement, even if a bicycle  
10 through movement exists.  
11 B. The primary bicycle signal face shall have either 8-inch or 12-inch signal indications, even if it is  
12 located at the near side of the signal-controlled location.  
13 C. When the primary bicycle signal face is located more than 120 feet beyond the stop line, a  
14 supplemental near-side bicycle signal face shall be provided.

##### 15 Guidance:

16 When the primary bicycle signal face is located more than 80 feet and up to 120 feet beyond the stop line,  
17 a supplemental near-side bicycle signal face should be provided.

18 A bicycle signal face should be separated horizontally or vertically from the nearest vehicular traffic  
19 signal face for the same approach by at least 3 feet measured either horizontally perpendicular to the  
20 approach between the centers of the signal faces or vertically from the center of the lowest signal indication  
21 of the top signal face to the center of the highest signal indication of the bottom signal face. If horizontally-  
22 arranged or clustered signal faces are used, the minimum 3-foot horizontal separation between the two signal  
23 faces should be measured from the center of the right-most signal indication in the signal face on the left to  
24 the center of the left-most signal indication in the signal face on the right.

25 Bicycle signal faces should be placed such that visibility is maximized for bicyclists and minimized for  
26 adjacent or conflicting vehicle movements not controlled by the bicycle signal face. Consideration should be  
27 given to using visibility-limited bicycle signal faces in situations where drivers not controlled by the bicycle  
28 signal face might be confused by viewing the bicycle signal indications, such as when the bicycle movement  
29 controlled by the bicycle signal face is sometimes allowed to proceed or sometimes required to stop at times  
30 when motor vehicle traffic, making the same movement and controlled by other vehicular signal faces, is  
31 required to stop or allowed to proceed, respectively.

#### 32 Section 4H.10 Mounting Height of Bicycle Signal Faces

##### 33 Standard:

34 The provisions of Section 4D.08 shall apply to the mounting height of bicycle signal faces except as  
35 follows:

- 36 A. The bottom of the signal housing (including brackets) of a bicycle signal face that is not located  
37 over a roadway shall be a minimum of 7 feet above the sidewalk or ground, except where the  
38 Bicycle Signal (R10-35 or R10-35a) sign is installed below the bicycle signal face. If the Bicycle  
39 Signal sign is installed below the bicycle signal face, the minimum mounting height to the  
40 bottom of the sign shall be 6 feet. If the bottom of the sign is mounted less than 7 feet above a  
41 pedestrian sidewalk or pathway, the sign shall not project more than 4 inches into the  
42 pedestrian facility.  
43 B. If 4-inch signal indications are used in a supplemental, post-mounted, near-side bicycle signal  
44 face, the bottom of the signal housing (including brackets) shall be a minimum of 4 feet and a  
45 maximum of 8 feet above the sidewalk or ground. Bicycle signal faces with 4-inch signal  
46 indications installed above a pedestrian sidewalk or pathway shall not project more than 4  
47 inches into the pedestrian facility.

#### 48 Section 4H.11 Intensity and Light Distribution of Bicycle Signal Faces

##### 49 Guidance:

1 Except for the 4-inch nominal size of the lens diameter, the intensity and distribution of light from each  
2 illuminated bicycle signal face should be similar to that recommended for vehicular traffic signal faces in  
3 accordance with Paragraph 11 of Section 4E.01 to the extent practical.

4 **Section 4H.12 Yellow Change and Red Clearance Intervals for Bicycle Signal Faces**

5 **Standard:**

6 **The provisions of Section 4F.17 shall apply to the duration of the yellow change and the red**  
7 **clearance intervals of a bicycle signal phase except that the minimum duration of the yellow change**  
8 **interval shall be 3 seconds.**

9 **Support:**

10 The exclusive function of the yellow change interval is to warn bicyclists approaching a signalized  
11 location that their permission to proceed is being terminated after which they will be directed to stop.  
12 Providing clearance time for a bicyclist to travel through the intersection or conflict area is the purpose of the  
13 red clearance interval rather than the yellow change interval.

1 **CHAPTER ~~4E~~ 4I. PEDESTRIAN CONTROL FEATURES**

2 **Section ~~4E.01~~ 4I.01 Pedestrian Signal Heads**

3 Support:

4 Pedestrian signal heads provide special types of traffic signal indications exclusively intended for  
5 controlling pedestrian traffic. These signal indications consist of the illuminated symbols of a WALKING  
6 PERSON (symbolizing WALK) and an UPRAISED HAND (symbolizing DONT WALK).

7 [See Section 4D.02 for information on when to use pedestrian signal heads.](#)

8 *Guidance:*

9 ~~*Engineering judgment should determine the need for separate pedestrian signal heads (see Section 4D.02)*~~  
10 ~~*and accessible pedestrian signals (see Section 4K.01).*~~

11 [Accessible pedestrian signals \(see Chapter 4K\) that provide information in non-visual formats \(such as](#)  
12 [audible tones, speech messages, and/or vibrating surfaces\) should be provided based on the results of an](#)  
13 [engineering study considering the factors listed in Section 4K.01.](#)

14 Support:

15 Chapter 4J contains information regarding the use of pedestrian hybrid beacons and Chapter 4U contains  
16 information regarding the use of In-Roadway Warning Lights at unsignalized marked crosswalks.

17 ~~Section 4E.02 Meaning of Pedestrian Signal Head Indications~~ Section was relocated to new  
18 **Section 4A.05**

19 ~~Section 4E.03 Application of Pedestrian Signal Heads~~ P1 and P3 were relocated to new Section  
20 **4D.02, P2 deleted; Section deleted**

21 **Section ~~4E.04~~ 4I.02 Size, Design, and Illumination of Pedestrian Signal Head Indications**

22 Standard:

23 All new pedestrian signal head indications shall be displayed within a rectangular background and  
24 shall consist of symbolized messages (see Figure ~~4I-14E-1~~ 4I-1), except that existing pedestrian signal head  
25 indications with lettered or outline style symbol messages shall be permitted to be retained for the  
26 remainder of their useful service life. The symbol designs that are set forth in the “Standard Highway  
27 Signs and Markings” book (see Section 1A.05) shall be used. Each pedestrian signal head indication  
28 shall be independently displayed and emit a single color.

29 **Figure 4I-1. Typical Pedestrian Signal Indications**

30 If a two-section pedestrian signal head is used, the UPRAISED HAND (symbolizing DONT WALK)  
31 signal section shall be mounted directly above the WALKING PERSON (symbolizing WALK) signal  
32 section. If a one-section pedestrian signal head is used, the symbols shall be either overlaid upon each  
33 other or arranged side-by-side with the UPRAISED HAND symbol to the left of the WALKING  
34 PERSON symbol, and a light source that can display each symbol independently shall be used.

35 The WALKING PERSON (symbolizing WALK) signal indication shall be white, ~~conforming to the~~  
36 ~~publication entitled “Pedestrian Traffic Control Signal Indications” (see Section 1A.11),~~ with all except  
37 the symbol obscured by an opaque material [for signal optical units that use incandescent lamps within](#)  
38 [optical assemblies that include lenses.](#) The UPRAISED HAND (symbolizing DONT WALK) signal  
39 indication shall be Portland orange, ~~conforming to the publication entitled “Pedestrian Traffic Control~~  
40 ~~Signal Indications” (see Section 1A.11),~~ with all except the symbol obscured by an opaque material [for](#)  
41 [signal optical units that use incandescent lamps within optical assemblies that include lenses.](#)

42 [Except as provided in Paragraph 5, the requirements of Chapter 3 of the publication entitled](#)  
43 [“Equipment and Materials Standards of the Institute of Transportation Engineers” \(see Section 1A.05\)](#)  
44 [that pertain to the aspects of the pedestrian signal head design that affect the display of the signal](#)  
45 [indications shall be met for signal optical units that use incandescent lamps within optical assemblies](#)  
46 [that include lenses. Except as provided in Paragraph 5, the requirements of the publication entitled](#)  
47 [“Pedestrian Traffic Control Signal Indicators – Light Emitting Diode \(LED\) Signal Modules” \(see](#)  
48 [Section 1A.05\) that pertain to the aspects of the signal head design that affect the display of the signal](#)  
49 [indications shall be met for light emitting diode \(LED\) pedestrian signal head modules.](#)

1 Guidance:

2 The intensity and distribution of light from each illuminated pedestrian signal lens or LED pedestrian  
3 signal head module should comply with the publications specified in Paragraph 4, as appropriate.

4 When not illuminated, the WALKING PERSON (symbolizing WALK) and UPRAISED HAND (symbolizing  
5 DONT WALK) symbols ~~shall~~ should not be ~~readily~~ visible to pedestrians at the far end of the crosswalk that  
6 the pedestrian signal head indications control. **Standard changed to Guidance**

7 Standard:

8 **For pedestrian signal head indications, the symbols shall be at least 6 inches high.**

9 **The light source of a flashing UPRAISED HAND (symbolizing DONT WALK) signal indication**  
10 **shall be flashed continuously at a rate of not less than 50 or more than 60 times per minute. The**  
11 **displayed period of each flash shall be a minimum of 1/2 and a maximum of 2/3 of the total flash cycle.**

12 Guidance:

13 *Pedestrian signal head indications should be conspicuous and recognizable to pedestrians at all distances*  
14 *from the beginning of the controlled crosswalk to a point 10 feet from the end of the controlled crosswalk*  
15 *during both day and night.*

16 *For crosswalks where the pedestrian enters the crosswalk more than 100 feet from the pedestrian signal*  
17 *head indications, the symbols should be at least 9 inches high.*

18 *If the pedestrian signal indication is so bright that it causes excessive glare in nighttime conditions, some*  
19 *form of automatic dimming should be used to reduce the brilliance of the signal indication.*

20 Option:

21 An animated eyes symbol may be added to a pedestrian signal head in order to prompt pedestrians to look  
22 for vehicles in the intersection during the time that the WALKING PERSON (symbolizing WALK) signal  
23 indication is displayed.

24 Standard:

25 **If used, the animated eyes symbol shall consist of an outline of a pair of white steadily-illuminated**  
26 **eyes with white eyeballs that scan from side to side at a rate of approximately once per second. The**  
27 **animated eyes symbol shall be at least 12 inches wide with each eye having a width of at least 5 inches**  
28 **and a height of at least 2.5 inches. The animated eyes symbol shall be illuminated at the start of the**  
29 **walk interval and shall terminate at the end of the walk interval.**

30 **Section ~~4E.05~~ 4I.03 Location and Height of Pedestrian Signal Heads**

31 Standard:

32 **Pedestrian signal heads shall be mounted with the bottom of the signal housing including brackets**  
33 **not less than 7 feet or more than 10 feet above sidewalk level, and shall be positioned and adjusted to**  
34 **provide maximum visibility at the beginning of the controlled sidewalk.**

35 Guidance: **Standard changed to Guidance**

36 *If pedestrian signal heads are mounted on the same support as vehicular signal heads, there ~~shall~~ should*  
37 *be a physical separation between them.*

38 ~~Section 4E.06 Pedestrian Intervals and Signal Phases~~ **This section was relocated to new Section**

39 **4I.06**

40 **Section ~~4E.07~~ 4I.04 Countdown Pedestrian Signals**

41 Standard:

42 **All pedestrian signal heads used at crosswalks where the pedestrian change interval is more than 7**  
43 **seconds shall include a pedestrian change interval countdown display in order to inform pedestrians of**  
44 **the number of seconds remaining in the pedestrian change interval.**

45 Option:

46 Pedestrian signal heads used at crosswalks where the pedestrian change interval is 7 seconds or less may  
47 include a pedestrian change interval countdown display in order to inform pedestrians of the number of  
48 seconds remaining in the pedestrian change interval.

1 **Standard:**

2 Where countdown pedestrian signals are used, the countdown shall always be displayed  
3 simultaneously with the flashing UPRAISED HAND (symbolizing DONT WALK) signal indication  
4 displayed for that crosswalk.

5 Countdown pedestrian signals shall consist of Portland orange numbers that are at least 6 inches in  
6 height on a black opaque background. The countdown pedestrian signal shall be located immediately  
7 adjacent to the associated UPRAISED HAND (symbolizing DONT WALK) pedestrian signal head  
8 indication (see Figure ~~4I-14E-1~~).

9 The display of the number of remaining seconds shall begin only at the beginning of the pedestrian  
10 change interval (flashing UPRAISED HAND). After the countdown displays zero, the display shall  
11 remain dark until the beginning of the next countdown.

12 The countdown pedestrian signal shall display the number of seconds remaining until the  
13 termination of the pedestrian change interval (flashing UPRAISED HAND). Countdown displays shall  
14 not be used during the walk interval. ~~or~~ Countdown displays shall not be used during the red clearance  
15 interval of a concurrent vehicular phase that is ending simultaneously with or after the end of the  
16 pedestrian phase.

17 *Guidance:*

18 *If used with a pedestrian signal head that does not have a concurrent vehicular phase, the pedestrian*  
19 *change interval (flashing UPRAISED HAND) should be set to be approximately 4 seconds less than the*  
20 *required pedestrian clearance time (see Section 4I.07) and an additional clearance interval (during which a*  
21 *steady UPRAISED HAND is displayed) should be provided prior to the start of the conflicting vehicular*  
22 *phase.*

23 *For crosswalks where the pedestrian enters the crosswalk more than 100 feet from the countdown*  
24 *pedestrian signal display, the numbers should be at least 9 inches in height.*

25 *Because some technology includes the countdown pedestrian signal logic in a separate timing device that*  
26 *is independent of the timing in the traffic signal controller, care should be exercised by the engineer when*  
27 *timing changes are made to pedestrian change intervals.*

28 *If the pedestrian change interval is interrupted or shortened as a part of a transition into a preemption*  
29 *sequence (see Section 4F.19), the countdown pedestrian signal display should be discontinued and go dark*  
30 *immediately upon activation of the preemption transition.*

31 **Section ~~4E.08~~ 4I.05 Pedestrian Detectors**

32 **Option:**

33 Pedestrian detectors may be push buttons or passive detection devices. Pedestrian detectors may include  
34 features that allow touch-free activation in addition to all other push button features required in this section.

35 **Support:**

36 Passive detection devices register the presence of a pedestrian in a position indicative of a desire to cross,  
37 without requiring the pedestrian to push a button. Some passive detection devices are capable of tracking the  
38 progress of a pedestrian as the pedestrian crosses the roadway for the purpose of extending or shortening the  
39 duration of certain pedestrian timing intervals.

40 The provisions in this Section place pedestrian push buttons within easy reach of pedestrians who are  
41 intending to cross each crosswalk and make it obvious which push button is associated with each crosswalk.  
42 These provisions also position push button poles in optimal locations for installation of accessible pedestrian  
43 signals (see Chapter 4K). Information regarding reach ranges can be found in the U.S. Department of Justice  
44 2010 ADA Standards for Accessible Design, September 15, 2010 and Code of Federal Regulations, Title 28,  
45 Parts 35 and 36. Americans with Disabilities Act of 1990 ~~“Americans with Disabilities Act Accessibility~~  
46 ~~Guidelines for Buildings and Facilities (ADAAG)”~~ (see Section 1A.05).

47 *Guidance:*

48 *If pedestrian push buttons are used, they should be capable of easy activation requiring no more than 5*  
49 *pounds of force, not require tight grasping, pinching, or twisting of the wrist, and be conveniently located*

1 near each end of the crosswalks. Except as provided in Paragraphs 5 and 6, pedestrian push buttons should  
2 be located to meet all of the following criteria (see Figure ~~4I-2~~ ~~4E-3~~):

- 3 A. Unobstructed and accessible within one or more of the reach ranges specified in Section 308, and  
4 from a clear ground clearance as specified in Section 305, of the 2010 ADA Standards for Accessible  
5 Design adjacent to a level all-weather surface to provide access from a wheelchair;  
6 B. ~~Where there is an all-weather surface. To provide~~ a wheelchair accessible route from the push button  
7 to the ramp;  
8 C. ~~Between the edge of the crosswalk line (extended) farthest from the center of the intersection and the~~  
9 ~~side of a the curb ramp (if present), but not greater than 5 feet from said crosswalk line;~~ On the side of  
10 the curb ramp which is farthest from the center of the intersection;  
11 D. Not greater than 10 feet from the edge of the associated curb ramp which is farther from the center of  
12 the intersection;  
13 E. Not greater than 5 feet from the outside edge of the marked crosswalk farthest from the center of the  
14 intersection;  
15 F. Not farther from the crosswalk than the stop line is, if present;  
16 ~~D.G.~~ Between 1.5 and 6 feet from the edge-face of the curb, or from the outside edge of the  
17 shoulder, (or if no shoulder exists, from the edge of the pavement);  
18 ~~E.H.~~ With the face of the push button parallel to the crosswalk to be used; and  
19 ~~I. F.~~ At a mounting height of approximately 3.5 feet, but no more than 4 feet, above the sidewalk;  
20 J. Allowing a minimum 4-foot continuous clear width for a pedestrian access route; and  
21 ~~F.K.~~ Outside the flared side of the curb ramp, if present.

#### 22 **Figure 4I-2. Pushbutton Location Area**

#### 23 **Figure 4I-3. Typical Pushbutton Locations**

24 Where there are physical constraints that make it impractical to place the pedestrian push button adjacent  
25 to a level all-weather surface, the surface should be as level as feasible.

26 Where there are physical constraints that make it impractical to place the pedestrian push button between  
27 1.5 and 6 feet from the ~~edge-face~~ of the curb, or from the outside edge of the shoulder, (or if no shoulder  
28 exists, from the edge of the pavement), it should not be farther than 10 feet from the edge-face of the curb, or  
29 from the outside edge of the shoulder, (or if no shoulder exists, from the edge of the pavement).

30 Except as provided in Paragraph 8, where two pedestrian push buttons are provided on the same corner  
31 of a signalized location, the push buttons should be separated by a distance of at least 10 feet.

32 Option:

33 Where there are physical constraints on a particular corner that make it impractical to provide the 10-foot  
34 separation between the two pedestrian push buttons, or when an exclusive pedestrian phase is used at an  
35 intersection and the pedestrian signals controlling the crosswalks on a given corner of the intersection both  
36 operate together such that the “Walk” indication is always simultaneous for both crosswalks, the push buttons  
37 may be placed closer together or on the same pole. **Revised to reflect Official Change Request 4(09)-42**

38 Support:

39 Figure ~~4I-3~~ ~~4E-4~~ shows typical pedestrian push button locations for a variety of situations.

40 **Standard:**

41 If a pedestrian push button is provided, a sign (see Section 2B.62) shall also be mounted adjacent to  
42 or integral with installed explaining the purpose and use of the pedestrian push buttons detector,  
43 explaining their purpose and use.

44 Option:

45 At certain locations, a supplemental sign in a more visible location may be used to call attention to the  
46 pedestrian push button.

47 **Standard:**

48 **The positioning of pedestrian push buttons and the legends on the pedestrian push button signs**  
49 **shall clearly indicate which crosswalk signal is actuated by each pedestrian push button.** **Revised to**  
50 **reflect Official Change Request 4(09)-42**

1 If the pedestrian clearance time is sufficient only to cross from the curb or shoulder to a median of  
2 sufficient width for pedestrians to wait and the signals are pedestrian actuated, an additional pedestrian  
3 detector shall be provided in the median.

4 *Guidance:*

5 *The use of additional pedestrian detectors on islands or medians where a pedestrian might become*  
6 *stranded should be considered.*

7 *If used, special purpose push buttons (to be operated only by authorized persons) should include a*  
8 *housing capable of being locked to prevent access by the general public and do not need an instructional sign.*

9 **Standard:**

10 If used, a pilot light or other means of indication installed with a pedestrian push button shall not be  
11 illuminated until actuation. Once it is actuated, the pilot light shall remain illuminated until the  
12 pedestrian's green or WALKING PERSON (symbolizing WALK) signal indication is displayed.

13 ~~If a pilot light is used at an accessible pedestrian signal location (see Sections 4E.09 through 4E.13),~~  
14 ~~each actuation shall be accompanied by the speech message "wait."~~ Repeat of P23 in existing 4E.11

15 Option:

16 At signalized locations with a demonstrated need and subject to equipment capabilities, pedestrians with  
17 special needs may be provided with additional crossing time by means of an extended push button press.

18 **Standard:**

19 If additional crossing time is provided by means of an extended push button press, a PUSH  
20 BUTTON FOR 2 SECONDS FOR EXTRA CROSSING TIME (R10-32P) plaque (see Section 2B.62)  
21 shall be ~~mounted adjacent to or integral with the pedestrian pushbutton~~ installed.

## 22 ~~Section 4E.06~~ 4I.06 Pedestrian Intervals and Signal Phases

23 **Standard:**

24 At intersections equipped with pedestrian signal heads, the pedestrian signal indications shall be  
25 displayed except when the vehicular traffic control signal is being operated in the flashing mode. At  
26 those times, the pedestrian signal indications shall not be displayed.

27 Except as provided in Paragraph 3, when the pedestrian signal heads associated with a crosswalk  
28 are displaying either a steady WALKING PERSON (symbolizing WALK) or a flashing UPRAISED  
29 HAND (symbolizing DONT WALK) signal indication, a steady ~~or a flashing~~ red signal indication shall  
30 be shown to any conflicting vehicular movement that is approaching the intersection or midblock  
31 location perpendicular or nearly perpendicular to the crosswalk.

32 When the pedestrian signal heads at a pedestrian hybrid beacon (see Chapter 4J) location are  
33 displaying a flashing UPRAISED HAND (symbolizing DONT WALK) signal indication, a flashing red  
34 signal indication shall be shown to any conflicting vehicular movement that is approaching the  
35 intersection or midblock location perpendicular or nearly perpendicular to the crosswalk.

36 When pedestrian signal heads are used, a WALKING PERSON (symbolizing WALK) signal  
37 indication shall be displayed only when pedestrians are permitted to leave the curb or shoulder.

38 A pedestrian change interval consisting of a flashing UPRAISED HAND (symbolizing DONT  
39 WALK) signal indication shall begin immediately following the WALKING PERSON (symbolizing  
40 WALK) signal indication. Following the pedestrian change interval, a buffer interval consisting of a  
41 steady UPRAISED HAND (symbolizing DONT WALK) signal indication shall be displayed for at least  
42 ~~3-2~~ seconds prior to the release of any conflicting vehicular movement. The sum of the time of the  
43 pedestrian change interval and the buffer interval shall not be less than the calculated pedestrian  
44 clearance time (see Paragraphs 8 through 17). The buffer interval shall not begin later than the  
45 beginning of the red clearance interval, if used. Revised to reflect Official Change Request 4(09)-42

46 Option:

47 During the yellow change interval, the UPRAISED HAND (symbolizing DON'T WALK) signal  
48 indication may be displayed as either a flashing indication, a steady indication, or a flashing indication for an  
49 initial portion of the yellow change interval and a steady indication for the remainder of the interval.

50 Support:

1 Figure 4I-4 ~~4E-2~~ illustrates the pedestrian intervals and their possible relationships with associated  
2 vehicular signal phase intervals.

### 3 **Figure 4I-4. Pedestrian Intervals**

4 *Guidance:*

5 *Except as provided in Paragraph 9, the pedestrian clearance time should be sufficient to allow a*  
6 *pedestrian crossing in the crosswalk who left the curb or ~~shoulder~~ edge of pavement at the end of the*  
7 *WALKING PERSON (symbolizing WALK) signal indication to travel at a walking speed of 3.5 feet per second*  
8 *to at least the far side of the traveled way or to a median of sufficient width for pedestrians to wait.*

9 *Option:*

10 A walking speed of up to 4 feet per second may be used to evaluate the sufficiency of the pedestrian  
11 clearance time at locations where an extended push button press function has been installed to provide slower  
12 pedestrians an opportunity to request and receive a longer pedestrian clearance time. Passive pedestrian  
13 detection may also be used to automatically adjust the pedestrian clearance time based on the pedestrian's  
14 actual walking speed or actual clearance of the crosswalk.

15 The additional time provided by an extended push button press to satisfy pedestrian clearance time needs  
16 may be added to either the walk interval or the pedestrian change interval.

17 *Guidance:*

18 *Where pedestrians who walk slower than 3.5 feet per second, or pedestrians who use wheelchairs,*  
19 *routinely use the crosswalk, a walking speed of less than 3.5 feet per second should be considered in*  
20 *determining the pedestrian clearance time.*

21 *Except as provided in Paragraph 13, the walk interval should be at least 7 seconds in length so that*  
22 *pedestrians will have adequate opportunity to leave the curb or shoulder before the pedestrian clearance time*  
23 *begins.*

24 *Option:*

25 If pedestrian volumes and characteristics do not require a 7-second walk interval, walk intervals as short  
26 as 4 seconds may be used.

27 *Support:*

28 The walk interval is intended for pedestrians to start their crossing. The pedestrian clearance time is  
29 intended to allow pedestrians who started crossing during the walk interval to complete their crossing. Longer  
30 walk intervals are often used when the duration of the vehicular green phase associated with the pedestrian  
31 crossing is long enough to allow it.

32 *Guidance:*

33 *The total of the walk interval and pedestrian clearance time should be sufficient to allow a pedestrian*  
34 *crossing in the crosswalk who left the pedestrian detector (or, if no pedestrian detector is present, a location 6*  
35 *feet ~~from~~ behind the face of the curb or ~~from~~ 6 feet behind the edge of the pavement) at the beginning of the*  
36 *WALKING PERSON (symbolizing WALK) signal indication to travel at a walking speed of 3 feet per second*  
37 *to the far side of the traveled way being crossed or to the median if a two-stage pedestrian crossing sequence*  
38 *is used. Any additional time that is required to satisfy the conditions of this paragraph should be added to the*  
39 *walk interval.*

40 *Option:*

41 On a street with a median of sufficient width for pedestrians to wait, a pedestrian clearance time that  
42 allows the pedestrian to cross only from the curb or shoulder to the median may be provided.

43 **Standard:**

44 **Where the pedestrian clearance time is sufficient only for crossing from the curb or shoulder to a**  
45 **median of sufficient width for pedestrians to wait, median-mounted pedestrian signals, with pedestrian**  
46 **detectors (see Sections 4I.06 and 4K.02) if actuated operation is used, shall be provided and signing such**  
47 **as the R10-3d sign (see Section 2B.62) shall be provided to notify pedestrians to cross only to the median**  
48 **to await the next WALKING PERSON (symbolizing WALK) signal indication.**

49 *Guidance:*

1       Where median-mounted pedestrian signals and detectors are provided, the use of accessible pedestrian  
2 signals (see Chapter 4K) should be considered

3 Option:

4       During the transition into preemption, the walk interval and the pedestrian change interval may be  
5 shortened or omitted as described in Section 4F.19.

6       At intersections with high pedestrian volumes and high conflicting turning vehicle volumes, a brief  
7 leading pedestrian interval, during which an advance WALKING PERSON (symbolizing WALK) indication  
8 is displayed for the crosswalk while red indications continue to be displayed to parallel through and/or turning  
9 traffic, may be used to reduce conflicts between pedestrians and turning vehicles.

10 *Guidance:*

11       If a leading pedestrian interval is used, the use of accessible pedestrian signals (see ~~Sections 4E.09-~~  
12 ~~through 4E.13~~ Chapter 4K) should be considered.

13 Support:

14       If a leading pedestrian interval is used without accessible features, pedestrians ~~who are visually~~  
15 ~~impaired~~with vision disabilities can be expected to begin crossing at the onset of the vehicular movement  
16 when drivers are not expecting them to begin crossing.

17 *Guidance:*

18       If a leading pedestrian interval is used, it should be at least 3 seconds in duration and should be timed to  
19 allow pedestrians to cross at least one lane of traffic or, in the case of a large corner radius, to travel far  
20 enough for pedestrians to establish their position ahead of the turning traffic before the turning traffic is  
21 released.

22       If a leading pedestrian interval is used, consideration should be given to prohibiting turns across the  
23 crosswalk during the leading pedestrian interval.

24 **Standard:**

25       **At locations where a leading pedestrian interval is used without accessible pedestrian signals, the**  
26 **minimum required time for the Walk Interval shall be displayed in addition to the time provided for**  
27 **the leading pedestrian interval.**

28 Support:

29       At intersections with pedestrian volumes that are so high that drivers have difficulty finding an  
30 opportunity to turn across the crosswalk, the duration of the green interval for a parallel concurrent vehicular  
31 movement is sometimes intentionally set to extend beyond the pedestrian clearance time to provide turning  
32 drivers additional green time to make their turns while the pedestrian signal head is displaying a steady  
33 UPRAISED HAND (symbolizing DONT WALK) signal indication after pedestrians have had time to  
34 complete their crossings.

35

1 **CHAPTER ~~4F~~4J. PEDESTRIAN HYBRID BEACONS**

2 **Section ~~4F.01~~4J.01 Application of Pedestrian Hybrid Beacons**

3 Support:

4 A pedestrian hybrid beacon is a special type of hybrid beacon used to warn and control traffic at an  
5 unsignalized location to assist pedestrians in crossing a street or highway at a marked crosswalk.

6 Option:

7 A pedestrian hybrid beacon may be considered for installation to facilitate pedestrian crossings at a  
8 location that does not meet traffic signal warrants (see Chapter 4C), or at a location that meets traffic signal  
9 warrants under Sections 4C.05 and/or 4C.06 but a decision is made to not install a traffic control signal.

10 **Standard:**

11 **If used, pedestrian hybrid beacons shall be used in conjunction with signs and pavement markings**  
12 **to warn and control traffic at locations where pedestrians enter or cross a street or highway. A**  
13 **pedestrian hybrid beacon shall only be installed at a marked crosswalk.**

14 *Guidance:*

15 *If one of the signal warrants of Chapter 4C is met and a traffic control signal is justified by an*  
16 *engineering study, and if a decision is made to install a traffic control signal, it should be installed based*  
17 *upon the provisions of Chapters 4D through 4I and 4K.*

18 *If a traffic control signal is not justified under the signal warrants of Chapter 4C and if gaps in traffic are*  
19 *not adequate to permit pedestrians to cross, or if the speed for vehicles approaching on the major street is too*  
20 *high to permit pedestrians to cross, or if pedestrian delay is excessive, the need for a pedestrian hybrid*  
21 *beacon should be considered on the basis of an engineering study that considers major-street volumes,*  
22 *speeds, widths, and gaps in conjunction with pedestrian volumes, walking speeds, and delay.*

23 *For a major street where the posted or statutory speed limit or the 85<sup>th</sup>-percentile speed is 35 mph or less,*  
24 *the need for a pedestrian hybrid beacon should be considered if the engineering study finds that the plotted*  
25 *point representing the vehicles per hour on the major street (total of both approaches) and the corresponding*  
26 *total of all pedestrians crossing the major street for 1 hour (any four consecutive 15-minute periods) of an*  
27 *average day falls above the applicable curve in Figure 4J-1 ~~4F-1~~ for the length of the crosswalk.*

28 *For a major street where the posted or statutory speed limit or the 85<sup>th</sup>-percentile speed exceeds 35 mph,*  
29 *the need for a pedestrian hybrid beacon should be considered if the engineering study finds that the plotted*  
30 *point representing the vehicles per hour on the major street (total of both approaches) and the corresponding*  
31 *total of all pedestrians crossing the major street for 1 hour (any four consecutive 15-minute periods) of an*  
32 *average day falls above the applicable curve in Figure 4J-2 ~~4F-2~~ for the length of the crosswalk.*

33 *For crosswalks that have lengths other than the four that are specifically shown in Figures 4J-1 ~~4F-1~~ and*  
34 *4J-2 ~~4F-2~~, the values should be interpolated between the curves.*

35 **Figure 4J-1. Guidelines for the Installation of Pedestrian Hybrid Beacons on Low-Speed**  
36 **Roadways**

37 **Figure 4J-2. Guidelines for the Installation of Pedestrian Hybrid Beacons on High-Speed**  
38 **Roadways**

39 Option:

40 The criteria for the pedestrian volume crossing the major street shown in Figures 4J-1 and 4J-2 may be  
41 reduced as much as 50 percent if the 15<sup>th</sup>-percentile crossing speed of pedestrians is less than 3.5 feet per  
42 second.

43 Where there is a divided street having a median of sufficient width for pedestrians to wait, the  
44 criteria for the major-street traffic volume shown in Figures 4J-1 and 4J-2 may be applied separately  
45 to each direction of vehicular traffic. Added to reflect Official Interpretation 4(09)-25(I)

46 **Section ~~4F.02~~4J.02 Design of Pedestrian Hybrid Beacons**

47 **Standard:**

1 Except as otherwise provided in this Section, a pedestrian hybrid beacon shall meet the provisions  
2 of Chapters 4D through 4G, 4I, and 4J.

3 A pedestrian hybrid beacon face shall consist of three signal sections, with a CIRCULAR YELLOW  
4 signal indication centered below two horizontally aligned CIRCULAR RED signal indications (see  
5 Figure ~~4J-34F-3~~).

6 When an engineering study finds that installation of a pedestrian hybrid beacon is justified, then:

7 A. At least two pedestrian hybrid beacon faces shall be installed for each approach of the major  
8 street,

9 B. A stop line shall be installed for each approach to the crosswalk,

10 C. A pedestrian signal head ~~conforming to~~ complying with the provisions set forth in Chapter 4I  
11 shall be installed at each end of the marked crosswalk, ~~and~~

12 D. The pedestrian hybrid beacon shall be pedestrian actuated, ~~and~~

13 E. If the pedestrian hybrid beacon is installed at or immediately adjacent to an intersection with a  
14 minor street, a STOP sign shall be installed for each minor-street approach. **Added to reflect**  
15 **Official Change Request 4(09)-16**

### 16 **Figure 4J-3. Sequence for a Pedestrian Hybrid Beacon**

17 *Guidance:*

18 *When an engineering study finds that installation of a pedestrian hybrid beacon is justified, then:*

19 ~~A. The pedestrian hybrid beacon should be installed at least 100 feet from side streets or driveways that~~  
20 ~~are controlled by STOP or YIELD signs.~~ **Deleted to reflect Official Change Request 4(09)-16**

21 A. Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at  
22 least 20 feet beyond the marked crosswalk, or site accommodations should be made through curb  
23 extensions or other techniques to provide adequate sight distance, and

24 ~~C. The installation should include suitable standard signs and pavement markings, and~~

25 B. If installed within a signal system, the pedestrian hybrid beacon should be coordinated.

26 *On approaches having posted or statutory speed limits or 85<sup>th</sup>-percentile speeds in excess of 35 mph and*  
27 *on approaches having traffic or operating conditions that would tend to obscure visibility of roadside hybrid*  
28 *beacon face locations, both of the minimum of two pedestrian hybrid beacon faces should be installed over the*  
29 *roadway.*

30 *On multi-lane approaches having posted or statutory speed limits or 85<sup>th</sup>-percentile speeds of 35 mph or*  
31 *less, either a pedestrian hybrid beacon face should be installed on each side of the approach (if a median of*  
32 *sufficient width exists) or at least one of the pedestrian hybrid beacon faces should be installed over the*  
33 *roadway.*

34 *A pedestrian hybrid beacon should comply with the signal face location provisions described in Sections*  
35 *4D.04 through 4D.09.*

36 Accessible pedestrian signals should be installed in conjunction with a pedestrian hybrid beacon.

37 **Revised to reflect Official Change Request 4(09)-42**

38 **Standard Option:** Standard changed to Option; text revised to reflect Official Interpretation 4(09)-61(I)  
39 **and Official Change Request 4(09)-42**

40 A CROSSWALK STOP ON RED (symbolic circular red) (R10-23) sign or a STOP ON RED—  
41 PROCEED ON FLASHING RED WHEN CLEAR (R10-23a) sign (see Section 2B.63) ~~shall may be mounted~~  
42 ~~installed adjacent to a pedestrian hybrid beacon face on facing~~ each major street approach.

43 ~~If an overhead pedestrian hybrid beacon face is provided, the sign shall be mounted adjacent to the~~  
44 ~~overhead signal face.~~ **Text was relocated to new Section 2B.63**

45 *Option:*

46 A Pedestrian (W11-2) warning sign (see Section 2C.55) with an AHEAD (W16-9P) supplemental plaque  
47 may be placed in advance of a pedestrian hybrid beacon. A warning beacon may be installed to supplement  
48 the W11-2 sign.

49 *Guidance:*

1 If a warning beacon supplements a W11-2 sign in advance of a pedestrian hybrid beacon, it should be  
2 programmed to flash only when the pedestrian hybrid beacon is not in the dark mode.

3 **Standard:**

4 If a warning beacon is installed to supplement the W11-2 sign, the design and location of the  
5 warning beacon shall comply with the provisions of Sections 4S.01 and 4S.03.

6 Bicycle signal faces (see Chapter 4H) shall not be used at a pedestrian hybrid beacon.

7 **Section ~~4F.03~~ 4J.03 Operation of Pedestrian Hybrid Beacons**

8 **Standard:**

9 Pedestrian hybrid beacon indications shall be dark (not illuminated) during periods between  
10 actuations.

11 Upon Following an actuation by a pedestrian, a pedestrian hybrid beacon face shall display a  
12 flashing CIRCULAR YELLOW signal indication, followed by a steady CIRCULAR YELLOW signal  
13 indication, followed by both steady CIRCULAR RED signal indications during the pedestrian walk  
14 interval, followed by alternating flashing CIRCULAR RED signal indications during the pedestrian  
15 change interval (see Figure ~~4J-34F-3~~ 4J-34F-3). Upon termination of the pedestrian change interval, the  
16 pedestrian hybrid beacon faces shall revert to a dark (not illuminated) condition.

17 Except as provided in Paragraph 4, the pedestrian signal heads shall continue to display a steady  
18 UPRAISED HAND (symbolizing DONT WALK) signal indication when the pedestrian hybrid beacon  
19 faces are either dark or displaying flashing or steady CIRCULAR YELLOW signal indications. The  
20 pedestrian signal heads shall display a WALKING PERSON (symbolizing WALK) signal indication  
21 when the pedestrian hybrid beacon faces are displaying steady CIRCULAR RED signal indications.  
22 The pedestrian signal heads shall display a flashing UPRAISED HAND (symbolizing DONT WALK)  
23 signal indication when the pedestrian hybrid beacon faces are displaying alternating flashing  
24 CIRCULAR RED signal indications. Upon termination of the pedestrian change interval, the  
25 pedestrian signal heads shall revert to a steady UPRAISED HAND (symbolizing DONT WALK) signal  
26 indication.

27 **Option:**

28 Where the pedestrian hybrid beacon is installed adjacent to a roundabout to facilitate crossings by  
29 pedestrians with visual disabilities and an engineering study determines that pedestrians without visual  
30 disabilities can be allowed to cross the roadway without actuating the pedestrian hybrid beacon, the pedestrian  
31 signal heads may be dark (not illuminated) when the pedestrian hybrid beacon faces are dark.

32 **Guidance:**

33 *The duration of the flashing yellow interval should be determined by engineering judgment.*

34 If the pedestrian hybrid beacon is coordinated as a part of a signal system:

35 A. The duration of the flashing yellow interval should not vary on a cycle-by-cycle basis.

36 B. The pedestrian hybrid beacon should remain in the dark condition after a pedestrian actuation has  
37 been received until the point in the background cycle when the predetermined duration of the flashing  
38 yellow interval needs to be initiated in order to achieve the appropriate coordinated offset.

39 **Option:**

40 If a minimum dark time between activations of the pedestrian hybrid beacon has been set on the  
41 controller, the pedestrian hybrid beacon may remain in the dark condition after a pedestrian actuation has been  
42 received until the minimum dark time has been provided. **Added to reflect Official Interpretation 4(09)-  
43 32(1)**

44 **Standard:**

45 The duration of the steady yellow change interval shall be determined using engineering practices in  
46 accordance with the provisions in Section 4F.17.

47 **Guidance:**

48 A yellow change interval should have a minimum duration of 3 seconds and a maximum duration of 6  
49 seconds (see Section 4F.17). The longer intervals should be reserved for use on approaches with higher  
50 speeds.

1 Option:

2 A steady red clearance interval may be used after the steady yellow change interval. **Added to reflect**

3 **Official Interpretation 4(09)-14 (I)**

4 The alternating flashing CIRCULAR RED signal indications may continue to flash for a short period after  
5 the pedestrian change interval has terminated to provide a buffer interval for pedestrians. **Added to reflect**

6 **Official Interpretation 4(09)-14 (I)**

7 A pedestrian hybrid beacon that is located in close proximity to an active grade crossing may be  
8 preempted in accordance with the applicable provisions in Sections 4F.19 and 8D.09.

9 Standard:

10 If a pedestrian hybrid beacon is placed into a flashing mode by a conflict monitor (malfunction  
11 management unit) or by a manual switch, the pedestrian hybrid beacon faces shall display flashing  
12 CIRCULAR YELLOW signal indications to each approach of the major street and the pedestrian  
13 signal heads shall revert to a dark (not illuminated) condition.

1 **CHAPTER 4K. ACCESSIBLE PEDESTRIAN SIGNALS AND DETECTORS**

2 **Section ~~4E.09~~ 4K.01 Accessible Pedestrian Signals and Detectors—General**

3 Support:

4 Accessible pedestrian signals and detectors provide information in non-visual formats (such as audible  
5 tones, speech messages, and/or vibrating surfaces).

6 The primary technique that pedestrians who have visual disabilities use to cross streets at signalized  
7 locations is to initiate their crossing when they hear the traffic in front of them stop and the traffic alongside  
8 them begin to move, which often corresponds to the onset of the green interval. The existing environment is  
9 often not sufficient to provide the information that pedestrians who have visual disabilities need to cross a  
10 roadway at a signalized location.

11 *Guidance:*

12 *If a particular signalized location presents difficulties for pedestrians who have ~~visual~~-vision disabilities*  
13 *to cross the roadway, an engineering study should be conducted that considers the needs of pedestrians in*  
14 *general, as well as the information needs of pedestrians with ~~visual~~-vision disabilities. The engineering study*  
15 *should consider the following factors:*

- 16 A. Potential demand for accessible pedestrian signals;
- 17 B. A request for accessible pedestrian signals;
- 18 C. Traffic volumes during times when pedestrians might be present, including periods of low traffic  
19 volumes or high turn-on-red volumes;
- 20 D. The complexity of traffic signal phasing (such as split phases, protected turn phases, leading  
21 pedestrian intervals, and exclusive pedestrian phases); and
- 22 E. The complexity of intersection geometry.

23 Support:

24 The factors that make crossing at a signalized location difficult for pedestrians who have visual  
25 disabilities include: increasingly quiet cars, right turn on red (which masks the beginning of the through  
26 phase), continuous right-turn movements, complex signal operations, traffic circles, and wide streets.  
27 Furthermore, low traffic volumes might make it difficult for pedestrians who have visual disabilities to discern  
28 signal phase changes.

29 Local organizations, providing support services to pedestrians who have visual and/or hearing disabilities,  
30 can often act as important advisors to the traffic engineer when consideration is being given to the installation  
31 of devices to assist such pedestrians. Additionally, orientation and mobility specialists or similar staff also  
32 might be able to provide a wide range of advice. The U.S. Access Board ([www.access-board.gov](http://www.access-board.gov)) provides  
33 technical assistance for making pedestrian signal information available to persons with visual disabilities (see  
34 Page i for the address for the U.S. Access Board).

35 **Standard:**

36 **When used, accessible pedestrian signals shall be used in combination with pedestrian signal timing.**

37 **The information provided by an accessible pedestrian signal shall ~~clearly~~ indicate which pedestrian**  
38 **crossing is served by each device. Revised to reflect Official Change Request 4(09)-42**

39 **Under steady (stop-and-go) operation, accessible pedestrian signals shall not be limited in operation**  
40 **by the time of day or day of week.**

41 Option:

42 Accessible pedestrian signal detectors may be push buttons or passive detection devices.

43 *Guidance:*

44 *At locations ~~with pretimed traffic control signals or non-actuated approaches~~ where it is not necessary for*  
45 *pedestrians to push a push button detector to receive a **WALKING PERSON** signal indication, pedestrian*  
46 *push buttons ~~may~~ should be used to activate the accessible pedestrian signals and to provide information in*  
47 *non-visual formats to assist pedestrians with visual disabilities.*

48 Support:

1 Accessible pedestrian signals are typically integrated into the pedestrian detector (push button), so the  
2 audible tones and/or messages come from the push button housing. They have a push button locator tone and  
3 a vibrotactile arrow, and can include audible beaconing and other special features.

4 Option:

5 The name of the street to be crossed may also be provided in accessible format, such as Braille or raised  
6 print. Tactile maps of crosswalks may also be provided.

7 Support:

8 Specifications regarding the use of Braille or raised print ~~for traffic control devices~~ can be found in the  
9 [U.S. Department of Justice 2010 ADA Standards for Accessible Design, September 15, 2010 and Code of  
10 Federal Regulations, Title 28, Parts 35 and 36. Americans with Disabilities Act of 1990](#) ~~“Americans with  
11 Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)”~~ (see Section 1A.05).

12 **Standard:**

13 At accessible pedestrian signal locations where pressing the pedestrian push buttons are used is  
14 necessary to activate the walk interval, ~~each~~ pressing the pedestrian push button shall activate both the  
15 walk interval and the accessible pedestrian signals.

#### 16 Section ~~4E.10~~ 4K.02 Accessible Pedestrian Signals and Detectors — Location

17 Support:

18 Accessible pedestrian signals that are located as close as possible to pedestrians waiting to cross the street  
19 provide the clearest and least ambiguous indication of which pedestrian crossing is served by a device.

20 *Guidance:*

21 *Push buttons for accessible pedestrian signals should be located in accordance with the provisions of*  
22 *Section 4I.06-05 and should be located as close as possible to the crosswalk line furthest from the center of*  
23 *the intersection and as close as possible to the curb ramp.*

24 **Standard:**

25 Except for the situation regarding simultaneous “Walk” indications for both crosswalks as  
26 described in Paragraph 8 of Section 4I.06, if two accessible pedestrian push buttons are placed less  
27 than 10 feet apart or on the same pole (see Paragraphs 7 and 8 in Section 4I.06), each accessible  
28 pedestrian push button shall be provided with the following features ~~(see Sections 4K.03 through~~  
29 ~~4K.05)~~: **Revised to reflect Official Interpretation 4(09)-3(I)**

30 ~~A. A pushbutton locator tone,~~

31 ~~B. A tactile arrow,~~

32 A. A speech walk message for the WALKING PERSON (symbolizing WALK) indication (see  
33 [Section 4K.03](#)), and

34 B. A speech push button information message (see [Section 4K.05](#)).

35 If the pedestrian clearance time is sufficient only to cross from the curb or shoulder to a median of  
36 sufficient width for pedestrians to wait and accessible pedestrian signal detectors are used, an  
37 additional accessible pedestrian signal detector shall be provided in the median.

#### 38 Section ~~4E.11~~ 4K.03 Accessible Pedestrian Signals and Detectors — Walk Indications

39 Support:

40 Technology that provides different sounds for each non-concurrent signal phase has frequently been found  
41 to provide ambiguous information. Research indicates that a rapid tick tone for each crossing coming from  
42 accessible pedestrian signal devices on separated poles located close to each crosswalk provides unambiguous  
43 information to pedestrians who are blind or visually impaired. Vibrotactile indications provide information to  
44 pedestrians who are blind and deaf and are also used by pedestrians who are blind or who have low vision to  
45 confirm the walk signal in noisy situations.

46 **Standard:**

47 Accessible pedestrian signals shall have both audible and vibrotactile walk indications.

1 Vibrotactile walk indications shall be provided by a vibrotactile arrow that is located on the push  
2 button or on the speaker box (see Paragraph 1 in Section 4K.04) ~~that~~. The vibrotactile arrow shall  
3 vibrates during the walk interval.

4 Accessible pedestrian signals shall have an audible walk indication during the walk interval only.

5 The audible walk indication shall be audible ~~from~~ at the beginning of the associated crosswalk. The  
6 accessible walk indication shall have the same duration as the pedestrian walk signal except when the  
7 pedestrian signal rests in walk.

8 *Guidance:*

9 *If the pedestrian signal rests in walk, the accessible walk indication should be limited to the first 7*  
10 *seconds of the walk interval. The accessible walk indication should be recalled by a button press during the*  
11 *walk interval provided that the crossing time remaining is ~~greater~~ longer than the pedestrian change interval.*

12 **Standard:**

13 ~~Where two accessible pedestrian signals are separated by a distance of at least 10 feet, the~~  
14 ~~audible walk indication shall be a percussive tone.~~ Where two accessible pedestrian signals on  
15 one corner, or in a median, that are associated with different phases are ~~not separated by a~~  
16 ~~distance of at least~~ placed less than 10 feet apart, the audible walk indication shall be a speech  
17 walk message (see Paragraph 3 in Section 4K.02). In all other cases, including at midblock  
18 crossings, on corners where only one accessible pedestrian signal is present, in a median, and on  
19 corners where two accessible pedestrian signals are separated by a distance of at least 10 feet,  
20 the audible walk indication shall be a percussive tone.

21 Audible tone walk indications shall repeat at eight to ten ticks per second. Audible tones used as  
22 walk indications shall consist of multiple frequencies with a dominant component at 880 Hz.

23 *Guidance:*

24 *The volume of audible walk indications and push button locator tones (see Section 4K.04) should be set to*  
25 *be a maximum of 5 dBA louder than ambient sound, except when audible beaconing is provided in response to*  
26 *an extended push button press.*

27 **Standard:**

28 Automatic volume adjustment up to a maximum volume of 100 dBA in response to ambient traffic  
29 sound level shall be provided ~~up to a maximum volume of 100 dBA.~~

30 *Guidance:*

31 *The sound level of audible walk indications and push button locator tones should be adjusted to be low*  
32 *enough to avoid misleading pedestrians who have visual disabilities when the following conditions exist:*

- 33 A. *Where there is an island that allows unsignalized right turns across a crosswalk between the island*  
34 *and the sidewalk.*  
35 B. *Where multi-leg approaches or complex signal phasing require more than two pedestrian phases,*  
36 *such that it might be unclear which crosswalk is served by each audible tone.*  
37 C. *At intersections where a diagonal pedestrian crossing is allowed, or where one street receives a*  
38 *WALKING PERSON (symbolizing WALK) signal indication simultaneously with another street.*

39 **Option:**

40 An alert tone, which is a very brief burst of high-frequency sound at the beginning of the audible walk  
41 indication that rapidly decays to the frequency of the walk tone, may be used to alert pedestrians to the  
42 beginning of the walk interval.

43 **Support:**

44 An alert tone can be particularly useful if the walk tone is not easily audible in some traffic conditions.

45 Speech walk messages communicate to pedestrians which street has the walk interval. ~~Speech messages~~  
46 ~~might be either directly audible or transmitted, requiring a personal receiver to hear the message.~~ To be a  
47 useful system, the words and their meaning need to be correctly understood by all users in the context of the  
48 street environment where they are used. Because of this, tones are the preferred means of providing audible  
49 walk indications except where two accessible pedestrian signals on one corner are not separated by a distance  
50 of at least 10 feet.

1 If speech walk messages are used, pedestrians have to know the names of the streets that they are crossing  
2 in order for the speech walk messages to be unambiguous. In getting directions to travel to a new location,  
3 pedestrians with visual disabilities do not always get the name of each street to be crossed. Therefore, it is  
4 desirable to give users of accessible pedestrian signals the name of the street controlled by the push button.  
5 This can be done by means of a speech push button information message (see Section 4K.05) during the  
6 flashing or steady UPRaised HAND intervals, or by raised print and Braille labels on the push button  
7 housing.

8 By combining the information from the push button message or Braille label, the [vibrotactile](#) arrow  
9 aligned in the direction of travel on the relevant crosswalk, and the speech walk message, pedestrians with  
10 visual disabilities are able to correctly respond to speech walk messages even if there are two push buttons on  
11 the same pole.

12 **Standard:**

13 **If speech walk messages are used to communicate the walk interval, they shall provide a clear**  
14 **message that the walk interval is in effect, as well as to which crossing it applies.** ~~Speech walk messages~~  
15 ~~shall be used only at intersections where it is technically infeasible to install two accessible pedestrian~~  
16 ~~signals at one corner separated by a distance of at least 10 feet.~~

17 **Guidance:** **The following three paragraphs changed from Standard to Guidance**

18 *Speech walk messages that are used at intersections having pedestrian phasing that is concurrent with*  
19 *vehicular phasing ~~shall~~ [should](#) be patterned after the model: “Broadway. Walk sign is on to cross*  
20 *Broadway.”*

21 *Speech walk messages that are used at intersections having exclusive pedestrian phasing ~~shall~~ [should](#) be*  
22 *patterned after the model: “Walk sign is on for all crossings.”*

23 *Speech walk messages ~~shall~~ [should](#) not contain any additional information, except they ~~shall~~ [should](#)*  
24 *include designations such as “Street” or “Avenue” where this information is necessary to avoid ambiguity at*  
25 *a particular location.*

26 ~~**Guidance:**~~

27 *Speech walk messages should not state or imply a command to the pedestrian, such as “Cross Broadway*  
28 *now.” Speech walk messages should not tell pedestrians that it is “safe to cross,” because it is always the*  
29 *pedestrian’s responsibility to check actual traffic conditions.*

30 **Standard:**

31 **A speech walk message is not required at times when the walk interval is not timing, but, if**  
32 **provided:**

33 **A. It shall begin with the term “wait.”**

34 **B. It need not be repeated for the entire time that the walk interval is not timing.**

35 **If a pilot light (see Section 4I.06) is used at an accessible pedestrian signal location, each actuation**  
36 **shall be accompanied by the speech message “wait.”**

37 **Option:**

38 Accessible pedestrian signals that provide speech walk messages may provide similar messages in  
39 languages other than English, if needed, ~~except for the terms “walk sign” and “wait.”~~

40 **Standard:**

41 **If used, speech walk messages in a language other than English shall be stated first in English, and**  
42 **then repeated in the second language, alternating back and forth while the walk interval is timing.**

43 ~~**Standard:**~~

44 ~~**Following the audible walk indication, accessible pedestrian signals shall revert to the pushbutton**~~  
45 ~~**locator tone (see Section 4E.12) during the pedestrian change interval.**~~ **Text was relocated into**  
46 **Paragraph 4 of new Section 4K.04**

47 **Section 4E.12 4K.04 Accessible Pedestrian Signals and Detectors—Vibrotactile Arrows and**  
48 **Locator Tones**

49 **Standard:**

1 To enable pedestrians who have visual disabilities to distinguish and locate the appropriate push  
2 button at an accessible pedestrian signal location, and to help them align with the crosswalk, each push  
3 buttons shall clearly indicate by means of a vibrotactile arrows which crosswalk signal is actuated by  
4 ~~each~~ the push button. Vibrotactile arrows shall be located on the button of the push button assembly or  
5 immediately adjacent to the button on the same surface of the push button assembly housing, shall have  
6 high visual contrast (light on dark or dark on light), and shall be aligned parallel to the direction of  
7 travel on the associated crosswalk. If a push button is not provided for pedestrian detection or to  
8 activate the accessible pedestrian signal features, the vibrotactile arrow shall be located on the speaker  
9 box, and the speaker box shall be located in compliance with Section 4I.06.

10 ~~An accessible pedestrian pushbutton shall incorporate~~ A locator tone shall be incorporated into the  
11 accessible pedestrian signal equipment to help pedestrians with visual disabilities locate the tactile  
12 arrow, and the associated push button if a push button is provided.

13 Support:

14 A push button locator tone is a repeating sound that informs approaching pedestrians that a push button to  
15 actuate pedestrian timing or receive additional information exists, and that enables pedestrians with visual  
16 disabilities to locate the push button.

17 **Standard:**

18 Push button locator tones shall have a duration of 0.15 seconds or less, and except as provided in  
19 Paragraph 5, push button locator shall repeat at 1-second intervals at all times that the audible walk  
20 indication is not active, including during the pedestrian change interval and during the time that the  
21 pedestrian signal is resting in walk (see Paragraph 6 in Section 4K.03).

22 Option:

23 The push button locator tone may default to a deactivated mode during periods when the steady UPRAISED  
24 HAND (symbolizing DONT WALK) signal indication is being displayed for the associated crosswalk if a  
25 passive pedestrian detection system is implemented that activates the locator tone at all times (other than when  
26 the audible walk indication is active) that a pedestrian is present within a 12-foot radius from the push button  
27 location. Where pedestrian facilities (such as sidewalks) are present, the passive detection requirement may  
28 be reduced such that it only applies to pedestrians who are on the pedestrian facilities within the 12-foot radius  
29 from the push button location. Added to reflect Official Interpretation 4(09)-26(I)

30 **Standard:**

31 Push button locator tones shall be deactivated when the traffic control signal or pedestrian hybrid  
32 beacon is operating in a flashing mode. This requirement shall not apply to traffic control signals or  
33 pedestrian hybrid beacons that are activated from a flashing or dark mode to a steady (stop-and-go)  
34 mode by pedestrian actuations.

35 Push button locator tones shall be intensity responsive to ambient sound, ~~and be audible 6 to 12 feet~~  
36 ~~from the pushbutton, or to the building line, whichever is less.~~ Standard changed to Guidance below

37 Guidance:

38 Push button locator tones should be audible 6 to 12 feet from the push button, or to the building line,  
39 whichever is less.

40 Support:

41 Section 4K.03 contains additional provisions regarding the volume and sound level of push button locator  
42 tones.

43 ~~Section 4E.13 4K.05 Accessible Pedestrian Signals and Detectors — Extended Push Button~~  
44 ~~Press Features~~ Revised to reflect Official Change Request 4(09)-42

45 Option:

46 Pedestrians may be provided with additional features such as increased crossing time, audible beaconing,  
47 or a speech push button information message as a result of an extended push button press.

48 **Standard:**

49 If an extended push button press (see Paragraph 18 in Section 4I.06) is used to provide any  
50 additional feature(s), a push button press of less than one second shall actuate only the pedestrian

1 timing and any associated accessible walk indication, and a push button press of one second or more  
2 shall actuate the pedestrian timing, any associated accessible walk indication, and any additional  
3 feature(s).

4 ~~If additional crossing time is provided by means of an extended pushbutton press, a PUSH-~~  
5 ~~BUTTON FOR 2 SECONDS FOR EXTRA CROSSING TIME (R10 32P) plaque (see Section 2B.62)~~  
6 ~~shall be mounted adjacent to or integral with the pedestrian pushbutton.~~

7 Support:

8 Audible beaconing is the use of an audible signal in such a way that pedestrians with visual disabilities  
9 can home in on the signal that is located on the far end of the crosswalk as they cross the street.

10 Not all crosswalks at an intersection need audible beaconing; ~~audible beaconing can actually cause~~  
11 ~~confusion if used at all crosswalks at some intersections.~~ Audible beaconing is not appropriate at locations  
12 with channelized turns or split phasing, because of the possibility of confusion.

13 *Guidance:*

14 Audible beaconing should ~~only~~ be considered following an engineering study at:

- 15 A. Crosswalks longer than 70 feet, unless ~~they~~ those crosswalks are divided by a median that has  
16 another accessible pedestrian signal with a locator tone;  
17 B. Crosswalks that are skewed;  
18 C. Intersections with irregular geometry, such as more than four legs;  
19 D. Crosswalks where audible beaconing is requested by an individual with visual disabilities; or  
20 E. Other locations where a study indicates audible beaconing would be beneficial.

21 ~~Option~~ Guidance:

22 If audible beaconing is used, it may should be provided in several ways, any of which are initiated by an  
23 extended push button press.

24 **Standard:**

25 If audible beaconing is used, the volume of the push button locator tone during the pedestrian  
26 change interval of the called pedestrian phase shall be increased to a maximum of 100 dBA, and  
27 ~~operated in one of the following ways:~~ shall come from a loudspeaker that is mounted at the far end of  
28 the crosswalk at a height of 7 to 10 feet above the pavement.

- 29 ~~A. The louder audible walk indication and louder locator tone comes from the far end of the~~  
30 ~~crosswalk, as pedestrians cross the street,~~  
31 ~~B. The louder locator tone comes from both ends of the crosswalk, or~~  
32 ~~C. The louder locator tone comes from an additional speaker that is aimed at the center of the~~  
33 ~~crosswalk and that is mounted on a pedestrian signal head.~~

34 Guidance:

35 The audible beaconing loudspeaker mounted at the far end of the crosswalk should be within the width of  
36 the crosswalk.

37 Support:

38 When the locator tone is active during the pedestrian change interval at a traffic control signal or  
39 pedestrian hybrid beacon where audible beaconing is used, both the audible beaconing loudspeaker and the  
40 accessible pedestrian signal emit the tone.

41 Option:

42 The sound level of the accessible pedestrian signal walk indication and subsequent push button locator  
43 tone may be increased by an extended push button press.

44 Speech push button information messages may provide intersection identification, as well as information  
45 about unusual intersection signalization and geometry, such as notification regarding exclusive pedestrian  
46 phasing, leading pedestrian intervals, split phasing, diagonal crosswalks, and medians or islands.

47 **Standard:**

48 If speech push button information messages are made available by actuating the accessible  
49 pedestrian signal detector, they shall only be actuated when the walk interval is not timing. They shall  
50 begin with the term “Wait,” followed by intersection identification information modeled after: “Wait to

1 **cross Broadway at Grand.” If information on intersection signalization or geometry is also given, it**  
2 **shall follow the intersection identification information.**

3 *Guidance:*

4 *Speech push button information messages should not be used to provide landmark information or to*  
5 *inform pedestrians with visual disabilities about detours or temporary traffic control situations.*

6 **Support:**

7 Additional information on the structure and wording of speech push button information messages is  
8 included in ITE’s “Electronic Toolbox for Making Intersections More Accessible for Pedestrians Who Are  
9 Blind or Visually Impaired,” which is available at ITE’s website (see Page i).

1 **CHAPTER 4L. RECTANGULAR RAPID FLASHING BEACONS**

2 **Chapter added to reflect Interim Approval 21, Official Interpretations 4-376(I), 4(09)-5(I), 4(09)-17(I),**  
3 **4(09)-21(I), 4(09)-22(I), 4(09)-24(I), 4(09)-37(I), 4(09)-38(I), 4(09)-41(I), and 4(09)-58(I)**

4 **Section 4L.01 Application of Rectangular Rapid Flashing Beacons**

5 **Option:**

6 A pedestrian-activated rectangular rapid flashing beacon (RRFB) may be used to provide supplemental  
7 emphasis to pedestrian, school, and trail warning signs at marked crosswalks across uncontrolled approaches.

8 **Standard:**

9 An RRFB shall only be installed to function as a Warning Beacon (see Section 4S.03). Except as  
10 otherwise provided in this Chapter, all other provisions of the MUTCD applicable to Warning Beacons  
11 shall apply to RRFBs.

12 An RRFB shall only be used to supplement a post-mounted W11-2 (Pedestrian), S1-1 (School), or  
13 W11-15 (Trail) crossing warning sign with a diagonal downward arrow (W16-7P) plaque, or an  
14 overhead-mounted W11-2, S1-1, or W11-15 crossing warning sign, located at or immediately adjacent  
15 to a marked crosswalk.

16 Except for crosswalks across the approach to or egress from a roundabout, or crosswalks across  
17 free-flow right turn lanes separated by a channelizing island, an RRFB shall not be used for crosswalks  
18 across approaches controlled by YIELD signs, STOP signs, traffic control signals, or pedestrian hybrid  
19 beacons.

20 **Option:**

21 In the event sight distance approaching the crosswalk at which an RRFB is used is less than deemed  
22 necessary by the engineer, an additional RRFB may be installed on that approach in advance of the crosswalk,  
23 as a Warning Beacon to supplement a W11-2 (Pedestrian), S1-1 (School), or W11-15 (Trail) crossing  
24 warning sign with an AHEAD (W16-9P) or distance (W16-2P or W16-2aP) plaque.

25 **Standard:**

26 If an additional RRFB is installed on the approach in advance of the crosswalk, it shall be  
27 supplemental to and not a replacement for the RRFB at the crosswalk itself.

28 **Section 4L.02 Design of Rectangular Rapid Flashing Beacons**

29 **Standard:**

30 Each RRFB unit shall consist of two rapidly-flashed rectangular-shaped yellow indications, each  
31 with an LED-array based pulsing light source. The size of each RRFB indication shall be at least 5  
32 inches wide by at least 2 inches high.

33 The two RRFB indications for each RRFB unit shall be aligned horizontally, with the longer  
34 dimension horizontal and with a minimum space between the two indications of at least 7 inches,  
35 measured from nearest edge of one indication to the nearest edge of the other indication. The outside  
36 edges of the RRFB indications, including any housings, shall not project beyond the outside edges of the  
37 W11-2, S1-1, or W11-15 sign that it supplements.

38 An RRFB unit shall not be installed independent of the crossing warning signs for the approach  
39 that the RRFB faces. If the RRFB unit is supplementing a post-mounted sign, the RRFB unit shall be  
40 installed on the same support as the associated W11-2, S1-1, or W11-15 crossing warning sign and  
41 plaque. If the RRFB unit is supplementing an overhead-mounted sign, the RRFB unit shall be mounted  
42 directly below the bottom of the sign.

43 **Option:**

44 As a specific exception to Paragraph 6 of Section 4S.01, the RRFB unit associated with a post-mounted  
45 sign and plaque may be located between and immediately adjacent to the bottom of the crossing warning sign  
46 and the top of the supplemental downward diagonal arrow plaque (or, in the case of a supplemental advance  
47 sign, the AHEAD or distance plaque) or within 12 inches above the crossing warning sign, rather than the  
48 recommended minimum of 12 inches above or below the sign assembly.

49 **Standard:**

1 For any approach on which RRFBs are used to supplement post-mounted signs, at least two W11-2,  
2 S1-1, or W11-15 crossing warning signs (each with an RRFB unit and a W16-7P plaque) shall be  
3 installed at the crosswalk, one on the right-hand side of the roadway and one on the left-hand side of the  
4 roadway.

5 Guidance:

6 *On a divided highway, the left-hand side RRFB assembly should be installed on the median, if practical,*  
7 *rather than on the far left side of the highway.*

8 Standard:

9 For any approach on which RRFBs are used to supplement an overhead-mounted sign, at least one  
10 W11-2, S1-1, or W11-15 crossing warning sign (without a W16-7P plaque) located approximately over  
11 the center of the lanes of the approach (or where optimum visibility can be achieved) shall be installed  
12 at the crosswalk.

13 Option:

14 RRFBs may be installed at intersections with more than one crosswalks on the same uncontrolled  
15 approach.

16 Standard:

17 If used at intersections, the design of the RRFBs shall conform to the requirements for post-  
18 mounted or overhead placement described in paragraph X.

19 Option:

20 If used at intersections with two crosswalks on an uncontrolled approach, post-mounted RRFBs may be  
21 installed to face only one direction of travel at the first crosswalk that traffic encounters (see Figure 4L-1).

22 **Figure 4L-1. Example of Post-Mounted RRFBs Installed to Face Only One Direction of Travel**  
23 **at Intersections with Two Crosswalks on an Uncontrolled Approach**

24 The light intensity of the yellow indications during daytime conditions shall meet the minimum  
25 specifications for Class 1 yellow peak luminous intensity in the Society of Automotive Engineers (SAE)  
26 Standard J595 (Directional Flashing Optical Warning Devices for Authorized Emergency,  
27 Maintenance, and Service Vehicles) dated January 2005 or the minimum specifications in subsequent  
28 versions of SAE J595.

29 Option:

30 If the RRFB indications are so bright that they cause excessive glare during nighttime conditions, an  
31 automatic signal dimming device may be used to reduce the brilliance of the RRFB indications during  
32 nighttime conditions.

33 Standard:

34 If pedestrian push button detectors (rather than passive detection) are used to actuate the RRFB  
35 indications, a PUSH BUTTON TO TURN ON WARNING LIGHTS (R10-25) sign (see Section 2B.62)  
36 shall be installed explaining the purpose and use of the pedestrian push button detector.

37 Guidance:

38 *An audible information device should be used with RRFBs to assist pedestrians with visual disabilities.*

39 Option:

40 A small light directed at and visible to pedestrians in the crosswalk may be installed integral to the RRFB  
41 or pedestrian push button detector to give confirmation that the RRFB is in operation.

42 **Section 4L.03 Operation of Rectangular Rapid Flashing Beacons**

43 Standard:

44 The RRFB shall be normally dark, shall initiate operation only upon pedestrian actuation, and shall  
45 cease operation at a predetermined time after the pedestrian actuation or, with passive detection, after  
46 the pedestrian clears the crosswalk.

47 All RRFB units associated with a given crosswalk (including those with an advance crossing sign, if  
48 used) shall, when activated, simultaneously commence operation of their rapid flashing indications and  
49 shall cease operation simultaneously.

1 Guidance:

2 The duration of a predetermined period of operation of the RRFBs following each actuation should be  
3 based on the procedures for the timing of pedestrian clearance times for pedestrian signals (see Section  
4 4I.07).

5 **Standard:**

6 **The predetermined flash period shall be immediately initiated each and every time that a pedestrian**  
7 **is detected either through passive detection or as a result of a pedestrian pressing a push button**  
8 **detector, including when pedestrians are detected while the RRFBs are already flashing and when**  
9 **pedestrians are detected immediately after the RRFBs have ceased flashing.**

10 **When activated, the two yellow indications in each RRFB unit shall flash in a rapidly flashing**  
11 **sequence. As a specific exception to the requirements for the flash rate of beacons provided in**  
12 **Paragraph 3 of Section 4S.01, RRFBs shall use a much faster flash rate and shall provide 75 flashing**  
13 **sequences per minute.**

14 **Except as provided in Paragraph 7, during each 800-millisecond flashing sequence, the left and**  
15 **right RRFB indications shall operate using the following sequence:**

16 **A. The RRFB indication on the left-hand side shall be illuminated for approximately 50**  
17 **milliseconds.**

18 **B. Both RRFB indications shall be dark for approximately 50 milliseconds.**

19 **C. The RRFB indication on the right-hand side shall be illuminated for approximately 50**  
20 **milliseconds.**

21 **D. Both RRFB indications shall be dark for approximately 50 milliseconds.**

22 **E. The RRFB indication on the left-hand side shall be illuminated for approximately 50**  
23 **milliseconds.**

24 **F. Both RRFB indications shall be dark for approximately 50 milliseconds.**

25 **G. The RRFB indication on the right-hand side shall be illuminated for approximately 50**  
26 **milliseconds.**

27 **H. Both RRFB indications shall be dark for approximately 50 milliseconds.**

28 **I. Both RRFB indications shall be illuminated for approximately 50 milliseconds.**

29 **J. Both RRFB indications shall be dark for approximately 50 milliseconds.**

30 **K. Both RRFB indications shall be illuminated for approximately 50 milliseconds.**

31 **L. Both RRFB indications shall be dark for approximately 250 milliseconds.**

32 **The flash rate of each individual RRFB indication, as applied over the full flashing sequence, shall**  
33 **not be more than 5 flashes per second, to avoid frequencies that might cause seizures.**

34 Option:

35 Existing RRFB units that use the flashing sequence that was specified in the Interim Approval 11  
36 memorandum and a subsequent interpretation (the RRFB indication on the left-hand side emits two slow  
37 pulses of light after which the RRFB indication on the right-hand side emits four rapid pulses of light  
38 followed by one long pulse of light) may be retained for the remainder of their useful service life.

39 **Standard: Added to reflect Official Change Request 4(09)-42**

40 **If an audible information device is used in conjunction with an RRFB, the audible information**  
41 **device shall not use vibrotactile indications or percussive indications.**

42 **Guidance: Added to reflect Official Change Request 4(09)-42**

43 If an audible information device is used in conjunction with an RRFB, the audible message should be a  
44 speech message that says, “Yellow lights are flashing”. The audible message should be spoken twice.

1 **CHAPTER ~~4G-4M~~. TRAFFIC CONTROL SIGNALS ~~AND HYBRID BEACONS~~ FOR**  
2 **EMERGENCY-VEHICLE ACCESS**

3 **Section ~~4G-01~~ ~~4M.01~~ Application of Emergency-Vehicle Traffic Control Signals ~~and Hybrid~~**  
4 **Beacons**

5 Support:

6 An emergency-vehicle traffic control signal is a special traffic control signal that ~~assigns the right of way~~  
7 ~~to~~ directs all conflicting traffic to stop in order to permit the driver of an authorized emergency vehicle to  
8 proceed into the roadway or intersection.

9 Option:

10 An emergency-vehicle traffic control signal may be installed at a location that does not meet other traffic  
11 signal warrants such as at an intersection or other location to permit direct access from a building housing the  
12 emergency vehicle.

13 An emergency-vehicle hybrid beacon may be installed instead of an emergency-vehicle traffic control  
14 signal under conditions described in Section 4N.01.

15 *Guidance:*

16 *If a traffic control signal is not justified under the signal warrants of Chapter 4C and if gaps in traffic are*  
17 *not adequate to permit the timely entrance of emergency vehicles, or the stopping sight distance for vehicles*  
18 *approaching on the major street is insufficient for emergency vehicles, installing an emergency-vehicle traffic*  
19 *control signal should be considered. If one of the signal warrants of Chapter 4C is met and a traffic control*  
20 *signal is justified by an engineering study, and if a decision is made to install a traffic control signal, it should*  
21 *be installed based upon the provisions of Chapters 4D through 4I.*

22 *The sight distance determination should be based on the location of the visibility obstruction for the*  
23 *critical approach lane for each street or drive and the posted or statutory speed limit or 85<sup>th</sup>-percentile speed*  
24 *on the major street, whichever is higher.*

25 **Section ~~4G-02~~ ~~4M.02~~ Design of Emergency-Vehicle Traffic Control Signals**

26 **Standard:**

27 **Except as otherwise provided in this Section, an emergency-vehicle traffic control signal shall meet**  
28 **the requirements of this Manual.**

29 **An Emergency Vehicle (W11-8) sign (see Section 2C.54) with an EMERGENCY SIGNAL AHEAD**  
30 **(W11-12P) supplemental plaque shall be placed in advance of all emergency-vehicle traffic control**  
31 **signals. If a warning beacon is installed to supplement the W11-8 sign, the design and location of the**  
32 **beacon shall comply with the Standards of Sections 4S.01 and 4S.03.**

33 *Guidance:*

34 *At least one of the two required signal faces for each approach on the major street should be located over*  
35 *the roadway.*

36 *The following size signal indications should be used for emergency-vehicle traffic control signals: 12-inch*  
37 *diameter for steady red and steady yellow circular signal indications and any arrow indications, and 8-inch*  
38 *diameter for green or flashing yellow circular signal indications.*

39 **Standard:**

40 **An EMERGENCY SIGNAL (R10-13) sign (see Section 2B.63) shall be ~~mounted~~ installed ~~adjacent~~**  
41 **~~to a signal face on~~ facing each major street approach.**

42 **If an overhead signal face is provided, the EMERGENCY SIGNAL sign shall be mounted adjacent**  
43 **to the overhead signal face.**

44 Option:

45 An approach that only serves emergency vehicles may be provided with only one signal face consisting of  
46 one or more signal sections.

47 Besides using an 8-inch diameter signal indication, other appropriate means to reduce the flashing yellow  
48 light output may be used.

1 **Section ~~4G.03~~ 4M.03 Operation of Emergency-Vehicle Traffic Control Signals**

2 **Standard:**

3 ~~Right of way~~ **Green signal indications** for emergency vehicles at signalized locations operating in  
4 the steady (stop-and-go) mode shall be obtained as provided in Section 4F.19.

5 As a minimum, the signal indications, sequence, and manner of operation of an emergency-vehicle  
6 traffic control signal installed at a midblock location shall be as follows:

- 7 A. The signal indication, between emergency-vehicle actuations, shall be either green or flashing  
8 yellow. If the flashing yellow signal indication is used instead of the green signal indication, it  
9 shall be displayed in the normal position of the green signal indication, while the steady red and  
10 steady yellow signal indications shall be displayed in their normal positions.
- 11 B. When an emergency-vehicle actuation occurs, a steady yellow change interval followed by a  
12 steady red interval shall be displayed to traffic on the major street.
- 13 C. A yellow change interval is not required following the green interval for the emergency-vehicle  
14 driveway.

15 **Guidance:**

16 *Emergency-vehicle traffic control signals located at intersections ~~shall~~ should either be operated in the*  
17 *flashing mode (see Sections 4G.01 and 4G.03) between emergency-vehicle actuations or be full-actuated or*  
18 *semi-actuated to accommodate normal vehicular and pedestrian traffic on the streets. **Standard changed to***

19 **Guidance**

20 *Warning beacons, if used with an emergency-vehicle traffic control signal, ~~shall~~ should be flashed only:*

- 21 A. *For an appropriate time in advance of and during the steady yellow change interval for the major*  
22 *street; and*
- 23 B. *During the steady red interval for the major street. **Standard changed to Guidance***

24 ~~Guidance:~~

25 *The duration of the steady red interval for traffic on the major street should be determined by on-site test-*  
26 *run time studies, but should not exceed 1.5 times the time required for the emergency vehicle to clear the path*  
27 *of conflicting vehicles.*

28 **Option:**

29 An emergency-vehicle traffic control signal sequence may be initiated manually from a local control point  
30 such as a fire station or law enforcement headquarters or from an emergency vehicle equipped for remote  
31 operation of the signal.

1 **CHAPTER 4N. HYBRID BEACONS FOR EMERGENCY-VEHICLE ACCESS**

2 **Section ~~4G.04~~ 4N.01 Application of Emergency-Vehicle Hybrid Beacons** Paragraphs in this  
3 **Section were relocated to new Sections 4N.02 and 4N.03**

4 **Standard:**

5 **Emergency-vehicle hybrid beacons shall be used only in conjunction with signs to warn and control**  
6 **traffic at an unsignalized location where emergency vehicles enter or cross a street or highway.**  
7 **Emergency-vehicle hybrid beacons shall be actuated only by authorized emergency or maintenance**  
8 **personnel.**

9 *Guidance:*

10 *Emergency-vehicle hybrid beacons should only be used when all of the following criteria are satisfied:*

- 11 *A. The conditions justifying an emergency-vehicle traffic control signal (see Section 4M.01) are met; and*
- 12 *B. An engineering study, considering the road width, approach speeds, and other pertinent factors,*  
13 *determines that emergency-vehicle hybrid beacons can be designed and located in compliance with*  
14 *the requirements contained in this Section and in Section 4S.01, such that they effectively warn and*  
15 *control traffic at the location; and*
- 16 *C. The location is not at or within 100 feet from an intersection or driveway where the side road or*  
17 *driveway is controlled by a STOP or YIELD sign.*

18 **Section 4N.02 Design of Emergency-Vehicle Hybrid Beacons** Paragraphs were relocated from  
19 **existing Section 4G.04**

20 **Standard:**

21 **Except as otherwise provided in this Section, an emergency-vehicle hybrid beacon shall meet the**  
22 **requirements of this Manual.**

23 **An emergency-vehicle hybrid beacon face shall consist of three signal sections, with a CIRCULAR**  
24 **YELLOW signal indication centered below two horizontally aligned CIRCULAR RED signal**  
25 **indications (see Figure 4N-14G-1).**

26 **Figure 4N-1. Sequence for an Emergency-Vehicle Hybrid Beacon**

27 **At least two emergency-vehicle hybrid beacon faces shall be installed for each approach of the**  
28 **major street ~~and a stop line shall be installed for each approach of the major street.~~**

29 *Guidance:*

30 *On approaches having posted or statutory speed limits or 85<sup>th</sup>-percentile speeds in excess of 40 mph, and*  
31 *on approaches having traffic or operating conditions that would tend to obscure visibility of roadside beacon*  
32 *faces, both of the minimum of two emergency-vehicle hybrid beacon faces should be installed over the*  
33 *roadway.*

34 *On multi-lane approaches having posted or statutory speed limits or 85<sup>th</sup>-percentile speeds of 40 mph or*  
35 *less, either an emergency-vehicle hybrid beacon face should be installed on each side of the approach (if a*  
36 *median of sufficient width exists) or at least one of the emergency-vehicle hybrid beacon faces should be*  
37 *installed over the roadway.*

38 *An emergency-vehicle hybrid beacon should comply with the signal face location provisions described in*  
39 *Sections ~~4D.11 through 4D.16~~ 4D.04 through 4D.09.*

40 **Standard:**

41 **Stop lines and EMERGENCY SIGNAL—STOP ON FLASHING RED (R10-14 or R10-14a) signs**  
42 **(see Section ~~2B.53-2B.63~~) shall be used with emergency-vehicle hybrid beacons for each approach of the**  
43 **major street.**

44 **Option:**

45 **If needed for extra emphasis, a STOP HERE ON FLASHING RED (R10-14b) sign (see Section ~~2B.53-~~**  
46 **2B.63) may be installed with an emergency-vehicle hybrid beacon.**

47 **Emergency-vehicle hybrid beacons may be equipped with a light or other display visible to the operator of**  
48 **the egressing emergency vehicle to provide confirmation that the beacons are operating.**

1 Emergency-vehicle hybrid beacons may be supplemented with an advance warning sign, which may also  
2 be supplemented with a Warning Beacon (see Section ~~4L.03~~ 4S.03).

3 *Guidance:*

4 *If a Warning Beacon is used to supplement the advance warning sign, it should be programmed to flash*  
5 *only when the emergency-vehicle hybrid beacon is not in the dark mode.*

6 **Section 4N.03 Operation of Emergency-Vehicle Hybrid Beacons** Paragraphs relocated from  
7 **existing Section 4G.04**

8 **Standard:**

9 **Emergency-vehicle hybrid beacons shall be placed in a dark mode (no indications displayed) during**  
10 **periods between actuations.**

11 **Upon actuation by authorized emergency personnel, the emergency-vehicle hybrid beacon faces**  
12 **shall each display a flashing yellow signal indication, followed by a steady yellow change interval, prior**  
13 **to displaying two CIRCULAR RED signal indications in an alternating flashing array for a duration of**  
14 **time adequate for egress of the emergency vehicles. The alternating flashing red signal indications shall**  
15 **only be displayed when it is required that drivers on the major street stop and then proceed subject to**  
16 **the rules applicable after making a stop at a STOP sign. Upon termination of the flashing red signal**  
17 **indications, the emergency-vehicle hybrid beacons shall revert to a dark mode (no indications**  
18 **displayed) condition.**

19 *Guidance:*

20 *The duration of the flashing yellow interval should be determined by engineering judgment.*

21 **Standard:**

22 **The duration of the steady yellow change interval shall be determined using engineering practices in**  
23 **accordance with the provisions in Section 4F.17.**

24 *Guidance:*

25 ~~The~~ A *yellow change interval should have a minimum duration of 3 seconds and a maximum duration of 6*  
26 *seconds (see Section ~~4D.26~~ 4F.17). The longer intervals should be reserved for use on approaches with*  
27 *higher speeds.*

28 **Option:**

29 A steady red clearance interval may be used after the steady yellow change interval.

30 An emergency-vehicle hybrid beacon that is located in close proximity to an active grade crossing may be  
31 preempted in accordance with the applicable provisions in Sections 4F.19 and 8D.09.

32 **Standard:**

33 **If an emergency-vehicle hybrid beacon is placed into a flashing mode by a conflict monitor**  
34 **(malfunction management unit) or by a manual switch, the emergency-vehicle hybrid beacon faces shall**  
35 **display flashing yellow signal indications to each approach of the major street.**

1 **CHAPTER ~~4H~~ 40. TRAFFIC CONTROL SIGNALS FOR ONE-LANE, TWO-WAY**  
2 **FACILITIES**

3 **Section ~~4H.01~~ 40.01 Application of Traffic Control Signals for One-Lane, Two-Way Facilities**

4 Support:

5 A traffic control signal at a narrow bridge, tunnel, or roadway section is a special signal that ~~assigns the~~  
6 ~~right of way for~~ alternates which direction of vehicles passing over a bridge or through a tunnel or roadway  
7 section that is not of sufficient width for two opposing vehicles to pass is directed to stop and which direction  
8 is permitted to proceed.

9 Temporary traffic control signals (see Sections ~~4D.32 and 6F.84~~ 4D.10 and 6L.01) are the most frequent  
10 application of one-lane, two-way facilities.

11 *Guidance:*

12 *Sight distance across or through the one-lane, two-way facility should be considered as well as the*  
13 *approach speed and sight distance approaching the facility when determining whether traffic control signals*  
14 *should be installed.*

15 Option:

16 At a narrow bridge, tunnel, or roadway section where a traffic control signal is not justified under the  
17 conditions of Chapter 4C, a traffic control signal may be used if gaps in opposing traffic do not permit the  
18 flow of traffic through the one-lane section of roadway.

19 **Section ~~4H.02~~ 40.02 Design of Traffic Control Signals for One-Lane, Two-Way Facilities**

20 **Standard:**

21 **The provisions of Chapters 4D through 4G shall apply to traffic control signals for one-lane, two-**  
22 **way facilities, except that:**

- 23 **A. Durations of red clearance intervals shall be adequate to clear the one-lane section of conflicting**  
24 **vehicles.**  
25 **B. Adequate means, such as interconnection, shall be provided to prevent conflicting signal**  
26 **indications, such as green and green, at opposite ends of the section.**

27 **Section ~~4H.03~~ 40.03 Operation of Traffic Control Signals for One-Lane, Two-Way Facilities**

28 **Standard:**

29 **Traffic control signals at one-lane, two-way facilities shall operate in a manner consistent with**  
30 **traffic requirements.**

31 **When in the flashing mode, the signal indications shall flash red.**

32 *Guidance:*

33 *Adequate time should be provided to allow traffic to clear the narrow facility before opposing traffic is*  
34 *allowed to move. Engineering judgment should be used to determine the proper timing for the signal.*

1 **CHAPTER 4I-4P. TRAFFIC CONTROL SIGNALS FOR FREEWAY ENTRANCE RAMPS**

2 **Section 4I-01-4P.01 Application of Freeway Entrance Ramp Control Signals**

3 Support:

4 Ramp control signals are traffic control signals that control the flow of traffic entering the freeway  
5 facility. This is often referred to as “ramp metering.”

6 Freeway entrance ramp control signals are sometimes used if controlling traffic entering the freeway  
7 could reduce the total expected delay to traffic in the freeway corridor, including freeway ramps and local  
8 streets.

9 *Guidance:*

10 *The installation of ramp control signals should be preceded by an engineering study of the physical and*  
11 *traffic conditions on the highway facilities likely to be affected. The study should include the ramps and ramp*  
12 *connections and the surface streets that would be affected by the ramp control, as well as the freeway section*  
13 *concerned.*

14 Support:

15 Information on conditions that might justify freeway entrance ramp control signals, factors to be evaluated  
16 in traffic engineering studies for ramp control signals, design of ramp control signals, and operation of ramp  
17 control signals can be found in the FHWA’s “Ramp Management and Control Handbook” (see Section ~~1A.11~~  
18 1A.05).

19 **Section 4I-02-4P.02 Design of Freeway Entrance Ramp Control Signals** **The sequence of**  
20 **paragraphs in this section was revised**

21 **Standard:**

22 **Ramp control signals shall meet all of the standard design specifications for traffic control signals,**  
23 **except as otherwise provided in this Section.**

24 **The signal face for freeway entrance ramp control signals shall be either a two-section signal face**  
25 **containing red and green signal indications or a three-section signal face containing red, yellow, and**  
26 **green signal indications.**

27 **Option:**

28 Ramp control signals may be placed in the dark mode (no indications displayed) when not in use.

29 Ramp control signals may be used to control some, but not all, lanes on a ramp, such as when non-  
30 metered HOV bypass lanes are provided on a ramp.

31 **Standard:**

32 **If only one controlled lane is present on an entrance ramp, or if more than one controlled lane is**  
33 **present on an entrance ramp and the ramp control signals are operated such that green signal**  
34 **indications are always displayed simultaneously to all of the controlled lanes on the ramp, then a**  
35 **minimum of two signal faces per ramp shall face entering traffic.**

36 **If ~~more than one lane is~~ two controlled lanes are present on an entrance ramp and the ramp control**  
37 **signals are operated such that green signal indications are not always displayed simultaneously to ~~all~~**  
38 **both of the controlled lanes on the ramp, a minimum of two signal faces shall be provided for each of**  
39 **the two lanes~~then one signal face shall be provided over the approximate center of each separately-~~**  
40 **~~controlled lane.~~ Added to reflect Official Interpretation 4(09)-29(I)**

41 **If three or more controlled lanes are present on an entrance ramp and the ramp control signals are**  
42 **operated such that green signal indications are not always displayed simultaneously to all of the**  
43 **controlled lanes on the ramp, then one signal face shall be provided over the approximate center of each**  
44 **separately-controlled lane. Added to reflect Official Interpretation 4(09)-29(I)**

45 *Guidance:*

46 *Additional side-mounted signal faces should be considered for ramps with ~~two~~ three or more separately-*  
47 *controlled lanes. Revised to reflect Official Interpretation 4(09)-29(I)*

48 **Option:**

1 ~~The required signal faces, if located at the side of the ramp roadway, may be mounted such that the height~~  
2 ~~above the pavement grade at the center of the ramp roadway to the bottom of the signal housing of the lowest~~  
3 ~~signal face is between 4.5 and 6 feet.~~ **Text incorporated into the next paragraph**

4 For entrance ramps with only one controlled lane, the two required signal faces may both be mounted at  
5 the side of the roadway on a single pole (as a specific exception to the normal 8-foot minimum lateral  
6 separation of signal faces required by Section 4D.06), with ~~one face at the normal mounting height and one~~  
7 ~~the lower signal~~ face ~~mounted lower as provided in Paragraph 9~~ installed at a minimum mounting height of  
8 4.5 feet, ~~as a specific exception to the normal 8-foot minimum lateral separation of signal faces required by~~  
9 ~~Section 4D.13.~~

10 For entrance ramps with two or more controlled lanes, if two signal faces are installed for the right-hand  
11 lane or for the left-hand lane, the two signal faces for that lane may both be mounted at the closest side of the  
12 roadway on a single pole (as a specific exception to the normal 8-foot minimum lateral separation of signal  
13 faces required by Section 4D.06), with the lower signal face installed at a minimum mounting height of 4.5  
14 feet.

15 *Guidance:*

16 *Ramp control signals ~~shall~~ should be located and designed to minimize their viewing by mainline freeway*  
17 *traffic.* **Standard changed to Guidance**

18 *Regulatory signs with legends appropriate to the control, such as XX VEHICLE(S) PER GREEN or XX*  
19 *VEHICLE(S) PER GREEN EACH LANE (see Section ~~2B.56~~ 2B.66), should be installed ~~adjacent to the ramp~~*  
20 *~~control signal faces.~~*

21 *When ramp control signals are installed on a freeway-to-freeway ramp, special consideration should be*  
22 *given to assuring adequate visibility of the ramp control signals, and multiple advance warning signs with*  
23 *flashing warning beacons should be installed to warn road users of the metered operation.*

#### 24 **Section ~~4L.03~~ 4P.03 Operation of Freeway Entrance Ramp Control Signals**

25 *Guidance:*

26 *Operational strategies for ramp control signals, such as periods of operation, metering rates and*  
27 *algorithms, and queue management, should be determined by the operating agency prior to the installation of*  
28 *the ramp control signals and should be closely monitored and adjusted as needed thereafter.*

29 *When the ramp control signals are operated only during certain periods of the day, a RAMP METERED*  
30 *WHEN FLASHING (W3-8) sign (see Section ~~2C.37~~ 2C.39) should be installed in advance of the ramp control*  
31 *signal near the entrance to the ramp, or on the arterial on the approach to the ramp, to alert road users to the*  
32 *presence and operation of ramp meters.*

33 **Standard:**

34 **The RAMP METERED WHEN FLASHING sign shall be supplemented with a warning beacon (see**  
35 **Section ~~4L.03~~ 4S.03) that flashes when the ramp control signal is in operation. Flashing light emitting**  
36 **diode (LED) units shall not be used within the legend or border of the sign to inform road users that the**  
37 **ramp control signal is in operation.**

1 **CHAPTER ~~4J.4Q.~~ 4Q. TRAFFIC CONTROL FOR MOVABLE BRIDGES**

2 **Section ~~4J.01-4Q.01~~ 4Q.01 Application of Traffic Control for Movable Bridges**

3 Support:

4 Traffic ~~control~~ signals for movable bridges are a special type of highway traffic signal installed at  
5 movable bridges to notify road users to stop because of a road closure rather than alternately ~~giving the right~~  
6 ~~of way to~~ controlling the flow of conflicting traffic movements. The signals are operated in coordination with  
7 the opening and closing of the movable bridge, and with the operation of movable bridge warning and  
8 resistance gates, or other devices and features used to warn, control, and stop traffic.

9 Movable bridge warning gates installed at movable bridges decrease the likelihood of vehicles and  
10 pedestrians passing the stop line and entering an area where potential hazards exist because of bridge  
11 operations.

12 A movable bridge resistance gate is sometimes used at movable bridges and located downstream of the  
13 movable bridge warning gate. A movable bridge resistance gate provides a physical deterrent to road users  
14 when placed in the appropriate position. The movable bridge resistance gates are considered a design feature  
15 and not a traffic control device; requirements for them are contained in AASHTO’s “Standard Specifications  
16 for Movable Highway Bridges” (see Page i for AASHTO’s address).

17 **Standard:**

18 **Traffic control at movable bridges shall include both signals and gates, except in the following**  
19 **cases:**

- 20 **A. Neither is required if other traffic control devices or measures considered appropriate are used**  
21 **under either of the following conditions:**  
22 **1. On low-volume roads (roads of less than 400 vehicles average daily traffic), or**  
23 **2. At manually operated bridges if electric power is not available.**  
24 **B. Only signals are required in urban areas if intersecting streets or driveways make gates**  
25 **ineffective.**  
26 **C. Only movable bridge warning gates are required if a traffic control signal that is controlled as**  
27 **part of the bridge operations exists within 500 feet of the movable bridge resistance gates and no**  
28 **intervening traffic entrances exist.**

29 **Section ~~4J.02-4Q.02~~ 4Q.02 Design and Location of Movable Bridge Signals and Gates**

30 **Standard:**

31 **The signal faces and mountings of movable bridge signals shall comply with the provisions of**  
32 **Chapters 4D through 4G except as provided in this Section.**

33 **Signal faces with 12-inch diameter signal indications shall be used for all new movable bridge**  
34 **signals.**

35 **Option:**

36 Existing signal faces with 8-inch diameter lenses may be retained for the remainder of their useful service  
37 life.

38 **Standard:**

39 **Since movable bridge operations cover a variable range of time periods between openings, the**  
40 **signal faces shall be one of the following types:**

- 41 **A. Three-section signal faces with red, yellow, and green signal indications; or**  
42 **B. Two one-section signal faces with red signal indications in a vertical array separated by a STOP**  
43 **HERE ON RED (R10-6) sign (see Section ~~2B.53-2B.63~~).**

44 **Regardless of which signal type is selected, at least two signal faces shall be provided for each**  
45 **approach to the movable span and a stop line (see Section ~~3B.16-3B.19~~) shall be installed to indicate the**  
46 **point behind which vehicles are required to stop.**

47 **Guidance:**

48 *If movable bridge operation is frequent, the use of three-section signal faces should be considered.*

1        *Insofar as practical, the height and lateral placement of signal faces should comply with the requirements*  
2 *for other traffic control signals in accordance with Chapter 4D. They should be located no more than 50 feet*  
3 *in advance of the movable bridge warning gate.*

4 Option:

5        Movable bridge signals may be supplemented with audible warning devices to provide additional warning  
6 to drivers and pedestrians.

7 ~~Standard~~ Guidance: **Standard changed to Guidance**

8        *A DRAW BRIDGE (W3-6) sign (see Section ~~2C.39~~ 2C.29) ~~shall~~ should be used in advance of movable*  
9 *bridge signals and gates to give warning to road users, except in urban conditions where such signing would*  
10 *not be practical.*

11 Standard:

12        **If physical conditions prevent a road user from having a continuous view of at least two signal**  
13 **indications for the distance specified in Table 4D-2, an auxiliary device (either a supplemental signal**  
14 **face or the mandatory DRAW BRIDGE (W3-6) sign to which has been added a warning beacon that is**  
15 **interconnected with the movable bridge controller unit) shall be provided in advance of movable bridge**  
16 **signals and gates.**

17 Option:

18        The DRAW BRIDGE (W3-6) sign may be supplemented by a Warning Beacon (see Section ~~4L.03~~  
19 4S.03).

20 ~~Standard~~ Support: **Standard changed to Support**

21        If two sets of gates (both a warning and a resistance gate) are used for a single direction, highway traffic  
22 signals ~~shall~~ are not ~~be~~ required to accompany the resistance gate nearest the span opening.

23 Standard:

24        **Movable bridge warning gates, if used, shall be at least standard railroad size, striped with 16-inch**  
25 **alternate vertical, fully reflectorized red and white stripes. Flashing red lights in accordance with the**  
26 **Standards for those on railroad gates (see Section ~~8C.04~~ 8D.03) shall be included on the gate arm and**  
27 **they shall only be operated if the gate is closed or in the process of being opened or closed.**

28 Guidance: **Standard changed to Guidance**

29        *In the horizontal position, the top of the gate ~~shall~~ should be approximately 4 feet above the pavement.*

30 ~~Guidance~~:

31        *Movable bridge warning gates should be of lightweight construction. In its normal upright position, the*  
32 *gate arm should provide adequate lateral clearance.*

33 Option:

34        The movable bridge resistance gates may be delineated, if practical, in a manner similar to the movable  
35 bridge warning gate.

36 ~~Standard~~ Guidance: **Standard changed to Guidance**

37        *Movable bridge warning gates, if used, ~~shall~~ should extend at least across the full width of the approach*  
38 *lanes if movable bridge resistance gates are used. On divided highways in which the roadways are separated*  
39 *by a barrier median, movable bridge warning gates, if used, ~~shall~~ should extend across all roadway lanes*  
40 *approaching the span openings.*

41 ~~Guidance~~:

42        *If movable bridge resistance gates are not used on undivided highways, movable bridge warning gates, if*  
43 *used, should extend across the full width of the roadway.*

44 Option:

45        A single full-width gate or two half-width gates may be used.

46 Support:

47        The locations of movable bridge signals and gates are determined by the location of the movable bridge  
48 resistance gate (if used) rather than by the location of the movable spans. The movable bridge resistance gates

1 for high-speed highways are preferably located 50 feet or more from the span opening except for bascule and  
2 lift bridges, where they are often attached to, or are a part of, the structure.

3 ~~Standard~~ *Guidance*: **Standard changed to Guidance**

4 *Except where physical conditions make it impractical, movable bridge warning gates ~~shall~~ should be*  
5 *located 100 feet or more from the movable bridge resistance gates or, if movable bridge resistance gates are*  
6 *not used, 100 feet or more from the movable span.*

7 ~~Guidance~~:

8 *On bridges or causeways that cross a long reach of water and that might be hit by large marine vessels,*  
9 *within the limits of practicality, traffic should not be halted on a section of the bridge or causeway that is*  
10 *subject to impact.*

11 *In cases where it is not practical to halt traffic on a span that is not subject to impact, traffic should be*  
12 *halted at least one span from the opening. If traffic is halted by signals and gates more than 330 feet from the*  
13 *movable bridge warning gates (or from the span opening if movable bridge warning gates are not used), a*  
14 *second set of gates should be installed approximately 100 feet from the gate or span opening.*

15 *If the movable bridge is close to a grade crossing and traffic might possibly be stopped on the crossing as*  
16 *a result of the bridge opening, a traffic control device should notify the road users to not stop on the railroad*  
17 *tracks.*

## 18 **Section ~~4J.03~~ 4Q.03 Operation of Movable Bridge Signals and Gates**

19 **Standard:**

20 **Traffic control devices at movable bridges shall be coordinated with the movable spans, so that the**  
21 **signals, gates, and movable spans are controlled by the bridge tender through an interlocked control.**

22 **If the three-section type of signal face is used, the green signal indication shall be displayed at all**  
23 **times between bridge openings, except that if the bridge is not expected to open during continuous**  
24 **periods in excess of 5 hours, a flashing yellow signal indication shall be permitted to be used. The signal**  
25 **shall display a steady red signal indication when traffic is required to stop. The duration of the yellow**  
26 **change interval between the display of the green and steady red signal indications, or flashing yellow**  
27 **and steady red signal indications, shall be determined using engineering practices (see Section ~~4D.26~~**  
28 **4F.17).**

29 **If the vertical array of red signal indications is the type of signal face selected, the red signal**  
30 **indications shall flash alternately only when traffic is required to stop.**

31 *Guidance:*

32 *The yellow change interval should have a minimum duration of 3 seconds and a maximum duration of 6*  
33 *seconds. The longer intervals should be reserved for use on approaches with higher speeds.*

34 *Traffic control signals on adjacent streets and highways should be interconnected with the drawbridge*  
35 *control if indicated by engineering judgment. When such interconnection is provided, the traffic control*  
36 *signals at adjacent intersections should be preempted by the operation of the movable bridge in the manner*  
37 *described in Section ~~4D.27~~ 4F.19.*

1 **CHAPTER ~~4K~~ 4R. HIGHWAY TRAFFIC SIGNALS AT TOLL PLAZAS**

2 **Section ~~4K.01~~ 4R.01 Traffic Signals at Toll Plazas**

3 **Standard:**

4 Traffic control signals or devices that closely resemble traffic control signals that use red or green  
5 circular indications shall not be used at toll plazas to indicate the open or closed status of the toll plaza  
6 lanes.

7 *Guidance:*

8 Traffic control signals or devices that closely resemble traffic control signals that use red or green  
9 circular indications should not be used for new or reconstructed installations at toll plazas to indicate the  
10 success or failure of electronic toll payments or to alternately direct drivers making cash toll payments to stop  
11 and then proceed.

12 **Section ~~4K.02~~ 4R.02 Lane-Use Control Signals at or Near Toll Plazas**

13 **Standard:**

14 Lane-use control signals used at toll plazas shall comply with the provisions of Chapter ~~4M~~ 4T  
15 except as otherwise provided in this Section.

16 At toll plazas with multiple lanes where one or more lanes is sometimes closed to traffic, a lane-use  
17 control signal shall be installed above the center of each toll plaza lane to indicate the open or closed  
18 status of the controlled lane.

19 *Option:*

20 The bottom of the signal housing of a lane-use control signal above a toll plaza lane having a canopy may  
21 be mounted lower than 15 feet above the pavement, but not lower than the vertical clearance of the canopy  
22 structure.

23 Lane-use control signals may also be used to indicate the open or closed status of an Open-Road ETC lane  
24 as a supplement to other devices used for the temporary closure of a lane (see Part 6).

25 **Section ~~4K.03~~ 4R.03 Warning Beacons at Toll Plazas**

26 **Standard:**

27 Warning Beacons used at toll plazas shall comply with the provisions of Chapter ~~4L~~ 4S except as  
28 otherwise provided in this Section.

29 *Guidance:*

30 Warning Beacons, if used with a toll plaza canopy sign (see Section 2F.16) to assist drivers of such  
31 vehicles in locating the dedicated ETC Account-Only lane(s), should be installed in a manner such that the  
32 beacons are distinctly separate from the lane-use control signals (see Section 4T.01) for the toll plaza lane.

33 *Option:*

34 Warning Beacons that are mounted on toll plaza islands, behind impact attenuators in front of toll plaza  
35 islands, and/or on toll booth pylons (ramparts) to identify them as objects in the roadway may be mounted at a  
36 height that is appropriate for viewing in a toll plaza context, even if that height is lower than the normal  
37 minimum of 8 feet above the pavement.

38

1 **CHAPTER ~~4L~~ 4S. FLASHING BEACONS**

2 **Section ~~4L.01~~ 4S.01 General Design and Operation of Flashing Beacons**

3 Support:

4 A Flashing Beacon is a highway traffic signal with one or more signal sections that operates in a flashing  
5 mode. It can provide traffic control when used as an intersection control beacon (see Section ~~4L.02~~ 4S.02) or  
6 it can provide warning when used in other applications (see Sections ~~4L.03, 4L.04, and 4L.05~~ 4S.03, 4S.04,  
7 and 4S.05).

8 **Standard:**

9 Flashing Beacon units and their mountings shall comply with the provisions of Chapters 4D and 4E,  
10 except as otherwise provided in this Chapter.

11 Beacons shall be flashed at a rate of not less than 50 or more than 60 times per minute. The  
12 illuminated period of each flash shall be a minimum of 1/2 and a maximum of 2/3 of the total cycle.

13 A beacon shall not be included within the border of a sign except for Interchange Exit Direction  
14 signs with advisory speed panels (see Section 2E.26) ~~School Speed Limit Sign Beacons (see Sections~~  
15 ~~4L.04 and 7B.15)~~. **Revised to reflect Official Change Request 4(09)-30**

16 There shall be two nominal diameter sizes for flashing beacon signal indications: 8 inches and 12  
17 inches. Added to reflect Official Interpretation 4(09)-7(I)

18 *Guidance:*

19 *If used to supplement a warning or regulatory sign, the edge of the beacon signal housing should*  
20 *normally be located no closer than 12 inches outside of the nearest edge of the sign or from the nearest edge*  
21 *of any of the signs and plaques in a sign assembly.*

22 **Option:**

23 An automatic dimming device may be used to reduce the brilliance of flashing yellow signal indications  
24 during night operation.

25 **Section ~~4L.02~~ 4S.02 Intersection Control Beacon**

26 **Standard:**

27 An Intersection Control Beacon shall consist of one or more signal faces directed toward each  
28 approach to an intersection. Each signal face shall consist of one or more signal sections of a standard  
29 traffic signal face, with flashing CIRCULAR YELLOW or CIRCULAR RED signal indications in each  
30 signal face. They shall be installed and used only at an intersection to control two or more directions of  
31 travel.

32 Application of Intersection Control Beacon signal indications shall be limited to the following:

33 A. Yellow on one route (normally the major street) and red for the remaining approaches that are  
34 controlled by STOP signs, and

35 B. Red for all approaches (if ~~the warrant described in Section 2B.07 for a multi-way stop is~~  
36 ~~satisfied~~ all of the intersection approaches are controlled by STOP signs). **Revised to reflect**  
37 **Official Change Request 4(09)-42**

38 Flashing yellow signal indications shall not face conflicting vehicular approaches.

39 A STOP sign (see Section 2B.04) shall be used on approaches to which a flashing red signal  
40 indication is displayed on an Intersection Control Beacon (~~see Section 2B.04~~).

41 If two horizontally aligned red signal indications are used on an approach for an Intersection  
42 Control Beacon, they shall be flashed simultaneously to avoid being confused with grade crossing  
43 flashing-light signals. If two vertically aligned red signal indications that have a physical separation  
44 between them are used on an approach for an Intersection Control Beacon, they shall be flashed  
45 alternately.

46 Twelve-inch signal indications shall be used for Intersection Control Beacons facing approaches  
47 where: **Added to reflect Official Change Request 4(09)-18**

48 A. Road users view both flashing beacon and lane-use control signal indications simultaneously; or

1 **B. The nearest flashing beacon signal face is more than 120 feet beyond the stop line, unless a**  
2 **supplemental near-side flashing beacon signal face is provided.**

3 *Guidance:*

- 4 *Twelve-inch signal indications should be used for Intersection Control Beacons facing approaches where:*  
5 *A. The posted or statutory speed limit or the 85th-percentile approach speed is higher than 40 mph; or*  
6 *B. Where only post-mounted flashing beacon signal faces are used.*

7 **Added to reflect Official Change Request 4(09)-18**

8 *An Intersection Control Beacon should not be mounted on a pedestal in the roadway unless the pedestal is*  
9 *within the confines of a traffic or pedestrian island.*

10 *Option:*

11 Supplemental signal indications may be used on one or more approaches in order to provide adequate  
12 visibility to approaching road users.

13 Intersection Control Beacons may be used at intersections where traffic or physical conditions do not  
14 justify conventional traffic control signals but crash rates indicate the possibility of a special need.

15 An Intersection Control Beacon is generally located over the center of an intersection; however, it may be  
16 used at other suitable locations.

17 **Section ~~4L.03~~ 4S.03 Warning Beacon**

18 *Support:*

19 Typical applications of Warning Beacons include the following:

- 20 A. ~~As supplemental emphasis to signs or object markers on or in front of~~ obstructions that are in or  
21 immediately adjacent to the roadway;  
22 B. As supplemental emphasis to warning signs;  
23 C. As emphasis for midblock crosswalks;  
24 D. As supplemental emphasis to regulatory signs, except STOP, DO NOT ENTER, WRONG WAY, and  
25 SPEED LIMIT signs; and  
26 E. In conjunction with a regulatory or warning sign that includes the phrase WHEN FLASHING in its  
27 legend or on a supplemental plaque to indicate that the regulation is in effect or that the condition is  
28 present only at certain times. It is not appropriate to use flashing light emitting diode (LED) units  
29 within the legend or border of the sign to inform road users that the regulation is in effect or that the  
30 condition is present.

31 **Standard:**

32 **A Warning Beacon shall consist of one or more signal sections of a standard traffic signal face with**  
33 **a flashing CIRCULAR YELLOW signal indication in each signal section.**

34 **A Warning Beacon shall be used only to supplement an appropriate warning or regulatory sign or**  
35 **marker.**

36 **Warning Beacons, if used at intersections, shall not face conflicting vehicular approaches.**

37 ~~If a Warning Beacon is suspended over the roadway, the clearance above the pavement shall be a~~  
38 ~~minimum of 15 feet and a maximum of 19 feet~~ **Removed to reflect Official Interpretation 4(09)-11(I)**

39 *Guidance:*

40 *The condition or regulation justifying Warning Beacons should largely govern their location with respect*  
41 *to the roadway.*

42 *If an obstruction is in or adjacent to the roadway, illumination of the lower portion or the beginning of the*  
43 *obstruction or illumination of ~~the~~ sign on or in front of the obstruction, in addition to the beacon, should be*  
44 *considered.*

45 *Warning Beacons should be operated only during those periods or times when the condition or regulation*  
46 *exists.*

47 *Option:*

48 Warning Beacons that are actuated by pedestrians, bicyclists, or other road users may be used as  
49 appropriate to provide additional warning to vehicles approaching a crossing or other location.

1 If Warning Beacons have more than one signal section, they may be flashed either alternately or  
2 simultaneously.

3 A ~~flashing yellow~~ Warning Beacon interconnected with a traffic signal controller assembly may be used  
4 with a ~~traffic signal warning~~ BE PREPARED TO STOP (W3-4) sign and a WHEN FLASHING (W16-13P)  
5 plaque (see Section ~~2C.36~~ 2C.37).

6 Guidance:

7 An audible information device should be used with pedestrian-actuated Warning Beacons to assist  
8 pedestrians with visual disabilities.

9 **Standard:** Added to reflect Official Change Request 4(09)-42

10 If an audible information device is used in conjunction with a pedestrian-actuated Warning Beacon  
11 at a pedestrian crossing, the audible information device shall not use vibrotactile indications or  
12 percussive indications.

13 Guidance: Added to reflect Official Change Request 4(09)-42

14 If an audible information device is used in conjunction with a pedestrian-actuated Warning Beacon at a  
15 pedestrian crossing, the audible message should be a speech message that says, "Yellow lights are flashing".  
16 The audible message should be spoken twice.

### 17 **Section ~~4L.04~~ 4S.04 Speed Limit Sign Beacon**

18 **Standard:**

19 A Speed Limit Sign Beacon shall be used only to supplement a Speed Limit sign.

20 A Speed Limit Sign Beacon shall consist of one or more signal sections of a standard traffic control  
21 signal face, with a flashing CIRCULAR YELLOW signal indication in each signal section. ~~The signal~~  
22 ~~indications shall have a nominal diameter of not less than 8 inches. If two signal indications are used,~~  
23 ~~they shall be vertically aligned, except that they shall be permitted to be horizontally aligned if the~~  
24 ~~Speed Limit (R2-1) sign is longer horizontally than vertically. If two or more signal indications are~~  
25 ~~used, they shall be alternately flashed.~~

26 Option:

27 A Speed Limit Sign Beacon may be used with a fixed or variable Speed Limit sign. If applicable, a  
28 flashing Speed Limit Sign Beacon (with an appropriate accompanying sign) may be used to indicate that the  
29 displayed speed limit is in effect.

30 ~~A Speed Limit Sign Beacon may be included within the border of a School Speed Limit (S5-1) sign (see~~  
31 ~~Section 7B.15).~~ **Deleted to reflect Official Change Request 4(09)-30**

32 **Standard:**

33 Flashing light emitting diode (LED) units shall not be used within the legend or border of a Speed  
34 Limit sign to indicate that the displayed speed limit is in effect.

### 35 **Section ~~4L.05~~ 4S.05 Stop Beacon**

36 **Standard:**

37 A Stop Beacon shall be used only to supplement a STOP sign, a DO NOT ENTER sign, or a  
38 WRONG WAY sign.

39 A Stop Beacon shall consist of one or more signal sections of a standard traffic signal face with a  
40 flashing CIRCULAR RED signal indication in each signal section. If two horizontally aligned signal  
41 indications are used for a Stop Beacon, they shall be flashed simultaneously to avoid being confused  
42 with grade crossing flashing-light signals. If two vertically aligned signal indications are used for a Stop  
43 Beacon, they shall be flashed alternately.

44 Guidance: **Standard changed to Guidance**

45 The ~~bottom edge~~ of the signal housing of a Stop Beacon ~~shall~~ should be not less than 12 inches or more  
46 than 24 inches ~~above the top~~ from the nearest edge of a ~~the~~ STOP sign, ~~a~~ DO NOT ENTER sign, or ~~a~~ WRONG  
47 WAY sign that it supplements.

## CHAPTER ~~4M.4T.~~ LANE-USE CONTROL SIGNALS

### Section ~~4M.01-4T.01~~ Application of Lane-Use Control Signals

Support:

Lane-use control signals are special overhead signals that permit or prohibit the use of specific lanes of a street or highway or that indicate the impending prohibition of their use. Lane-use control signals are distinguished by placement of special signal faces over a certain lane or lanes of the roadway and by their distinctive shapes and symbols. Supplementary signs are sometimes used to explain their meaning and intent.

Lane-use control signals are most commonly used for reversible-lane control, but are also used in certain non-reversible lane applications and for toll plaza lanes (see Section ~~4K.02-4R.02~~).

*Guidance:*

*An engineering study should be conducted to determine whether a reversible-lane operation can be controlled satisfactorily by static signs (see Section ~~2B.26-2B.36~~) or whether lane-use control signals are necessary. Lane-use control signals should be used to control reversible-lane operations if any of the following conditions are present:*

- A. *More than one lane is reversed in direction;*
- B. *Two-way or one-way left turns are allowed during peak-period reversible operations, but those turns are from a different lane than used during off-peak periods;*
- C. *Other unusual or complex operations are included in the reversible-lane pattern;*
- D. *Demonstrated crash experience occurring with reversible-lane operation controlled by static signs that can be corrected by using lane-use control signals at the times of transition between peak and off-peak patterns; and/or*
- E. *An engineering study indicates that the safety and efficiency of the traffic operations of a reversible-lane system would be improved by lane-use control signals.*

**Standard:**

**Pavement markings (see Section ~~3B.03-3B.04~~) shall be used in conjunction with reversible-lane control signals.**

**Option:**

Lane-use control signals may also be used if there is no intent or need to reverse lanes, but there is a need to indicate the open or closed status of one or more lanes, such as:

- A. On a freeway, if it is desired to close certain lanes at certain hours to facilitate the merging of traffic from a ramp or other freeway;
- B. On a freeway, near its terminus, to indicate a lane that ends;
- C. On a freeway or long bridge, to indicate that a lane may be temporarily blocked by a crash, breakdown, construction or maintenance activities, or similar temporary conditions; and
- D. On a conventional road or driveway, at access or egress points to or from a facility, such as a parking garage, where one or more lanes of the access or egress are opened or closed at various times.

[A USE LANE\(S\) WITH GREEN ARROW \(R10-8\) sign \(see Section 2B.63\) may be used in conjunction with lane-use control signals.](#)

### Section ~~4M.02-4T.02~~ Meaning of Lane-Use Control Signal Indications

**Standard:**

**The meanings of lane-use control signal indications shall be as follows:**

- A. A steady DOWNWARD GREEN ARROW signal indication shall mean that ~~a road user is permitted to drive in the lane over~~ which the arrow signal indication is located over is open to vehicle travel in that direction.
- B. A steady YELLOW X signal indication shall mean that the lane with the Yellow X signal indication located over it is about to be closed to vehicle traffic in that direction and shall be followed by ~~a road user is to prepare to vacate the lane over which the signal indication is located because a lane control change is being made to~~ a steady RED X signal indication.
- C. A steady WHITE TWO-WAY LEFT-TURN ARROW signal indication (see Figure ~~4M-1-4T-1~~) shall mean that the lane with the turning arrows indication located over it is open to traffic

1 ~~making a road user is permitted to use a lane over which the signal indication is located for a~~  
2 left turn from either direction of travel, but not for through travel, ~~with the understanding that~~  
3 ~~common use of the lane by oncoming road users for left turns is also permitted.~~

- 4 D. A steady WHITE ONE-WAY LEFT-TURN ARROW signal indication (see Figure ~~4T-14M-1~~)  
5 shall mean that the lane with the turning arrow indication located over it is open to traffic  
6 ~~making a road user is permitted to use a lane over which the signal indication is located for a~~  
7 left turn in that direction (without opposing turns in the same lane), but not for through travel.  
8 E. A steady RED X signal indication shall mean that the lane with the Red X signal indication over  
9 it is closed to vehicle traffic in the direction viewed by the a road user. ~~is not permitted to use~~  
10 ~~the lane over which the signal indication is located and that this signal indication shall modify~~  
11 ~~accordingly the meaning of other traffic controls present.~~

### 12 **Figure 4T-1. Left-Turn Lane-Use Control Signals**

#### 13 **Section ~~4M.03~~ 4T.03 Design of Lane-Use Control Signals**

##### 14 **Standard:**

15 All lane-use control signal indications shall be in units with rectangular signal faces and shall have  
16 opaque backgrounds. Except as provided in Paragraph 13, the nominal minimum height and width of  
17 each DOWNWARD GREEN ARROW, YELLOW X, and RED X signal face shall be 18 inches for  
18 typical applications. Except as provided in Paragraph 13, the WHITE TWO-WAY LEFT-TURN  
19 ARROW and WHITE ONE-WAY LEFT-TURN ARROW signal faces shall have a nominal minimum  
20 height and width of 30 inches.

21 Each lane to be reversed or closed shall have signal faces with at least a DOWNWARD GREEN  
22 ARROW and a RED X symbol.

23 Each reversible lane that also operates as a two-way or one-way left-turn lane during certain  
24 periods shall have signal faces that also include the applicable WHITE TWO-WAY LEFT-TURN  
25 ARROW or WHITE ONE-WAY LEFT-TURN ARROW symbol.

26 Each non-reversible lane immediately adjacent to a reversible lane shall have signal indications that  
27 display a DOWNWARD GREEN ARROW to traffic traveling in the permitted direction and a RED X  
28 to traffic traveling in the opposite direction.

29 If in separate signal sections, the relative positions, from left to right, of the signal indications shall  
30 be RED X, YELLOW X, DOWNWARD GREEN ARROW, WHITE TWO-WAY LEFT-TURN  
31 ARROW, WHITE ONE-WAY LEFT-TURN ARROW.

##### 32 Guidance:

33 *The color of lane-use control signal indications ~~shall~~ should be clearly visible for 2,300 feet at all times*  
34 *under normal atmospheric conditions, unless otherwise physically obstructed.* **Standard changed to**

##### 35 **Guidance**

36 *Lane-use control signal faces ~~shall~~ should be located approximately over the center of the lane controlled.*  
37 **Standard changed to Guidance**

38 *If the area to be controlled is more than 2,300 feet in length, or if the vertical or horizontal alignment is*  
39 *curved, intermediate lane-use control signal faces ~~shall~~ should be located over each controlled lane at*  
40 *frequent intervals. This location ~~shall~~ should be such that road users will at all times be able to see at least*  
41 *one signal indication and preferably two along the roadway, and will have a definite indication of the lanes*  
42 *specifically reserved for their use.* **Standard changed to Guidance**

43 *All lane-use control signal faces ~~shall~~ should be located in a straight line across the roadway*  
44 *approximately at right angles to the roadway alignment.* **Standard changed to Guidance**

45 *On roadways having intersections controlled by traffic control signals, the lane-use control signal face*  
46 *~~shall~~ should be located sufficiently far in advance of or beyond such traffic control signals to prevent them*  
47 *from being misconstrued as traffic control signals.* **Standard changed to Guidance**

##### 48 **Standard:**

49 **Except as provided in Paragraph 12, the bottom of the signal housing of any lane-use control signal**  
50 **face shall be a minimum of 15 feet and a maximum of 19 feet above the pavement grade.**

1 Option:

2 The bottom of a lane-use control signal housing may be lower than 15 feet above the pavement if it is  
3 mounted on a canopy or other structure over the pavement, but not lower than the vertical clearance of the  
4 structure.

5 Except for lane-use control signals at toll plazas (see Section ~~4K.02~~ 4R.02), in areas with minimal visual  
6 clutter and with speeds of less than 40 mph, lane-use control signal faces with nominal height and width of 12  
7 inches may be used for the DOWNWARD GREEN ARROW, YELLOW X, and RED X signal faces, and  
8 lane-use control signal faces with nominal height and width of 18 inches may be used for the WHITE TWO-  
9 WAY LEFT-TURN ARROW and WHITE ONE-WAY LEFT-TURN ARROW signal faces.

10 Other sizes of lane-use control signal faces larger than 18 inches with proportional dimensions and with  
11 message recognition distances appropriate to signal spacing may be used for the DOWNWARD GREEN  
12 ARROW, YELLOW X, and RED X signal faces.

13 Non-reversible lanes not immediately adjacent to a reversible lane on any street so controlled may also be  
14 provided with signal indications that display a DOWNWARD GREEN ARROW to traffic traveling in the  
15 permitted direction and a RED X to traffic traveling in the opposite direction.

16 The signal indications provided for each lane may be in separate signal sections or may be superimposed  
17 in the same signal section.

## 18 Section ~~4M.04~~ 4T.04 **Operation of Lane-Use Control Signals**

### 19 **Standard:**

20 All lane-use control signals shall be coordinated so that all the signal indications along the  
21 controlled section of roadway are operated uniformly and consistently. The lane-use control signal  
22 system shall be designed to reliably guard against showing any prohibited combination of signal  
23 indications to any traffic at any point in the controlled lanes.

24 For reversible-lane control signals, the following combination of signal indications shall not be  
25 simultaneously displayed over the same lane to both directions of travel:

- 26 A. DOWNWARD GREEN ARROW in both directions,
- 27 B. YELLOW X in both directions,
- 28 C. WHITE ONE-WAY LEFT-TURN ARROW in both directions,
- 29 D. DOWNWARD GREEN ARROW in one direction and YELLOW X in the other direction,
- 30 E. WHITE TWO-WAY LEFT-TURN ARROW or WHITE ONE-WAY LEFT-TURN ARROW in  
31 one direction and DOWNWARD GREEN ARROW in the other direction,
- 32 F. WHITE TWO-WAY LEFT-TURN ARROW in one direction and WHITE ONE-WAY LEFT-  
33 TURN ARROW in the other direction, and
- 34 G. WHITE ONE-WAY LEFT-TURN ARROW in one direction and YELLOW X in the other  
35 direction.

36 A moving condition in one direction shall be terminated either by the immediate display of a RED X  
37 signal indication or by a YELLOW X signal indication followed by a RED X signal indication.

38 Guidance: **Standard changed to Guidance**

39 *In either case, the duration of the RED X signal indication ~~shall~~ should be sufficient to allow clearance of*  
40 *the lane before any moving condition is allowed in the opposing direction.*

### 41 Standard:

42 Whenever a DOWNWARD GREEN ARROW signal indication is changed to a WHITE TWO-  
43 WAY LEFT-TURN ARROW signal indication, the RED X signal indication shall continue to be  
44 displayed to the opposite direction of travel for an appropriate duration to allow traffic time to vacate  
45 the lane being converted to a two-way left-turn lane.

46 If an automatic control system is used, a manual control to override the automatic control shall be  
47 provided.

48 *Guidance:*

49 *The type of control provided for reversible-lane operation should be such as to permit either automatic or*  
50 *manual operation of the lane-use control signals.*

1 **Standard:**

2 **If used, lane-use control signals shall be operated continuously, except that lane-use control signals**  
3 **that are used only for special events or other infrequent occurrences and lane-use control signals on**  
4 **non-reversible freeway lanes ~~shall be~~ are permitted to be darkened when not in operation. The change**  
5 **from normal operation to non-operation shall occur only when the lane-use control signals display**  
6 **signal indications that are appropriate for the lane use that applies when the signals are not operated.**  
7 **The lane-use control signals shall display signal indications that are appropriate for the existing lane**  
8 **use when changed from non-operation to normal operations. Also, traffic control devices shall clearly**  
9 **indicate the proper lane use when the lane control signals are not in operation.**

10 Support:

11 Section ~~2B.26~~ 2B.36 contains additional information concerning considerations involving left-turn  
12 prohibitions in conjunction with reversible-lane operations. [Section 2G.24 contains additional information](#)  
13 [concerning lane-use control signals used for part-time travel on a shoulder.](#) [Section 2G.25 contains additional](#)  
14 [information concerning lane-use control signals used for active lane management on freeways and](#)  
15 [expressways.](#)  
16

1 **CHAPTER ~~4N~~4U. IN-ROADWAY WARNING LIGHTS**

2 **Section ~~4N.01~~4U.01 Application of In-Roadway Warning Lights**

3 Support:

4 In-Roadway Warning Lights are special types of highway traffic signals installed in the roadway surface  
5 to warn road users that they are approaching a condition on or adjacent to the roadway that might not be  
6 readily apparent and might require the road users to ~~slow down~~ reduce their speed and/or come to a stop. This  
7 includes situations warning of marked school crosswalks, marked midblock crosswalks, marked crosswalks  
8 on uncontrolled approaches, marked crosswalks in advance of roundabouts as described in Chapter ~~3C~~3D,  
9 and other roadway situations involving pedestrian crossings.

10 **Standard:**

11 **In-Roadway Warning Lights shall not be used for any application that is not described in this**  
12 **Chapter.**

13 **When used, In-Roadway Warning Lights shall be flashed and shall not be steadily illuminated.**

14 Support:

15 Steadily-illuminated lights installed in the roadway surface are considered to be internally-illuminated  
16 raised pavement markers (see Section ~~3B.11~~3B.14).

17 Option:

18 In-Roadway Warning Lights may be flashed in a manner that includes a continuous flash of varying  
19 intensity and time duration that is repeated to provide a flickering effect (see Section ~~4N.02~~4U.02).

20 **Guidance:** **This paragraph was relocated from earlier in this section; Standard changed to Guidance**

21 *If used, In-Roadway Warning Lights ~~shall~~ should not exceed a height of 3/4 inch above the roadway*  
22 *surface.*

23 **Section ~~4N.02~~4U.02 In-Roadway Warning Lights at Crosswalks**

24 Option:

25 In-Roadway Warning Lights may be installed at certain marked crosswalks, based on an engineering  
26 study or engineering judgment, to provide additional warning to road users.

27 **Standard:**

28 **If used, In-Roadway Warning Lights at crosswalks shall be installed only at marked crosswalks**  
29 **with applicable warning signs. They shall not be used at crosswalks controlled by YIELD signs, STOP**  
30 **signs, ~~or~~ traffic control signals, or pedestrian hybrid beacons.**

31 **If In-Roadway Warning Lights are used at a crosswalk, the following requirements shall apply:**

- 32 **A. Except as provided in Paragraphs 7 and 8, they shall be installed along both sides of the**  
33 **crosswalk and shall span its entire length.**
- 34 **B. They shall initiate operation based on pedestrian actuation and shall cease operation at a**  
35 **predetermined time after the pedestrian actuation or, with passive detection, after the**  
36 **pedestrian clears the crosswalk.**
- 37 **C. They shall display a flashing yellow light when actuated. The flash rate shall be at least 50, but**  
38 **no more than 60, flash periods per minute. If they are flashed in a manner that includes a**  
39 **continuous flash of varying intensity and time duration that is repeated to provide a flickering**  
40 **effect, the flickers or pulses shall not repeat at a rate that is between 5 and 30 per second to**  
41 **avoid frequencies that might cause seizures.**
- 42 **D. They shall be installed in the area between the outside edge of the crosswalk line and 10 feet**  
43 **from the outside edge of the crosswalk.**
- 44 **E. They shall face away from the crosswalk if unidirectional, or shall face away from and across**  
45 **the crosswalk if bidirectional.**

46 **If used on one-lane, one-way roadways, a minimum of two In-Roadway Warning Lights shall be**  
47 **installed on the approach side of the crosswalk. If used on two-lane roadways, a minimum of three In-**  
48 **Roadway Warning Lights shall be installed along both sides of the crosswalk. If used on roadways with**

1 **more than two lanes, a minimum of one In-Roadway Warning Light per lane shall be installed along**  
2 **both sides of the crosswalk.**

3 *Guidance:*

4 *If used, In-Roadway Warning Lights should be installed in the center of each travel lane, at the center line*  
5 *of the roadway, at each edge of the roadway or parking lanes, or at other suitable locations away from the*  
6 *normal tire track paths.*

7 *The location of the In-Roadway Warning Lights within the lanes should be based on engineering*  
8 *judgment.*

9 *Option:*

10 On one-way streets, In-Roadway Warning Lights may be omitted on the departure side of the crosswalk.

11 Based on engineering judgment, the In-Roadway Warning Lights on the departure side of the crosswalk  
12 on the left-hand side of a median may be omitted.

13 Unidirectional In-Roadway Warning Lights installed at crosswalk locations may have an optional,  
14 additional yellow light indication in each unit that is visible to pedestrians in the crosswalk to indicate to  
15 pedestrians in the crosswalk that the In-Roadway Warning Lights are in fact flashing as they cross the street.  
16 These yellow lights may flash with and at the same flash rate as the light module in which each is installed.

17 *Guidance:*

18 *If used, the period of operation of the In-Roadway Warning Lights following each actuation should be*  
19 *sufficient to allow a pedestrian crossing in the crosswalk to leave the curb or shoulder and travel at a walking*  
20 *speed of 3.5 feet per second to at least the far side of the traveled way or to a median of sufficient width for*  
21 *pedestrians to wait. Where pedestrians who walk slower than 3.5 feet per second, or pedestrians who use*  
22 *wheelchairs, routinely use the crosswalk, a walking speed of less than 3.5 feet per second should be*  
23 *considered in determining the period of operation.*

24 *An audible information device should be used with In-Roadway Warning Lights to provide assistance for*  
25 *pedestrians with visual disabilities.*

26 **Standard:**

27 **If pedestrian push buttons (rather than passive detection) are used to actuate the In-Roadway**  
28 **Warning Lights, a PUSH BUTTON TO TURN ON WARNING LIGHTS (~~with pushbutton symbol~~)**  
29 **(R10-25) sign (see Section 2B.26-2B.62) shall be ~~mounted adjacent to or integral with each~~ installed**  
30 **explaining the purpose and use of the pedestrian push button detector.**

31 **Where the period of operation is sufficient only for crossing from a curb or shoulder to a median of**  
32 **sufficient width for pedestrians to wait, median-mounted pedestrian actuators shall be provided.**

33 **If an audible information device is used in conjunction with In-Roadway Warning Lights, the**  
34 **audible information device shall not use vibrotactile indications or percussive indications.**

35 **Guidance: Added to reflect Official Change Request 4(09)-42**

36 *If an audible information device is used in conjunction with In-Roadway Warning Lights, the audible*  
37 *message during the time that the lights are flashing should be a speech message that says, “Yellow lights are*  
38 *flashing.” The audible message should be spoken twice.*

1 **PART 5 – AUTOMATED VEHICLES**

2 **CHAPTER 5A. GENERAL**

3 **Section 5A.01 Purpose and Scope**

4 **Support:**

5 The purpose of this Chapter is to provide agencies with general considerations for vehicle automation  
6 as they assess their infrastructure needs, prepare their roadways for automated vehicle (AV) technologies,  
7 and to support the safe deployment of automated vehicle technology.

8 This Chapter provides an overview of foundational AV technology terminology, key principles,  
9 considerations for traffic control device selection, and topics for agencies to consider. The MUTCD does  
10 not address standardizing several areas that might be important to AV technologies such as digital  
11 infrastructure, geometric road design, setting maintenance levels for all traffic control devices, and setting  
12 minimum condition levels for paving materials.

13 It is important for early implementers of automated vehicles to understand the ramifications of traffic  
14 control devices in a mixed fleet environment and to consider the needs of both human and machine led  
15 road users. Partial automation technologies are already commercially available in the vehicle fleet and  
16 are operating under current infrastructure conditions. The overall effectiveness of the automation is  
17 impacted by the uniformity and consistent application of the highway infrastructure, including traffic  
18 control devices.

19 **Section 5A.02 Overview of Connected and Automated Vehicles**

20 **Support:**

21 Connected vehicle technology enables cars, buses, trucks, trains, roads and roadside infrastructure, as  
22 well as other devices such as cellular telephones, to communicate with one another. This technology  
23 enables every vehicle on the road to be aware of where other nearby vehicles are. Drivers would receive  
24 notifications and alerts of dangerous situations, such as a vehicle about to run a red traffic signal as it  
25 nears an intersection or an oncoming car, out of sight beyond a curve, swerving into the opposing lane to  
26 avoid an object on the road.

27 AV technology automates some or all aspects of the driving tasks to assist or replace the human  
28 vehicle operator. Automated vehicle features may include adaptive cruise control, adaptive headlights,  
29 automatic emergency braking, lane tracking assist, or other technology based features used to control  
30 some or all aspects of the vehicle. AVs are vehicles in which at least one element of vehicle control (e.g.  
31 steering, speed control, braking) occurs without direct driver input. AVs work by gathering information  
32 from a suite of sensors:

33 A. Cameras;

34 B. Radar;

35 C. Light detection and ranging (LiDAR);

36 D. Ultrasonic; and

37 E. Infrared.

38 AVs may combine sensor data with other inputs including detailed map data and information from  
39 other connected vehicles or infrastructure. AVs may be able to detect and classify objects in their  
40 surroundings and may predict how they are likely to behave.

41 **Section 5A.03 Definitions and Terms**

42 **Support:**

43 The following definitions and terms, found in the Society of Automotive Engineers standard SAE  
44 J3016 and other sources, are used extensively in automated vehicle technology. Their definitions are  
45 summarized for reference and for use with the provisions of this Manual:

- 1 A. Automated Driving Systems (ADS) - The hardware and software that are collectively capable of  
2 performing the entire dynamic driving task (DDT) on a sustained basis, regardless of whether it is  
3 limited to a specific operational design domain (ODD); this term is used specifically to describe a  
4 level 3, 4, or 5 driving automation system (DAS).
- 5 B. Advanced Driver Assistance Systems (ADAS) – are electronic systems that aid a vehicle driver  
6 with one or more driving tasks while driving. They are intended to increase safe operation of a  
7 vehicle and includes applications such as automatic braking, lane keep assistance, adaptive cruise  
8 control, and others.
- 9 C. Automation Levels:
- 10 1. Level 0 - The full-time performance by the human driver of all aspects of the DDT, even  
11 when enhanced by warning or intervention systems.
- 12 2. Level 1 - The driving mode specific execution by a driver assistance system of either  
13 steering or acceleration/deceleration using information about the driving environment and  
14 with the expectation that the human driver performs all remaining aspects of the DDT.
- 15 3. Level 2 - The driving mode specific execution by one or more driver assistance systems  
16 of both steering or acceleration/deceleration using information about the driving  
17 environment and with the expectation that the human driver performs all remaining  
18 aspects of the DDT.
- 19 4. Level 3 - The driving mode specific performance by an ADS of all aspects of the DDT  
20 with the expectation that the human driver will respond appropriately to a request to  
21 intervene.
- 22 5. Level 4 - The driving mode specific performance by an ADS of all aspects of the DDT,  
23 even if a human driver does not respond appropriately to a request to intervene.
- 24 6. Level 5 - The full-time performance by an ADS of all aspects of the DDT under all  
25 roadway and environmental conditions that can be managed by a human driver.
- 26 D. Cooperative Automation – technology that enables communication with other vehicles and the  
27 infrastructure to coordinate automated vehicle operation.
- 28 E. DAS - The hardware and software that are collectively capable of performing part or all of the  
29 DDT on a sustained basis; this term is used generically to describe any system capable of level 1-  
30 5 driving automation.
- 31 F. DDT - All of the real-time operational and tactical functions required to operate a vehicle in on-  
32 road traffic, excluding the strategic functions such as trip scheduling and selection of destinations  
33 and waypoints.
- 34 G. ODD - Operating conditions under which a given DAS or feature thereof is specifically designed  
35 to function, including, but not limited to, environmental, geographical, and time-of-day  
36 restrictions, and/or the requisite presence or absence of certain traffic or roadway characteristics.

#### 37 **Section 5A.04 Traffic Control Device Design and Use Considerations**

##### 38 Support:

39 The interaction of traffic control devices with DAS can create many challenges for agencies in  
40 determining traffic control device selection and application. The lack of tolerance of DAS for non-  
41 uniformity in traffic control device design and application is a limiting factor of current DAS  
42 sophistication, i.e. DAS has limited ability to interpolate across gaps in traffic control device cues to the  
43 vehicle in the following situations:

- 44 A. The DAS technologies ability to adapt to existing traffic control device design and typical quality,  
45 e.g. the refresh rates of electronic changeable message sign displays or the overall quality of a  
46 device that has been out on the roadway for many years;
- 47 B. The color perception of signs;
- 48 C. The electronically perceptible conspicuity and contrast of markings in different environments and  
49 lighting conditions;

1 D. The DAS camera technologies and device photometric characteristics in reading various types of  
2 traffic signals

3 E. The ability to discern and comprehend temporary traffic control devices and their varying  
4 applications, e.g. active electronic display devices, flaggers, etc.;

5 F. The ability to decipher traffic control at rail grade crossings, especially with passive control.

6 These and other challenges might limit the functionality of DAS making them less effective or  
7 functional. The uniform design and consistent application of standardized traffic control devices supports  
8 the functionality of DAS technology in many situations. Similarly, good traffic control device  
9 maintenance practices and programs will help improve the potential for vehicle DAS to operate properly  
10 in many roadway environments.

11 Guidance:

12 Agencies should adopt traffic control device maintenance policies and or practices with  
13 consideration to both the human vehicle operator and DAS technology needs (see Sections 1A.12, 2A.18,  
14 3A.05 and 4A.10 of this Manual).

15 Engineering judgment (see Section 1D.03 of this Manual) used to determine traffic control device  
16 selection and placement should consider uniformity in application and location needed to support both  
17 the human vehicle operator and DAS technology.

18 Support:

19 A systematic approach to traffic control device selection, application, and maintenance taking into  
20 consideration certain fundamental principles, will help agencies considering the inclusion of DAS  
21 vehicles on their roadways. Generally, improvements to traffic control device uniformity and improved  
22 maintenance policies and practices that keep traffic control devices in good working order with high  
23 levels of conspicuity that benefit the human vehicle operator will benefit DAS vehicles as well.

24 Guidance:

25 Agencies should apply the following fundamental principles and considerations as they evaluate  
26 traffic control devices and other maintenance practices to support AV technologies during maintenance  
27 and infrastructure improvements:

28 A. The uniform and consistent application of traffic control devices on each type of roadway;  
29 applying a similar approach to traffic control at similar locations in similar situations.

30 B. Established maintenance policies that incorporate effective practices to ensure the clear message  
31 intended to the road user on traffic control devices reaching the end of their useful life, or are  
32 damaged or otherwise no longer serviceable, be identified, fixed or replaced in a timely manner.

33 C. Temporary or emergency traffic control, to the extent practical, is planned in advance using  
34 devices that comply with the provisions of this Manual and following policies designed to ensure  
35 uniformity throughout the site and across jurisdiction.

36 D. Removal of extraneous devices that are no longer necessary or that provide limited benefit to  
37 vehicle operation or navigation.

1                    **CHAPTER 5B. PROVISIONS FOR TRAFFIC CONTROL DEVICES**

2                    **Section 5B.01 Signs**

3                    Support:

4                    DAS uses machine vision technology to locate, read, and comprehend traffic signs and appropriately  
5                    make vehicle operational decisions. Location, condition, uniformity, design characteristics, and  
6                    consistent application all affect the ability of machine vision to perform these functions.

7                    Guidance:

8                    Sign location and application should be clearly associated with the displayed message to the specific  
9                    lane or road to which it applies, such as in the case of parallel roads or lanes with different speed limits  
10                   or restrictions.

11                   The practice of sign and information spreading (see Section 2A.19) should be used to limit the  
12                   amount of information displayed in one location or on one sign to minimize sign clutter.

13                   Signs with designs that are otherwise not provided for in this Manual or the Standard Highway Signs  
14                   publication should use standardized sign design practices and features as provided for in this Manual for  
15                   the type of sign, the location, and character of the roadway on which it is used.

16                   The illuminated portion of electronic-display signs using LEDs should have a standard refresh/flicker  
17                   rate. The refresh rate of the LEDs should be greater than 200 Hz to be easier for the camera to detect.

18                   **Section 5B.02 Markings**

19                   Support:

20                   DAS uses machine vision technology to locate, read and comprehend pavement markings. Location,  
21                   condition, uniformity, design characteristics, and consistent application all have some effect on the ability  
22                   of machine vision to perform this function. Certain pavement marking applications and practices have  
23                   been shown through research to better support AV operations, while also benefiting, or at least not  
24                   detracting from, the performance of the human operator. Such practices include the following:

25                   A. Normal-width longitudinal lines on freeways, expressways, and ramps of at least 6 inches wide  
26                   (see Section 3A.04).

27                   B. Edge lines of at least 6 inches in width on roadways with posted speeds greater than 40 mph (see  
28                   Section 3B.09).

29                   Guidance:

30                   The following should be considered to better accommodate machine vision used to support the  
31                   automation of vehicles:

32                   A. Normal-width longitudinal lines of at least 6 inches wide on conventional roadways.

33                   B. Edge lines of at least 6 inches in width on conventional roadways with posted speeds of 40 mph  
34                   or less.

35                   C. Dotted edge line extensions along all entrance and exit ramps, all auxiliary lanes, and all tapers  
36                   where a deceleration or auxiliary lane is added (see Section 3B.11).

37                   D. Chevron markings (see Section 3B.25) in the neutral areas of exit gores to distinguish them from  
38                   travel lanes.

39                   E. Continuous markings at the beginning of work zones and in all lane transitions.

40                   F. Raised pavement markers only as a supplement to, rather than as a substitute for, markings (see  
41                   Sections 3B.16 and 3B.17).

42                   G. Uniform contrast markings on light-colored pavements to create greater contrast.

43                   H. Broken lines (see Section 3B.06) of at least 10 ft in length with a maximum gap of 30 ft.

44                   I. Avoidance of decorative elements in crosswalks.

45                   **Section 5B.03 Highway Traffic Signals**

46                   Guidance:

1 The following considerations should be used to better accommodate machine vision used to support  
2 the automation of vehicles and benefit the performance of the human vehicle operator:

3 A. Traffic signal design should be consistent along corridors with respect to the placement of signal  
4 faces overhead on span-wire and mast arms versus post-mounting on the side of the roadway.

5 B. The number of signal faces for approach lanes and the selection of signal indications and signal  
6 clusters should be consistent along a corridor to promote uniform displays for identical or  
7 similar situations.

8 C. The refresh rate of the LED traffic signals should be consistent throughout the jurisdiction and be  
9 greater than 200 Hz to allow greater consistency in machine vision detection.

10 **Support:**

11 Achieving uniformity along a corridor is desirable for machine vision technology, but can be  
12 challenging. Multiple options are available for traffic signal displays to allow design variations based on  
13 specific intersection variables such as available overhead clearance, utility conflicts, signal support design  
14 constraints and other factors. Where possible, connected and automated vehicles (CAV) needs with  
15 respect to traffic signals are better addressed through vehicle to infrastructure (V2I) for the reasons stated  
16 above and for reliability and accuracy of critical communications under all environmental conditions.

17 **Section 5B.04 Temporary Traffic Control**

18 **Guidance:**

19 Considerations should be given to better accommodate machine vision used to support the  
20 automation of vehicles and benefit the performance of the human vehicle operator in and through work  
21 zones.

22 The type of signs, spacing and mounting height should follow the requirements of Section 6B.04  
23 Advance Warning Area and 6F.02 Sign Placement. The END ROAD WORK (G20-2) sign should be used  
24 to establish the end of the work zone.

25 **Standard:**

26 **Existing pavement markings shall be maintained in all long-term stationary (see Section 6G.02)**  
27 **temporary traffic control zones in accordance with Chapters 3A and 3B, except as otherwise**  
28 **provided for temporary pavement markings in Section 6F.78. Pavement markings shall match the**  
29 **alignment of the markings in place at both ends of the TTC zone. Pavement markings shall be**  
30 **placed along the entire length of any paved detour or temporary roadway prior to the detour or**  
31 **roadway being opened to road users.**

32 **For long-term stationary operations, pavement markings in the temporary traveled way that**  
33 **are no longer applicable shall be removed or obliterated as soon as practical. Pavement marking**  
34 **obliteration shall remove the non-applicable pavement marking material, and the obliteration**  
35 **method shall minimize pavement scarring. Painting over existing pavement markings with black**  
36 **paint or spraying with asphalt shall not be accepted as a substitute for removal or obliteration.**

37 **Guidance:**

38 To better accommodate machine vision used to support the automation of vehicles, -channelizing  
39 devices should be at least 8 inches wide with retroreflective material for reliable machine detection in all  
40 weather conditions. Markings entering the work zone and through lane shifts should be made with highly  
41 visible and continuous materials, not intermittent buttons and reflectors.

42 **Section 5B.05 Traffic Control for Railroad and Light Rail Transit Grade Crossings**

43 **Guidance:**

44 For passive and active grade crossings, placement of signs and markings should be consistent along  
45 a corridor to promote uniformity and to improve the ability of machine vision technology to recognize  
46 highway-rail grade crossings.

1 For active grade crossings, V2I communication should be used to relay information on the arrival or  
2 presence of a train at a highway-rail grade crossing.

3 To better accommodate machine vision used to support the automation of vehicles, the signs and  
4 pavement markings associated with railroad crossings and tracks that are no longer active should be  
5 removed.

6 Support:

7 Where possible, CAV needs with respect to highway-rail grade crossings are better addressed  
8 through V2I infrastructure for reasons of reliability and accuracy of critical communications under all  
9 environmental conditions.

## 10 **Section 5B.06 Traffic Control for Bicycle Facilities**

11 Guidance:

12 To better accommodate machine vision used to support the automation of vehicles, bicycle facilities  
13 should be segregated from other vehicle traffic using physical barriers where practicable.

14 Road markings should indicate the end of a bike lane that is merged with other traffic.

1

**CHAPTER 5C. FUTURE CONSIDERATIONS**

2 (Reserved)

1 CHAPTER 6A . GENERAL

2 Section 6A.01 General

3 Support:

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

5 Standard:

6 The needs and control of all road users (motorists, bicyclists, and pedestrians within the highway, or  
7 on ~~private roads~~ site roadways open to public travel (see definition in Section ~~1A-131C.02~~), including  
8 persons with disabilities in accordance with the Americans with Disabilities Act of 1990 (ADA), Title II,  
9 ~~Paragraph 35.130~~) through a TTC zone shall be an essential part of highway construction, utility work,  
10 maintenance operations, and the management of traffic incidents. **Edited to improve consistency**

11 Support:

12 When the normal function of the roadway, or a ~~private road~~ site roadway open to public travel, is  
13 suspended, TTC planning provides for continuity of the movement of motor vehicle, bicycle, and pedestrian  
14 traffic (including accessible passage); transit operations; and access (and accessibility) to property and  
15 utilities. **Edited to improve consistency**

16 The primary function of TTC is to ~~provide for the reasonably safe and effective~~ facilitate movement of  
17 road users through or around TTC zones while ~~reasonably~~ protecting road users, workers, responders to traffic  
18 incidents, and equipment. **Edited to improve accuracy**

19 Of equal importance to the public traveling through the TTC zone is the safety of workers performing the  
20 many varied tasks within the work space. TTC zones present constantly changing conditions that are  
21 unexpected by the road user. This creates an even higher degree of vulnerability for the workers and incident  
22 management responders on or near the roadway (see Section ~~6D-036C.04~~). At the same time, the TTC zone  
23 provides for the efficient completion of whatever activity interrupted the normal use of the roadway.

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

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

32 The temporary traffic control for low-volume rural and special purpose roads will generally be minimal,  
33 recognizing the lower speeds and traffic volumes. A limited number of signs, maintenance vehicle warning  
34 flashers, or a single flagger could be adequate for most situations. **Added due to elimination of Part 5**

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

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

47 Standard:

48 TTC plans and devices shall be the responsibility of the ~~authority of a public body or official~~ or the  
49 owners of site roadways open to public travel having jurisdiction for guiding road users. **Edited to**  
50 **improve consistency**

1 **Guidance: Standard changed to Guidance**

2 There ~~shall~~ should be adequate statutory authority for the implementation and enforcement of needed  
3 road user regulations, parking controls, speed zoning, and the management of traffic incidents. Such statutes  
4 ~~shall~~ should provide sufficient flexibility in the application of TTC to meet the needs of changing conditions in  
5 the TTC zone.

6 **Support:**

7 Temporary facilities, including pedestrian routes around worksites, are also covered by the accessibility  
8 requirements of the Americans with Disabilities Act of 1990 (ADA) (Public Law 101-336, 104 Stat. 327, July  
9 26, 1990. 42 U.S.C. 12101-12213 (as amended)). **Deleted; redundant with Standard statement above**

10 **Guidance:**

11 ~~The TTC plan should start in the planning phase and continue through the design, construction, and~~  
12 ~~restoration phases. The TTC plans and devices should follow the principles set forth in Part 6. The~~  
13 ~~management of traffic incidents should follow the principles set forth in Chapter 6I.~~ **This text was relocated**  
14 **to new Section 6B.01**

15 **Option:**

16 TTC plans may deviate from the typical applications described in Chapter 6H to allow for conditions and  
17 requirements of a particular site or jurisdiction. **This text was relocated to new Section 6P.01**

18 **Support:**

19 The provisions of Part 6 apply to both rural and urban areas. A rural highway is normally characterized  
20 by lower volumes, higher speeds, fewer turning conflicts, and less conflict with pedestrians. An urban street  
21 is typically characterized by relatively low speeds, wide ranges of road user volumes, narrower roadway lanes,  
22 frequent intersections and driveways, significant pedestrian activity, and more businesses and houses.

23 The determination as to whether a particular facility at a particular time of day can be considered to be a  
24 high-volume roadway or can be considered to be a low-volume roadway is made by the public agency or  
25 official having jurisdiction.

26 Special plans preparation and coordination with transit, other highway agencies, law enforcement and  
27 other emergency units, utilities, schools, trucking associations and railroad companies might be needed to  
28 reduce unexpected and unusual road user operation situations. **This text was relocated from existing Section**  
29 **6B.01**

30 **Section ~~6B.01~~6A.02 Fundamental Principles of Temporary Traffic Control**

31 **Support:**

32 ~~Construction, maintenance, utility, and incident zones can all benefit from TTC to compensate for the~~  
33 ~~unexpected or unusual situations faced by road users. When planning for TTC in these zones, it can be~~  
34 ~~assumed that it is appropriate for road users to exercise caution. Even though road users are assumed to be~~  
35 ~~using caution, special care is still needed in applying TTC techniques.~~ **Deleted; redundant with new Part 1**  
36 **language on target road users**

37 ~~Special plans preparation and coordination with transit, other highway agencies, law enforcement and~~  
38 ~~other emergency units, utilities, schools, and railroad companies might be needed to reduce unexpected and~~  
39 ~~unusual road user operation situations.~~ **This text was relocated to new Section 6A.01**

40 ~~During TTC activities, commercial vehicles might need to follow a different route from passenger~~  
41 ~~vehicles because of bridge, weight, clearance, or geometric restrictions. Also, vehicles carrying hazardous~~  
42 ~~materials might need to follow a different route from other vehicles. The Hazardous Materials and National~~  
43 ~~Network signs are included in Sections 2B.62 and 2B.63, respectively.~~ **This was text relocated to new**  
44 **Section 6B.01**

45 Experience has shown that following the fundamental principles of Part 6 will assist road users and help  
46 protect workers in the vicinity of TTC zones.

47 **Standard:**

48 ~~Before any new detour or temporary route is opened to traffic, all necessary signs shall be in place.~~  
49 **Relocated from below and deleted; redundant with new Standard in new Section 1D.11**

1 All TTC devices shall be removed as soon as practical when they are no longer needed. When work  
2 is suspended for short periods of time, TTC devices that are no longer appropriate shall be removed or  
3 covered. **Relocated from below**

4 *Guidance:*

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

10 *Support:*

11 ~~Formulating specific plans for TTC at traffic incidents is difficult because of the variety of situations that~~  
12 ~~can arise.~~ **This text was relocated to new Section 6B.01**

13 *Guidance:*

14 The following are the seven fundamental principles of TTC:

- 15 1. General plans or guidelines should be developed to provide safety for motorists, bicyclists,  
16 pedestrians, workers, enforcement/emergency officials, and equipment, with the following factors  
17 being considered:
  - 18 A. The basic safety principles governing the design of permanent roadways and roadsides should  
19 also govern the design of TTC zones. The goal should be to route road users through such zones  
20 using roadway geometrics, roadside features, and TTC devices as nearly as possible comparable  
21 to those for normal highway situations.
  - 22 B. A TTC plan, in detail appropriate to the complexity of the work project or incident, should be  
23 prepared and understood by all responsible parties before the site is occupied. Any changes in  
24 the TTC plan should be approved by an official who is knowledgeable (for example, trained  
25 and/or certified) in proper TTC practices.
- 26 2. Road user movement should be inhibited as little as practical, based on the following considerations:
  - 27 A. TTC at work and incident sites should be designed on the assumption that drivers will only reduce  
28 their speeds if they clearly perceive a need to do so (see Section ~~6C.016B.01~~).
  - 29 B. Frequent and abrupt changes in geometrics such as lane narrowing, dropped lanes, or main  
30 roadway transitions that require rapid maneuvers, should be avoided.
  - 31 C. Work should be scheduled in a manner that minimizes the need for lane closures or alternate  
32 routes, while still getting the work completed quickly and the lanes or roadway open to traffic as  
33 soon as possible.
  - 34 D. Attempts should be made to reduce the volume of traffic using the roadway or freeway to match  
35 the restricted capacity conditions. Road users should be encouraged to use alternative routes.  
36 When the roadway capacity is reduced due the lane closures, the demand will exceed the  
37 available capacity and result in either a lengthy stopped or slow moving queue of vehicles that  
38 may extend past the normal signs shown in the typical advance warning area. An assessment of  
39 the expected queue length should be a part of the temporary traffic control plan design process  
40 and adjustments to the sign spacing and number of signs as well as the possibility of using more  
41 conspicuous devices may be provided to increase the distance and conspicuity of the advance  
42 warning area. **Added to reflect NTSB H-15-16 recommendation** For high-volume roadways  
43 and freeways, the closure of selected entrance ramps or other access points and the use of signed  
44 diversion routes should be evaluated.
  - 45 E. Bicyclists and pedestrians, including those with disabilities, should be provided with access and  
46 ~~reasonably safe~~ passage through the TTC zone. **Edited to improve consistency**
  - 47 F. If work operations permit, lane closures on high-volume streets and highways should be  
48 scheduled during off-peak hours. Night work should be considered if the work can be  
49 accomplished with a series of short-term operations.
  - 50 G. Early coordination with officials having jurisdiction over the affected cross streets and providing  
51 emergency services should occur if significant impacts to roadway operations are anticipated.

- 1 3. Motorists, bicyclists, and pedestrians should be guided in a clear and positive manner while  
2 approaching and traversing TTC zones and incident sites. The following principles should be  
3 applied:
- 4 A. Adequate warning, delineation, and channelization should be provided to assist in guiding road  
5 users in advance of and through the TTC zone or incident site by using proper pavement marking,  
6 signing, or other devices that are effective under varying conditions. ~~Providing information~~  
7 ~~should be provided in that is in usable formats by for~~ pedestrians with visual disabilities ~~should~~  
8 ~~also be considered.~~ Edited to reflect 28 CFR 35.160 (subpart a)
- 9 B. TTC devices inconsistent with intended travel paths through TTC zones should be removed or  
10 covered. However, in intermediate-term stationary, short-term, and mobile operations, where  
11 visible permanent devices are inconsistent with intended travel paths, devices that highlight or  
12 emphasize the appropriate path should be used. ~~Providing traffic control devices~~ should  
13 provide information in usable formats for pedestrians with visual disabilities. ~~that are accessible~~  
14 ~~to and usable by pedestrians with disabilities should be considered.~~ Edited to reflect 28 CFR  
15 35.160 (subpart a)
- 16 C. Flagging procedures, when used, should provide positive guidance to road users traversing the  
17 TTC zone.
- 18 4. To provide acceptable levels of operations, routine day and night inspections of TTC elements should  
19 be performed as follows:
- 20 A. Individuals who are knowledgeable (for example, trained and/or certified) in the principles of  
21 proper TTC should be assigned responsibility for safety in TTC zones. The most important duty  
22 of these individuals ~~should be is~~ to check that ~~all~~ TTC devices ~~of on~~ the project are consistent with  
23 the TTC plan and are effective for motorists, bicyclists, pedestrians, and workers. Edited to  
24 improve consistency
- 25 B. As the work progresses, temporary traffic controls and/or working conditions should be modified,  
26 ~~if appropriate as needed, in order to provide mobility and positive guidance to the facilitate~~ road  
27 user movement and ~~to provide~~ worker safety. The individual responsible for TTC should have the  
28 authority to halt work until applicable or remedial safety measures are taken. Edited to improve  
29 consistency
- 30 C. TTC zones should be carefully monitored under varying conditions of road user volumes, light,  
31 and weather to check that applicable TTC devices are effective, clearly visible, clean, and in  
32 compliance with the TTC plan.
- 33 D. When warranted, an engineering study should be made (in cooperation with law enforcement  
34 officials) of reported crashes occurring within the TTC zone. Crash records in TTC zones should  
35 be monitored to identify the need for changes in the TTC zone.
- 36 5. Attention should be given to the maintenance of roadside safety during the life of the TTC zone by  
37 applying the following principles:
- 38 A. To accommodate run-off-the-road incidents, disabled vehicles, or emergency situations,  
39 unencumbered roadside recovery areas or clear zones should be provided where practical.
- 40 B. Channelization of road users should be accomplished by the use of pavement markings, signing,  
41 and crashworthy, detectable channelizing devices.
- 42 C. Work equipment, workers' private vehicles, materials, and debris should be stored in such a  
43 manner to reduce the probability of being impacted by run-off-the-road vehicles.
- 44 6. Each person whose actions affect TTC zone safety, from the upper-level management through the field  
45 workers, should receive training appropriate to the job decisions each individual is required to make.  
46 Only those individuals who are trained in proper TTC practices and have a basic understanding of  
47 the principles (established by applicable standards and guidelines, including those of this Manual)  
48 should supervise the selection, placement, and maintenance of TTC devices used for TTC zones and  
49 for incident management.
- 50 7. Good public relations should be maintained by applying the following principles:
- 51 A. The needs of all road users should be assessed such that appropriate advance notice is given and  
52 clearly defined alternative paths are provided.

- 1 B. The cooperation of the various news media should be sought in publicizing the existence of and  
2 reasons for TTC zones because news releases can assist in keeping the road users well informed.  
3 C. The needs of abutting property owners, residents, and businesses should be assessed and  
4 appropriate accommodations made.  
5 D. The needs of emergency service providers (law enforcement, fire, and medical) should be  
6 assessed and appropriate coordination and accommodations made.  
7 E. The needs of railroads and transit should be assessed and appropriate coordination and  
8 accommodations made.  
9 F. The needs of operators of commercial vehicles such as buses and large trucks should be assessed  
10 and appropriate accommodations made.

11 **Standard:-**

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

16 **Section 6F.016A.03 Types of TTC Devices** New Section with paragraphs from existing Section  
17 **6F.01 and section title changed**

18 *Guidance:*

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

21 **Standard:**

22 Traffic control devices shall be defined as all signs, signals, markings, channelizing devices, and/or  
23 other devices that used colors, shapes, symbols, words, sounds, or tactile information for the primary  
24 purpose of communicating a regulatory, warning, or guidance message to road users, placed on,  
25 over, or adjacent to a street, highway, pedestrian facility, bikeway, pathway, or private roads site  
26 roadways open to public travel (see definition in Section 1A.13), pedestrian facility, or bikeway by  
27 authority of a public body or official having jurisdiction. Revised for consistency with revised definition  
28 in Part 1.

29 All traffic control devices used for construction, maintenance, utility, or incident management  
30 operations on a street, highway, or private road site roadways open to public travel ~~(see definition in~~  
31 ~~Section 1A.13)~~ shall comply with the applicable provisions of this Manual. Edited to improve  
32 consistency

33 **Section 6A.04 Crashworthiness of TTC Devices** New Section with paragraphs from existing  
34 **Section 6F.01**

35 *Support:*

36 Various Sections of the MUTCD require certain traffic control devices, their supports, and/or related  
37 appurtenances to be crashworthy. Such MUTCD crashworthiness provisions apply to all streets, highways,  
38 and site roadways open to public travel. FHWA policy requires that all roadside appurtenances such as traffic  
39 barriers, barrier terminals and crash cushions, bridge railings, sign and light pole supports, and work zone  
40 hardware used on the National Highway System meet the crashworthy performance criteria contained in the  
41 National Cooperative Highway Research Program (NCHRP) Report 350, “Recommended Procedures for the  
42 Safety Performance Evaluation of Highway Features.” The FHWA website at  
43 “<http://safety.fhwa.dot.gov/programs/roadside硬件.htm>” identifies all such hardware and includes copies  
44 of FHWA acceptance letters for each of them. In the case of proprietary items, links are provided to  
45 manufacturers’ websites as a source of detailed information on specific devices. The website also contains an  
46 “Ask the Experts” section where questions on roadside design issues can be addressed.

47 ~~Various Sections of the MUTCD require certain traffic control devices, their supports, and/or related~~  
48 ~~appurtenances to be crashworthy. Such MUTCD crashworthiness provisions apply to all streets, highways,~~  
49 ~~and private roads open to public travel. Also, State Departments of Transportation and local agencies might~~  
50 ~~have expanded the NCHRP Report 350 crashworthy criteria to apply to certain other roadside appurtenances.~~

1 ~~Crashworthiness and crash testing information on devices described in Part 6 are found in AASHTO's~~  
2 ~~"Roadside Design Guide" (see Section 1A.11).~~

3 ~~As defined in Section 1A.13, "crashworthy" is a characteristic of a roadside appurtenance that has been~~  
4 ~~successfully crash tested in accordance with a national standard such as the NCHRP Report 350,~~  
5 ~~"Recommended Procedures for the Safety Performance Evaluation of Highway Features." Edited to improve~~  
6 **clarity**

7 **Section 6A.05 Night Work** **New section with paragraphs 2-5 from existing Section 6G.19**

8 Support:

9 Conducting highway construction and maintenance activities during night hours could provide an  
10 advantage when traditional daytime traffic control strategies cannot achieve an acceptable balance between  
11 worker and public safety, traffic and community impact, and constructability. The two basic advantages of  
12 working at night are reduced traffic congestion and less involvement with business activities. However, the  
13 two basic conditions that must normally be met for night work to offer any advantage are reduced traffic  
14 volumes and easy set up and removal of the traffic control patterns on a nightly basis.

15 Shifting work activities to night hours, when traffic volumes are lower and normal business is less active,  
16 might offer an advantage in some cases, as long as the necessary work can be completed and the worksite  
17 restored to essentially normal operating conditions to carry the higher traffic volume during non-construction  
18 hours.

19 Although working at night might offer advantages, it also includes safety issues. Reduced visibility  
20 inherent in night work impacts the performance of both drivers and workers. Because traffic volumes are  
21 lower and congestion is minimized, speeds are often higher at night necessitating greater visibility at a time  
22 when visibility is reduced. Finally, the incidence of impaired (alcohol or drugs), fatigued, or drowsy drivers  
23 might be higher at night.

24 Working at night also involves other factors, including construction productivity and quality, social  
25 impacts, economics, and environmental issues. A decision to perform construction or maintenance activities  
26 at night normally involves some consideration of the advantages to be gained compared to the safety and other  
27 issues that might be impacted.

28 **See Section 6N.18 for specific provisions on TTC for work during nighttime hours.** **Added to reflect**  
29 **reorganization of material between Section 6A.05 and Section 6N.18**

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~~CHAPTER 6B. FUNDAMENTAL PRINCIPLES~~

~~Section 6B.01 Fundamental Principles of Temporary Traffic Control~~ This chapter and most of its text  
has been moved to new Section 6A.02

1 CHAPTER ~~6C~~6B. TEMPORARY TRAFFIC CONTROL ELEMENTS

2 Section ~~6C.01~~6B.01 Temporary Traffic Control Plans

3 Support:

4 Each TTC zone is different. Many variables, such as location of work, highway type, geometrics, vertical  
5 and horizontal alignment, intersections, interchanges, road user volumes, road vehicle mix (buses, trucks, and  
6 cars), and road user speeds affect the needs of each zone. The goal of TTC in work zones is safety with  
7 minimum disruption to road users. The key factor in promoting TTC zone safety is proper judgment. **This  
8 text was relocated from existing Section 6G.01**

9 A TTC plan describes TTC measures to be used for facilitating road users through a work zone or an  
10 incident area. TTC plans play a vital role in ~~providing continuity of effective~~ facilitating road user flow when  
11 a work zone, incident, or other event temporarily disrupts normal road user flow. Important auxiliary  
12 provisions that cannot conveniently be specified on project plans can easily be incorporated into Special  
13 Provisions within the TTC plan. **Edited to improve consistency**

14 TTC plans range in scope from being very detailed to simply referencing typical drawings contained in  
15 this Manual, standard approved highway agency drawings and manuals, or specific drawings contained in the  
16 contract documents. The degree of detail in the TTC plan depends entirely on the nature and complexity of  
17 the situation.

18 During TTC activities, commercial vehicles might need to follow a different route from passenger  
19 vehicles because of bridge, weight, clearance, or geometric restrictions. Also, vehicles carrying hazardous  
20 materials might need to follow a different route from other vehicles. The Hazardous Materials and National  
21 Network signs are included in Sections 2B.~~7262~~ and 2B.~~6373~~, respectively. **This text was relocated from  
22 existing Section 6B.01.**

23 *Guidance:*

24 *A TTC plan should be developed for any activity, either planned or unplanned, that will affect road users.*  
25 **Added to improve accuracy**

26 *The TTC plan should start in the planning phase and continue through the design, construction, and*  
27 *restoration phases. The TTC plans and devices should follow the principles set forth in Part 6. The*  
28 *management of traffic incidents should follow the principles set forth in Chapter ~~6H60~~.* **This text was  
29 relocated from existing Section 6A.01.**

30 *TTC plans should be prepared by persons knowledgeable (for example, trained and/or certified) about the*  
31 *fundamental principles of TTC and work activities to be performed. The design, selection, and placement of*  
32 *TTC devices for a TTC plan should be based on engineering judgment.*

33 *Coordination should be made between adjacent or overlapping projects to check that duplicate signing is*  
34 *not used and to check compatibility of traffic control between adjacent or overlapping projects.*

35 *Traffic control planning should be completed for all highway construction, utility work, maintenance*  
36 *operations, and incident management including minor maintenance and utility projects prior to occupying the*  
37 *TTC zone. Planning for all road users should be included in the process.*

38 *For any planned special event that will have an impact on the traffic on any street or highway, a TTC*  
39 *plan should be developed in conjunction with and be approved by the agency or agencies that have*  
40 *jurisdiction over the affected roadways.* **This text was relocated from existing Section 6G.01**

41 *Provisions for effective continuity of accessible circulation paths for pedestrians should be incorporated*  
42 *into the TTC process plan. ~~Where existing pedestrian routes are blocked or detoured, information should be~~*  
43 *~~provided about alternative routes that are usable by pedestrians with disabilities, particularly those who have~~*  
44 *~~visual disabilities. Access to temporary bus stops, travel across intersections with accessible pedestrian~~*  
45 *~~signals (see Section 4E.09), and other routing issues should be considered where temporary pedestrian routes~~*  
46 *~~are channelized. Barriers and channelizing devices that are detectable by people with visual disabilities~~*  
47 *~~should be provided.~~* **Deleted; redundant with other text in this section**

48 Option:

49 Provisions may be incorporated into the project bid documents that enable contractors to develop an  
50 alternate TTC plan.

1 Modifications of TTC plans may be necessary because of changed conditions or a determination of better  
2 methods of safely and efficiently handling road users.

3 *Guidance:*

4 *This alternate or modified plan should have the approval of the responsible highway agency or owner of*  
5 *site roadways open to public travel prior to implementation. Edited to improve consistency*

6 *Provisions for effective continuity of transit service should be incorporated into the TTC planning process*  
7 *because often public transit buses cannot efficiently be detoured in the same manner as other vehicles*  
8 *(particularly for short-term maintenance projects). Where applicable, the TTC plan should provide for*  
9 *features such as accessible temporary bus stops, pull-outs, and satisfactory waiting areas for transit patrons,*  
10 *including persons with disabilities, ~~if applicable~~ (see Section 8A.0814 for additional light rail transit issues to*  
11 *consider for TTC).*

12 *Provisions for effective continuity of railroad service and acceptable access to abutting property owners*  
13 *and businesses should also be incorporated into the TTC planning process.*

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

16 *~~If R~~reduced speed limits are used, they should be used only in the specific portion of the TTC zone where*  
17 *conditions or restrictive features are present. However, frequent changes in the speed limit should be*  
18 *avoided. A TTC plan should be designed so that vehicles can travel through the TTC zone with a speed limit*  
19 *reduction of no more than 10 mph. Edited to improve consistency*

20 *A reduction of more than 10 mph in the speed limit should be used only when required by restrictive*  
21 *features in the TTC zone. Where restrictive features justify a speed reduction of more than 10 mph, additional*  
22 *driver notification should be provided. The speed limit should be stepped down in advance of the location*  
23 *requiring the lowest speed, and additional TTC warning devices should be used.*

24 *Support:*

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

29 Chapter 6P contains typical applications (TAs) of TTC zones that are organized according to duration,  
30 location, type of work, and highway type. Table ~~6H-16P-1~~ is an index of these typical applications. These  
31 typical applications include the use of various TTC methods, but do not include a layout for every conceivable  
32 work situation. **This text was relocated from existing Section 6G.01 and edited to improve clarity**

33 Decisions regarding the selection of the most appropriate typical application to use as a guide for a  
34 specific TTC zone require an understanding of each situation. Although there are many ways of categorizing  
35 TTC zone applications, ~~the four factors mentioned earlier~~ (work duration, work location, work type, and  
36 highway type) are used to characterize the typical applications illustrated in Chapter ~~6H6P~~. **This text was**  
37 **relocated from existing Section 6G.01 and edited to improve consistency**

38 *Guidance:*

39 *Typical applications should be altered, when necessary, to fit the conditions of a particular TTC zone.*

40 **This text was relocated from existing Section 6G.01**

41 *Option:*

42 Other devices may be added to supplement the devices shown in the typical applications, while others  
43 may be deleted. The sign spacings and taper lengths may be increased to provide additional time or space for  
44 driver response. **This text was relocated from existing Section 6G.01**

45 *Support:*

46 Formulating specific plans for TTC at traffic incidents is difficult because of the variety of situations that  
47 can arise. **This text was relocated from existing Section 6B.01**

48 Well-designed TTC plans for planned special events will likely be developed from a combination of  
49 treatments from several of the typical applications. **This text was relocated from existing Section 6G.01**

## 50 **Section ~~6C.02~~6B.02 Temporary Traffic Control Zones**

1 Support:

2 A TTC zone is an area of a highway where road user conditions are changed because of a work zone, an  
3 incident zone, or a planned special event through the use of TTC devices, uniformed law enforcement officers,  
4 or other authorized personnel.

5 A work zone is an area of a highway with construction, maintenance, or utility work activities. A work  
6 zone is typically marked by signs, channelizing devices, barriers, pavement markings, and/or work vehicles.  
7 It extends from the first warning sign or high-intensity rotating, flashing, oscillating, or strobe lights on a  
8 vehicle to the END ROAD WORK sign or the last TTC device.

9 An incident zone is an area of a highway where temporary traffic controls are imposed by authorized  
10 officials in response to a traffic incident (see Section ~~6C.03~~6C.01). It extends from the first warning device (such  
11 as a sign, light, or cone) to the last TTC device or to a point where road users return to the original lane  
12 alignment and are clear of the incident.

13 A planned special event often creates the need to establish altered traffic patterns to handle the increased  
14 traffic volumes generated by the event. The size of the TTC zone associated with a planned special event can  
15 be small, such as closing a street for a festival, or can extend throughout a municipality for larger events. The  
16 duration of the TTC zone is determined by the duration of the planned special event.

### 17 **Section ~~6C.03~~6B.03 Components of Temporary Traffic Control Zones**

18 Support:

19 ~~Most~~A TTC zones ~~are~~ is often divided into four areas as needed, based on engineering judgment: the  
20 advance warning area, the transition area, the activity area, and the termination area. Figure ~~6C-16B-1~~  
21 illustrates these four areas typically included in a TTC zone. These four areas are described in Sections  
22 ~~6C.04~~6B.04 through ~~6C.07~~6B.07. **Edited to improve clarity**

#### 23 **Figure 6B-1. Component Parts of a Temporary Traffic Control Zone**

### 24 **Section ~~6C.04~~6B.04 Advance Warning Area**

25 Support:

26 The advance warning area is the section of highway where road users are informed about the upcoming  
27 ~~work zone~~transition and activity areas or incident area. **Edited to improve clarity**

28 Option:

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

31 *Guidance:*

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

35 *On urban streets, the effective placement of the ~~first~~nearest warning sign to the TTC zone, in feet, should*  
36 *range from 4 to 8 times the speed limit in mph, with the high end of the range being used when speeds are*  
37 *relatively high. **Edited to improve clarity** ~~When a single advance warning sign is used (in cases such as~~  
38 ~~low speed residential streets), the advance warning area can be as short as 100 feet. **Guidance changed to**~~  
39 **Option and relocated to paragraph below** *When two or more advance warning signs are used on higher-*  
40 *speed streets, such as major arterials, the advance warning area should extend a greater distance (see Table*  
41 *6C-16B-1).**

42 Option:

43 When a single advance warning sign is used (in cases such as low-speed residential streets), the advance  
44 warning area may be as short as 100 feet. **Guidance changed to Option and relocated from paragraph**  
45 above

46 Guidance:

47 *Since rural highways are normally characterized by higher speeds, the effective placement of the first*  
48 *warning sign in feet should be substantially longer—from 8 to 12 times the speed limit in mph. Since two or*

1 more advance warning signs are normally used for these conditions, the advance warning area should extend  
2 1,500 feet or more for open highway conditions (see Table ~~6C-1~~6B-1).

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

6 Support:

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

11 Option:

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

14 **Table 6B-1. Recommended Advance Warning Sign Minimum Spacing**

15 \*Speed category to be determined by the highway agency or owner of roadways open to public travel

16 **Section ~~6C.05~~6B.05 Transition Area**

17 Support:

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

21 Standard:

22 **When redirection of the road users' normal path is required, they shall be directed from the normal**  
23 **path to a new path, with signs, arrow boards, and/or channelizing devices, except for short-term or**  
24 **mobile operations.** Edited to improve consistency

25 Option:

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

30 **Section ~~6C.06~~6B.06 Activity Area**

31 Support:

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

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

37 Option:

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

39 Guidance:

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

42 Support:

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

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

46 Guidance:

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

1 Option:

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

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

5 The longitudinal buffer space may also be used to separate opposing road user flows that use portions of  
6 the same traffic lane, as shown in Figure ~~6C-26B-2~~.

7 If a longitudinal buffer space is used, the values shown in Table ~~6C-26B-2~~ may be used to determine the  
8 length of the longitudinal buffer space.

9 Support:

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

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

14 Option:

15 The lateral buffer space may be used to separate the traffic space from the work space, as shown in  
16 Figures ~~6C-16B-1~~ and ~~6C-26B-2~~, or such areas as excavations or pavement-edge drop-offs. A lateral buffer  
17 space also may be used between two travel lanes, especially those carrying opposing flows.

18 *Guidance:*

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

20 Option:

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

24 **Figure 6B-2. Types of Tapers and Buffer Spaces**

25 **Table 6B-2. Stopping Sight Distance as a Function of Speed**

26 **Section ~~6C-07~~6B.07 Termination Area**

27 Support:

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

31 Option:

32 An END ROAD WORK sign, a Speed Limit sign, or other signs may be used to inform road users that  
33 they can resume normal operations.

34 A longitudinal buffer space may be used between the work space and the beginning of the downstream  
35 taper.

36 **Section ~~6C-08~~6B.08 Tapers**

37 Option:

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

41 Support:

42 Tapers are created by using a series of channelizing devices and/or pavement markings to move traffic out  
43 of or into the normal path. Types of tapers are shown in Figure ~~6C-26B-2~~.

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

1 Guidance:

2 The appropriate taper length (L) should be determined using the criteria shown in Tables ~~6C-36B-3~~ and  
3 ~~6C-46B-4~~.

4 ~~The maximum distance in feet between devices in a taper should not exceed 1.0 times the speed limit in~~  
5 ~~mph.~~ **This text was relocated to new Section 6K.01**

6 Support:

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

9 Guidance:

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

13 Support:

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

17 Guidance:

18 A shifting taper should have a length of approximately 1/2 L (see Tables ~~6C-36B-3~~ and ~~6C-46B-4~~).

19 Support:

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

23 Guidance:

24 If used, shoulder tapers should have a length of approximately 1/3 L (see Tables ~~6C-36B-3~~ and ~~6C-46B-~~  
25 ~~4~~). If a shoulder is used as a travel lane, either through practice or during a TTC activity, a normal merging  
26 or shifting taper should be used.

27 Support:

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

30 Guidance:

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

33 Support:

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

36 Guidance:

37 ~~Traffic should be controlled by a flagger or temporary traffic control signal (if sight distance is limited),~~  
38 ~~or a STOP or YIELD sign.~~ **Deleted; redundant with Chapter 3E** A ~~short~~ taper having a minimum length of  
39 50 feet and a maximum length of 100 feet with channelizing devices at approximately 20-foot spacing should  
40 be used to guide traffic into the one-lane section, and a downstream taper should be used to guide traffic back  
41 into their original lane. **Edited to improve accuracy**

42 Support:

43 An example of a one-lane, two-way traffic taper is shown in Figure ~~6C-36B-3~~.

44 **Figure 6B-3. Example of a One-Lane, Two-Way Traffic Taper**

45 **Table 6B-3. Taper Length Criteria for Temporary Traffic Control Zones**

46 **Table 6B-4. Formulas for Determining Taper Length**

47 **Section ~~6C-09~~6B.09 Detours and Diversions**

1 Support:

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

3 *Guidance:*

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

6 Support:

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

9 ~~Section 6C.10 One-Lane, Two-Way Traffic Control~~ This text was relocated to new Section  
10 ~~6E.01~~

11 ~~Section 6C.11 Flagger Method of One-Lane, Two-Way Traffic Control~~ This text was relocated  
12 ~~to new Section 6E.02~~

13 ~~Section 6C.12 Flag Transfer Method of One-Lane, Two-Way Traffic Control~~ This text was  
14 ~~relocated to new Section 6E.03~~

15 ~~Section 6C.13 Pilot Car Method of One-Lane, Two-Way Traffic Control~~ This text was  
16 ~~relocated to new Section 6E.04~~

17 ~~Section 6C.14 Temporary Traffic Control Signal Method of One-Lane, Two-Way Traffic~~  
18 ~~Control~~ This text was relocated to new Section 6E.05

19 ~~Section 6C.15 Stop or Yield Control Method of One-Lane, Two-Way Traffic Control~~ This text was  
20 ~~relocated to new Section 6E.06~~

21

1 CHAPTER ~~6D~~6C. PEDESTRIAN AND WORKER SAFETY

2 Section 6C.01 Pedestrian and Worker Safety – General

3 **Standard:**

4 The various TTC provisions for pedestrian and worker safety set forth in Part 6 shall be applied by  
5 knowledgeable (for example, trained and/or certified) persons after appropriate evaluation and  
6 engineering judgment. **This text was relocated from existing Section 6D.01**

7 Section ~~6D.01~~6C.02 Pedestrian Considerations

8 Support:

9 A wide range of pedestrians might be affected by TTC zones, including the young, elderly, and people  
10 with disabilities such as hearing, visual, or mobility. ~~These p~~ Pedestrians need a clearly delineated and usable  
11 travel path. Considerations for pedestrians with disabilities are addressed in Section ~~6D~~6C.0203.

12 **Standard:**

13 ~~The various TTC provisions for pedestrian and worker safety set forth in Part 6 shall be applied by~~  
14 ~~knowledgeable (for example, trained and/or certified) persons after appropriate evaluation and~~  
15 ~~engineering judgment. This text was relocated to new Section 6C.01~~

16 **Guidance:** **Standard changed to Guidance and edited to improve consistency**

17 Prior to closing a ~~Advance notification of sidewalk,~~ ~~closures shall be provided by~~ the maintaining  
18 agency should advise users of the future closure.

19 **Standard:**

20 If the TTC zone affects the movement of pedestrians, adequate pedestrian access and walkways  
21 shall be provided. ~~If the TTC zone affects an accessible and detectable pedestrian facility, the~~  
22 ~~accessibility and detectability shall be maintained along the alternate pedestrian route. Deleted;~~  
23 ~~redundant with new Section 6N.04~~

24 Option:

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

28 If an existing pedestrian route is impacted by a short-duration or short term work zone that is attended  
29 with project personnel, establishing an alternate pedestrian route may not be necessary if the work can be  
30 stopped and pedestrians can navigate the work zone. Pedestrians may be delayed for a short period of time for  
31 project personnel to move equipment and material to facilitate passage. Work zone personnel may also  
32 provide assistance to the pedestrian as necessary. **Added to improve accuracy**

33 Support:

34 ~~It must be recognized that p~~ Pedestrians are reluctant to retrace their steps to a prior intersection for a  
35 crossing or to add distance or out-of-the-way travel to a destination. **Edited to improve accuracy** This is  
36 especially true for site roadways open to public travel where pedestrians will seek the shortest route, e.g., from  
37 a site building to their parked vehicle. **Added to improve consistency**

38 **Guidance:**

39 *The following three items should be considered when planning for pedestrians in TTC zones:*

- 40 A. *Pedestrians should not be led into conflicts with vehicles, equipment, and operations.*
- 41 B. *Pedestrians should not be led into conflicts with vehicles moving through or around the worksite.*
- 42 C. *Pedestrians should be provided with a convenient and accessible path that replicates as nearly as*  
43 *practical the most desirable characteristics of the existing sidewalk(s) or footpath(s).*

44 *A pedestrian route should not be severed and/or moved for non-construction activities such as parking for*  
45 *vehicles and equipment.*

46 *Consideration should be made to separate pedestrian movements from both worksite activity and*  
47 *vehicular traffic. Unless an acceptable route that does not involve crossing the roadway can be provided,*  
48 *pedestrians should be appropriately directed with advance signing that encourages them to cross to the*

1 opposite side of the roadway. In urban and suburban areas with high vehicular traffic volumes, these signs  
2 should be placed at intersections (rather than midblock locations) so that pedestrians are not confronted with  
3 midblock worksites that will induce them to attempt skirting the worksite or making a midblock crossing.

4 Due to the likelihood of high pedestrian presence in site roadways open to public travel, TTC zones  
5 should be designed to minimize conflicts between vehicular and pedestrian movements. **Added to improve**  
6 **consistency**

7 Support:

8 Figures ~~6H6P~~-28 and ~~6H6P~~-29 show typical TTC device usage and techniques for pedestrian movement  
9 through work zones.

10 Guidance:

11 To accommodate the needs of pedestrians, including those with disabilities, the following considerations  
12 should be addressed when temporary pedestrian pathways in TTC zones are designed or modified:

- 13 A. Provisions for continuity of accessible paths for pedestrians should be incorporated into the TTC  
14 plan.
- 15 B. Access to transit stops should be maintained.
- 16 C. A smooth, continuous hard surface should be provided throughout the entire length of the temporary  
17 pedestrian facility. There should be no curbs or abrupt changes in grade or terrain that could cause  
18 tripping or be a barrier to wheelchair use. The geometry and alignment of the facility should meet the  
19 applicable requirements of the “U.S. Department of Justice 2010 ADA Standards for Accessible  
20 Design, September 15, 2010 and Code of Federal Regulations, Title 28, Parts 35 and 36. Americans  
21 with Disabilities Act of 1990~~Americans with Disabilities Act Accessibility Guidelines for Buildings~~  
22 ~~and Facilities (ADAAG)”~~ (see Section 1A.1105).
- 23 D. The width of the existing pedestrian facility should be provided for the temporary facility if practical.  
24 Traffic control devices and other construction materials and features should not intrude into the  
25 usable width of the sidewalk, temporary pathway, or other pedestrian facility. When it is not possible  
26 to maintain a minimum width of 60 inches throughout the entire length of the pedestrian pathway, a  
27 60 x 60-inch passing space should be provided at least every 200 feet to allow individuals in  
28 wheelchairs to pass.
- 29 E. Blocked routes, alternate crossings, and sign and signal information should be communicated to  
30 pedestrians with visual disabilities by providing devices such as audible information devices,  
31 accessible pedestrian signals, or barriers and channelizing devices that are detectable to the  
32 pedestrians traveling with the aid of a long cane or who ~~have low~~ have vision disabilities. Where  
33 pedestrian traffic is detoured to a TTC signal, engineering judgment should be used to determine if  
34 pedestrian signals or accessible pedestrian signals should be considered for crossings along an  
35 alternate route.
- 36 F. When channelization is used to delineate a pedestrian pathway, a continuous detectable edging  
37 should be provided throughout the length of the facility such that pedestrians using a long cane can  
38 follow it. These detectable edgings should comply with the provisions of Section ~~6F6M.7404~~.
- 39 G. Signs and other devices mounted lower than 7 feet above the temporary pedestrian pathway should  
40 not project more than 4 inches into accessible pedestrian facilities.

41 Option:

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

44 Guidance:

45 Fencing should not create sight distance restrictions for road users. Fences should not be constructed of  
46 materials that would be hazardous if impacted by vehicles. Wooden railing, fencing, and similar systems  
47 placed immediately adjacent to motor vehicle traffic should not be used as substitutes for crashworthy  
48 temporary traffic barriers.

49 Ballast for TTC devices should be kept to the minimum amount needed and should be mounted low to  
50 prevent penetration of the vehicle windshield.

51 Movement by work vehicles and equipment across designated pedestrian paths should be minimized and,  
52 when necessary, should be controlled by flaggers or other TTC. **Edited to improve accuracy** Staging or

1 *stopping of work vehicles or equipment along the side of pedestrian paths should be avoided, since it*  
2 *encourages movement of workers, equipment, and materials across the pedestrian path.*

3 *Access to the work space by workers and equipment across pedestrian walkways should be minimized*  
4 *because the access often creates unacceptable changes in grade, and rough or muddy terrain, and pedestrians*  
5 *will tend to avoid these areas by attempting non-intersection crossings where no curb ramps are available.*

6 Option:

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

9 *Guidance:*

10 *Covered walkways should be sturdily constructed and adequately lighted for nighttime use.*

11 *When pedestrian and vehicle paths are rerouted to a closer proximity to each other, consideration should*  
12 *be given to separating them by a temporary traffic barrier.*

13 *If a temporary traffic barrier is used to shield pedestrians, it should be designed to accommodate site*  
14 *conditions.*

15 Support:

16 Depending on the possible vehicular speed and angle of impact, temporary traffic barriers might deflect  
17 upon impact by an errant vehicle. Guidance for locating and designing temporary traffic barriers can be found  
18 in Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.1105).

19 **Standard:**

20 ~~Short intermittent segments of temporary traffic barrier shall not be used because they nullify the~~  
21 ~~containment and redirective capabilities of the temporary traffic barrier, improve the potential for~~  
22 ~~serious injury both to vehicle occupants and pedestrians, and encourage the presence of blunt, leading~~  
23 ~~ends. This text was relocated to new Section 6M.02. All upstream leading ends that are present shall be~~  
24 ~~appropriately flared or protected with properly installed and maintained crashworthy cushions.~~  
25 Deleted; redundant with new Section 6M.02 ~~Adjacent temporary traffic barrier segments shall be~~  
26 ~~properly connected in order to provide the overall strength required for the temporary traffic barrier~~  
27 ~~to perform properly. This text was relocated to new Section 6M.02~~

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

30 Option:

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

34 Support:

35 A major concern for pedestrians is ~~urban and suburban~~ building construction encroaching onto the  
36 contiguous sidewalks, which forces pedestrians off the curb into direct conflict with moving vehicles. Edited  
37 to improve consistency

38 *Guidance:*

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

41 Support:

42 TTC devices, ~~jersey temporary concrete~~ barriers, and wood or chain link fencing with a continuous  
43 detectable edging can satisfactorily delineate a pedestrian path. Edited to improve accuracy

44 *Guidance:*

45 *Tape, rope, or plastic chain strung between devices are not detectable, and are therefore not accessible to*  
46 *and usable by individuals with disabilities. Such items do not comply with the design standards in the*  
47 *"Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" (see Section*  
48 *1A.05), and should not be used as a control for pedestrian movements. Edited to improve accuracy*

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

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

### 5 **Section ~~6D.02~~6C.03 Accessibility Considerations**

6 Support:

7 Additional information on the design and construction of accessible temporary facilities is found in  
8 publications listed in Section 1A.1105 (see Publications 12, 38, 39, and 42).

9 *Guidance:*

10 *Adequate provisions should be made for pedestrians with disabilities. The extent of ~~pedestrian~~ needs for such*  
11 *provisions should be determined through engineering judgment or by the individual responsible for each TTC*  
12 *zone situation. **The sequence of the sentences has been rearranged***

13 **Standard:**

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

19 Support:

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

25 *Guidance:*

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

31 Support:

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

40 *Guidance:*

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

### 44 **Section ~~6D.03~~6C.04 Worker Safety Considerations**

45 Support:

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

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

7 *Guidance:*

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

- 10 A. *Training—all workers should be trained on how to work next to motor vehicle traffic in a way that*  
11 *minimizes their vulnerability. Workers having specific TTC responsibilities should be trained in TTC*  
12 *techniques, device usage, and placement.*
- 13 B. *Temporary Traffic Barriers—temporary traffic barriers should be placed along the work space*  
14 *depending on factors such as lateral clearance of workers from adjacent traffic, speed of traffic,*  
15 *duration and type of operations, time of day, and volume of traffic.*
- 16 C. *Speed Reduction—reducing the speed of vehicular traffic, mainly through regulatory speed zoning,*  
17 *funneling, lane reduction, or the use of uniformed law enforcement officers or flaggers, should be*  
18 *considered.*
- 19 D. *Activity Area—operations entering and departing the work space, and within the work space, should*  
20 *be planned to minimize backing maneuvers by construction vehicles and equipment to minimize the*  
21 *risk of runover and backover accidents*~~*planning the internal work activity area to minimize backing-*~~  
22 ~~*up maneuvers of construction vehicles should be considered to minimize the exposure to risk.*~~ Edited  
23 **to improve clarity**
- 24 E. *Worker Safety Planning—a trained person designated by the employer should conduct a basic hazard*  
25 *assessment for the worksite and job classifications required in the activity area. This safety*  
26 *professional should determine whether engineering, administrative, or personal protection measures*  
27 *should be implemented. This plan should be in accordance with the Occupational Safety and Health*  
28 *Act of 1970, as amended, “General Duty Clause” Section 5(a)(1) - Public Law 91-596, 84 Stat. 1590,*  
29 *December 29, 1970, as amended, and with the requirement to assess worker risk exposures for each*  
30 *job site and job classification, as per 29 CFR 1926.20 (b)(2) of “Occupational Safety and Health*  
31 *Administration Regulations, General Safety and Health Provisions” (see Section 1A.H05).*

32 **Standard:**

33 ~~**All workers, including emergency responders, within the right-of-way who are exposed either to**~~  
34 ~~**traffic (vehicles using the highway for purposes of travel) or to work vehicles and construction-**~~  
35 ~~**equipment within the TTC zone shall wear high-visibility safety apparel that meets the Performance-**~~  
36 ~~**Class 2 or 3 requirements of the ANSI/ISEA 107-2004 publication entitled “American National**~~  
37 ~~**Standard for High-Visibility Safety Apparel and Headwear” (see Section 1A.11), or equivalent-**~~  
38 ~~**revisions, and labeled as meeting the ANSI 107-2004 standard performance for Class 2 or 3 risk-**~~  
39 ~~**exposure, except as provided in Paragraph 5. A person designated by the employer to be responsible**~~  
40 ~~**for worker safety shall make the selection of the appropriate class of garment.**~~ This text was relocated  
41 **to new Section 6C.05 and combined with text from existing Section 6E.02**

42 **Option:**

43 ~~Emergency and incident responders and law enforcement personnel within the TTC zone may wear high-~~  
44 ~~visibility safety apparel that meets the performance requirements of the ANSI/ISEA 207-2006 publication~~  
45 ~~entitled “American National Standard for High-Visibility Public Safety Vests” (see Section 1A.11), or~~  
46 ~~equivalent revisions, and labeled as ANSI 207-2006, in lieu of ANSI/ISEA 107-2004 apparel.~~ This text was  
47 **relocated to new Section 6C.05**

48 **Standard:**

49 ~~**When uniformed law enforcement personnel are used to direct traffic, to investigate crashes, or to**~~  
50 ~~**handle lane closures, obstructed roadways, and disasters, high-visibility safety apparel as described in**~~  
51 ~~**this Section shall be worn by the law enforcement personnel.**~~ This text was relocated to new Section  
52 **6C.05**

1 ~~Except as provided in Paragraph 8, firefighters or other emergency responders working within the~~  
2 ~~right-of-way shall wear high-visibility safety apparel as described in this Section.~~ **This text was**  
3 **relocated to new Section 6C.05**

4 Option:

5 ~~Firefighters or other emergency responders working within the right-of-way and engaged in emergency~~  
6 ~~operations that directly expose them to flame, fire, heat, and/or hazardous materials may wear retroreflective~~  
7 ~~turn-out gear that is specified and regulated by other organizations, such as the National Fire Protection~~  
8 ~~Association.~~ **This text was relocated to new Section 6C.05**

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

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

25 Support:

26 Judicious use of the special devices described in Item E in Paragraph 94 might be helpful for certain  
27 difficult TTC situations, but misuse or overuse of special devices or techniques might lessen their  
28 effectiveness.

29 **Section 6E.026C.05 High-Visibility Safety Apparel** **This text was relocated from existing**  
30 **Section 6E.02 and incorporates text from existing Section 6D.03 to improve consistency**

31 Standard:

32 For daytime and nighttime activity, ~~flaggers~~ all workers, including emergency responders, within  
33 the right-of-way who are exposed either to traffic (vehicles using the highway for purposes of travel) or  
34 to work vehicles and construction equipment within the TTC zone shall wear high-visibility safety  
35 apparel that meets the Performance Class 2 or 3 requirements of the ANSI/ISEA 107-~~2004~~2015  
36 publication entitled “American National Standard for High-Visibility Safety Apparel and Headwear”  
37 (see Section 1A.1105), or equivalent revisions, and labeled as meeting the ANSI 107-2004 standard  
38 performance for Class 2 or 3 risk exposure except as provided in Paragraph 4. A person designated by  
39 the employer to be responsible for worker safety shall make the selection of the appropriate class of  
40 garment. **Edited to incorporate text from existing Section 6D.03 and to improve consistency**

41 The apparel background (outer) material color shall be fluorescent orange-red, fluorescent yellow-  
42 green, or a combination of the two as defined in the ANSI standard. The retroreflective material shall  
43 be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, ~~and shall be~~  
44 ~~visible at a minimum distance of 1,000 feet. The retroreflective safety apparel shall be designed to~~  
45 ~~clearly identify the wearer as a person.~~ **Edited to improve consistency**

46 *Guidance:*

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

1 When uniformed law enforcement ~~officers~~ personnel are used to direct traffic ~~within a TTC zone, to~~  
2 investigate crashes, or to handle lane closures, obstructed roadways, and disasters, they shall wear high-  
3 visibility safety apparel as described in this Section shall be worn by the law enforcement personnel.  
4 Edited to incorporate text from existing Section 6D.03 and to improve consistency

5 Option:

6 ~~In lieu of ANSI/ISEA 107-2004 apparel, Emergency and incident responders and~~ law enforcement  
7 personnel within the TTC zone may wear high-visibility safety apparel that meets the performance  
8 requirements of the ANSI/ISEA 207-2006 publication entitled “American National Standard for High-  
9 Visibility Public Safety Vests” (see Section 1A. ~~405~~), or equivalent revisions, and labeled as ANSI 207-2006,  
10 in lieu of ANSI/ISEA 107-2004 apparel. Edited to incorporate text from existing Section 6D.03 and to  
11 improve accuracy

12 **Standard:**

13 Except as provided in Paragraph ~~86~~, firefighters or other emergency responders working within the  
14 right-of-way shall wear high-visibility safety apparel as described in this Section. This text was  
15 relocated from existing Section 6D.03

16 Option:

17 Firefighters or other emergency responders working within the right-of-way and engaged in emergency  
18 operations that directly expose them to flame, fire, heat, and/or hazardous materials may wear retroreflective  
19 turn-out gear that is specified and regulated by other organizations, such as the National Fire Protection  
20 Association. This text was relocated from existing Section 6D.03

21 *Guidance:*

22 For flagger wear during nighttime activity, high-visibility safety apparel that meets the Performance  
23 Class 3 requirements of the ANSI/ISEA 107-~~2004~~ 2015 publication entitled “American National Standard for  
24 High-Visibility Apparel and Headwear” (see Section 1A. ~~405~~), or equivalent revision, and labeled as meeting  
25 the ANSI 107-~~2004~~ 2015 standard performance for Class 3 risk exposure should be ~~considered worn for~~  
26 ~~flagger wear.~~ Relocated from above and edited to improve consistency

1 CHAPTER ~~6E~~6D. FLAGGER CONTROL

2 Section ~~6E.01~~6D.01 Qualifications for Flaggers

3 *Guidance:*

4 *Because flaggers are responsible for public safety and make the greatest number of contacts with the*  
5 *public of all highway workers, they should be trained in safe/proper traffic control practices and public*  
6 *contact techniques. Flaggers should be able to satisfactorily demonstrate the following abilities:*

- 7 A. *Ability to receive and communicate specific instructions clearly, firmly, and courteously;*
- 8 B. *Ability to move and maneuver quickly in order to avoid danger from errant vehicles;*
- 9 C. *Ability to control signaling devices (such as paddles and flags) in order to provide clear and positive*  
10 *guidance to drivers approaching a TTC zone in frequently changing situations;*
- 11 D. *Ability to understand and apply safe/proper traffic control practices, sometimes in stressful or*  
12 *emergency situations; and*
- 13 E. *Ability to recognize dangerous traffic situations and warn workers in sufficient time to avoid injury.*

14 **Edited to improve accuracy**

15 ~~Section 6E.02 High-Visibility Safety Apparel~~ **This text was relocated to new Section 6C.05**

16 Section ~~6E.03~~6D.02 Hand-Signaling Devices STOP/SLOW Paddle for Hand-Signaling **Text from**  
17 **existing Section 6E.03 was divided into new Sections 6D.02, 6D.03, and 6D.04**

18 *Guidance:*

19 *The STOP/SLOW paddle should be the primary and preferred hand-signaling device because the*  
20 *STOP/SLOW paddle gives road users more positive guidance than red flags. ~~Use of flags should be limited to~~*  
21 *emergency situations.* **This text was relocated to new Section 6D.03**

22 **Standard:**

23 **The STOP/SLOW paddle (W20-8) shall have an octagonal shape on a rigid handle. ~~STOP/SLOW~~**  
24 **~~paddles shall be at least 18 inches wide with letters at least 6 inches high. The STOP (R1-1) face shall~~**  
25 **~~have white letters and a white border on a red background. The SLOW (W20-8) face shall have black~~**  
26 **~~letters and a black border on an orange background.~~ When used at night, the STOP/SLOW paddle**  
27 **shall be retroreflectorized. Deleted; redundant with the “Standard Highway Signs and Markings” book**

28 Option

29 A STOP/STOP or a SLOW/SLOW paddle may be used in certain situations (see Section 6D.05), provided  
30 the device meets the size and shape requirements for the STOP/SLOW paddle. **Added to improve flexibility**

31 *Guidance:*

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

33 **Support:**

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

37 **Option:**

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

- 41 A. Two white or red lights, one centered vertically above and one centered vertically below the STOP  
42 legend; and/or two white or yellow lights, one centered vertically above and one centered vertically  
43 below the SLOW legend;
- 44 B. Two white or red lights, one centered horizontally on each side of the STOP legend; and/or two white  
45 or yellow lights, one centered horizontally on each side of the SLOW legend;
- 46 C. One white or red light centered below the STOP legend; and/or one white or yellow light centered  
47 below the SLOW legend;
- 48 D. A series of eight or more small white or red lights no larger than 1/4 inch in diameter along the outer  
49 edge of the paddle, arranged in an octagonal pattern at the eight corners of the border of the STOP

1 face; and/or a series of eight or more small white or yellow lights no larger than 1/4 inch in diameter  
2 along the outer edge of the paddle, arranged in a diamond pattern along the border of the SLOW face;  
3 or

4 E. A series of white lights forming the shapes of the letters in the legend.

5 **Standard:**

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

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

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

13 **Section 6D.03 Flag for Hand-Signaling** Text from existing Section 6E.03 was divided into new  
14 **Sections 6D.02, 6D.03, and 6D.04**

15 *Guidance:*

16 *Use of flags should be limited to emergency situations.* This text was relocated from existing Section  
17 **6E.03**

18 **Standard:**

19 **Flags, when used, shall be red or fluorescent orange-red in color, shall be a minimum of 24 inches**  
20 **square, and shall be securely fastened to a staff that is approximately 36 inches in length.** Edited to  
21 **reflect Official Interpretation 6(09)-001(I)**

22 *Guidance:*

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

24 **Standard:**

25 **When used at nighttime, flags shall be retroreflectorized red or fluorescent orange-red.** Edited to  
26 **reflect Official Interpretation 6(09)-001(I)**

27 **Section 6D.04 Flashlight for Hand-Signaling** Text from existing Section 6E.03 was relocated  
28 **into new Sections 6D.02, 6D.03, and 6D.04**

29 *Option:*

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

32 **Standard:**

33 **When a flashlight is used for flagging in an emergency situation at night in a non-illuminated**  
34 **flagger station, the flagger shall hold the flashlight in the left hand, shall hold the paddle or flag in the**  
35 **right hand as shown in Figure ~~6E-3~~6D-1, and shall use the flashlight in the following manner to control**  
36 **approaching road users:**

- 37 **A. To inform road users to stop, the flagger shall hold the flashlight with the left arm extended and**  
38 **pointed down toward the ground, and then shall slowly wave the flashlight in front of the body**  
39 **in a slow arc from left to right such that the arc reaches no farther than 45 degrees from**  
40 **vertical.**
- 41 **B. To inform road users to proceed, the flagger shall point the flashlight at the vehicle's bumper,**  
42 **slowly aim the flashlight toward the open lane, then hold the flashlight in that position. The**  
43 **flagger shall not wave the flashlight.**
- 44 **C. To alert or slow traffic, the flagger shall point the flashlight toward oncoming traffic and**  
45 **quickly wave the flashlight in a figure eight motion.**

46 **Figure 6D-1. Use of Hand-Signaling Devices by Flaggers**

47 ~~Section 6E.04 Automated Flagger Assistance Devices~~ This text was relocated to new Section 6L.02

1 ~~Section 6E.05 STOP/SLOW Automated Flagger Assistance Devices~~ The text from this section  
2 has been relocated to new Section 6L.03

3 ~~Section 6E.06 Red/Yellow Lens Automated Flagger Assistance Devices~~ The text from this  
4 Section has been relocated to new Section 6L.04

5 Section ~~6E.07~~6D.05 Flagger Procedures

6 Support:

7 The use of paddles and flags by flaggers is illustrated in Figure ~~6E-3~~6D-1.

8 Standard:

9 **Flaggers shall use a STOP/SLOW paddle, a flag, or an Automated Flagger Assistance Device**  
10 **(AFAD) (see Sections 6L.02 through 6L.04) to control road users approaching a TTC zone. The use of**  
11 **hand movements alone without a paddle, flag, or AFAD to control road users shall be prohibited when**  
12 **controlling traffic in a one-lane two-way operation except when the control is provided by ~~for law-~~**  
13 **~~enforcement personnel~~ or emergency responders at incident scenes as described in Section ~~6I6O.01~~ or**  
14 **provided by uniformed law enforcement officers. Edited to reflect Official Interpretation 6(09)-16(I)**

15 The following methods of signaling with a paddles shall be used: Edited to improve accuracy

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

26 Option:

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

29 Standard:

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

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

41 Guidance:

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

49 Option:

1 In certain conditions, it may be more appropriate for a flagger to use a STOP/STOP or a SLOW/SLOW  
2 paddle to convey the appropriate message to approaching road users and avoid confusing those that are  
3 approaching the operation from the opposing direction. **Added to improve flexibility and consistent with**  
4 **new Section 6D.02**

5 **Option:**

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

8 **Guidance:**

9 ~~When a single flagger is used, the flagger should be stationed on the shoulder opposite the spot lane~~  
10 ~~closure or work space, or in a position where good visibility and traffic control can be maintained at all~~  
11 ~~times.~~ **Deleted; redundant with new Section 6E.02**

## 12 **Section ~~6E.08~~6D.06** Flagger Stations

13 **Standard:** Guidance: **Standard changed to Guidance**

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

16 **Option:**

17 The distances shown in Table ~~6E-16D-1~~, which provides information regarding the stopping sight  
18 distance as a function of speed, may be used for the location of a flagger station. These distances may be  
19 increased for downgrades and other conditions that affect stopping distance.

20 **Guidance:**

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

24 **Standard:**

25 **Except in emergency situations, flagger stations shall be preceded by an advance warning sign or**  
26 **signs. Except in emergency situations, flagger stations shall be illuminated when flagging is used at**  
27 **night.** **Edited to improve accuracy**

### 28 **Table 6D-1. Stopping Sight Distance as a Function of Speed**

1 CHAPTER 6E. ONE-LANE, TWO-WAY TRAFFIC CONTROL

2 **New Chapter with text from existing Sections 6C.10 through 6C.15**

3 **Section ~~6C.10~~6E.01 One-Lane, Two-Way Traffic Control – General**

4 **Standard:**

5 **Except as provided in Paragraph 54, when traffic in both directions must use a single lane for a**  
6 **limited distance, movements from each end shall be coordinated.**

7 *Guidance:*

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

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

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

14 **Option:**

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

18 **Section ~~6C.11~~6E.02 Flagger Method of One-Lane, Two-Way Traffic Control** Title edited to  
19 **reflect new Chapter**

20 *Guidance:*

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

25 **Option:**

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

28 *Guidance:*

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

33 **Section ~~6C.12~~6E.03 Flag Transfer Method of One-Lane, Two-Way Traffic Control** Title edited  
34 **to reflect new Chapter**

35 **Support:**

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

40 *Guidance:*

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

43 **Section ~~6C.13~~6E.04 Pilot Car Method of One-Lane, Two-Way Traffic Control** Title edited to reflect  
44 **new Chapter**

45 **Option:**

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

1 *Guidance:*

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

3 **Standard:**

4 The PILOT CAR FOLLOW ME (G20-4) sign ~~(see Section 6F.58)~~ shall be mounted on the top or on  
5 the rear of the rear of the pilot vehicle (see Section 6H.37). Edited to improve consistency

6 ~~A flagger shall be stationed on the approach to the activity area to control vehicular traffic until the~~  
7 ~~pilot vehicle is available.~~ The pilot car operation shall be coordinated with flagging operations or other  
8 methods of control at each end of the one lane section of the work zone.

9 If an Automated Flagger Assistance Device (AFAD) is used in pilot car operations, it shall be  
10 operated by a flagger. Added to improve accuracy

11 ~~Section 6C.146E.05 Temporary Traffic Control Signal Method of One Lane, Two-Way Traffic Control~~  
12 ~~Title edited to reflect new Chapter~~

13 Option:

14 Traffic control signals may be used to control vehicular traffic movements in one-lane, two-way TTC  
15 zones (see Figure 6H6P-12 and Chapter 4HQ).

16 ~~Section 6C.156E.06 Stop or Yield Control Method of One Lane, Two-Way Traffic Control~~  
17 ~~Title edited to reflect new Chapter~~

18 Option:

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

22 *Guidance:*

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

25

1 CHAPTER 6F. TEMPORARY TRAFFIC CONTROL ZONE ~~DEVICES~~SIGNS - GENERAL

2 ~~Section 6F.01 Types of Devices~~ Text in Paragraphs 1, 6, and 7 was relocated to new Section 6A.04. Text  
3 in Paragraphs 2-5 was relocated to new Section 6A.05

4 Section 6F.~~02~~01 General Characteristics of TTC Zone Signs Edited to improve consistency

5 Support:

6 TTC zone signs convey both general and specific messages by means of words, symbols, and/or arrows  
7 and have the same three categories as all road user signs: regulatory, warning, and guide.

8 **Standard:**

9 ~~The colors for regulatory signs shall follow the Standards for regulatory signs in Table 2A-5 and~~  
10 ~~Chapter 2B.~~ Deleted; redundant with new Section 6G.02 ~~Warning signs in TTC zones shall have a~~  
11 ~~black legend and border on an orange background, except for the Grade Crossing Advance Warning~~  
12 ~~(W10-1) sign which shall have a black legend and border on a yellow background, and except for signs~~  
13 ~~that are required or recommended in Parts 2 or 7 to have fluorescent yellow-green backgrounds.—~~

14 Deleted; redundant with new Section 6H.01 ~~Colors for guide signs shall follow the Standards in Table~~  
15 ~~2A-5 and Chapter 2D, except for guide signs as otherwise provided in Section 6F.55.~~ Deleted;  
16 redundant with new Section 6I.01

17 Option:

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

19 Support:

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

22 Option:

23 ~~Existing warning signs that are still applicable may remain in place.~~ This text was relocated to new  
24 Section 6H.01

25 ~~In order to maintain the systematic use of yellow or fluorescent yellow-green backgrounds for pedestrian,~~  
26 ~~bicycle, and school warning signs in a jurisdiction, the yellow or fluorescent yellow-green background for~~  
27 ~~pedestrian, bicycle, and school warning signs may be used in TTC zones.~~ Deleted; redundant with new  
28 Section 6H.01

29 Standard orange flags, flashing beacons, or flashing warning lights may be used in conjunction with signs.  
30 Edited to improve consistency with Part 2

31 **Standard:**

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

34 Except as provided in Section 2A.~~H07~~, the sizes for TTC signs and plaques shall be as shown in  
35 Tables ~~6F-1~~6G-1, 6H-1, and 6I-1. The sizes in the minimum column shall only be used on low-volume  
36 rural roads, local streets, or roadways where the 85<sup>th</sup>-percentile operating speed ~~or posted speed limit is~~  
37 30 mph or less than 35 mph. Edited to improve consistency

38 Option:

39 The dimensions of signs and plaques shown in Tables ~~6F-1~~ 6G-1, 6H-1, and 6I-1 may be increased  
40 wherever necessary for greater legibility or emphasis.

41 **Standard:** Guidance: Standard changed to Guidance

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

43 Support:

44 Sign design details are contained in the “Standard Highway Signs and Markings” book (see Section  
45 1A.~~H05~~).

46 Section 2A.~~06~~04 contains additional information regarding the design of signs, including an Option  
47 allowing the development of special word message signs if a standard word message or symbol sign is not  
48 available to convey the necessary regulatory, warning, or guidance information.

1 **Standard:**

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

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

7 Option:

8 Sign illumination may be either internal or external.

9 Signs may be made of rigid or flexible material.

10 **Section 6F.0302 Sign Placement**

11 *Guidance:*

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

13 Option:

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

17 Support:

18 The provisions of this Section regarding mounting height apply unless otherwise provided for a particular  
19 sign elsewhere in this Manual.

20 **Standard:**

21 The minimum height, measured vertically from the bottom of the sign to the elevation of the near  
22 edge of the pavement, of signs installed at the side of the road in rural areas shall be 5 feet (see Figure  
23 6F-1).

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

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

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

33 Option:

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

36 *Guidance:*

37 *Neither portable nor permanent sign supports should be located on sidewalks, bicycle facilities, or areas*  
38 *designated for pedestrian or bicycle traffic. ~~If the bottom of a secondary sign that is mounted below another~~*  
39 *~~sign is mounted lower than 7 feet above a pedestrian sidewalk or pathway (see Section 6D.02), the secondary~~*  
40 *~~sign should not project more than 4 inches into the pedestrian facility.~~ Deleted; redundant with Part 2*

41 **Standard:**

42 ~~Where it has been determined that the accommodation of pedestrians with disabilities is necessary,~~  
43 ~~s~~ Signs shall be mounted and placed in accordance with Section 3074.4 of the “2010 ADA Standards for  
44 Accessible Design the “Americans with Disabilities Act Accessibility Guidelines for Buildings and  
45 Facilities (ADAAG)” (see Section 1A.1105). **Edited to improve accuracy**

46 ~~Signs mounted on barricades and barricade/sign combinations shall be crashworthy.~~ Deleted;  
47 **redundant with Section 6A.04**

48 *Guidance:*

1 Except as provided in Paragraph 12, signs mounted on portable sign supports that do not meet the  
2 minimum mounting heights provided in ~~Paragraphs 4 through 6~~[Part 2](#) should not be used for a duration of  
3 more than 3 days. **Edited to improve consistency**

4 Option:

5 The R9-8 through R9-11a series, R11 series, W1-6 through W1-8 series, M4-10, E5-1, or other similar  
6 type signs (see Figures ~~6F-36G-1, 6F-46H-1, and 6F-56I-1~~) may be used on portable sign supports that do not  
7 meet the minimum mounting heights provided in ~~Paragraphs 4 through 6~~[Part 2](#) for longer than 3 days. **Edited**  
8 **to improve consistency**

9 Support:

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

11 *Guidance:*

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

14 **Standard:**

15 **Signs and sign supports [used together](#) shall be crashworthy. **Edited to improve clarity** Where**  
16 **large signs having an area exceeding 50 square feet are installed on multiple breakaway posts, the**  
17 **clearance from the ground to the bottom of the sign shall be at least 7 feet.**

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

20 Option:

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

23 ~~Support:~~

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

26 **Deleted to improve clarity**

27 **Figure 6F-1. Height and Lateral Location of Signs – Typical Installations**

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

### 29 **Section 6F.0403 [Sign Maintenance](#)**

30 *Guidance:*

31 *Signs should be properly maintained for cleanliness, visibility, [retroreflectivity](#), and correct positioning.*  
32 **Edited to improve consistency with Part 2.**

33 *Signs that have lost significant legibility should be promptly replaced.*

34 Support:

35 Section 2A.0821 contains information regarding the retroreflectivity of signs, including the signs that are  
36 used in TTC zones.

37

1 CHAPTER 6G. TTC ZONE REGULATORY SIGNS

2 **Section ~~6F.05~~6G.01 Regulatory Sign Authority**

3 Support:

4 Regulatory signs such as those shown in Figure ~~6F-36G-1~~ inform road users of traffic laws or regulations  
5 and indicate the applicability of legal requirements that would not otherwise be apparent.

6 **Standard:**

7 Regulatory signs shall be authorized by the public agency or official having jurisdiction and shall  
8 conform with Chapter 2B.

9 **Section ~~6F.06~~6G.02 Regulatory Sign Design**

10 **Standard:**

11 TTC regulatory signs shall comply with the Standards for regulatory signs presented in Part 2 and  
12 in the FHWA’s “Standard Highway Signs and Markings” book (see Section 1A.~~1105~~).

13 ~~Support:~~ Deleted; redundant with Part 2

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

16 ~~Option:~~ Deleted; redundant with Part 2

17 ~~The ONE WAY sign may be either a horizontal or vertical rectangular sign.~~

18 **Table 6G-1. Temporary Traffic Control Zone Regulatory Sign and Plaque Sizes**

19 **Figure 6G-1. Regulatory Signs and Plaques in Temporary Traffic Control Zones**

20 **Section ~~6F.07~~6G.03 Regulatory Sign Applications**

21 **Standard:**

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

26 **Section ~~6F.08~~6G.04 ROAD (STREET) CLOSED Sign (R11-2)**

27 *Guidance:*

28 The ROAD (STREET) CLOSED (R11-2) sign (see Figure ~~6F-36G-1~~) should be used when the roadway is  
29 closed to all road users except contractors’ equipment or officially authorized vehicles. The R11-2 sign  
30 should be accompanied by appropriate warning and detour signing.

31 *Option:*

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

34 *Guidance:*

35 The ROAD (STREET) CLOSED sign should be installed at or near the center of the roadway on or above  
36 a Type 3 Barricade that closes the roadway (see Section ~~6F.68~~6K.07).

37 **Standard:**

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

41 **Section ~~6F.09~~6G.05 Local Traffic Only Signs (R11-3a, R11-4)**

42 *Guidance:*

43 The Local Traffic Only signs (see Figure ~~6F-36G-1~~) should be used where road user flow detours to avoid  
44 a closure some distance beyond the sign, but where local road users can use the roadway to the point of  
45 closure. These signs should be accompanied by appropriate warning and detour signing.

1 *In rural applications, the Local Traffic Only sign should have the legend ROAD CLOSED XX MILES*  
2 *AHEAD, LOCAL TRAFFIC ONLY (R11-3a).*

3 Option:

4 In urban areas, the legend ROAD (STREET) CLOSED TO THRU TRAFFIC (R11-4) or ROAD  
5 CLOSED, LOCAL TRAFFIC ONLY may be used.

6 In urban areas, a word message that includes the name of an intersecting street name or well-known  
7 destination may be substituted for the words XX MILES AHEAD on the R11-3a sign where applicable.

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

## 10 **Section ~~6F.10~~ 6G.06 Weight Limit Signs (R12-1, R12-2, R12-5)**

11 **Standard:**

12 **A Weight Limit sign (see Figure ~~6F-36G-1~~), which shows the gross weight or axle weight that is**  
13 **permitted on the roadway or bridge, shall be consistent with State or local regulations and shall not be**  
14 **installed without the approval of the authority having jurisdiction over the highway.**

15 **When weight restrictions are imposed because of the activity in a TTC zone, a marked detour shall**  
16 **be provided for vehicles weighing more than the posted limit.**

## 17 **Section ~~6F.11~~ 6G.07 STAY IN LANE Signs (R4-9, R4-9a)**

18 Option:

19 A STAY IN LANE (R4-9) sign (see Figure ~~6F-36G-1~~) may be used where a multi-lane shift has been  
20 incorporated as part of the TTC on a highway to direct road users around road work that occupies part of the  
21 roadway on a multi-lane highway.

22 *Guidance:*

23 *A STAY IN LANE TO MERGE POINT (R4-9a) (see Figure 6G-1) should be used during late merge*  
24 *operations to use all available lanes until the merge point is reached.*

## 25 **Section ~~6F.12~~ 6G.08 Work Zone and Higher Fines Signs and Plaques**

26 Option:

27 A WORK ZONE (G20-5aP) plaque (see Figure ~~6F-36G-1~~) may be mounted above a Speed Limit sign to  
28 emphasize that a reduced speed limit is in effect within a TTC zone. An END WORK ZONE SPEED LIMIT  
29 (R2-12) sign (see Figure ~~6F-36G-1~~) may be installed at the downstream end of the reduced speed limit zone.

30 *Guidance:*

31 *A BEGIN HIGHER FINES ZONE (R2-10) sign (see Figure ~~6F-36G-1~~) should be installed at or near the*  
32 *~~upstream end~~ beginning of a work zone where increased fines are imposed for traffic violations, and an END*  
33 *HIGHER FINES ZONE (R2-11) sign (see Figure ~~6F-36G-1~~) should be installed at or near the downstream*  
34 *end of the ~~work~~ TTC zone. **Edited to improve consistency***

35 Option:

36 Alternate legends such as BEGIN (or END) DOUBLE FINES ZONE may also be used for the R2-10 and  
37 R2-11 signs.

38 A FINES HIGHER, FINES DOUBLE, or \$XX FINE plaque (see Section 2B.~~1727~~ and Figure ~~6F-36G-1~~)  
39 may be mounted below the Speed Limit sign if increased fines are imposed for traffic violations within the  
40 TTC zone.

41 Individual signs and plaques for work zone speed limits and higher fines may be combined into a single  
42 sign or may be displayed as an assembly of signs and plaques.

## 43 **Section ~~6F.13~~ 6G.09 PEDESTRIAN CROSSWALK Sign (R9-8)**

44 Option:

45 The PEDESTRIAN CROSSWALK (R9-8) sign (see Figure ~~6F-36G-1~~) may be used to indicate where a  
46 temporary crosswalk has been established.

1 **Standard:**

2 **If a temporary crosswalk is established, it shall be accessible to pedestrians with disabilities in**  
3 **accordance with Section ~~6D.02~~6C.03.**

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

5 *Guidance:*

6 *SIDEWALK CLOSED signs (see Figure ~~6F-36~~6G-1) should be used where pedestrian flow is restricted.*  
7 *Bicycle/Pedestrian Detour (M4-9a) signs or Pedestrian Detour (M4-9b) signs should be used where*  
8 *pedestrian flow is rerouted (see Section ~~6F.59~~6I.02).*

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

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

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

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

18 **Support:**

19 These signs are typically mounted on a detectable barricade to encourage compliance and to communicate  
20 with pedestrians that the sidewalk is closed. Printed signs are not useful to many pedestrians with visual  
21 disabilities. A barrier or barricade detectable by a person with a visual disability is sufficient to indicate that a  
22 sidewalk is closed. If the barrier is continuous with detectable channelizing devices for an alternate route,  
23 accessible signing might not be necessary. ~~An audible information device is needed when the detectable~~  
24 ~~barricade or barrier for an alternate channelized route is not continuous.~~ Deleted to improve consistency with  
25 **new Section 6C.03**

26 **Section 6G.11 TURN OFF 2-WAY RADIO AND CELLPHONE (RXX-X) Sign Added Section**  
27 **to improve consistency**

28 **Standard:**

29 **The TURN OFF 2-WAY RADIO AND CELL PHONE (RXX-X) sign (see Figure 6G-1) shall be**  
30 **used to require road users to turn off mobile radio transmitters and cellular telephones where blasting**  
31 **operations occur.**

32 **Support:**

33 See Section 6H.25 for the full sequence of signs for blasting zones and the specific requirements for  
34 location of this regulatory sign.

35 **Section ~~6F.15~~6G.12 Special-Other Regulatory Signs Edited to improve consistency**

36 **Option:**

37 ~~Special-Regulatory~~ word message signs other than those classified and specified in this Manual and the  
38 “Standard Highways Signs and Markings” book (see Section 1A.05) may be developed and may be used  
39 based on engineering judgment consistent with regulatory requirements to aid the enforcement of other laws  
40 or regulations in TTC zones. Edited to improve consistency with paragraph 2 in existing Section 2B.02

41 *Guidance:*

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

1 CHAPTER 6H. TTC ZONE WARNING SIGNS

2 **Section ~~6F.16~~6H.01 Warning Sign Function, Design, and Application**

3 Support:

4 TTC zone warning signs (see Figure ~~6F-4~~6H-1) notify road users of specific situations or conditions on or  
5 adjacent to a roadway that might not otherwise be apparent.

6 **Table 6H-1. Temporary Traffic Control Zone Warning Sign and Plaque Sizes**

7 **Figure 6H-1. Warning Signs and Plaques in Temporary Traffic Control Zones**

8 **Standard:**

9 TTC warning signs shall comply with the Standards for warning signs presented in Part 2 and in  
10 FHWA’s “Standard Highway Signs and Markings” book (see Section 1A.~~1105~~).

11 Except as provided in ~~Paragraph 3~~ the Option below, TTC warning signs shall be diamond-shaped  
12 with a black legend and border on an orange background, except for the Grade Crossing Advance  
13 Warning (W10-1 sign), which shall have a black legend and border on a yellow background, ~~and except~~  
14 ~~for signs that are required or recommended in Parts 2 or 7 to have fluorescent yellow-green~~  
15 ~~backgrounds.~~ Edited to improve consistency

16 Option:

17 Warning signs that are required or recommended in Parts 2 or 7 to have a fluorescent yellow-green  
18 background may have that color background in TTC zones. Added to improve consistency

19 Existing warning signs with a yellow background that are still applicable may remain in place. **This text**  
20 **was relocated from existing Section 6F.02 and edited to improve clarity**

21 Warning signs used for TTC incident management situations may have a black legend and border on a  
22 fluorescent pink background.

23 Mounting or space considerations may justify a change from the standard diamond shape to a rectangular  
24 shape. Edited to improve accuracy

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

27 *Guidance:*

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

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

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

35 Support:

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

38 Option:

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

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

42 **Section ~~6F.17~~6H.02 Position of Advance Warning Signs**

43 *Guidance:*

44 *Where highway conditions permit, warning signs should be placed in advance of the transition and*  
45 *activity areas~~TTC zone~~ at varying distances depending on roadway type, condition, and posted speed. Table*  
46 *~~6C-16B-1~~ contains information regarding the spacing of advance warning signs. Where a series of two or*  
47 *more advance warning signs is used, the closest sign to the transition and activity areas~~TTC zone~~ should be*

1 placed approximately 100 feet for low-speed urban streets to 1,000 feet or more for freeways and  
2 expressways. **Edited to improve clarity**

3 Where multiple advance warning signs are needed on the approach to a [transition and activity area](#)~~TTC~~  
4 ~~zone~~, the ROAD WORK AHEAD (W20-1) sign should be the first advance warning sign encountered by road  
5 users. **Edited to improve clarity**

6 Support:

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

9 Option:

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

11 Support:

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

14 Option:

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

17 Guidance:

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

## 20 **Section ~~6F.18~~[6H.03](#) ROAD (STREET) WORK Sign (W20-1)**

21 Guidance:

22 The ROAD (STREET) WORK (W20-1) sign (see Figure ~~6F-46H-1~~), which serves as a general warning of  
23 obstructions or restrictions, should be located in advance of the work space or any detour, on the road where  
24 the work is taking place.

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

27 **Standard:**

28 ~~The ROAD (STREET) WORK (W20-1) sign shall have the legend ROAD (STREET) WORK, XX~~  
29 ~~FEET, XX MILES, or AHEAD.~~ **Deleted; redundant with the “Standard Highway Signs and Markings”**  
30 **book and the new Option below**

31 **Option:**

32 [The legend STREET may be substituted for ROAD and the distance legend may be either XX FEET, XX](#)  
33 [MILES, or AHEAD.](#) **Standard changed to Option**

## 34 **Section ~~6F.19~~[6H.04](#) DETOUR Sign (W20-2)**

35 Guidance:

36 The DETOUR (W20-2) sign (see Figure ~~6F-46H-1~~) should be used in advance of a road user detour over  
37 a different roadway or route.

38 **Standard:**

39 ~~The DETOUR sign shall have the legend DETOUR, XX FEET, XX MILES, or AHEAD.~~ **Deleted;**  
40 **redundant with the “Standard Highway Signs and Markings” book and the new Option below**

41 **Option:**

42 [The distance legend may be either XX FEET, XX MILES, or AHEAD.](#) **Standard changed to Option**

## 43 **Section ~~6F.20~~[6H.05](#) ROAD (STREET) CLOSED Sign (W20-3)**

44 Guidance:

45 The ROAD (STREET) CLOSED (W20-3) sign (see Figure ~~6F-46H-1~~) should be used in advance of the  
46 point where a highway is closed to all road users, or to all but local road users.

1 **Standard:**

2 ~~The ROAD (STREET) CLOSED sign shall have the legend ROAD (STREET) CLOSED, XX FEET,~~  
3 ~~XX MILES, or AHEAD. Deleted; redundant with the “Standard Highway Signs and Markings” book~~  
4 ~~and the new Option below~~

5 Option:

6 The legend STREET may be substituted for ROAD and the distance legend may be either XX FEET, XX  
7 MILES, or AHEAD. Standard changed to Option

8 **Section ~~6F.21~~6H.06 ONE LANE ROAD Sign (W20-4)**

9 **Standard:**

10 The ONE LANE ROAD (W20-4) sign (see Figure ~~6F-46H-1~~) shall be used only in advance of that  
11 point where motor vehicle traffic in both directions must use a common single lane (see Section  
12 ~~6C.10~~6E.01). ~~It shall have the legend ONE LANE ROAD, XX FEET, XX MILES, or AHEAD. Deleted;~~  
13 ~~redundant with the “Standard Highway Signs and Markings” book and the new Option below~~

14 Option:

15 The distance legend may be either XX FEET, XX MILES, or AHEAD. Standard changed to Option

16 **Section ~~6F.22~~6H.07 Lane(s) Closed Signs (W20-5, W20-5a, and W9-3)** ~~The text in existing~~  
17 ~~Section 6F.23 was incorporated into this Section~~

18 **Standard:**

19 The Lane(s) Closed sign (see Figure ~~6F-46H-1~~) shall be used in advance of that point where one or  
20 more through lanes of a multi-lane roadway are closed.

21 For a single lane closure, the Lane Closed (W20-5) sign (see Figure ~~6F-46H-1~~) shall ~~have-use~~ the  
22 legend RIGHT (LEFT) LANE CLOSED, ~~XX FEET, XX MILES, or AHEAD~~. Where two adjacent  
23 lanes are closed, the W20-5a sign (see Figure ~~6F-46H-1~~) shall ~~have-use~~ the legend XX RIGHT (LEFT)  
24 LANES CLOSED, ~~XX FEET, XX MILES, or AHEAD~~. ~~Edited to improve consistency~~

25 Option:

26 The distance legend may be either XX FEET, XX MILES, or AHEAD. Standard changed to Option

27 ~~Section 6F.23 CENTER LANE CLOSED AHEAD Sign (W9-3)~~ ~~The text in this section was~~  
28 ~~incorporated into new Section 6H.07~~

29 *Guidance:*

30 *The CENTER LANE CLOSED AHEAD (W9-3) sign (see Figure ~~6F-46H-1~~) should be used in advance of*  
31 *that point where work occupies the center lane(s) and approaching motor vehicle traffic is directed to the*  
32 *right or left of the work zone in the center lane.*

33 **Section ~~6F.24~~6H.08 Lane Ends Signs (W4-2, W9-2a)**

34 **Option:**

35 The Lane Ends (W4-2) symbol sign (see Figure ~~6F-46H-1~~) may be used to warn drivers of the reduction  
36 in the number of lanes for moving motor vehicle traffic in the direction of travel on a multi-lane roadway.

37 Guidance:

38 The MERGE HERE TAKE TURNS (W9-2a) (see Figure 6H-1) should be used to identify the merge point  
39 and to take turns merging during Late Merge applications (see Figure 6N-1).

40 **Section ~~6F.25~~6H.09 ON RAMP Plaque (W13-4P)**

41 *Guidance:*

42 *When work is being done on a ramp, but the ramp remains open, the ON RAMP (W13-4P) plaque (see*  
43 *Figure ~~6F-46H-1~~) should be used to supplement the advance ROAD WORK sign.*

44 **Section ~~6F.26~~6H.10 RAMP NARROWS Sign (W5-4)**

45 *Guidance:*

1 The RAMP NARROWS (W5-4) sign (see Figure [6F-46H-1](#)) should be used in advance of the point where  
2 work on a ramp reduces the normal width of the ramp along a part or all of the ramp.

### 3 **Section [6F-276H.11](#) SLOW TRAFFIC AHEAD Sign (W23-1)**

4 Option:

5 The SLOW TRAFFIC AHEAD (W23-1) sign (see Figure [6F-46H-1](#)) may be used on a shadow vehicle,  
6 usually mounted on the rear of the most upstream shadow vehicle, along with other appropriate signs for  
7 mobile operations to warn of slow moving work vehicles. A ROAD WORK (W20-1) sign may also be used  
8 with the SLOW TRAFFIC AHEAD sign.

### 9 **Section [6F-286H.12](#) EXIT OPEN and EXIT CLOSED Signs (E5-2, E5-2a)**

10 Option:

11 An EXIT OPEN (E5-2) or EXIT CLOSED (E5-2a) sign (see Figure [6F-56H-1](#)) may be used to  
12 supplement other warning signs where work is being conducted in the vicinity of an exit ramp and where the  
13 exit maneuver for vehicular traffic using the ramp is different from the normal condition.

14 *Guidance:*

15 ~~When an exit ramp is closed, an EXIT CLOSED sign panel with a black legend and border on an orange~~  
16 ~~background should be placed diagonally across the interchange/intersection guide signs.~~ **This text was**  
17 **relocated to new Section 6I.03**

### 18 **Section [6F-296H.13](#) EXIT ONLY Sign (E5-3)**

19 Option:

20 An EXIT ONLY (E5-3) sign (see Figure [6F-56H-1](#)) may be used to supplement other warning signs  
21 where work is being conducted in the vicinity of an exit ramp and where the exit maneuver for vehicular  
22 traffic using the ramp is different from the normal condition.

### 23 **Section [6F-306H.14](#) NEW TRAFFIC PATTERN AHEAD Sign (W23-2)**

24 Option:

25 A NEW TRAFFIC PATTERN AHEAD (W23-2) sign (see Figure [6F-46H-1](#)) may be used on the  
26 approach to an intersection or along a section of roadway to provide advance warning of a change in traffic  
27 patterns, such as revised lane usage, roadway geometry, or signal phasing.

28 *Guidance:*

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

### 31 **Section [6F-316H.15](#) Flagger Signs (W20-7, W20-7a)**

32 *Guidance:*

33 *The Flagger (W20-7) symbol sign (see Figure [6F-46H-1](#)) should be used in advance of any point where a*  
34 *flagger is stationed to control road users.*

35 Option:

36 A distance legend may be displayed on a supplemental plaque below the Flagger sign. The sign may be  
37 used with appropriate legends or in conjunction with other warning signs, such as the BE PREPARED TO  
38 STOP (W3-4) sign (see Figure [6F-46H-1](#)).

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

### 41 **Section [6F-326H.16](#) Two-Way Traffic Sign (W6-3)**

42 *Guidance:*

43 *When one roadway of a normally divided highway is closed, with two-way vehicular traffic maintained on*  
44 *the other roadway, the Two-Way Traffic (W6-3) sign (see Figure [6F-46H-1](#)) should be used at the beginning*  
45 *of the two-way vehicular traffic section and at intervals to remind road users of opposing vehicular traffic.*

1 **Section ~~6F.76~~6H.17 Opposing Lane Traffic Divider and Sign (W6-4) **This Section relocated**  
2 **from existing Section 6F.76 because this device was reclassified from a channelizing device**  
3 **to a warning sign****

4 **Standard:**

5 The Opposing Lane Traffic Divider (W6-4) sign (see Figure ~~6F-46~~46H-1) shall be an upright,  
6 retroreflective orange-colored sign placed on a flexible support and sized at least 12 inches wide by 18  
7 inches high. **Relocated from below**

8 Support:

9 ~~The Opposing traffic Lane Traffic dDividers (W6-4) sign is intended for mounting only on a flexible~~  
10 ~~support are delineation devices used as center lane dividers in a series along the center lane to separate~~  
11 ~~opposing vehicular traffic on a two-lane, two-way operation.~~ **Edited to improve consistency**

12 **Standard:**

13 ~~Opposing traffic Lane Traffic dDividers signs shall not be placed across-within pedestrian~~  
14 ~~crossings.~~ **Edited to improve consistency**

15 ~~The Opposing Traffic Lane Divider (W6-4) sign (see Figure 6F-4) shall be an upright,~~  
16 ~~retroreflective orange-colored sign placed on a flexible support and sized at least 12 inches wide by 18~~  
17 ~~inches high.~~ **Relocated to above**

18 **Section ~~6F.33~~6H.18 Workers Signs (W21-1, W21-1a)**

19 Option:

20 A Workers (W21-1) symbol sign (see Figure ~~6F-46~~46H-1) may be used to alert road users of workers in or  
21 near the roadway.

22 *Guidance:*

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

25 Option:

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

28 **Section ~~6F.34~~6H.19 FRESH OIL (TAR) Sign (W21-2)**

29 *Guidance:*

30 *The FRESH OIL (TAR) (W21-2) sign (see Figure ~~6F-46~~46H-1) should be used to warn road users of the*  
31 *surface treatment.*

32 **Section ~~6F.35~~6H.20 ROAD MACHINERY AHEAD Sign (W21-3)**

33 Option:

34 The ROAD MACHINERY AHEAD (W21-3) sign (see Figure ~~6F-46~~46H-1) may be used to warn of  
35 machinery operating in or adjacent to the roadway.

36 **Section ~~6F.36~~6H.21 Motorized Traffic Signs (W8-6, W11-10)**

37 Option:

38 Motorized Traffic (W8-6, W11-10) signs may be used to alert road users to locations where unexpected  
39 travel on the roadway or entries into or departures from the roadway by construction vehicles might occur.  
40 The TRUCK CROSSING (W8-6) word message sign may be used as an alternate to the Truck Crossing  
41 (W11-10) symbol sign (see Figure ~~6F-46~~46H-1) where there is an established construction vehicle crossing of  
42 the roadway.

43 Support:

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

45 **Section ~~6F.37~~6H.22 Shoulder Work Signs (W21-5, W21-5a, W21-5b)**

1 Support:

2 Shoulder Work signs (see Figure ~~6F-46H-1~~) warn of maintenance, reconstruction, or utility operations on  
3 the highway shoulder where the roadway is unobstructed.

4 **Standard:**

5 **The Shoulder Work sign shall have the legend SHOULDER WORK (W21-5), RIGHT (LEFT)**  
6 **SHOULDER CLOSED (W21-5a), or RIGHT (LEFT) SHOULDER CLOSED XX FT or AHEAD (W21-**  
7 **5b).**

8 Option:

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

12 *Guidance:*

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

16 **Section ~~6F.38~~6H.23 SURVEY CREW Sign (W21-6)**

17 *Guidance:*

18 *The SURVEY CREW (W21-6) sign (see Figure ~~6F-46H-1~~) should be used to warn of surveying crews*  
19 *working in or adjacent to the roadway.*

20 **Section ~~6F.39~~6H.24 UTILITY WORK Sign (W21-7)**

21 Option:

22 The UTILITY WORK (W21-7) sign (see Figure ~~6F-46H-1~~) may be used as an alternate to the ROAD  
23 (STREET) WORK (W20-1) sign for utility operations on or adjacent to a highway.

24 Support:

25 Typical examples of where the UTILITY WORK sign is used appear in Figures ~~6H6P-4~~, ~~6H6P-6~~, ~~6H6P-~~  
26 ~~10~~, ~~6H6P-15~~, ~~6H6P-18~~, ~~6H6P-21~~, ~~6H6P-22~~, ~~6H6P-26~~, and ~~6H6P-33~~.

27 **Standard:**

28 ~~The UTILITY WORK sign shall carry the legend UTILITY WORK, XX FEET, XX MILES, or~~  
29 ~~AHEAD.~~ Deleted; redundant with the “Standard Highway Signs and Markings” book and the new  
30 **Option below**

31 **Option:**

32 The distance legend may be either XX FEET, XX MILES, or AHEAD. **Standard changed to Option**

33 **Section ~~6F.40~~6H.25 Signs for Blasting Areas **The text in this Section was combined from**  
34 **existing Sections 6F.40 thru 6F.43 and edited****

35 Support:

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

38 **Standard:**

39 **Road users shall be warned ~~to turn off mobile radio transmitters and cellular telephones~~ where**  
40 **blasting operations occur. A sequence of signs shall be prominently displayed to warn all road users of**  
41 **a blasting operations and to direct operators of mobile radio equipment, including cellular telephones,**  
42 **to turn off transmitters in a blasting area. These signs shall be covered or removed when there are no**  
43 **explosives in the area or the area is otherwise secured. **Edited to improve consistency****

44 ~~Section 6F.41 – BLASTING ZONE AHEAD Sign (W22-1)~~ **The text in this section was combined into new**  
45 **Section 6H.25**

46 **Standard:**

1 The BLASTING ZONE AHEAD (W22-1) sign (see Figure [6F-46H-1](#)) shall be used in advance of  
2 any TTC zone where explosives are being used. The TURN OFF 2-WAY RADIO AND CELL PHONE  
3 ([RXX-X](#)) and END BLASTING ZONE ([W22-3](#)) signs shall be used in sequence with this sign.

4 ~~Section 6F.42 TURN OFF 2-WAY RADIO AND CELL PHONE Sign (W22-2)~~ The text in this  
5 section was combined into new Section 6H.25

6 **Standard:**

7 The TURN OFF 2-WAY RADIO AND CELL PHONE (~~W22-2~~[RXX-X](#)) sign (see [Section 6G.11 and](#)  
8 [Figure 6F-46G-1](#)) shall follow the BLASTING ZONE AHEAD ([W22-1](#)) sign and shall be placed at least  
9 1,000 feet before the beginning of the blasting zone.

10 ~~Section 6F.43 END BLASTING ZONE Sign (W22-3)~~ The text in this section was combined  
11 into new Section 6H.25

12 **Standard:**

13 The END BLASTING ZONE (W22-3) sign (see Figure [6F-46H-1](#)) shall be placed a minimum of  
14 1,000 feet past the blasting zone.

15 **Option:**

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

17 **Section ~~6F.44~~[6H.26](#) Shoulder Signs and Plaque (W8-4, W8-9, W8-17, and W8-17P)**

18 **Option:**

19 The SOFT SHOULDER (W8-4) sign (see Figure [6F-46H-1](#)) may be used to warn of a soft shoulder  
20 condition.

21 The LOW SHOULDER (W8-9) sign (see Figure [6F-46H-1](#)) may be used to warn of a shoulder condition  
22 where there is an elevation difference of 3 inches or less between the shoulder and the travel lane.

23 **Guidance:**

24 *The Shoulder Drop Off (W8-17) sign (see Figure [6F-46H-1](#)) should be used when an unprotected*  
25 *shoulder drop-off, adjacent to the travel lane, exceeds 3 inches in depth for a continuous length along the*  
26 *roadway, based on engineering judgment.*

27 **Option:**

28 A SHOULDER DROP-OFF (W8-17P) supplemental plaque (see Figure [6F-46H-1](#)) may be mounted  
29 below the W8-17 sign.

30 **Section ~~6F.45~~[6H.27](#) UNEVEN LANES Sign (W8-11)**

31 **Guidance:**

32 *The UNEVEN LANES (W8-11) sign (see Figure [6F-46H-1](#)) should be used during operations that create*  
33 *a difference in elevation between adjacent lanes that are open to travel.*

34 **Section ~~6F.46~~[6H.28](#) STEEL PLATE AHEAD Sign (W8-24)**

35 **Option:**

36 A STEEL PLATE AHEAD (W8-24) sign (see Figure [6F-46H-1](#)) may be used to warn road users that the  
37 presence of a temporary steel plate(s) might make the road surface uneven and might create slippery  
38 conditions during wet weather.

39 **Section ~~6F.47~~[6H.29](#) NO CENTER LINE Sign (W8-12)**

40 **Guidance:**

41 *The NO CENTER LINE (W8-12) sign (see Figure [6F-46H-1](#)) should be used when the work obliterates*  
42 *the center line pavement markings. This sign should be placed at the beginning of the TTC zone and repeated*  
43 *at 2-mile intervals in long TTC zones.*

44 **Support:**

45 Section [6F.78](#)[6J.02](#) contains information regarding temporary markings.

1 **Section ~~6F.48~~6H.30 Reverse Curve Signs (W1-4 Series)**

2 *Guidance:*

3 *In order to give road users advance notice of a lane shift, a Reverse Curve (W1-4, W1-4b, or W1-4c) sign*  
4 *(see Figure ~~6F-46H-1~~) should be used when a lane (or lanes) is being shifted to the left or right. If the design*  
5 *speed of the curves is 30 mph or less, a Reverse Turn (W1-3) sign should be used.*

6 **Standard:**

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

10 *Option:*

11 Where two or more lanes are being shifted, a W1-4 (or W1-3) sign with an ALL LANES (W24-1cP)  
12 plaque (see Figure ~~6F-46H-1~~) may be used instead of a sign that illustrates the number of lanes.

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

14 **Section ~~6F.49~~6H.31 Double Reverse Curve Signs (W24-1 Series)**

15 *Option:*

16 The Double Reverse Curve (W24-1, W24-1a, or W24-1b) sign (see Figure ~~6F-46H-1~~) may be used where  
17 the tangent distance between two reverse curves is less than 600 feet, thus making it difficult for a second  
18 Reverse Curve (W1-4 series) sign to be placed between the curves. If the design speed of the curves is 30  
19 mph or less, Double Reverse Turn signs should be used.

20 **Standard:**

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

24 *Option:*

25 Where two or more lanes are being shifted, a W24-1 (or Double Reverse Turn sign showing one lane)  
26 sign with an ALL LANES (W24-1cP) plaque (see Figure ~~6F-46H-1~~) may be used instead of a sign that  
27 illustrates the number of lanes.

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

30 ~~Section 6F.50 Other Warning Signs~~ This text was relocated to new Section 6H.38

31 ~~Section 6F.51 Special Warning Signs~~ This text was relocated to new Section 6H.38

32 **Section ~~6F.52~~6H.32 Advisory Speed Plaque (W13-1P)**

33 *Option:*

34 In combination with a warning sign, an Advisory Speed (W13-1P) plaque (see Figure ~~6F-46H-1~~) may be  
35 used to indicate a recommended speed through the TTC zone.

36 **Standard:**

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

43 Support:

44 Warning signs with advisory speed plaques inform drivers of the recommended operating speed based on  
45 temporary conditions within a TTC zone (see Section 2C.58). Examples include narrow lanes, temporary  
46 diversion (reverse curves), lane shifts, sight distance restrictions, rough road surface, bumps, low/no shoulder.

1 [workers on foot, work vehicles or equipment close to the open travel lane, or other conditions that indicate the](#)  
2 [need for reduced speed.](#)

3 [AASHTO and ITE design documents contain established engineering practices for the determination of](#)  
4 [the recommended advisory speeds for horizontal curves or locations with limited sight distance.](#) **Added to**  
5 **improve consistency**

### 6 **Section ~~6F.53~~[6H.33](#) Supplementary Distance Plaque (W7-3aP)**

7 Option:

8 In combination with a warning sign, a Supplementary Distance (W7-3aP) plaque (see Figure ~~6F-46H-1~~)  
9 with the legend NEXT XX MILES may be used to indicate the length of highway over which a work activity  
10 is being conducted, or over which a condition exists in the TTC zone.

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

14 **Standard:**

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

19 **Edited to improve consistency**

20 *Guidance:*

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

### 24 **Section ~~6F.54~~[6H.34](#) Motorcycle Plaque (W8-15P)**

25 Option:

26 A Motorcycle (W8-15P) plaque (see Figure ~~6F-46H-1~~) may be mounted below a LOOSE GRAVEL (W8-  
27 7) sign, a GROOVED PAVEMENT (W8-15) sign, a METAL BRIDGE DECK (W8-16) sign, or a STEEL  
28 PLATE AHEAD (W8-24) sign if the warning is intended to be directed primarily to motorcyclists.

29 **Section ~~6F.55~~ Guide Signs** **The text in this section was relocated to new Section 6I.01**

### 30 **Section ~~6F.56~~[6H.35](#) ROAD WORK NEXT XX MILES Sign (G20-1)**

31 *Guidance:*

32 *The ROAD WORK NEXT XX MILES (G20-1) sign (see Figure ~~6F-46H-1~~) should be installed in advance*  
33 *of TTC zones that are more than 2 miles in length.*

34 Option:

35 The ROAD WORK NEXT XX MILES sign may be mounted on a Type 3 Barricade. The sign may also  
36 be used for TTC zones of shorter length.

37 **Standard:**

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

### 40 **Section ~~6F.57~~[6H.36](#) END ROAD WORK Sign (G20-2)**

41 *Guidance:*

42 *When used, the END ROAD WORK (G20-2) sign (see Figure ~~6F-46H-1~~) should be placed near the*  
43 *downstream end of the termination area, as determined by engineering judgment.*

44 Option:

45 The END ROAD WORK sign may be installed on the back of a warning sign facing the opposite  
46 direction of road users or on the back of a Type 3 Barricade.

1 **Section ~~6F.58~~6H.37 PILOT CAR FOLLOW ME Sign (G20-4)**

2 **Standard:**

3 The PILOT CAR FOLLOW ME (G20-4) sign (see Figure ~~6F-4~~6H-1) shall be mounted in a  
4 conspicuous position on the top or on the rear of a vehicle used for guiding one-way vehicular traffic  
5 through or around a TTC zone (see Section ~~6C.13~~6E.04). **Edited to improve consistency**

6 **Section ~~6F.50~~6H.38 Other Warning Signs** **This text was relocated from existing Sections 6F.50**

7 **Option:**

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

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

11 ~~Special-Word message~~ warning signs other than those classified and specified in this Manual and the  
12 “Standard Highways Signs and Markings” book (see Section 1A.105) may be developed and used based on  
13 engineering judgment to warn of special conditions in TTC zones. **Relocated from below and edited to**  
14 **improve consistency with paragraph 2 in existing Section 2B.02**

15 **Standard:**

16 Except as provided in Sections ~~6F.02~~01 and 6H.01, other warning signs that are used in TTC zones  
17 shall have black legends and borders on an orange background.

18 ~~Section 6F.51 Special Warning Signs~~ **This Section was combined into new Section 6H.38**

19 ~~Option:~~

20 ~~Special warning signs may be used based on engineering judgment.~~ **Relocated to above**

21 *Guidance:*

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

1 CHAPTER 6L. TTC ZONE GUIDE SIGNS

2 **Section ~~6F.55~~6L.01 Guide Signs - General** **The text in this section was relocated from existing**  
3 **Section 6F.55**

4 Support:

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

7 *Guidance:*

8 *The following guide signs should be used in TTC zones as needed:*

- 9 A. *Standard route markings, where temporary route changes are necessary,*
- 10 B. *Directional signs and street name signs, and*
- 11 C. *Special guide signs relating to the condition or work being done.*

12 **Standard:**

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

15 *Option:*

16 Guide signs used in TTC incident management situations may have a black legend and border on a  
17 fluorescent pink background.

18 When temporary directional signs and temporary street name signs are used in conjunction with detour  
19 routing, these signs may have a black legend and border on an orange background. **Edited to improve**  
20 **consistency**

21 When permanent directional signs or permanent street name signs are used in conjunction with detour  
22 signing, they may have a white legend on a green background (see Section 2D.59).

23 **Table 6I-1. Temporary Traffic Control Zone Guide Sign and Plaque Sizes**

24 **Section ~~6F.59~~6L.02 Detour Signs (M4-8, M4-8a, M4-8b, M4-9, M4-9a, M4-9b, M4-9c, and M4-**  
25 **10)**

26 **Standard:**

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

28 *Option:*

29 Detour signs in TTC incident management situations may have a black legend and border on a fluorescent  
30 pink background.

31 The Detour Arrow (M4-10) sign (see Figure 6F-56I-1) may be used where a detour route has been  
32 established.

33 The DETOUR (M4-8) sign (see Figure 6F-56I-1) may be mounted at the top of a route sign assembly to  
34 mark a temporary route that detours from a highway, bypasses a section closed by a TTC zone, and rejoins the  
35 highway beyond the TTC zone.

36 *Guidance:*

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

40 *The DETOUR (M4-9) sign (see Figure 6F-56I-1) should be used for unnumbered highways, for*  
41 *emergency situations, for periods of short durations, or where, over relatively short distances, road users are*  
42 *guided along the detour and back to the desired highway without route signs.*

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

45 *Option:*

46 The END DETOUR (M4-8a) or END (M4-8b) sign (see Figure 6F-56I-1) may be used to indicate that the  
47 detour has ended.

1 *Guidance:*

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

4 *The Pedestrian/Bicycle Detour (M4-9a) sign (see Figure 6F-56I-1) should be used where a*  
5 *pedestrian/bicycle detour route has been established because of the closing of a pedestrian/bicycle facility to*  
6 *through traffic.*

7 **Standard:**

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

10 **Option:**

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

12 The Pedestrian Detour (M4-9b) sign or Bicycle Detour (M4-9c) sign (see Figure 6F-56I-1) may be used  
13 where a pedestrian or bicycle detour route (not both) has been established because of the closing of the  
14 pedestrian or bicycle facility to through traffic.

15 **Figure 6I-1. Exit Open and Closed and Detour Signs**

16 **Section 6L03 EXIT CLOSED Panel** This text was relocated from existing Section 6F.28

17 *Guidance:*

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

20 ~~Section 6F.60 Portable Changeable Message Signs~~ The text in this Section was relocated to new  
21 **Section 6L.05**

22 ~~Section 6F.61 Arrow Boards~~ The text in this Section was relocated to new **Section 6L.06**

23 ~~Section 6F.62 High-Level Warning Devices (Flag Trees)~~ The text in this Section was relocated  
24 **to new Section 6L.08**

25

1 **CHAPTER 6J. TTC ZONE PAVEMENT MARKINGS**

2 **New Chapter with text from existing Sections 6F.77 through 6F.80**

3 **Section 6F.776J.01 Pavement Markings in TTC Zones**

4 Support:

5 Pavement markings are installed or existing markings are maintained or enhanced in TTC zones to  
6 provide road users with a clearly defined path for travel through the TTC zone in day, night, and twilight  
7 periods under both wet and dry pavement conditions.

8 *Guidance:*

9 *The work should be planned and staged to provide for the placement and removal of the pavement*  
10 *markings in a way that minimizes the disruption to traffic flow approaching and through the TTC zone during*  
11 *the placement and removal process.*

12 **Standard:**

13 **Existing pavement markings shall be maintained in all long-term stationary (see Section**  
14 **6G.026N.01) TTC zones in accordance with Chapters 3A and 3B, except as otherwise provided for**  
15 **temporary pavement markings in Section 6F.786J.02. Pavement markings shall match the alignment of**  
16 **the markings in place at both ends of the TTC zone. Pavement markings shall be placed along the**  
17 **entire length of any paved detour or temporary roadway prior to the detour or roadway being opened**  
18 **to road users.**

19 *Guidance:* **Standard changed to Guidance**

20 *For long-term stationary operations, pavement markings in the temporary traveled way that are no longer*  
21 *applicable shall should be removed or obliterated as soon as practical. Pavement marking obliteration*  
22 *shall should remove the non-applicable pavement marking material, and the obliteration method shall should*  
23 *minimize pavement scarring.*

24 **Standard:**

25 **Painting over existing pavement markings with black paint or spraying with asphalt shall not be**  
26 **accepted as a substitute for removal or obliteration.**

27 Option:

28 Removable, non-reflective, preformed tape that is approximately the same color as the pavement surface  
29 may be used where markings need to be covered temporarily.

30 **Section 6F.786J.02 Temporary Markings**

31 Support:

32 Temporary markings are those pavement markings or devices that are placed within TTC zones to provide  
33 road users with a clearly defined path of travel through the TTC zone when the permanent markings are either  
34 removed or obliterated during the work activities. Temporary markings are typically needed during the  
35 reconstruction of a road while it is open to traffic, such as overlays or surface treatments or where lanes are  
36 temporarily shifted on pavement that is to remain in place.

37 *Guidance:*

38 *Unless justified based on engineering judgment, temporary pavement markings should not remain in*  
39 *place for more than 14 days after the application of the pavement surface treatment or the construction of the*  
40 *final pavement surface on new roadways or over existing pavements.*

41 *The temporary use of edge lines, channelizing lines, lane-reduction transitions, gore markings, and other*  
42 *longitudinal markings, and the various non-longitudinal markings (such as stop lines, railroad crossings,*  
43 *crosswalks, words, symbols, or arrows) should be in accordance with the State’s or highway agency’s policy.*

44 **Standard:**

45 **Warning signs, channelizing devices, and delineation shall be used to indicate required road user**  
46 **paths in TTC zones where it is not possible to provide a clear path by pavement markings.**

47 **Except as otherwise provided in this Section, all temporary pavement markings for no-passing**  
48 **zones shall comply with the requirements of Chapters 3A and 3B. All temporary broken-line pavement**

1 markings shall use the same cycle length as permanent markings and shall have line segments that are  
2 at least 2 feet long.

3 *Guidance:*

4 *All pavement markings and devices used to delineate road user paths should be reviewed during daytime*  
5 *and nighttime periods.*

6 *Option:*

7 Half-cycle lengths with a minimum of 2-foot stripes may be used on roadways with severe curvature (see  
8 Section 3A.0604) for broken line center lines in passing zones and for lane lines.

9 For temporary situations of 14 days or less, for a two- or three-lane road, no-passing zones may be  
10 identified by using DO NOT PASS (R4-1), PASS WITH CARE (R4-2), and NO PASSING ZONE (W14-3)  
11 signs (see Sections 2B.2838, 2B.2939, and 2C.4552) rather than pavement markings. Also, DO NOT PASS,  
12 PASS WITH CARE, and NO PASSING ZONE signs may be used instead of pavement markings on roads  
13 with low volumes for longer periods in accordance with the State's or highway agency's policy.

14 *Guidance:*

15 *If used, the DO NOT PASS, PASS WITH CARE, and NO PASSING ZONE signs should be placed in*  
16 *accordance with Sections 2B.2838, 2B.2939, and 2C.4552.*

17 *If used, the NO CENTER LINE sign should be placed in accordance with Section 6F.476H.29.*

### 18 Section 6F.796J.03 Temporary Raised Pavement Markers

19 *Option:*

20 Retroreflective or internally illuminated raised pavement markers, or non-retroreflective raised pavement  
21 markers supplemented by retroreflective or internally illuminated markers, may be substituted for markings of  
22 other types in TTC zones.

23 **Standard:**

24 **If used, the color and pattern of the raised pavement markers shall simulate the color and pattern**  
25 **of the markings for which they substitute.**

26 **If temporary raised pavement markers are used to substitute for broken line segments, a group of**  
27 **at least three retroreflective markers shall be equally spaced at no greater than  $N/8$  (see Section 3B.14),**  
28 **5 feet shall be installed every 40 feet. ~~The value of N for a broken or dotted line shall equal the length of~~**  
29 **~~one line segment plus one gap.~~ Edited to improve consistency**

30 **If temporary raised pavement markers are used to substitute for solid lines, the markers shall be**  
31 **equally spaced at no greater than  $N/4$  10 feet, with retroreflective or internally illuminated units at a**  
32 **spacing no greater than  $N/2$ , 20 feet. ~~The value of N referenced for solid lines shall equal the N for the~~**  
33 **~~broken or dotted lines that might be adjacent to or might extend the solid lines (see Section 3B.11).~~**  
34 **Edited to improve consistency**

35 *Option:*

36 Temporary raised pavement markers may be used to substitute for broken line segments by using at least  
37 two retroreflective markers placed at each end of a segment of 2 to 5 feet in length, using the same cycle  
38 length as permanent markings.

39 *Guidance:*

40 ~~Temporary raised pavement markers used on 2 to 5 foot segments to substitute for broken line segments~~  
41 ~~should not be in place for more than 14 days unless justified by engineering judgment.~~ Deleted; redundant  
42 **with new Section 6J.02.**

43 *Raised pavement markers should be considered for use along surfaced detours or temporary roadways,*  
44 *and other changed or new travel-lane alignments.*

45 *Option:*

46 Retroreflective or internally illuminated raised pavement markers, or non-retroreflective raised pavement  
47 markers supplemented by retroreflective or internally illuminated markers, may also be used in TTC zones to  
48 supplement markings as prescribed in Chapters 3A and 3B.

1 **Section ~~6F.80~~6J.04 Delineators**

2 Option:

3 Delineators may be used in TTC zones to indicate the alignment of the roadway and to outline the  
4 required vehicle path through the TTC zone. **Relocated from below**

5 **Standard:**

6 **When used, delineators shall combine with or supplement other TTC devices. ~~They shall be~~**  
7 **~~mounted on crashworthy supports so that the reflecting unit is approximately 4 feet above the near-~~**  
8 **~~roadway edge. The standard color for delineators used along both sides of two-way streets and~~**  
9 **~~highways and the right hand side of one-way roadways shall be white. Delineators used along the left-~~**  
10 **~~hand side of one-way roadways shall be yellow. and shall be in accordance with Chapter 3G. Deleted;~~**  
11 **redundant with Chapter 3F**

12 *Guidance:*

13 *Spacing along roadway curves should be as set forth in Section ~~3FG.04~~ and should be such that several*  
14 *delineators are ~~constantly~~ visible to ~~the~~ an approaching driver. **Edited to improve clarity***

15 **Option:**

16 ~~Delineators may be used in TTC zones to indicate the alignment of the roadway and to outline the~~  
17 ~~required vehicle path through the TTC zone. Relocated to above~~

1 CHAPTER 6K. TTC ZONE CHANNELIZING DEVICES

2 **Section ~~6F.63~~6K.01 Channelizing Devices – General**

3 **Standard:**

4 Designs of various channelizing devices shall be as shown in Figure ~~6F-7~~6K-1. All channelizing  
5 devices shall be crashworthy.

6 **Support:**

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

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

14 **Standard:** This text was relocated to new Section 6K.02

15 ~~Devices used to channelize pedestrians shall be detectable to users of long canes and visible to~~  
16 ~~persons having low vision.~~

17 ~~Where channelizing devices are used to channelize pedestrians, there shall be continuous detectable~~  
18 ~~bottom and top surfaces to be detectable to users of long canes. The bottom of the bottom surface shall~~  
19 ~~be no higher than 2 inches above the ground. The top of the top surface shall be no lower than 32~~  
20 ~~inches above the ground.~~

21 ~~Option:~~ Deleted; redundant with Standard statement above

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

24 **Guidance:**

25 ~~Where multiple channelizing devices are aligned to form a continuous pedestrian channelizer, connection~~  
26 ~~points should be smooth to optimize long cane and hand trailing.~~ Deleted; redundant with new Guidance in  
27 **Section 6K.02**

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

31 *When channelizing devices have the potential of leading vehicular traffic out of the intended vehicular*  
32 *traffic space as shown in Figure ~~6H6P~~39, the channelizing devices should be extended a distance in feet of*  
33 *2.0 times the speed limit in mph beyond the downstream end of the transition area.*

34 **Option:**

35 Warning lights (see Section ~~6F.83~~6L.07) may be added to channelizing devices in areas with frequent fog,  
36 snow, or severe roadway curvature, or where visual distractions are present.

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

39 **Support:**

40 The flashing rates and patterns for warning lights used on channelizing devices are specified in Section  
41 6L.07. Added to improve consistency

42 **Standard:**

43 ~~Warning lights shall flash when placed on channelizing devices used alone or in a cluster to warn of~~  
44 ~~a condition. Except for the sequential flashing warning lights discussed in Paragraphs 12 and 13,~~  
45 ~~warning lights placed on channelizing devices used in a series to channelize road users shall be steady-~~  
46 ~~burn.~~ This text was relocated to new Section 6L.07

47 **Option:**

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

3  
4 **Standard:**

5 ~~When used, the successive flashing of the sequential warning lights shall occur from the upstream~~  
6 ~~end of the merging taper to the downstream end of the merging taper in order to identify the desired~~  
7 ~~vehicle path. Each warning light in the sequence shall be flashed at a rate of not less than 55 nor more~~  
8 ~~than 75 times per minute.~~ **Deleted; redundant with new Section 6L.07**

9 The retroreflective material used on channelizing devices shall ~~have a smooth, sealed outer surface~~  
10 ~~that will~~ display a similar color day or night. **Edited to improve consistency**

11 Except as provided in Paragraph 11, information identifying the owner or manufacturer of the  
12 channelizing device shall not be displayed on any portion of the device that can be seen by road users  
13 approaching the device. **Added to reflect Official Interpretation 6(09)-11(I)**

14 Option:

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

17 **Standard:**

18 ~~The letters and numbers of~~ area containing the name and telephone number shall be non-  
19 retroreflective and not over 2 inches in height. **Added to reflect Official Interpretation 6(09)-11(I)**

20 *Guidance:*

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

23 **Standard:** **Standard changed to Guidance**

24 *Devices that are damaged or have lost a significant amount of their retroreflectivity and effectiveness*  
25 ~~shall~~*should* be replaced.

26 **Figure 6K-1. Channelizing Devices**

27 **Section 6K.02 Pedestrian Channelizing Devices** **New Section added to improve consistency**

28 Support:

29 Pedestrian channelizing devices indicate a suitable path of pedestrian travel around or through the work  
30 zone.

31 Guidance:

32 *Pedestrian channelizing devices should be provided when work activities impact sidewalks or other*  
33 *pedestrian facilities or when the design of the temporary pedestrian facility does not otherwise include*  
34 *accessibility features consistent with the features in the existing pedestrian facility.*

35 *The pedestrian channelizing devices should be used both to close sidewalks and to delineate an alternate*  
36 *route.*

37 Support:

38 An example of a Pedestrian Channelizing Device is depicted in Figure 6K-2.

39 **Figure 6K-2. Example of Pedestrian Channelizing Device**

40 Standard:

41 Pedestrian channelizing devices shall be crashworthy when exposed to vehicular traffic.

42 Devices used to channelize pedestrians shall be detectable to users of long canes and visible to  
43 ~~persons having low~~ pedestrians with vision disabilities. **This text was relocated from existing Section**  
44 **6F.63 and edited**

45 When used as a sidewalk closure, the device shall cover the entire width of the sidewalk.

46 ~~Where channelizing devices are used to channelize pedestrians, there shall be~~ Pedestrian  
47 channelizing devices shall have continuous ~~detectable~~ bottom and top surfaces ~~to be detectable to users~~  
48 ~~of long canes.~~ The bottom of the bottom surface portion shall be no higher than 2 inches above the

1 groundwalkway. The top edge of the bottom portion shall measure at least 8 inches above the walkway.  
2 The top of the top surfaceportion shall be no lower than 32 inches above the groundwalkway. This text  
3 was relocated from existing Section 6F.63 and edited to improve consistency The top surface shall be  
4 smooth to optimize hand-trailing. Both upper and lower surfaces shall share a common vertical plane.

5 Option:

6 A continuous wall may be used as a pedestrian channelizing device.

7 Guidance:

8 When used, a continuous wall should have a lower edge no more than 2 inches above the walkway, should  
9 extend a minimum of 32 inches above the walkway, should have a common vertical face, and should have  
10 alternating, contrasting sheeting positioned 32 inches above the walkway.

11 Option:

12 The continuous wall may extend to any height above the 32 inch minimum.

13 Guidance:

14 When pedestrian channelizing devices are combined in a series, the gap between devices should not  
15 exceed one inch.

16 Support:

17 A Hand-Trailing Edge is the upper surface of the upper rail on a pedestrian channelizing device, as shown  
18 in Figure 6K-2. It is provided to allow pedestrians with vision disabilities to follow the pedestrian  
19 channelizing device with their hand. The Hand-Trailing Edge is not a weight bearing railing.

20 Standard:

21 When exposed to vehicular traffic the bottom and top surfaces of the Pedestrian Channelizing  
22 Device shall have sheeting complying with Section 6K.01 Paragraph 9.

23 Guidance:

24 When not exposed to vehicular traffic, the Pedestrian Channelizing device should have a contrasting  
25 pattern in alternating light and dark colors to provide visual contrast on the upper surface consisting of a  
26 minimum of 6 inches of sheeting or other contrasting materials. Non-retroreflective materials may be used on  
27 the pedestrian side of the Pedestrian Channelizing device.

28 Option:

29 The sheeting on the side of the device on the pedestrian side of the Pedestrian Channelizing device may  
30 have sheeting with a vertical orientation.

31 Support:

32 The contrast of the light and dark stripes on the barricade sheeting assists pedestrians with vision  
33 disabilities in following the designated detour.

34 See also Section 6M.04 regarding detectable edging for pedestrian channelization.

35 **Section ~~6F.64~~6K.03 Cones**

36 **Standard:**

37 **Cones (see Figure ~~6F-76~~6K-1) shall be predominantly orange and shall be made of a material that**  
38 **can be struck without causing damage to the impacting vehicle. For daytime and low-speed roadways,**  
39 **cones shall be not less than 18 inches in height. When cones are used on freeways and other high-speed**  
40 **highways or at night on all highways, or when more conspicuous guidance is needed, cones shall be a**  
41 **minimum of 28 inches in height.**

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

46 **Retroreflectorization of cones that are more than 36 inches in height shall be provided by**  
47 **horizontal, circumferential, alternating orange and white retroreflective stripes that are 4 to 6 inches**  
48 **wide. Each cone shall have a minimum of two orange and two white stripes with the top stripe being**

1 orange. Any non-retroreflective spaces between the ~~orange and white~~ retroreflective stripes shall not  
2 exceed 3 inches in width. **Edited to improve clarity**

3 Option:

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

7 *Guidance:*

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

10 Option:

11 Cones may be doubled up to increase their weight.

12 Support:

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

16 *Guidance:*

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

## 18 **Section ~~6F.65~~6K.04 Tubular Markers**

19 **Standard:**

20 Tubular markers (see Figure ~~6F-76K-1~~) shall be predominantly orange for temporary traffic  
21 control zone applications and shall be not less than 18 inches high and 2 inches wide facing road users.  
22 **Edited to improve clarity** They shall be made of a material that can be struck without causing damage  
23 to the impacting vehicle.

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

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

32 *Guidance:*

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

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

38 Option:

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

42 **Standard:**

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

## 45 **Section ~~6F.66~~6K.05 Vertical Panels**

46 **Standard:**

1 Vertical panels (see Figure [6F-76K-1](#)) shall have retroreflective striped material that is 8 to 12  
2 inches in width and at least 24 inches in height. They shall have alternating diagonal orange and white  
3 retroreflective stripes sloping downward at an angle of 45 degrees in the direction vehicular traffic is to  
4 pass.

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

7 Option:

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

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

## 12 Section [6F.676K.06](#) Drums

13 **Standard:**

14 Drums (see Figure [6F-76K-1](#)) used for road user warning or channelization shall be constructed of  
15 lightweight, deformable materials. They shall be a minimum of 36 inches in height and have at least an  
16 18-inch minimum width regardless of orientation. Metal drums shall not be used. The markings on  
17 drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4 to 6  
18 inches wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe  
19 being orange. Any non-retroreflectorized spaces between the horizontal orange and white stripes shall  
20 not exceed 3 inches wide. Drums shall have closed tops that will not allow collection of construction  
21 debris or other debris.

22 Support:

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

27 Option:

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

30 *Guidance:*

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

35 **Standard:**

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

## 37 Section [6F.686K.07](#) Type 1, 2, or 3 Barricades

38 Support:

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

41 As shown in Figure [6F-76K-1](#), barricades are classified as Type 1, Type 2, or Type 3.

42 **Standard:**

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

46 Option:

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

48 **Standard:**

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

5 *Guidance:*

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

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

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

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

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

19       *Barricade rail supports should not project into pedestrian circulation routes more than 4 inches from the*  
20 *support between 27 and 80 inches from the surface as described in Section 3074.4.1 of the “[2010 ADA](#)*  
21 *[Standards for Accessible Design](#), ~~Americans with Disabilities Act Accessibility Guidelines for Buildings and~~*  
22 *~~Facilities (ADAAG)~~” (see Section 1A.1105). **Edited to improve consistency***

23 *Option:*

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

26 *Guidance:*

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

29 *Option:*

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

32 *Support:*

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

35 *Option:*

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

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

39 *Guidance:*

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

42 *Option:*

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

45 *Guidance:*

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

48 *Support:*

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

3 **Standard:**

4 A sign shall be installed with the appropriate legend concerning permissible use by local road users  
5 (see Section ~~6F.09~~6G.05).

6 *Guidance:* **Standard changed to Guidance**

7 Adequate visibility of the barricades from both directions ~~shall~~should be provided.

8 **Option:**

9 Signs may be installed on barricades (see Section ~~6F.03~~6F.02).

10 **Section ~~6F.69~~6K.08 Direction Indicator Barricades**

11 **Standard:**

12 The Direction Indicator Barricade (see Figure ~~6F-76~~6K-1) shall consist of a One-Direction Large  
13 Arrow (W1-6) sign mounted above a diagonal striped, horizontally aligned, retroreflective rail.

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

19 **Option:**

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

22 *Guidance:*

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

25 **Section ~~6F.70~~6K.09 Temporary Traffic Barriers as Channelizing Devices**

26 **Support:**

27 Temporary traffic barriers (see Section 6M.02) are not TTC devices in themselves; however, when placed  
28 in a position identical to a line of channelizing devices and marked and/or equipped with appropriate  
29 channelization features to provide guidance and warning both day and night, they serve as TTC devices.

30 **Standard:**

31 Temporary traffic barriers serving as TTC devices shall comply with requirements for such devices  
32 as set forth throughout Part 6.

33 Temporary traffic barriers (see Section ~~6F.85~~6M.02) shall not be used solely to channelize road  
34 users, but also to protect the work space. If used to channelize vehicular traffic, the temporary traffic  
35 barrier shall be supplemented with delineation, pavement markings, or channelizing devices for  
36 improved daytime and nighttime visibility.

37 *Guidance:*

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

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

42 **Standard:**

43 When it is necessary to use a temporary traffic barrier for a merging taper in low-speed urban  
44 areas or for a constricted/restricted TTC zone, the taper shall be delineated using channelizing devices,  
45 and/or an edge line, and/or delineators on the barrier. **Edited to improve clarify**

46 *Guidance:*

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

1 **Section ~~6F.71~~6K.10 Longitudinal Channelizing Devices**

2 Support:

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

5 **Standard:**

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

9 *Guidance:*

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

12 **Option:**

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

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

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

16 **Standard:**

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

20 *Guidance:*

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

23 **Section ~~6F.72~~6K.11 Temporary Lane Separators**

24 **Option:**

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

28 **Standard:**

29 ~~Temporary lane separators shall be crashworthy.~~ Deleted; redundant with new Section 6K.01  
30 Temporary lane separators shall consist of a longitudinal base component with have a maximum height  
31 of 4 inches and a maximum width of 1 foot, ~~and~~ The longitudinal base shall have sloping sides in order  
32 to facilitate crossover by emergency vehicles. One or more of types of channelizing devices, such as  
33 tubular markers, vertical panels, or Opposing Lane Traffic Divider (W6-4) signs mounted on flexible  
34 supports, shall be affixed to the longitudinal base. Edited to improve accuracy

35 ~~Option:~~

36 ~~Temporary lane separators may be supplemented with any of the approved channelizing devices contained~~  
37 ~~in this Chapter, such as tubular markers, vertical panels, and opposing traffic lane dividers.~~ Deleted;  
38 ~~redundant with edited Standard above~~

39 **Standard:**

40 ~~If appropriate~~ Channelizing devices are used to supplement affixed to the longitudinal base of a  
41 temporary lane separator, the channelizing devices shall be retroreflectORIZED to provide nighttime  
42 visibility. ~~If channelizing devices are not used, the temporary lane separator shall contain~~  
43 ~~retroreflectorization to enhance its visibility.~~ Edited to improve clarity

44 *Guidance:*

45 *A temporary lane separator should be stabilized by affixing it to the pavement in a manner suitable to its*  
46 *design, while allowing the unit to be ~~shifted~~ intentionally moved from place to place within the TTC zone in*  
47 *order to accommodate changing conditions.* Edited to improve clarity

1 Temporary Lane Separators should not be used to shield obstacles or provide positive protection for  
2 pedestrians or workers, because these devices have not met the crashworthy requirements for temporary  
3 traffic barriers. **Added to improve consistency**

4 **Standard:**

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

7 **Section ~~6F.73~~6K.12 Other Channelizing Devices**

8 Option:

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

11 *Guidance:*

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

14 ~~Section 6F.74 Detectable Edging for Pedestrians~~ **This text was relocated to new Section 6M.04**

15 ~~Section 6F.75 Temporary Raised Islands~~ **This text was relocated to new Section 6M.03**

16 ~~Section 6F.76 Opposing Traffic Lane Divider and Sign (W6-4)~~ **This Section was relocated to**  
17 **new Section 6H.17 because this device was reclassified from a channelizing device to a warning**  
18 **sign**

19 ~~Section 6F.77 Pavement Markings~~ **This text was relocated to new Section 6J.01**

20 ~~Section 6F.78 Temporary Markings~~ **This text was relocated to new Section 6J.02**

21 ~~Section 6F.79 Temporary Raised Pavement Markers~~ **This text was relocated to new Section**  
22 **6J.03**

23 ~~Section 6F.80 Delineators~~ **This text was relocated to new Section 6J.04**

1 **CHAPTER 6L. OTHER TTC ZONE TRAFFIC CONTROL DEVICES**

2 **Section 6F.846L.01 Temporary Traffic Control Signals **This text was relocated from existing****  
3 **Section 6F.84**

4 **Standard:**

5 **Temporary traffic control signals (see Section 4D.3210) used to control road user movements**  
6 **through TTC zones and in other TTC situations shall comply with the applicable provisions of Part 4.**

7 **Support:**

8 Temporary traffic control signals are typically used in TTC zones such as temporary haul road crossings;  
9 temporary one-way operations along a one-lane, two-way highway; temporary one-way operations on bridges,  
10 reversible lanes, and intersections.

11 **Standard:**

12 **A temporary traffic control signal that is used to control traffic through a one-lane, two-way section**  
13 **of roadway shall comply with the provisions of Section 4H.02.**

14 *Guidance:*

15 *Where pedestrian traffic is detoured to a temporary traffic control signal, ~~engineering judgment should be~~*  
16 *~~used to determine if pedestrian signals or an accessible pedestrian signals (see Section 4E.094K.01) are~~*  
17 *~~needed should be provided for crossing along an alternate route.~~ **Edited to improve consistency with new***  
18 **Section 4K.01**

19 *When temporary traffic control signals are used, conflict monitors typical of traditional traffic control*  
20 *signal operations should be used.*

21 **Option:**

22 Temporary traffic control signals may be portable or temporarily mounted on fixed supports.

23 *Guidance:*

24 *Temporary traffic control signals should only be used in situations where temporary traffic control*  
25 *signals are preferable to other means of traffic control, such as changing the work staging or work zone size*  
26 *to eliminate one-way vehicular traffic movements, using flaggers to control one-way or crossing movements,*  
27 *using STOP or YIELD signs, and using warning devices alone.*

28 **Support:**

29 Factors related to the design and application of temporary traffic control signals include the following:

- 30 A. Safety and road user needs;
- 31 B. Work staging and operations;
- 32 C. The feasibility of using other TTC strategies (for example, flaggers, providing space for two lanes, or  
33 detouring road users, including bicyclists and pedestrians);
- 34 D. Sight distance restrictions;
- 35 E. Human factors considerations (for example, lack of driver familiarity with temporary traffic control  
36 signals);
- 37 F. Road-user volumes including roadway and intersection capacity;
- 38 G. Affected side streets and driveways;
- 39 H. Vehicle speeds;
- 40 I. The placement of other TTC devices;
- 41 J. Parking;
- 42 K. Turning restrictions;
- 43 L. Pedestrians;
- 44 M. The nature of adjacent land uses (such as residential or commercial);
- 45 N. Legal authority;
- 46 O. Signal phasing and timing requirements;
- 47 P. Full-time or part-time operation;
- 48 Q. Actuated, fixed-time, or manual operation;
- 49 R. Power failures or other emergencies;
- 50 S. Inspection and maintenance needs;

- T. Need for detailed placement, timing, and operation records; and
- U. Operation by contractors or by others.

Although temporary traffic control signals can be mounted on trailers or lightweight portable supports, fixed supports offer superior resistance to displacement or damage by severe weather, vehicle impact, and vandalism.

*Guidance:*

*Other TTC devices should be used to supplement temporary traffic control signals, including warning and regulatory signs, pavement markings, and channelizing devices.*

*Temporary traffic control signals not in use should be covered or removed.*

*If a temporary traffic control signal is located within 1/2 mile of an adjacent traffic control signal, consideration should be given to interconnected operation.*

**Standard:**

**Temporary traffic control signals shall not be located within 200 feet of a grade crossing unless the temporary traffic control signal is provided with preemption in accordance with Section ~~4D.274F.18~~, or unless a uniformed officer or flagger is provided at the crossing to prevent vehicles from stopping within the crossing.**

**Section ~~6E.046L.02~~ Automated Flagger Assistance Devices – General ~~This text was relocated from existing Section 6E.04~~**

Support:

Automated Flagger Assistance Devices (AFADs) enable a flagger(s) to be positioned out of the lane of traffic and are used to control road users through temporary traffic control zones. These devices are designed to be remotely operated either by a single flagger at one end of the TTC zone or at a central location, or by separate flaggers near each device's location.

There are two types of AFADs:

- A. An AFAD (see Section ~~6E.056L.03~~) that uses a remotely controlled STOP/SLOW sign on either a trailer or a movable cart system to alternately control right-of-way.
- B. An AFAD (see Section ~~6E.066L.04~~) that uses remotely controlled red and yellow lenses and a gate arm to alternately control right-of-way.

AFADs might be appropriate for short-term and intermediate-term activities (see Section ~~6G.026N.01~~). Typical applications include TTC activities such as, but not limited to:

- A. Bridge maintenance;
- B. Haul road crossings; and
- C. Pavement patching.

**Standard:**

**AFADs shall only be used in situations where there is only one lane of approaching traffic in the direction to be controlled.**

**When used at night, the AFAD location shall be illuminated in accordance with Section ~~6E.086D.06~~.**

*Guidance:*

*AFADs should not be used for long-term stationary work (see Section ~~6G.026N.01~~).*

**Standard:**

**Because AFADs are not traffic control signals, they shall not be used as a substitute for or a replacement for a continuously operating temporary traffic control signal as described in Section ~~6F.846L.01~~.**

**AFADs shall meet the crashworthy performance criteria contained in Section ~~6F.016A.04~~.**

*Guidance:*

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

**Standard:**

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

4 If used, an AFAD shall be operated only by a flagger (see Section ~~6E.04~~6D.01) who has been trained  
5 on the operation of the AFAD. The flagger(s) operating the AFAD(s) shall not leave the AFAD(s)  
6 unattended at any time while the AFAD(s) is being used.

7 The use of AFADs shall conform to one of the following methods:

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

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

12 Option:

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

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

18 *Guidance:*

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

21 **Standard:**

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

24 *Guidance:*

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

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

37 **Section ~~6E.05~~6L.03 STOP/SLOW Automated Flagger Assistance Devices** **The text was**  
38 **relocated from existing Section 6E.05**

39 **Standard:**

40 A STOP/SLOW Automated Flagger Assistance Device (AFAD) (~~see Section 6E.04~~) shall include a  
41 STOP/SLOW sign that alternately displays the STOP (R1-1) face and the SLOW (W20-8) face of a  
42 STOP/SLOW paddle (see Figure ~~6E-16~~L-1).

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

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

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

- 5 A. White or red flashing lights within the STOP face and white or yellow flashing lights within the  
6 SLOW face meeting the provisions contained in Section ~~6E.03~~6D.02; or
- 7 B. A Stop Beacon (see Section ~~4L.4S.05~~) mounted a maximum of 24 inches above the STOP face  
8 and a Warning Beacon (see Section ~~4L.4S.03~~) mounted a maximum of 24 inches above, below, or  
9 to the side of the SLOW face. The Stop Beacon shall not be flashed or illuminated when the  
10 SLOW face is displayed, and the Warning Beacon shall not be flashed or illuminated when the  
11 STOP face is displayed. Except for the mounting locations, the beacons shall comply with the  
12 provisions of Chapter ~~4L.4S~~.

13 Option:

14 Type B warning light(s) (see Section ~~6F.83~~6L.07) or strobe lights may be used in lieu of the Warning  
15 Beacon during the display of the SLOW face of the AFAD's STOP/SLOW sign. **Edited to improve**  
16 **flexibility**

17 **Standard:**

18 If Type B warning lights or strobe lights are used in lieu of a Warning Beacon, they shall flash  
19 continuously when the SLOW face is displayed and shall not be flashed or illuminated when the STOP  
20 face is displayed. **Edited to improve flexibility**

21 Option:

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

24 **Standard:**

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

27 *Guidance:*

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

31 Option:

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

35 **Standard:**

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

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

41 A WAIT ON STOP (R1-7) sign (see Figure ~~6E-16~~L-1) shall be displayed to road users approaching  
42 the AFAD.

43 Option:

44 A GO ON SLOW (R1-8) sign (see Figure ~~6E-16~~L-1) may also be displayed to road users approaching the  
45 AFAD.

46 The WAIT ON STOP/ GO ON SLOW (R1-7a) sign (see Figure 6L-1) may also be used to display both  
47 messages to approaching road users. **Added to improve consistency**

48 **Standard:**

1 The GO ON SLOW sign, if used, and the WAIT ON STOP sign shall be positioned on the same  
2 support structure as the AFAD or immediately adjacent to the AFAD such that they are in the same  
3 direct line of view of approaching traffic as the sign faces of the AFAD. ~~Both signs shall have black~~  
4 ~~legends and borders on white backgrounds. Each of these signs shall be rectangular in shape and each~~  
5 ~~shall be at least 24 x 30 inches in size with letters at least 6 inches high.~~ Deleted; redundant with Part 2  
6 and Section 6G.02

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

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

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

17 **Section ~~6E.06~~6L.04 Red/Yellow Lens Automated Flagger Assistance Devices** This text was  
18 **relocated from existing Section 6E.06**

19 **Standard:**

20 A Red/Yellow Lens Automated Flagger Assistance Device (AFAD) (~~see Section 6E.04~~) shall  
21 alternately display a steadily illuminated CIRCULAR RED lens and a flashing CIRCULAR YELLOW  
22 lens to control traffic without the need for a flagger in the immediate vicinity of the AFAD or on the  
23 roadway (see Figure ~~6E-26~~6L-2).

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

31 **Option:**

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

35 **Standard:**

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

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

44 A Stop Here On Red (R10-6 or R10-6a) sign (see Section 2B.5363) shall be installed on the right-  
45 hand side of the approach at the point at which drivers are expected to stop when the steady  
46 CIRCULAR RED lens is illuminated (see Figure ~~6E-26~~6L-2).

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

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

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

11 A change interval shall not be provided between the display of the steady CIRCULAR RED  
12 indication and the display of the flashing CIRCULAR YELLOW indication.

13 *Guidance:*

14 *The steadily illuminated CIRCULAR YELLOW change interval should have a duration of at least 5*  
15 *seconds, unless a different duration, within the range of durations recommended by Section ~~4D-264~~F.17, is*  
16 *justified by engineering judgment.*

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

19 **Section ~~6F.60~~6L.05 Portable Changeable Message Signs** **This text was relocated from existing**  
20 **Section 6F.60**

21 Support:

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

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

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

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

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

40 Some typical applications include the following:

- 41 A. Where the speed of vehicular traffic is expected to drop substantially;
- 42 B. Where significant queuing and delays are expected;
- 43 C. Where adverse environmental conditions are present;
- 44 D. Where there are changes in alignment or surface conditions;
- 45 E. Where advance notice of ramp, lane, or roadway closures is needed;
- 46 F. Where crash or incident management is needed; and/or
- 47
- 48 G. Where changes in the road user pattern occur.

49 *Guidance:*

1        *The components of a portable changeable message sign should include: a message sign, control systems,*  
2 *a power source, and mounting and transporting equipment. The front face of the sign should be covered with*  
3 *a protective material.*

4 **Standard:**

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

9 Support:

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

12 **Standard:**

13        **The colors used for legends on portable changeable message signs shall comply with those shown in**  
14 **Table 2A-5.**

15 Support:

16        Section 2L.04 contains information regarding the luminance, luminance contrast, and contrast orientation  
17 that is also applicable to portable changeable message signs.

18 *Guidance:*

19        *Portable changeable message signs should be visible from 1/2 mile under both day and night conditions.*

20 Support:

21        Section 2B.1323 contains information regarding the design of portable changeable message signs that are  
22 used to display speed limits that change based on operational conditions, or are used to display the speed at  
23 which approaching drivers are traveling.

24 *Guidance:*

25        *A portable changeable message sign should be limited to three lines of eight characters per line or should*  
26 *consist of a full matrix display.*

27        *Except as provided in Paragraph 15, the letter height used for portable changeable message sign*  
28 *messages should be a minimum of 18 inches.*

29 Option:

30        For portable changeable message signs mounted on service patrol trucks or other incident response  
31 vehicles, a letter height as short as 10 inches may be used. Shorter letter sizes may also be used on a portable  
32 changeable message sign used on low speed facilities provided that the message is legible from at least 650  
33 feet.

34        The portable changeable message sign may vary in size.

35 *Guidance:*

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

41 Support:

42        Road users have difficulties in reading messages displayed in more than two phases on a typical three-line  
43 portable changeable message sign.

44 **Standard:**

45        **Except when being used to simulate an Arrow Board display (see Section 6L.06), techniques of**  
46 **message display such as animation, rapid flashing, dissolving, exploding, scrolling, travelling**  
47 **horizontally or vertically across the face of the sign, or other dynamic elements shall not be used. Edited**  
48 **to reflect Official Interpretation 6(09)-18(1)**

49 *Guidance:*

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

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

- 5 A. The message should be as brief as possible and should contain three thoughts (with each thought  
6 preferably shown on its own line) that convey:
- 7 1. The problem or situation that the road user will encounter ahead,
  - 8 2. The location of or distance to the problem or situation, and
  - 9 3. The recommended driver action.
- 10 B. If more than two phases are needed to display a message, additional portable changeable message  
11 signs should be used. When multiple portable changeable message signs are needed, they should be  
12 placed on the same side of the roadway and they should be separated from each other by a distance of  
13 at least 1,000 feet on freeways and expressways, and by a distance of at least 500 feet on other types  
14 of highways.

15 **Standard:**

16 When the word messages shown in Tables ~~1A.1D~~-1 or ~~1A.1D~~-2 need to be abbreviated on a portable  
17 changeable message sign, the provisions described in Section ~~1A.15D.10~~ shall be followed.

18 In order to maintain legibility, portable changeable message signs shall automatically adjust their  
19 brightness under varying light conditions.

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

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

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

28 *Guidance:*

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

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

34 *Portable changeable message signs should be sited and aligned to provide maximum legibility and to*  
35 *allow time for road users to respond appropriately to the portable changeable Message sign message.*

36 *Portable changeable message signs should be placed off the shoulder of the roadway and behind a traffic*  
37 *barrier, if practical. Where a traffic barrier is not available to shield the portable changeable message sign,*  
38 *it should be placed off the shoulder and outside of the clear zone. If a portable changeable message sign has*  
39 *to be placed on the shoulder of the roadway or within the clear zone, it should be delineated with*  
40 *retroreflective TTC devices.*

41 *When portable changeable message signs are used in TTC zones, they should display only TTC messages.*

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

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

49 **Section ~~6F.61~~6L.06 Arrow Boards** **This text was relocated from existing Section 6F.61**

1 **Standard:**

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

5 *Guidance:*

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

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

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

16 **Standard:**

17 **Arrow boards shall meet the minimum size, legibility distance, number of elements, and other**  
18 **specifications shown in Figure 6F-66L-3.**

19 **Figure 6L-3. Advance Warning Arrow Board Display Specifications**

20 *Support:*

21 Type A arrow boards are appropriate for use on low-speed urban streets. Type B arrow boards are  
22 appropriate for intermediate-speed facilities and for maintenance or mobile operations on high-speed  
23 roadways. Type C arrow boards are intended to be used on high-speed, high-volume motor vehicle traffic  
24 control projects. Type D arrow boards are intended for use on vehicles authorized by the State or local  
25 agency.

26 **Standard:**

27 **Type A, B, and C arrow boards shall have solid rectangular appearances. A Type D arrow board**  
28 **shall conform to the shape of the arrow.**

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

31 *Guidance:*

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

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

36 **Standard:**

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

39 *Guidance:*

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

41 **Standard:**

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

44 *Guidance:*

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

47 **Standard:**

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

4 An arrow board shall have the following three mode selections:

- 5 A. A Flashing Arrow, Sequential Arrow, or Sequential Chevron mode;
- 6 B. A flashing Double Arrow mode; and
- 7 C. A flashing Caution or Alternating Diamond mode.

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

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

13 *Guidance:*

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

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

17 **Standard:**

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

20 *Guidance:*

21 *When arrow boards are used to close multiple lanes, if the first arrow board is placed on the shoulder, the*  
22 *second arrow board should be placed in the first closed lane at the upstream end of the second merging taper*  
23 *(see Figure 6H6P-37). When the first arrow board is placed in the first closed lane, the second arrow board*  
24 *should be placed in the second closed lane at the downstream end of the second merging taper.*

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

27 **Standard:**

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

30 Arrow boards shall only be used to indicate a lane closure. Arrow boards shall not be used to  
31 indicate a lane shift.

32 *Option:*

33 A portable changeable message sign may be used to simulate an arrow board display.

34 **Section 6F.836L.07 Flashing Beacons and Warning Lights** This text was relocated from existing  
35 **Section 6F.83 and title was edited for clarity**

36 *Guidance:*

37 *Lighting devices should be provided in TTC zones based on engineering judgment.* This text was  
38 **relocated from existing Section 6F.81**

39 *Option:*

40 ~~Lighting devices~~ Flashing beacons (see Chapter 4S) and/or warning lights may be used to supplement  
41 retroreflectorized signs, barriers, and channelizing devices. This text was relocated from existing Section  
42 **6F.81**

43 *Support:*

44 Type A, Type B, Type C, and Type D 360-degree warning lights are portable, powered, yellow, lens-  
45 directed, enclosed lights.

46 **Standard:**

47 Warning lights shall ~~be in accordance~~ comply with the ~~current ITE "Purchase Specification for~~  
48 ~~Flashing and Steady-Burn Warning Lights"~~ provisions in Chapter 13 of the publication entitled,

1 [“Equipment and Materials Standards of the Institute of Transportation Engineers”](#) (see Section  
2 [1A.405](#)). **Edited to improve accuracy**

3 When warning lights are used, they shall be mounted on signs or channelizing devices in a manner  
4 that, if hit by an errant vehicle, they will not be likely to penetrate the windshield.

5 *Guidance:*

6 *The maximum spacing for warning lights should be identical to the channelizing device spacing*  
7 *requirements.*

8 *Support:*

9 The light weight and portability of warning lights are advantages that make these devices useful as  
10 supplements to the retroreflectorization on signs and channelizing devices. The flashing lights are effective in  
11 attracting road users’ attention.

12 *Option:*

13 Warning lights may be used in either a steady-burn or flashing mode.

14 **Standard:**

15 Warning lights shall flash when placed on channelizing devices used alone or in a cluster to warn of  
16 a condition. **This text was relocated from existing Section 6F.63**

17 Except for the sequential flashing warning lights discussed in Paragraphs ~~12 and 13~~, warning lights  
18 placed on channelizing devices used in a series to channelize road users shall be steady-burn. **This text**  
19 **was relocated from existing Section 6F.63**

20 Except for the sequential flashing warning lights that are described in Paragraphs ~~8 and 9~~ 12,  
21 flashing warning lights shall not be used for delineation, as a series of flashers fails to identify the  
22 desired vehicle path.

23 *Option:*

24 ~~A series of sequential flashing warning lights may be placed on channelizing devices that form a merging~~  
25 ~~taper in order to increase driver detection and recognition of the merging taper.~~ **Deleted; redundant with new**  
26 **Section 6K.01**

27 **Standard:**

28 If a series of sequential flashing warning lights is used on channelizing devices that form a merging  
29 taper, the successive flashing of the lights shall occur from the upstream end of the merging taper to the  
30 downstream end of the merging taper in order to identify the desired vehicle path. Each flashing  
31 warning light in the sequence shall be flashed at a rate of not less than 55 or more than 75 times per  
32 minute. **Edited to improve consistency**

33 Type A Low-Intensity Flashing warning lights, Type C Steady-Burn warning lights, and Type D  
34 360-degree Steady-Burn warning lights shall be maintained so as to be capable of being visible on a  
35 clear night from a distance of 3,000 feet. Type B High-Intensity Flashing warning lights shall be  
36 maintained so as to be capable of being visible on a sunny day when viewed without the sun directly on  
37 or behind the device from a distance of 1,000 feet.

38 Warning lights shall have a minimum mounting height of 30 inches to the bottom of the lens.

39 *Support:*

40 Type A Low-Intensity Flashing warning lights are used to warn road users during nighttime hours that  
41 they are approaching or proceeding in a potentially hazardous area.

42 *Option:*

43 Type A warning lights may be mounted on channelizing devices.

44 *Support:*

45 Type B High-Intensity Flashing warning lights are used to warn road users during both daylight and  
46 nighttime hours that they are approaching a potentially hazardous area.

47 *Option:*

48 Type B warning lights are designed to operate 24 hours per day and may be mounted on advance warning  
49 signs or on independent supports.

1 Type C Steady-Burn warning lights and Type D 360-degree Steady-Burn warning lights may be used  
2 during nighttime hours to delineate the edge of the traveled way.

3 *Guidance:*

4 *When used to delineate a curve, Type C and Type D 360-degree warning lights should only be used on*  
5 *devices on the outside of the curve, and not on the inside of the curve.*

6 **Section ~~6F.62~~6L.08 High-Level Warning Devices (Flag Trees)** **The text in this Section was**  
7 **relocated from existing Section 6F.62**

8 Option:

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

10 Support:

11 A high-level warning device is designed to be seen over the top of typical passenger cars. A typical high-  
12 level warning device is shown in Figure ~~6F-2~~6F-1.

13 **Standard:**

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

18 Option:

19 An appropriate warning sign may be mounted below the flags.

20 Support:

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

23

1 CHAPTER 6M. TTC ZONE DESIGN FEATURES AND DEVICES THAT ARE NOT TRAFFIC  
2 CONTROL DEVICES

3 **New Chapter with text from existing Sections 6F.74, 6F.75, 6F.82, and 6F.85 through 6F.88**

4 **Section 6M.01 General Added to improve accuracy**

5 Support:

6 Although certain devices and design features, such as lighting, barriers, dividers, crash cushions, and  
7 screens, are sometimes used in TTC zones to supplement traffic control devices or enhance traffic operations  
8 or safety for road users, they are not considered to be traffic control devices. The following Sections describe  
9 the most commonly used of such devices and design features. See also Section 1D.04 for additional  
10 information.

11 **Section 6F.856M.02 Positive Protection and Temporary Traffic Barriers This text was**  
12 **relocated from existing Section 6F.85**

13 Standard:

14 The need for longitudinal traffic barrier and other positive protection devices shall be based on an  
15 engineering study. At a minimum, positive protection devices shall be considered in work zone  
16 situations that place workers at increased risk from motorized traffic, and where positive protection  
17 devices offer the highest potential for increased safety for workers and road users. **Guidance changed**  
18 **to Standard to reflect CFR 630.1108 Work Zone Safety Management Measures and Strategies (subpart**  
19 **K) and relocated from below**

20 Support:

21 Consider positive protection under the following circumstances:

- 22 A. Work zones that provide workers no means of escape from motorized traffic such as tunnels or  
23 bridges;
- 24 B. Long-term stationary work zones of two weeks or more resulting in substantial worker exposure  
25 to motorized traffic;
- 26 C. Projects with anticipated operating speeds of 45 mph or greater, especially when combined with  
27 high traffic volumes;
- 28 D. Work operations that place workers close to travel lanes open to traffic; and
- 29 E. Roadside hazards, such as drop-offs or unfinished bridge decks, that will remain in place  
30 overnight or longer.

31 Work zone setups vary depending on the nature of the positive protection used.

32 For additional guidance refer to 23 CFR Part 630.1108(a). **Added to reflect CFR 640.1108 Work Zone**  
33 **Safety Management Measures and Strategies**

34 Temporary traffic barriers, including shifting portable or movable barriers, are devices designed to help  
35 prevent penetration by vehicles while minimizing injuries to vehicle occupants, and to protect workers,  
36 bicyclists, and pedestrians.

37 ~~The four primary functions of temporary traffic barriers are:~~

- 38 ~~A. To keep vehicular traffic from entering work areas, such as excavations or material storage sites;~~
- 39 ~~B. To separate workers, bicyclists, and pedestrians from motor vehicle traffic;~~
- 40 ~~C. To separate opposing directions of vehicular traffic; and~~
- 41 ~~D. To separate vehicular traffic, bicyclists, and pedestrians from the work area such as false work for~~  
42 ~~bridges and other exposed objects.~~ **Deleted; redundant with new Support statements above**

43 Option:

44 Temporary traffic barriers may be used to separate two-way vehicular traffic.

45 Guidance:

1 ~~Because the protective requirements of a TTC situation have priority in determining the need for~~  
2 ~~temporary traffic barriers, their use should be based on an engineering study.~~ **Guidance changed to**

3 **Standard and relocated to above**

4 **Standard:**

5 Temporary traffic barriers shall be supplemented with standard delineation, pavement markings,  
6 or channelizing devices for improved daytime and nighttime visibility if they are used to channelize  
7 vehicular traffic. The delineation color shall match the applicable pavement marking color.

8 Temporary traffic barriers, including their end treatments, shall be crashworthy. ~~In order to~~  
9 ~~mitigate the effect of striking the upstream end of a temporary traffic barrier, the end shall be installed~~  
10 ~~in accordance with AASHTO's "Roadside Design Guide" (see Section 1A.11) by flaring until the end is~~  
11 ~~outside the acceptable clear zone or by providing crashworthy end treatments.~~ **Deleted; redundant**  
12 **with new Section 6A.04**

13 Short intermittent segments of temporary traffic barrier shall not be used because they nullify the  
14 containment and redirective capabilities of the temporary traffic barrier, increase the potential for  
15 serious injury both to vehicle occupants and pedestrians, and encourage the presence of blunt leading  
16 ends. Adjacent temporary traffic barrier segments shall be properly connected in order to provide the  
17 overall strength required for the temporary traffic barrier to perform properly. **This text was**  
18 **relocated from existing Section 6D.01**

19 Option:

20 Steady-burn ~~Warning lights or steady burn~~ (see Section 6L.07) ~~lamps~~ may be mounted on temporary  
21 traffic barrier installations. **Edited to improve clarity**

22 Support:

23 Movable barriers may include movable concrete, movable steel or highly mobile barriers. Movable barrier  
24 may be moved laterally and/or longitudinally when needed and/or from site to site. ~~are capable of being~~  
25 ~~repositioned laterally using a transfer vehicle that travels along the barrier. Movable barriers enable short~~  
26 ~~term closures to be installed and removed on long term projects. Providing a barrier protected work space for~~  
27 ~~short term closures and providing unbalanced flow to accommodate changes in the direction of peak period~~  
28 ~~traffic flows are two of the advantages of using movable barriers.~~

29 ~~Figure 6H 45 shows a temporary reversible lane using movable barriers. The notable feature of the~~  
30 ~~movable barrier is that in both Phase A and Phase B, the lanes used by opposing traffic are separated by a~~  
31 ~~barrier.~~

32 ~~Figure 6H 34 shows an exterior lane closure using a temporary traffic barrier. Notes 7 through 9 address~~  
33 ~~the option of using a movable barrier. By using a movable barrier, the barrier can be positioned to close the~~  
34 ~~lane during the off-peak periods and can be relocated to open the lane during peak periods to accommodate~~  
35 ~~peak traffic flows. With one pass of the transfer vehicle, the barrier can be moved out of the lane and onto the~~  
36 ~~shoulder. Furthermore, if so desired, with a second pass of the transfer vehicle, the barrier could be moved to~~  
37 ~~the roadside beyond the shoulder.~~ **Edited to improve clarity and broaden the description of movable**  
38 **barrier**

39 More specific information on the use of temporary traffic barriers is contained in Chapters 8 and 9 of  
40 AASHTO's "Roadside Design Guide" (see Section 1A.405).

41 **Section ~~6F.75~~ 6M.03 Temporary Raised Islands **This text was relocated from existing Section****  
42 **6F.75**

43 **Standard:**

44 Temporary raised islands shall be used only in combination with pavement striping and other  
45 suitable channelizing devices.

46 Option:

47 A temporary raised island may be used to separate vehicular traffic flows in two-lane, two-way operations  
48 on roadways having a vehicular traffic volume range of 4,000 to 15,000 average daily traffic (ADT) and on  
49 freeways having a vehicular traffic volume range of 22,000 ADT to 60,000 ADT.

1 Temporary raised islands also may be used in other than two-lane, two-way operations where physical  
2 separation of vehicular traffic from the TTC zone is not required.

3 *Guidance:*

4 *Temporary raised islands should have the basic dimensions of 4 inches high by at least 12 inches wide*  
5 *and have rounded or chamfered corners.*

6 *The temporary raised islands should not be designed in such a manner that they would cause a motorist to*  
7 *lose control of the vehicle if the vehicle inadvertently strikes the temporary raised island. If struck, pieces of*  
8 *the island should not be dislodged to the extent that they could penetrate the occupant compartment or involve*  
9 *other vehicles.*

10 **Standard:**

11 **At pedestrian crossing locations, temporary raised islands shall have an opening or be shortened to**  
12 **provide at least a 60-inch wide pathway for the crossing pedestrian.**

13 **Section ~~6F.74~~6M.04 Detectable Edging for Pedestrians** **This text was relocated from existing**

14 **Section 6F.74**

15 Support:

16 Individual channelizing devices, tape or rope used to connect individual devices, other discontinuous  
17 barriers and devices, and pavement markings are not detectable by persons with visual disabilities and are  
18 incapable of providing detectable path guidance on temporary or realigned sidewalks or other pedestrian  
19 facilities.

20 *Guidance:*

21 ~~*When it is determined that a facility should be accessible to and detectable by pedestrians with visual*~~  
22 ~~*disabilities, a*~~ *A continuously detectable edging should be provided throughout the length of the facility such*  
23 *that it can be followed by pedestrians using long canes for guidance. This edging should protrude at least 6-8*  
24 *inches above the surface of the sidewalk or pathway, with the bottom of the edging a maximum of 2 inches*  
25 *above the surface. This edging should be continuous throughout the length of the facility except for gaps at*  
26 *locations where pedestrians or vehicles will be turning or crossing. This edging should consist of a*  
27 *prefabricated or formed-in-place curbing or other continuous device that is placed along the edge of the*  
28 *sidewalk or walkway. This edging should be firmly attached to the ground or to other devices. Adjacent*  
29 *sections of this edging should be interconnected such that the edging is not displaced by pedestrian or*  
30 *vehicular traffic or work operations, and such that it does not constitute a hazard to pedestrians, workers, or*  
31 *other road users.* **Edited to improve consistency with new Section 6K.02**

32 Support:

33 Examples of detectable edging for pedestrians include:

- 34 A. Prefabricated lightweight sections of plastic, metal, or other suitable materials that are interconnected  
35 and fixed in place to form a continuous edge.
- 36 B. Prefabricated lightweight sections of plastic, metal, or other suitable materials that are interconnected,  
37 fixed in place, and placed at ground level to provide a continuous connection between channelizing  
38 devices located at intervals along the edge of the sidewalk or walkway.
- 39 C. Sections of lumber interconnected and fixed in place to form a continuous edge.
- 40 D. Formed-in-place asphalt or concrete curb.
- 41 E. Prefabricated concrete curb sections that are interconnected and fixed in place to form a continuous  
42 edge.
- 43 F. Continuous temporary traffic barrier or longitudinal channelizing barricades placed along the edge of  
44 the sidewalk or walkway that provides a pedestrian edging at ground level.
- 45 G. Chain link or other fencing equipped with a continuous bottom rail.

46 *Guidance:*

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

49 **Section ~~6F.81~~ Lighting Devices** **Section deleted and 3 paragraphs relocated to other Sections**

1 *Guidance:*

2 *Lighting devices should be provided in TTC zones based on engineering judgment.* **This text was**  
3 **relocated to new Section 6L.07**

4 *When used to supplement channelization, the maximum spacing for warning lights should be identical to*  
5 *the channelizing device spacing requirements.* **Deleted; redundant with new Section 6L.07**

6 *Option:*

7 *Lighting devices may be used to supplement retroreflectorized signs, barriers, and channelizing devices.*  
8 **This text was relocated to new Section 6L.07**

9 *During normal daytime maintenance operations, the functions of flashing warning beacons may be*  
10 *provided by high intensity rotating, flashing, oscillating, or strobe lights on a maintenance vehicle.* **Deleted –**  
11 **covered elsewhere in Part 6.**

12 **Standard:**

13 ~~**Although vehicle hazard warning lights are permitted to be used to supplement high intensity**~~  
14 ~~**rotating, flashing, oscillating, or strobe lights, they shall not be used instead of high intensity rotating,**~~  
15 ~~**flashing, oscillating, or strobe lights.**~~ **Moved to new Section 6N.01**

16 ~~**Section 6F.82 Floodlights**~~ **This text was relocated to new Section 6M.08**

17 ~~**Section 6F.83 Warning Lights**~~ **This text was relocated to new Section 6L.07**

18 ~~**Section 6F.84 Temporary Traffic Control Signals**~~ **This text was relocated to new Section 6L.01**

19 ~~**Section 6F.85 Temporary Traffic Barriers**~~ **This text was relocated to new Section 6M.02**

20 ~~**Section 6F.86**~~**6M.05 Crash Cushions**

21 **Support:**

22 Crash cushions are systems that mitigate the effects of errant vehicles that strike obstacles, either by  
23 smoothly decelerating the vehicle to a stop when hit head-on, or by redirecting the errant vehicle. The two  
24 types of crash cushions that are used in TTC zones are stationary crash cushions and truck-mounted  
25 attenuators. Crash cushions in TTC zones help protect the drivers from the exposed ends of barriers, fixed  
26 objects, shadow vehicles, and other obstacles. Specific information on the use of crash cushions can be found  
27 in AASHTO's "Roadside Design Guide" (see Section 1A.4405).

28 **Standard:**

29 **Crash cushions shall be crashworthy. They shall also be designed for each application to stop or**  
30 **redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to**  
31 **verify that they have not been hit or damaged. Damaged crash cushions shall be promptly repaired or**  
32 **replaced to maintain their crashworthiness.**

33 **Support:**

34 Stationary crash cushions are used in the same manner as permanent highway installations to protect  
35 drivers from the exposed ends of barriers, fixed objects, and other obstacles.

36 **Standard:**

37 **Stationary crash cushions shall be designed for the specific application intended.**

38 **Truck-mounted attenuators shall be energy-absorbing devices attached to the rear of shadow**  
39 **trailers or trucks and shall be used in accordance with the manufacturer's specifications.** **Guidance**  
40 **from below changed to Standard and combined with existing Standard statement** **If used, the shadow**  
41 **vehicle with the attenuator shall be located in advance of the work area, workers, or equipment to**  
42 **reduce the severity of rear-end crashes from errant vehicles.**

43 **Support:**

44 Trucks or trailers are often used as shadow vehicles to protect workers or work equipment from errant  
45 vehicles. These shadow vehicles are normally equipped with flashing arrows, changeable message signs,  
46 and/or high-intensity rotating, flashing, oscillating, or strobe lights located properly in advance of the workers

1 and/or equipment that they are protecting. However, these shadow vehicles might themselves cause injuries  
2 to occupants of the errant vehicles if they are not equipped with truck-mounted attenuators.

3 *Guidance:*

4 *The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being*  
5 *protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around*  
6 *the shadow truck and strike the protected workers and/or equipment.*

7 Support:

8 Chapter 9 of AASHTO’s “Roadside Design Guide” (see Section 1A.1105) contains additional information  
9 regarding the use of shadow vehicles.

10 *Guidance:*

11 ~~*If used, the truck-mounted attenuator should be used in accordance with the manufacturer’s*~~  
12 ~~*specifications.*~~ **Guidance changed to Standard and combined with Standard above**

### 13 **Section 6F.876M.06 Rumble Strips**

14 Support:

15 Transverse rumble strips consist of intermittent, narrow, transverse areas of rough-textured or slightly  
16 raised or depressed road surface that extend across the travel lanes to alert drivers to unusual vehicular traffic  
17 conditions. Through noise and vibration they attract the driver’s attention to such features as unexpected  
18 changes in alignment and to conditions requiring a stop.

19 Longitudinal rumble strips consist of a series of rough-textured or slightly raised or depressed road  
20 surfaces located along the shoulder to alert road users that they are leaving the travel lanes.

21 **Standard:**

22 **If it is desirable to use a color other than the color of the pavement for a longitudinal rumble strip,**  
23 **the color of the rumble strip shall be the same color as the longitudinal line the rumble strip**  
24 **supplements.**

25 **If the color of a transverse rumble strip used within a travel lane is not the color of the pavement,**  
26 **the color of the rumble strip shall be white, black, or orange.**

27 Option:

28 Intervals between transverse rumble strips may be reduced as the distance to the approached conditions is  
29 diminished in order to convey an impression that a closure speed is too fast and/or that an action is imminent.  
30 A sign warning drivers of the onset of rumble strips may be placed in advance of any transverse rumble strip  
31 installation.

32 *Guidance:*

33 *Transverse rumble strips should be placed transverse to vehicular traffic movement. They should not*  
34 *adversely affect overall pavement skid resistance under wet or dry conditions.*

35 *In urban areas, even though a closer spacing might be warranted, transverse rumble strips should be*  
36 *designed in a manner that does not promote unnecessary braking or erratic steering maneuvers by road users.*

37 *Transverse rumble strips should not be placed on sharp horizontal or vertical curves.*

38 *Rumble strips should not be placed through pedestrian crossings or on bicycle routes.*

39 *Transverse rumble strips should not be placed on roadways used by bicyclists unless a minimum clear*  
40 *path of 4 feet is provided at each edge of the roadway or on each paved shoulder as described in AASHTO’s*  
41 *“Guide to the Development of Bicycle Facilities” (see Section 1A.1105).*

42 *Longitudinal rumble strips should not be placed on the shoulder of a roadway that is used by bicyclists*  
43 *unless a minimum clear path of 4 feet is also provided on the shoulder.*

### 44 **Section 6F.886M.07 Screens**

45 Support:

1 Screens are used to block the road users' view of activities that can be distracting. Screens might improve  
2 safety and motor vehicle traffic flow where volumes approach the roadway capacity because they discourage  
3 gawking and reduce headlight glare from oncoming motor vehicle traffic.

4 *Guidance:*

5 *Screens should not be mounted where they could adversely restrict road user visibility and sight distance*  
6 *and adversely affect the ~~reasonably safe~~ operation of vehicles. Edited to improve accuracy*

7 *Option:*

8 Screens may be mounted on the top of temporary traffic barriers that separate two-way motor vehicle  
9 traffic.

10 *Guidance:*

11 *Design of screens should be in accordance with Chapter 9 of AASHTO's "Roadside Design Guide" (see*  
12 *Section 1A.H05).*

13 **Section 6F.826M.08 Floodlights Lighting for Night Work** **This text was relocated from existing**  
14 **Section 6F.82 and edited to improve accuracy**

15 *Support:*

16 Utility, maintenance, or construction activities on highways are frequently conducted during nighttime  
17 periods when vehicular traffic volumes are lower. Large construction projects are sometimes operated on a  
18 double-shift basis requiring night work (see Section 6G.196N.18).

19 *Guidance:*

20 *When nighttime work is being performed, floodlights should be used to illuminate the work area,*  
21 *equipment crossings, and other areas.*

22 *When used, Floodlighting ~~shall~~ should not produce a disabling glare condition for*  
23 *approaching road users, flaggers, or workers. Standard changed to Guidance and*  
24 *relocated from below*

25 *The adequacy of the floodlight placement and elimination of potential glare should be determined by*  
26 *driving through and observing the floodlighted area from each direction on all approaching roadways after*  
27 *the initial floodlight setup, at night, and periodically. Relocated from below* *Lighting should be sufficient so*  
28 *as to clearly identify a worker as a person. Care should be taken to minimize the potential for shadows to*  
29 *conceal workers within the work area. Added to improve accuracy*

30 *Support:*

31 Desired illumination levels vary depending upon the nature of the task involved. An average horizontal  
32 luminance of 5 foot candles can be adequate for general activities. Tasks requiring high levels of precision  
33 and extreme care can require an average horizontal luminance of 20 foot candles. Relocated from below

34 **Standard:**

35 **Except in emergency situations, flagger stations shall be illuminated at night.**

36 **Floodlighting shall not produce a disabling glare condition for approaching road users, flaggers, or**  
37 **workers. Standard changed to Guidance and relocated to above**

38 *Guidance:*

39 *The adequacy of the floodlight placement and elimination of potential glare should be determined by*  
40 *driving through and observing the floodlighted area from each direction on all approaching roadways after*  
41 *the initial floodlight setup, at night, and periodically. Relocated to above*

42 *Support:*

43 *Desired illumination levels vary depending upon the nature of the task involved. An average horizontal*  
44 *luminance of 5 foot candles can be adequate for general activities. Tasks requiring high levels of precision and*  
45 *extreme care can require an average horizontal luminance of 20 foot candles. Relocated to above*

1 CHAPTER ~~6G~~6N. TYPE OF TEMPORARY TRAFFIC CONTROL ZONE ACTIVITIES

2 ~~Section 6G.01 Typical Applications~~ This text was relocated to new Section 6B.01

3 Section ~~6G.02~~6N.01 Work Duration

4 Support:

5 Work duration is a major factor in determining the number and types of devices used in TTC zones. The  
6 duration of a TTC zone is defined relative to the length of time a work operation occupies a spot location.

7 **Standard:**~~Guidance:~~ **Standard changed to Guidance**

8 *The five categories of work duration and their time at a location ~~shall~~should be defined as follows:*

- 9 A. *Long-term stationary is work that occupies a location more than 3 days.*
- 10 B. *Intermediate-term stationary is work that occupies a location more than one daylight period up to 3*  
11 *days, or nighttime work lasting more than 1 hour.*
- 12 C. *Short-term stationary is daytime work that occupies a location for more than 1 hour within a single*  
13 *daylight period.*
- 14 D. *Short duration is work that occupies a location up to 1 hour.*
- 15 E. *Mobile is work that moves intermittently or continuously.*

16 Support:

17 At long-term stationary TTC zones, there is ample time to install and realize benefits from the full range  
18 of TTC procedures and devices that are available for use. Generally, larger channelizing devices, temporary  
19 roadways, and temporary traffic barriers are used.

20 **Standard:**

21 **Since long-term operations extend into nighttime, retroreflective and/or illuminated devices shall be**  
22 **used in long-term stationary TTC zones.**

23 *Guidance:*

24 ~~Inappropriate Temporary markings in long-term stationary TTC zones should be removed and replaced~~  
25 ~~with temporary markings installed in accordance with Section 6J.01.~~ Edited to improve consistency with  
26 **6J.01.**

27 Support:

28 In intermediate-term stationary TTC zones, it might not be feasible or practical to use procedures or  
29 devices that would be desirable for long-term stationary TTC zones, such as altered pavement markings,  
30 temporary traffic barriers, and temporary roadways. The increased time to place and remove these devices in  
31 some cases could significantly lengthen the project, thus increasing exposure time.

32 **Standard:**

33 **Since intermediate-term operations extend into nighttime, retroreflective and/or illuminated devices**  
34 **shall be used in intermediate-term stationary TTC zones.**

35 Support:

36 Most maintenance and utility operations are short-term stationary work.

37 As compared to stationary operations, mobile and short-duration operations are activities that might  
38 involve different treatments. Devices having greater mobility might be necessary such as signs mounted on  
39 trucks. Devices that are larger, more imposing, or more visible can be used effectively and economically.  
40 The mobility of the TTC zone is important.

41 *Guidance:*

42 *Safety in short-duration or mobile operations should not be compromised by using fewer devices simply*  
43 *because the operation will frequently change its location.*

44 **Option:**

45 ~~Appropriately colored or marked vehicles with high intensity rotating, flashing, oscillating, or strobe~~  
46 ~~lights may be used in place of signs and channelizing devices for short duration or mobile operations. These~~  
47 ~~vehicles may be augmented with signs or arrow boards.~~ Deleted; redundant with other sections in Part 6

48 Support:

1 During short-duration work, it often takes longer to set up and remove the TTC zone than to perform the  
2 work. Workers face hazards in setting up and taking down the TTC zone. Also, since the work time is short,  
3 delays affecting road users are significantly increased when additional devices are installed and removed.

4 Option:

5 Considering these factors, simplified control procedures may be warranted for short-duration work. A  
6 reduction in the number of devices may be offset by the use of other more dominant devices such as high-  
7 intensity rotating, flashing, oscillating, or strobe lights on work vehicles.

8 Support:

9 Mobile operations often involve frequent short stops for activities such as litter cleanup, pothole patching,  
10 or utility operations, and are similar to short-duration operations.

11 *Guidance:*

12 ~~Warning signs and high intensity rotating, flashing, oscillating, or strobe lights should be used on the~~  
13 ~~vehicles that are participating in the mobile work.~~ Deleted; redundant with other sections in Part 6

14 Option:

15 Flags and/or channelizing devices may additionally be used and moved periodically to keep them near the  
16 mobile work area.

17 Flaggers may be used for mobile operations that often involve frequent short stops.

18 Support:

19 Mobile operations also include work activities where workers and equipment move along the road without  
20 stopping, usually at slow speeds. The advance warning area moves with the work area.

21 *Guidance:*

22 *When mobile operations are being performed, a shadow vehicle equipped with an arrow board or a sign*  
23 *should follow the work vehicle, especially when vehicular traffic speeds or volumes are high. Where feasible,*  
24 *warning signs should be placed along the roadway and moved periodically as work progresses.*

25 *Under high-volume conditions, consideration should be given to scheduling mobile operations work*  
26 *during off-peak hours.*

27 *If there are mobile operations on a high-speed travel lane of a multi-lane divided highway, arrow boards*  
28 *should be used.*

29 **Standard:**

30 **Mobile operations shall have appropriate devices on the equipment (that is, high-intensity rotating,**  
31 **flashing, oscillating, or strobe lights, signs, or special lighting), or shall use a separate vehicle with**  
32 **appropriate warning devices. Although vehicle hazard warning lights are permitted to be used to**  
33 **supplement high-intensity rotating, flashing, oscillating, or strobe lights, they shall not be used instead**  
34 **of ~~high-intensity rotating, flashing, oscillating, or strobe lights~~ these devices.** Last sentence was  
35 **relocated from existing Section 6F.81 and edited to improve clarity**

36 Option:

37 For mobile operations that move at speeds of less than 3 mph, mobile signs or stationary signing that is  
38 periodically retrieved and repositioned in the advance warning area may be used.

39 Support:

40 A rolling roadblock is a method of temporary traffic control used to slow or stop traffic as a means of  
41 temporarily removing traffic from a roadway. The rolling roadblock closes all lanes of traffic by using pacing  
42 vehicles to create a gap so that construction activities can be performed. Rolling roadblocks are used where  
43 long-term road closures using temporary traffic control devices (TTCD) are not needed. A rolling roadblock  
44 requires one blocking/pacing vehicle per lane of traffic, a clearing vehicle, and an advance warning vehicle.  
45 The rolling roadblock is normally performed by law enforcement officers during off-peak hours. Added to  
46 **reflect NTSB H-17-2 recommendation**

## 47 **Section ~~6G.036~~6N.02 Location of Work**

48 Support:

1 Chapter ~~6D~~6C and Sections ~~6F.74~~6M.04 and ~~6G.05~~6N.04 contain additional information regarding the  
2 steps to follow when pedestrian or bicycle facilities are affected by the worksite.

3 The choice of TTC needed for a TTC zone depends upon where the work is located. As a general rule,  
4 the closer the work is to road users (including bicyclists and pedestrians), the greater the number of TTC  
5 devices that are needed. Procedures are described later in this Chapter for establishing TTC zones in the  
6 following locations:

- 7 A. Outside the shoulder,
- 8 B. On the shoulder with no encroachment,
- 9 C. On the shoulder with minor encroachment,
- 10 D. Within the median, and
- 11 E. Within the traveled way.

12 **Standard:**

13 **When the work space is within the traveled way, except for short-duration and mobile operations,**  
14 **advance warning shall provide a general message that work is taking place and shall supply**  
15 **information about highway conditions. TTC devices shall ~~indicate how vehicular traffic can move~~**  
16 **clearly delineate the path roadway users are to follow through the TTC zone. Edited to improve clarity**

17 **Section ~~6G.04~~6N.03 Modifications To Fulfill Special Needs**

18 **Support:**

19 The typical applications in Chapter ~~6H~~6P illustrate commonly encountered situations in which TTC  
20 devices are employed.

21 **Option:**

22 Other devices may be added to supplement the devices provided in the typical applications, and device  
23 spacing may be adjusted to provide additional reaction time. When conditions are less complex than those  
24 depicted in the typical applications, fewer devices may be needed.

25 *Guidance:*

26 *When conditions are more complex, typical applications should be modified by giving particular attention*  
27 *to the provisions set forth in Chapter ~~6B~~6A and by incorporating appropriate devices and practices from the*  
28 *following list:*

29 A. *Additional devices:*

- 30 1. *Signs*
- 31 2. *Arrow boards*
- 32 3. *More channelizing devices at closer spacing (see Section ~~6F.74~~6M.04 for information regarding*  
33 *detectable edging for pedestrians)*
- 34 4. *Temporary raised pavement markers*
- 35 5. *High-level warning devices*
- 36 6. *Portable changeable message signs*
- 37 7. *Temporary traffic control signals (including pedestrian signals and accessible pedestrian signals)*
- 38 8. *Temporary traffic barriers*
- 39 9. *Crash cushions*
- 40 10. *Screens*
- 41 11. *Rumble strips*
- 42 12. *More delineation*

43 B. *Upgrading of devices:*

- 44 1. *A full complement of standard pavement markings*
- 45 2. *Brighter and/or wider pavement markings*
- 46 3. *Larger and/or brighter signs*
- 47 4. *Channelizing devices with greater conspicuity*
- 48 5. *Temporary traffic barriers in place of channelizing devices*

49 C. *Improved geometrics at detours or crossovers*

50 D. *Increased distances:*

- 1 1. Longer advance warning area
- 2 2. Longer tapers
- 3 E. Lighting:
  - 4 1. Temporary roadway lighting
  - 5 2. Steady-burn lights used with channelizing devices
  - 6 3. Flashing lights for isolated hazards
  - 7 4. Illuminated signs
  - 8 5. Floodlights
- 9 F. Pedestrian routes and temporary facilities
- 10 G. Bicycle diversions and temporary facilities

## 11 **Section 6G.056N.04 Work Affecting Pedestrian and Bicycle Facilities**

### 12 **Support:**

13 It is not uncommon, particularly in urban areas, that road work and the associated TTC will affect existing  
14 pedestrian or bicycle facilities. It is essential that the needs of all road users, including pedestrians with  
15 disabilities, are considered in TTC zones.

16 In addition to specific provisions identified in Sections 6G.066N.05 through 6G.146N.13, there are a  
17 number of provisions that might be applicable for all of the types of activities identified in this Chapter.

### 18 *Guidance:*

19 *Where pedestrian or bicycle usage is high, the typical applications should be modified by giving*  
20 *particular attention to the provisions set forth in Chapter ~~6D6C~~, this Chapter, Section 6F.746M.04, and in*  
21 *other Sections of Part 6 related to accessibility and detectability provisions in TTC zones.*

22 *Pedestrians should be separated from the worksite by appropriate devices that maintain the accessibility*  
23 *and detectability for pedestrians with disabilities.*

24 *Bicyclists and pedestrians should not be exposed to unprotected excavations, open utility access,*  
25 *overhanging equipment, or other such conditions.*

26 *Except for short duration and mobile operations, when a highway shoulder is occupied, a SHOULDER*  
27 *WORK (W21-5) sign should be placed in advance of the activity area. When work is performed on a paved*  
28 *shoulder 8 feet or more in width, channelizing devices should be placed on a taper having a length that*  
29 *conforms to the requirements of a shoulder taper. Signs should be placed such that they do not narrow any*  
30 *existing pedestrian passages to less than 48 inches.*

31 *Pedestrian detours should be avoided since pedestrians rarely observe them and the cost of providing*  
32 *accessibility and detectability might outweigh the cost of maintaining a continuous route. Whenever possible,*  
33 *work should be done in a manner that does not create a need to detour pedestrians from existing routes or*  
34 *crossings.*

### 35 **Standard:**

36 **Where pedestrian routes are closed, alternate pedestrian routes shall be provided.**

37 **When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary**  
38 **facilities shall be detectable and shall include accessibility features consistent with the features present**  
39 **in the existing pedestrian facility.**

### 40 *Guidance:*

41 *The continuity of a bikeway should be maintained through the TTC zone if practical.*

### 42 *Support:*

43 *The continuity of a bikeway through the TTC zone is particularly important where bicyclists have been*  
44 *traveling on a shoulder, bike lane, or shared-use path adjacent to a lane (having a speed limit greater than or*  
45 *equal to 35 miles per hour) and there would be a significant safety concern if bicyclists were to share that lane*  
46 *through the TTC zone.*

47 *On roadways which are not bikeways but where bicyclists (when present) typically share lanes with motor*  
48 *vehicle traffic, the TTC plan and Typical Applications for general traffic will usually be adequate for*  
49 *bicyclists as well.*

1 In order to maintain room for bicycle lanes through the TTC zone on a multi-lane roadway, one or more  
2 travel lanes could be closed.

3 Guidance:

4 If a bikeway detour is unavoidable, it should be as short and direct as practical.

5 On-road bicyclists should not be directed onto a path or sidewalk intended for pedestrian use except  
6 where such a path or sidewalk is a shared-use path, or where no practical alternative is available (such as  
7 might be the case on a bridge in the course of a rehabilitation project).

8 If a portion of a bikeway is to be closed due to construction activities and the detoured bikeway follows a  
9 complex path not in the original bikeway corridor, then a full detour plan should be developed and  
10 implemented. The TTC for the detour of the bikeway should include all necessary advance warning (W21  
11 series) signs, detour (W4-9 series) signs, and any other TTC devices necessary to guide bicyclists along the  
12 detour route.

13 Support:

14 Figures 6P-49 through 6P-53 provide examples and contain additional information for accommodating  
15 bicycles through or around typical work zones.

16 Option:

17 If an on-street bikeway had a wide travel lane or lanes in which bicycles traveled side by side with motor  
18 vehicles prior to construction, and construction activities reduce the lane width(s) to less than 17 feet through  
19 the TTC zone, then the BICYCLES MAY USE FULL LANE (R4-11) sign may be used.

20 Standard:

21 The minimum TTC sign and plaque sizes for shared-use paths shall conform to those shown in  
22 Table 9B-1. The minimum TTC sign and plaque sizes for on-street bikeways shall conform to Chapters  
23 6G, 6H, and 6I. Added to improve consistency

24 **Section ~~6G.066~~N.05 Work Outside of the Shoulder**

25 Support:

26 When work is being performed off the roadway (beyond the shoulders, but within the right-of-way), little  
27 or no TTC might be needed. TTC generally is not needed where work is confined to an area 15 feet or more  
28 from the edge of the traveled way. However, TTC is appropriate where distracting situations exist, such as  
29 vehicles parked on the shoulder, vehicles accessing the worksite via the highway, and equipment traveling on  
30 or crossing the roadway to perform the work operations (for example, mowing). For work beyond the  
31 shoulder, see Figure ~~6H~~6P-1.

32 *Guidance:*

33 *Where the situations described in Paragraph 1 exist, a single warning sign, such as ROAD WORK*  
34 *AHEAD (W20-1), should be used. If the equipment travels on the roadway, the equipment should be equipped*  
35 *with appropriate flags, high-intensity rotating, flashing, oscillating, or strobe lights, and/or a SLOW*  
36 *MOVING VEHICLE (W21-4) sign.*

37 *If work vehicles are on the shoulder, a SHOULDER WORK (W21-5) sign ~~may~~ should be used. **Option***  
38 **changed to Guidance and relocated from below**

39 *A general warning sign like ROAD MACHINERY AHEAD (W21-3) should be used if workers and*  
40 *equipment must occasionally move onto the shoulder. **Relocated from below***

41 *Option:*

42 *~~If work vehicles are on the shoulder, a SHOULDER WORK (W21-5) sign may be used. **Option changed**~~*  
43 **to Guidance and relocated to above** For mowing operations, the sign MOWING AHEAD (W21-8) may be  
44 used.

45 Where the activity is spread out over a distance of more than 2 miles, the SHOULDER WORK (W21-5)  
46 sign may be repeated every 1 mile.

47 A supplementary plaque with the message NEXT XX MILES (W7-3aP) may be used.

48 *Guidance:*

1 ~~A general warning sign like ROAD MACHINERY AHEAD (W21-3) should be used if workers and~~  
2 ~~equipment must occasionally move onto the shoulder.~~ **Relocated to above**

### 3 **Section 6G.076N.06 Work on the Shoulder with No Encroachment**

4 Support:

5 The provisions of this Section apply to short-term through long-term stationary operations.

6 **Standard:**

7 **When paved shoulders having a width of 8 feet or more are closed, at least one advance warning**  
8 **sign shall be used. In addition, channelizing devices shall be used to close the shoulder in advance to**  
9 **delineate the beginning of the work space and direct motor vehicle traffic to remain within the traveled**  
10 **way.**

11 *Guidance:*

12 *When paved shoulders having a width of 8 feet or more are closed on freeways and expressways, road*  
13 *users should be warned about potential disabled vehicles that cannot get off the traveled way. An initial*  
14 *general warning sign, such as ROAD WORK AHEAD (W20-1), should be used, followed by a RIGHT or*  
15 *LEFT SHOULDER CLOSED (W21-5a) sign. Where the downstream end of the shoulder closure extends*  
16 *beyond the distance that can be perceived by road users, a supplementary plaque bearing the message NEXT*  
17 *XX FEET (W16-4P) or MILES (W7-3aP) should be placed below the SHOULDER CLOSED (W21-5a) sign.*  
18 *On multi-lane, divided highways, signs advising of shoulder work or the condition of the shoulder should be*  
19 *placed only on the side of the affected shoulder.*

20 *When an improved shoulder is closed on a high-speed roadway, it should be treated as a closure of a*  
21 *portion of the road system because road users expect to be able to use it in emergencies. Road users should*  
22 *be given ample advance warning that shoulders are closed for use as refuge areas throughout a specified*  
23 *length of the approaching TTC zone. The sign(s) should read SHOULDER CLOSED (W21-5a) with distances*  
24 *indicated. The work space on the shoulder should be closed off by a taper or channelizing devices with a*  
25 *length of 1/3 L using the formulas in Tables 6C-36B-3 and 6C-46B-4.*

26 *When the shoulder is not occupied but work has adversely affected its condition, the LOW SHOULDER*  
27 *(W8-9) or SOFT SHOULDER (W8-4) sign should be used, as appropriate.*

28 *Where the condition extends over a distance in excess of 1 mile, the sign should be repeated at 1-mile*  
29 *intervals.*

30 Option:

31 In addition, a supplementary plaque bearing the message NEXT XX MILES (W7-3aP) may be used.  
32 Temporary traffic barriers may be needed to inhibit encroachment of errant vehicles into the work space and  
33 to protect workers.

34 **Standard:**

35 **When used for shoulder work, arrow boards shall operate only in the caution mode.**

36 Support:

37 A typical application for stationary work operations on shoulders is shown in Figure 6H6P-3. Short  
38 duration or mobile work on shoulders is shown in Figure 6H6P-4. Work on freeway shoulders is shown in  
39 Figure 6H6P-5.

### 40 **Section 6G.086N.07 Work on the Shoulder with Minor Encroachment**

41 Support:

42 Chapter 6D-6C and Sections 6F.746M.04 and 6G.056N.04 contain additional information regarding the  
43 steps to follow when pedestrian or bicycle facilities are affected by the worksite.

44 *Guidance:*

45 *When work takes up part of a lane, vehicular traffic volumes, vehicle mix (buses, trucks, cars, and*  
46 *bicycles), speed, and capacity should be analyzed to determine whether the affected lane should be closed.*  
47 *Unless the lane encroachment permits a remaining lane width of 10 feet, the lane should be closed.*

1 *Truck off-tracking should be considered when determining whether the minimum lane width of 10 feet is*  
2 *adequate.*

3 Option:

4 A lane width of 9 feet may be used for short-term stationary work on low-volume, low-speed roadways  
5 when vehicular traffic does not include longer and wider heavy commercial vehicles.

6 Support:

7 Figure [6H6P-6](#) illustrates a method for handling vehicular traffic where the stationary or short duration  
8 work space encroaches slightly into the traveled way.

### 9 **Section [6G.096N.08](#) Work Within the Median**

10 Support:

11 Chapter [6D-6C](#) and Sections [6F.746M.04](#) and [6G.056N.04](#) contain additional information regarding the  
12 steps to follow when pedestrian or bicycle facilities are affected by the worksite.

13 *Guidance:*

14 *If work in the median of a divided highway is within 15 feet from the edge of the traveled way for either*  
15 *direction of travel, TTC should be used through the use of advance warning signs and channelizing devices.*

### 16 **Section [6G.106N.09](#) Work Within the Traveled Way of a Two-Lane Highway**

17 Support:

18 Chapter [6D-6C](#) and Sections [6F.746M.04](#) and [6G.056N.04](#) contain additional information regarding the  
19 steps to follow when pedestrian or bicycle facilities are affected by the worksite.

20 Detour signs are used to direct road users onto another roadway. At diversions, road users are directed  
21 onto a temporary roadway or alignment placed within or adjacent to the right-of-way. Typical applications for  
22 detouring or diverting road users on two-lane highways are shown in Figures [6H6P-7](#), [6H6P-8](#), and [6H6P-9](#).  
23 Figure [6H6P-7](#) illustrates the controls around an area where a section of roadway has been closed and a  
24 diversion has been constructed. Channelizing devices and pavement markings are used to indicate the  
25 transition to the temporary roadway.

26 *Guidance:*

27 *When a detour is long, Detour (M4-8, M4-9) signs should be installed to remind and reassure road users*  
28 *periodically that they are still successfully following the detour.*

29 *When an entire roadway is closed, as illustrated in Figure [6H6P-8](#), a detour should be provided and road*  
30 *users should be warned in advance of the closure, which in this example is a closure 10 miles from the*  
31 *intersection. If local road users are allowed to use the roadway up to the closure, the ROAD CLOSED*  
32 *AHEAD, LOCAL TRAFFIC ONLY (R11-3a) sign should be used. The portion of the road open to local road*  
33 *users should have adequate signing, marking, and delineation.*

34 *Detours should be signed so that road users will be able to traverse the entire detour route and back to*  
35 *the original roadway as shown in Figure [6H6P-9](#).*

36 Support:

37 Techniques for controlling vehicular traffic under one-lane, two-way conditions are described in Section  
38 [6C.106E.01](#).

39 Option:

40 Flagger may be used as shown in Figure [6H6P-10](#).

41 STOP/YIELD sign control may be used on roads with low traffic volumes as shown in Figure [6H6P-11](#).

42 A temporary traffic control signal may be used as shown in Figure [6H6P-12](#).

### 43 **Section [6G.116N.10](#) Work Within the Traveled Way of an Urban Street**

44 Support:

45 Chapter [6D-6C](#) and Sections [6F.746M.04](#) and [6G.056N.04](#) contain additional information regarding the  
46 steps to follow when pedestrian or bicycle facilities are affected by the worksite.

1 In urban TTC zones, decisions are needed on how to control vehicular traffic, such as how many lanes are  
2 required, whether any turns need to be prohibited at intersections, and how to maintain access to business,  
3 industrial, and residential areas.

4 Pedestrian traffic needs separate attention. Chapter ~~6D-6C~~ contains information regarding pedestrian  
5 movements near TTC zones.

6 **Standard:**

7 **If the TTC zone affects the movement of bicyclists, adequate access to the roadway or shared-use**  
8 **paths shall be provided (see Part 9).**

9 **Where transit stops are affected or relocated because of work activity, both pedestrian and**  
10 **vehicular access to the affected or relocated transit stops shall be provided.**

11 *Guidance:*

12 *If a designated bicycle route is closed because of the work being done, a signed alternate route should be*  
13 *provided. Bicyclists should not be directed onto the path used by pedestrians.*

14 *Worksites within the intersection should be protected against inadvertent pedestrian incursion by*  
15 *providing detectable channelizing devices.*

16 **Support:**

17 Utility work takes place both within and outside the roadway to construct and maintain services such as  
18 power, gas, light, water, or telecommunications. Operations often involve intersections, since that is where  
19 many of the network junctions occur. The work force is usually small, only a few vehicles are involved, and  
20 the number and types of TTC devices placed in the TTC zone is usually minimal.

21 **Standard:**

22 ~~All TTC devices shall be retroreflective or illuminated if utility work is performed during nighttime~~  
23 ~~hours.~~ Deleted; redundant with other sections in Part 6

24 *Guidance:*

25 *As discussed under short-duration projects, however, the reduced number of devices in utility work zones*  
26 *should be offset by the use of high-visibility devices, such as high-intensity rotating, flashing, oscillating, or*  
27 *strobe lights on work vehicles or high-level warning devices.*

28 **Support:**

29 Figures ~~6H6P-6~~, ~~6H6P-10~~, ~~6H6P-15~~, ~~6H6P-18~~, ~~6H6P-21~~, ~~6H6P-22~~, ~~6H6P-23~~, ~~6H6P-26~~, and ~~6H6P-33~~ are  
30 examples of typical applications for utility operations. Other typical applications might apply as well.

31 **Section ~~6G.126N.11~~ Work Within the Traveled Way of a Multi-Lane, Non-Access Controlled**  
32 **Highway**

33 **Support:**

34 Chapter ~~6D6C~~ and Sections ~~6F.746M.04~~ and ~~6G.056N.04~~ contain additional information regarding the  
35 steps to follow when pedestrian or bicycle facilities are affected by the worksite.

36 Work on multi-lane (two or more lanes of moving motor vehicle traffic in one direction) highways is  
37 divided into right-lane closures, left-lane closures, interior-lane closures, multiple-lane closures, and closures  
38 on five-lane roadways.

39 **Standard:**

40 **When a lane is closed on a multi-lane road for other than a mobile operation, a transition area**  
41 **containing a merging taper shall be used.**

42 *Guidance:*

43 *When justified by an engineering study, temporary traffic barriers (see Section ~~6F.706K.09~~) should be*  
44 *used to prevent incursions of errant vehicles into hazardous areas or work space.*

45 **Support:**

46 Figure ~~6H6P-34~~ illustrates a lane closure in which temporary traffic barriers are used.

47 **Option:**

1 When the right-hand lane is closed, TTC similar to that shown in Figure ~~6H6P~~-33 may be used for  
2 undivided or divided four-lane roads.

3 *Guidance:*

4 *If morning and evening peak hour vehicular traffic volumes in the two directions are uneven and the*  
5 *greater volume is on the side where the work is being done in the right-hand lane, consideration should be*  
6 *given to closing the inside lane for opposing vehicular traffic and making the lane available to the side with*  
7 *heavier vehicular traffic, as shown in Figure ~~6H6P~~-31.*

8 *If the larger vehicular traffic volume changes to the opposite direction at a different time of the day, the*  
9 *TTC should be changed to allow two lanes for opposing vehicular traffic by moving the devices from the*  
10 *opposing lane to the center line. When it is necessary to create a temporary center line that is not consistent*  
11 *with the pavement markings, channelizing devices should be used and closely spaced.*

12 *Option:*

13 When closing a left-hand lane on a multi-lane undivided road, as vehicular traffic flow permits, the two  
14 interior lanes may be closed, as shown in Figure ~~6H6P~~-30, to provide drivers and workers additional lateral  
15 clearance and to provide access to the work space.

16 **Standard:**

17 **When only the left-hand lane is closed on undivided roads, channelizing devices shall be placed**  
18 **along the center line as well as along the adjacent lane.**

19 *Guidance:*

20 *When an interior lane is closed, an adjacent lane should also be considered for closure to provide*  
21 *additional space for vehicles and materials and to facilitate the movement of equipment within the work*  
22 *space.*

23 *When multiple lanes in one direction are closed, a capacity analysis should be made to determine the*  
24 *number of lanes needed to accommodate motor vehicle traffic needs. Vehicular traffic should be moved over*  
25 *one lane at a time. As shown in Figure ~~6H6P~~-37, the tapers should be separated by a distance of 2L, with L*  
26 *being determined by the formulas in Tables ~~6C-36B-3~~ and ~~6C-46B-4~~.*

27 *Option:*

28 If operating speeds are 40 mph or less and the space approaching the work area does not permit moving  
29 traffic over one lane at a time, a single continuous taper may be used.

30 **Standard:**

31 **When a directional roadway is closed, inapplicable WRONG WAY signs and markings, and other**  
32 **existing traffic control devices at intersections within the temporary two-lane, two-way operations**  
33 **section shall be covered, removed, or obliterated.**

34 *Option:*

35 When half the road is closed on an undivided highway, both directions of vehicular traffic may be  
36 accommodated as shown in Figure ~~6H6P~~-32. When both interior lanes are closed, temporary traffic controls  
37 may be used as provided in Figure ~~6H6P~~-30. When a roadway must be closed on a divided highway, a  
38 median crossover may be used (see Section ~~6G-166N.15~~).

39 *Support:*

40 TTC for lane closures on five-lane roads is similar to other multi-lane undivided roads. Figure ~~6H6P~~-32  
41 can be adapted for use on five-lane roads. Figure ~~6H6P~~-35 can be used on a five-lane road for short duration  
42 and mobile operations.

### 43 **Section ~~6G-136N.12~~ Work Within the Traveled Way at an Intersection**

44 *Support:*

45 Chapter ~~6D6C~~ and Sections ~~6F-746M.04~~ and ~~6G-056N.04~~ contain additional information regarding the  
46 steps to follow when pedestrian or bicycle facilities are affected by the worksite.

47 The typical applications for intersections are classified according to the location of the work space with  
48 respect to the intersection area (as defined by the extension of the curb or edge lines). The three  
49 classifications are near side, far side, and in-the-intersection. Work spaces often extend into more than one

1 portion of the intersection. For example, work in one quadrant often creates a near-side work space on one  
2 street and a far-side work space on the cross street. In such instances, an appropriate TTC plan is obtained by  
3 combining features shown in two or more of the intersection and pedestrian typical applications.

4 TTC zones in the vicinity of intersections might block movements and interfere with normal road user  
5 flows. Such conflicts frequently occur at more complex signalized intersections having such features as  
6 traffic signal heads over particular lanes, lanes allocated to specific movements, multiple signal phases, signal  
7 detectors for actuated control, and accessible pedestrian signals and detectors.

8 *Guidance:*

9 *The effect of the work upon signal operation should be considered, and temporary corrective actions*  
10 *should be taken, if necessary, such as revising signal phasing and/or timing to provide adequate capacity,*  
11 *maintaining or adjusting signal detectors, and relocating signal heads to provide adequate visibility as*  
12 *described in Part 4.*

13 **Standard:**

14 **When work will occur near an intersection where operational, capacity, or pedestrian accessibility**  
15 **problems are anticipated, the highway agency having jurisdiction shall be contacted.**

16 *Guidance:*

17 *For work at an intersection, advance warning signs, devices, and markings should be used on all cross*  
18 *streets, as appropriate. The typical applications depict urban intersections on arterial streets. Where the*  
19 *posted speed limit, the off-peak 85<sup>th</sup>-percentile speed prior to the work starting, or the anticipated speed*  
20 *exceeds 40 mph, additional warning signs should be used in the advance warning area.*

21 *Pedestrian crossings near TTC sites should be separated from the worksite by appropriate barriers that*  
22 *maintain the accessibility and detectability for pedestrians with disabilities.*

23 **Support:**

24 Near-side work spaces, as depicted in Figure 6H6P-21, are simply handled as a midblock lane closure. A  
25 problem that might occur with near-side lane closure is a reduction in capacity, which during certain hours of  
26 operation could result in congestion and backups.

27 **Option:**

28 When near-side work spaces are used, an exclusive turn lane may be used for through vehicular traffic.

29 Where space is restricted in advance of near-side work spaces, as with short block spacings, two warning  
30 signs may be used in the advance warning area, and a third action-type warning or a regulatory sign (such as  
31 Keep Left) may be placed within the transition area.

32 **Support:**

33 Far-side work spaces, as depicted in Figures 6H6P-22 through 6H6P-25, involve additional treatment  
34 because road users typically enter the activity area by straight-through and left- or right-turning movements.

35 *Guidance:*

36 *When a lane through an intersection must be closed on the far side, it should also be closed on the near-*  
37 *side approach to preclude merging movements within the intersection.*

38 **Option:**

39 If there are a significant number of vehicles turning from a near-side lane that is closed on the far side, the  
40 near-side lane may be converted to an exclusive turn lane.

41 **Support:**

42 Figures 6H6P-26 and 6H6P-27 provide guidance on applicable procedures for work performed within the  
43 intersection.

44 **Option:**

45 If the work is within the intersection, any of the following strategies may be used:

- 46 A. A small work space so that road users can move around it, as shown in Figure 6H6P-26;
- 47 B. Flaggers or uniformed law enforcement officers to direct road users, as shown in Figure 6H6P-27;
- 48 C. Work in stages so the work space is kept to a minimum; and
- 49 D. Road closures or upstream diversions to reduce road user volumes.

1 *Guidance:*

2 *Depending on road user conditions, a flagger(s) and/or a uniformed law enforcement officer(s) should be*  
3 *used to control road users.*

4 Support:

5 Work at a roundabout can present a challenge for developing an effective TTC plan. Figures 6P-47 and  
6 6P-48 provide guidance on applicable procedures for work performed within a roundabout. Added to  
7 improve consistency

## 8 **Section ~~6G.146~~N.13 Work Within the Traveled Way of a Freeway or Expressway**

9 Support:

10 Problems of TTC might occur under the special conditions encountered where vehicular traffic must be  
11 moved through or around TTC zones on high-speed, high-volume roadways. Although the general principles  
12 outlined in the previous Sections of this Manual are applicable to all types of highways, high-speed, access-  
13 controlled highways need special planning and attention in order to accommodate vehicular traffic while also  
14 protecting road users and workers. The road user volumes, road vehicle mix (buses, trucks, cars, and bicycles,  
15 if permitted), and speed of vehicles on these facilities require that careful TTC procedures be implemented,  
16 for example, to induce critical merging maneuvers well in advance of work spaces and in a manner that  
17 creates minimum turbulence and delay in the vehicular traffic stream. ~~These situations often require more~~  
18 ~~conspicuous devices than specified for normal rural highway or urban street use. However, the same~~  
19 ~~important basic considerations of uniformity and standardization of general principles apply for all roadways.~~

20 Edited to reflect NTSB H-15-16 recommendation

21 ~~Work under high speed, high volume vehicular traffic on a controlled access highway is complicated by~~  
22 ~~the roadway design and operational features. The presence of a median that establishes separate roadways for~~  
23 ~~directional vehicular traffic flow might prohibit the closing of one of the roadways or the diverting of~~  
24 ~~vehicular traffic to the other roadway. Lack of access to and from adjacent roadways prohibits rerouting of~~  
25 ~~vehicular traffic away from the work space in many cases. Other conditions exist where work must be limited~~  
26 ~~to night hours, thereby necessitating increased use of warning lights, illumination of work spaces, and advance~~  
27 ~~warning systems.~~

28 Often, when the roadway capacity is reduced due the lane closures, the demand will exceed the available  
29 capacity and result in either a lengthy stopped or slow moving queue of vehicles that may extend past the  
30 normal signs shown in the typical advance warning area. An assessment of the expected queue length should  
31 be a part of the temporary traffic control plan design process and adjustments to the sign spacing and number  
32 of signs as well as the possibility of using more conspicuous devices may be provided to increase the distance  
33 and conspicuity of the advance warning area. Added to reflect NTSB H-15-16 recommendation

34 One strategy often employed to mitigate the extended queue issue is to work during off peak hours or at  
35 night. When the work is limited to night hours, increased use of warning lights, illumination of work spaces,  
36 and intelligent advance warning systems may be necessary. Added to reflect NTSB H-15-16  
37 recommendation

38 TTC for a typical lane closure where a queue is not anticipated to accumulate on a divided highway is  
39 shown in Figure ~~6H6P~~-33. Edited to reflect NTSB H-15-16 recommendation Temporary traffic controls for  
40 short duration and mobile operations on freeways are shown in Figure ~~6H6P~~-35. A typical application for  
41 shifting vehicular traffic lanes around a work space is shown in Figure ~~6H6P~~-36. TTC for multiple and  
42 interior lane closures on a freeway is shown in Figures ~~6H6P~~-37 and ~~6H6P~~-38.

43 *Guidance:*

44 *The method for closing an interior lane when the open lanes have the capacity to carry vehicular traffic*  
45 *should be as shown in Figure ~~6H6P~~-37. When the capacity of the other lanes is needed, the method shown in*  
46 *Figure ~~6H6P~~-38 should be used.*

## 47 **Section ~~6G.156~~N.14 Two-Lane, Two-Way Traffic on One Roadway of a Normally Divided** 48 **Highway**

49 Support:

1 Two-lane, two-way operation on one roadway of a normally divided highway is a typical procedure that  
2 requires special consideration in the planning, design, and work phases, because unique operational problems  
3 (for example, increasing the risk of head-on crashes) can arise with the two-lane, two-way operation.

4 **Standard:**

5 **When two-lane, two-way traffic control must be maintained on one roadway of a normally divided**  
6 **highway, opposing vehicular traffic shall be separated with either temporary traffic barriers (concrete**  
7 **safety-shape or approved alternate), channelizing devices, Opposing Lane Traffic Divider (W6-4) signs**  
8 **on flexible supports (see Section 6H.17), or a temporary raised island throughout the length of the two-**  
9 **way operation. Edited to improve clarity The use of markings and complementary signing, by**  
10 **themselves, shall not be used.**

11 **Support:**

12 Figure 6H6P-39 shows the procedure for two-lane, two-way operation. Treatments for entrance and exit  
13 ramps within the two-way roadway segment of this type of work are shown in Figures 6H6P-40 and 6H6P-41.

14 **Section 6G.16N.15 Crossovers**

15 *Guidance:*

16 *The following are considered good guiding principles for the design of crossovers:*

- 17 A. *Tapers for lane drops should be separated from the crossovers, as shown in Figure 6H6P-39.*
- 18 B. *Crossovers should be designed for speeds no lower than 10 mph below the posted speed, the off-peak*  
19 *85<sup>th</sup>-percentile speed prior to the work starting, or the anticipated operating speed of the roadway,*  
20 *unless unusual site conditions require that a lower design speed be used.*
- 21 C. *A good array of channelizing devices, delineators, and full-length, properly placed pavement*  
22 *markings should be used to provide drivers with a clearly defined travel path.*
- 23 D. *The design of the crossover should accommodate all vehicular traffic, including trucks and buses.*

24 **Support:**

25 Temporary traffic barriers and the excessive use of TTC devices cannot compensate for poor geometric  
26 and roadway cross-section design of crossovers.

27 **Section 6G.17N.16 Interchanges**

28 *Guidance:*

29 *Access to interchange ramps on limited-access highways should be maintained even if the work space is*  
30 *in the lane adjacent to the ramps. Access to exit ramps should be clearly marked and delineated with*  
31 *channelizing devices. For long-term projects, conflicting pavement markings should be removed and new*  
32 *ones placed. Early coordination with officials having jurisdiction over the affected cross streets and*  
33 *providing emergency services should occur before ramp closings.*

34 **Option:**

35 If access is not possible, ramps may be closed by using signs and Type 3 Barricades. As the work space  
36 changes, the access area may be changed, as shown in Figure 6H6P-42. A TTC zone in the exit ramp may be  
37 handled as shown in Figure 6H6P-43.

38 When a work space interferes with an entrance ramp, a lane may need to be closed on the freeway (see  
39 Figure 6H6P-44). A TTC zone in the entrance ramp may require shifting ramp vehicular traffic (see Figure  
40 6H6P-44).

41 **Section 6G.18N.17 Work in the Vicinity of a Grade Crossing**

42 **Standard:**

43 **When grade crossings exist either within or in the vicinity of a TTC zone, lane restrictions, flagging,**  
44 **or other operations shall not create conditions where vehicles can be queued across the tracks. If the**  
45 **queuing of vehicles across the tracks cannot be avoided, a uniformed law enforcement officer or flagger**  
46 **shall be provided at the crossing to prevent vehicles from stopping on the tracks, even if automatic**  
47 **warning devices are in place.**

48 **Support:**

1 Figure ~~6H6P~~-46 shows work in the vicinity of a grade crossing.

2 Section 8A.~~0814~~ contains additional information regarding temporary traffic control zones in the vicinity  
3 of grade crossings.

4 *Guidance:*

5 *Early coordination with the railroad company or light rail transit agency should occur before work starts.*

## 6 Section ~~6G.196N.18~~ Temporary Traffic Control Work During Nighttime Hours

7 Support:

8 ~~Chapter 6D and Sections 6F.74 and 6G.05~~ 6A.05 contains additional information regarding ~~the steps to~~  
9 ~~follow when pedestrian or bicycle facilities are affected by the worksite.~~ considerations for conducting work  
10 operations during nighttime hours. **Edited to reflect reorganization of text into new Section 6A.05**

11 ~~Conducting highway construction and maintenance activities during night hours could provide an~~  
12 ~~advantage when traditional daytime traffic control strategies cannot achieve an acceptable balance between~~  
13 ~~worker and public safety, traffic and community impact, and constructability. The two basic advantages of~~  
14 ~~working at night are reduced traffic congestion and less involvement with business activities. However, the~~  
15 ~~two basic conditions that must normally be met for night work to offer any advantage are reduced traffic~~  
16 ~~volumes and easy set up and removal of the traffic control patterns on a nightly basis.~~ **This text was relocated**  
17 **to new Section 6A.05**

18 ~~Shifting work activities to night hours, when traffic volumes are lower and normal business is less active,~~  
19 ~~might offer an advantage in some cases, as long as the necessary work can be completed and the worksite~~  
20 ~~restored to essentially normal operating conditions to carry the higher traffic volume during non-construction~~  
21 ~~hours.~~ **This text was relocated to new Section 6A.05**

22 ~~Although working at night might offer advantages, it also includes safety issues. Reduced visibility~~  
23 ~~inherent in night work impacts the performance of both drivers and workers. Because traffic volumes are~~  
24 ~~lower and congestion is minimized, speeds are often higher at night necessitating greater visibility at a time~~  
25 ~~when visibility is reduced. Finally, the incidence of impaired (alcohol or drugs), fatigued, or drowsy drivers~~  
26 ~~might be higher at night.~~ **This text was relocated to new Section 6A.05**

27 ~~Working at night also involves other factors, including construction productivity and quality, social~~  
28 ~~impacts, economics, and environmental issues. A decision to perform construction or maintenance activities~~  
29 ~~at night normally involves some consideration of the advantages to be gained compared to the safety and other~~  
30 ~~issues that might be impacted.~~ **This text was relocated to new Section 6A.05**

31 *Guidance:*

32 *Considering the safety issues inherent to night work, consideration should be given to enhancing traffic*  
33 *controls (see Section ~~6G.046N.03~~) to provide added visibility and driver guidance, and increased protection*  
34 *for workers.*

35 *In addition to the enhancements listed in Section ~~6G.046N.03~~, consideration should be given to providing*  
36 *additional lights and retroreflective markings to workers, work vehicles, and equipment.*

37 *Option:*

38 *Where reduced traffic volumes at night make it feasible, the entire roadway may be closed by detouring*  
39 *traffic to alternate facilities, thus removing the traffic risk from the activity area.*

40 *Guidance:*

41 *Consideration should be given to stationing uniformed law enforcement officers and lighted patrol cars at*  
42 *night work locations where there is a concern that high speeds or impaired drivers might result in undue risks*  
43 *for workers or other drivers.*

44 **Standard:**

45 **Except in emergencies, temporary lighting shall be provided at all flagger stations used during**  
46 **nighttime work.** **Edited to improve clarity**

47 Support:

48 *Desired illumination levels vary depending upon the nature of the task involved. An average horizontal*  
49 *luminance of 5 foot candles can be adequate for general activities. An average horizontal luminance of 10*

1 foot candles can be adequate for activities around equipment. Tasks requiring high levels of precision and  
2 extreme care can require an average horizontal luminance of 20 foot candles.

3 **Section 6N.19 Late Merge** **Added to improve clarity**

4 Support:

5 The Late Merge is designed to use all available lanes until the merge point is reached at the lane closure  
6 taper rather than merging as soon as possible into the open lane. The Late Merge addresses many of the  
7 problems associated with traffic operations in advance of lane closures at work zones to include queue length,  
8 capacity and driver satisfaction.

9 Option:

10 Late merging systems may consist of static or portable changeable message signs.

11 Guidance:

12 Static Late Merge signing should consist of the STAY IN LANE TO MERGE POINT (R4-9a) sign and the  
13 MERGE HERE TAKE TURNS (W9-2a) sign (see Figure 6N-1).

14 If used, the Late Merge should not be used on high speed or low volume roadways.

15 Option:

16 The following messages may be used on changeable message signs during the late merge application:

17 A. “STAY IN YOUR LANE / MERGE AHEAD”

18 B. “USE BOTH LANES / TO MERGE POINT “; “TAKE YOUR TURN / MERGE HERE”

19 C. “SLOW TRAFFIC AHEAD / USE BOTH LANES”, “STAY IN YOUR LANE / MERGE AHEAD  
20 XX MILES”, “TAKE YOUR TURN / MERGE HERE”

21 D. “USE BOTH LANES,” “STOP TRAFFIC AHEAD,” “MERGE HERE,” and “TAKE TURNS”

22 E. “STAY IN YOUR LANE” / “MERGE AHEAD”

23 **Figure 6N-1. Example of Late Merge Signing**

24



1 Responders arriving at a traffic incident should estimate the magnitude of the traffic incident, the  
2 expected time duration of the traffic incident, and the expected vehicle queue length, and then should set up  
3 the appropriate temporary traffic controls for these estimates.

4 Option:

5 Warning and guide signs used for TTC traffic incident management situations may have a black legend  
6 and border on a fluorescent pink background (see Figure ~~6H-6O-1~~).

7 Support:

8 While some traffic incidents might be anticipated and planned for, emergencies and disasters might pose  
9 more severe and unpredictable problems. The ability to quickly install proper temporary traffic controls might  
10 greatly reduce the effects of an incident, such as secondary crashes or excessive traffic delays. An essential  
11 part of fire, rescue, spill clean-up, highway agency, and enforcement activities is the proper control of road  
12 users through the traffic incident management area in order to protect responders, victims, and other personnel  
13 at the site. These operations might need corroborating legislative authority for the implementation and  
14 enforcement of appropriate road user regulations, parking controls, and speed zoning. It is desirable for these  
15 statutes to provide sufficient flexibility in the authority for, and implementation of, TTC to respond to the  
16 needs of changing conditions found in traffic incident management areas.

17 Option:

18 For traffic incidents, particularly those of an emergency nature, TTC devices on hand may be used for the  
19 initial response as long as they do not themselves create unnecessary additional hazards.

20 Support:

21 The establishment, maintenance, and prompt removal of lane diversions can be effectively managed by  
22 interagency planning that includes representatives of highway and public safety agencies. **This text was  
23 relocated from existing Section 6I.02**

24 *Guidance:*

25 All traffic control devices needed to set up the TTC at a traffic incident should be available so that they  
26 can be readily deployed for all major traffic incidents. The TTC should include the proper traffic diversions,  
27 tapered lane closures, and upstream warning devices to alert traffic approaching the queue and to encourage  
28 early diversion to an appropriate alternative route. **This text was relocated from existing Section 6I.02**

29 Attention should be paid to the upstream end of the traffic queue such that warning is given to road users  
30 approaching the back of the queue. **This text was relocated to new Section 6I.02**

31 If manual traffic control is needed, it should be provided by qualified flaggers or uniformed law  
32 enforcement officers. **This text was relocated to new Section 6I.02**

33 Option:

34 If flaggers are used to provide traffic control for an incident management situation, the flaggers may use  
35 appropriate traffic control devices that are readily available or that can be brought to the traffic incident scene  
36 on short notice. **This text was relocated to new Section 6I.02**

37 *Guidance:*

38 When light sticks or flares are used to establish the initial traffic control at incident scenes, channelizing  
39 devices (see Section ~~6F-6J~~6K.01) should be installed as soon thereafter as practical. **This text was relocated  
40 to new Section 6I.02**

41 Option:

42 The light sticks or flares may remain in place if they are being used to supplement the channelizing  
43 devices. **This text was relocated to new Section 6I.02**

44 *Guidance:*

45 The light sticks, flares, and channelizing devices should be removed after the incident is terminated. **This  
46 text was relocated to new Section 6I.02**

#### 47 **Figure 6O-1. Examples of Traffic Incident Management Area Signs**

#### 48 **Section ~~6I.02~~6O.02 Major Traffic Incidents**

1 Support:

2 Major traffic incidents are typically traffic incidents involving hazardous materials, fatal traffic crashes  
3 involving numerous vehicles, and other natural or man-made disasters. These traffic incidents typically  
4 involve closing all or part of a roadway facility for a period exceeding 2 hours.

5 *Guidance:*

6 *If the traffic incident is anticipated to last more than 24 hours, applicable procedures and devices set*  
7 *forth in other Chapters of Part 6 should be used.*

8 Support:

9 A road closure can be caused by a traffic incident such as a road user crash that blocks the traveled way.  
10 Road users are usually diverted through lane shifts or detoured around the traffic incident and back to the  
11 original roadway. A combination of traffic engineering and enforcement preparations is needed to determine  
12 the detour route, and to install, maintain or operate, and then to remove the necessary traffic control devices  
13 when the detour is terminated. Large trucks are a significant concern in such a detour, especially when  
14 detouring them from a controlled-access roadway onto local or arterial streets.

15 During traffic incidents, large trucks might need to follow a route separate from that of automobiles  
16 because of bridge, weight, clearance, or geometric restrictions. Also, vehicles carrying hazardous material  
17 might need to follow a different route from other vehicles.

18 Some traffic incidents such as hazardous material spills might require closure of an entire highway.  
19 Through road users must have adequate guidance around the traffic incident. Maintaining good public  
20 relations is desirable. The cooperation of the news media in publicizing the existence of, and reasons for,  
21 traffic incident management areas and their TTC can be of great assistance in keeping road users and the  
22 general public well informed.

23 **Support:**

24 ~~The establishment, maintenance, and prompt removal of lane diversions can be effectively managed by~~  
25 ~~interagency planning that includes representatives of highway and public safety agencies.~~ **This text was**  
26 **relocated to new Section 6O.01**

27 *Guidance:*

28 ~~All traffic control devices needed to set up the TTC at a traffic incident should be available so that they~~  
29 ~~can be readily deployed for all major traffic incidents. The TTC should include the proper traffic diversions,~~  
30 ~~tapered lane closures, and upstream warning devices to alert traffic approaching the queue and to encourage~~  
31 ~~early diversion to an appropriate alternative route.~~ **This text was relocated to new Section 6O.01**

32 ~~Attention should be paid to the upstream end of the traffic queue such that warning is given to road users~~  
33 ~~approaching the back of the queue.~~ **This text was relocated to new Section 6O.01**

34 ~~If manual traffic control is needed, it should be provided by qualified flaggers or uniformed law~~  
35 ~~enforcement officers.~~ **This text was relocated to new Section 6O.01**

36 **Option:**

37 ~~If flaggers are used to provide traffic control for an incident management situation, the flaggers may use~~  
38 ~~appropriate traffic control devices that are readily available or that can be brought to the traffic incident scene~~  
39 ~~on short notice.~~ **This text was relocated to new Section 6O.01**

40 *Guidance:*

41 ~~When light sticks or flares are used to establish the initial traffic control at incident scenes, channelizing~~  
42 ~~devices (see Section 6F.63) should be installed as soon thereafter as practical.~~ **This text was relocated to**  
43 **new Section 6O.01**

44 **Option:**

45 ~~The light sticks or flares may remain in place if they are being used to supplement the channelizing~~  
46 ~~devices.~~ **This text was relocated to new Section 6O.01**

47 *Guidance:*

48 ~~The light sticks, flares, and channelizing devices should be removed after the incident is~~  
49 ~~terminated.~~ **This text was relocated to new Section 6O.01**

1 **Section ~~6I.03~~6O.03 Intermediate Traffic Incidents**

2 Support:

3 Intermediate traffic incidents typically affect travel lanes for a time period of 30 minutes to 2 hours, and  
4 usually require traffic control on the scene to divert road users past the blockage. Full roadway closures might  
5 be needed for short periods during traffic incident clearance to allow traffic incident responders to accomplish  
6 their tasks.

7 ~~The establishment, maintenance, and prompt removal of lane diversions can be effectively managed by~~  
8 ~~interagency planning that includes representatives of highway and public safety agencies. Deleted;~~  
9 **redundant with new Section 6O.01**

10 *Guidance:*

11 ~~All traffic control devices needed to set up the TTC at a traffic incident should be available so that they~~  
12 ~~can be readily deployed for intermediate traffic incidents. The TTC should include the proper traffic~~  
13 ~~diversions, tapered lane closures, and upstream warning devices to alert traffic approaching the queue and to~~  
14 ~~encourage early diversion to an appropriate alternative route. Deleted; redundant with new Section 6O.01~~

15 ~~Attention should be paid to the upstream end of the traffic queue such that warning is given to road users~~  
16 ~~approaching the back of the queue. Deleted; redundant with new Section 6O.01~~

17 ~~If manual traffic control is needed, it should be provided by qualified flaggers or uniformed law~~  
18 ~~enforcement officers. Deleted; redundant with new Section 6O.01~~

19 *Option:*

20 ~~If flaggers are used to provide traffic control for an incident management situation, the flaggers may use~~  
21 ~~appropriate traffic control devices that are readily available or that can be brought to the traffic incident scene~~  
22 ~~on short notice. Deleted; redundant with new Section 6O.01~~

23 *Guidance:*

24 ~~When light sticks or flares are used to establish the initial traffic control at incident scenes, channelizing~~  
25 ~~devices (see Section 6F.63) should be installed as soon thereafter as practical. Deleted; redundant with new~~  
26 **Section 6O.01**

27 *Option:*

28 ~~The light sticks or flares may remain in place if they are being used to supplement the channelizing~~  
29 ~~devices. Deleted; redundant with new Section 6O.01~~

30 *Guidance:*

31 ~~The light sticks, flares, and channelizing devices should be removed after the incident is~~  
32 ~~terminated. Deleted; redundant with new Section 6O.01~~

33 **Section ~~6I.04~~6O.04 Minor Traffic Incidents**

34 Support:

35 Minor traffic incidents are typically disabled vehicles and minor crashes that result in lane closures of less  
36 than 30 minutes. On-scene responders are typically law enforcement and towing companies, and occasionally  
37 highway agency service patrol vehicles.

38 Diversion of traffic into other lanes is often not needed or is needed only briefly. It is not generally  
39 possible or practical to set up a lane closure with traffic control devices for a minor traffic incident. Traffic  
40 control is the responsibility of on-scene responders.

41 *Guidance:*

42 ~~When a minor traffic incident blocks a travel lane, it should be removed from that lane to the shoulder as~~  
43 ~~quickly as possible.~~

44 **Section ~~6I.05~~6O.05 Use of Emergency-Vehicle Lighting**

45 Support:

46 The use of emergency-vehicle lighting (such as high-intensity rotating, flashing, oscillating, or strobe  
47 lights) is essential, especially in the initial stages of a traffic incident, for the safety of emergency responders

1 and persons involved in the traffic incident, as well as road users approaching the traffic incident.  
2 Emergency-vehicle lighting, however, provides warning only and provides no effective traffic control. The  
3 use of too many lights at an incident scene can be distracting and can create confusion for approaching road  
4 users, especially at night. Road users approaching the traffic incident from the opposite direction on a divided  
5 facility are often distracted by emergency-vehicle lighting and slow their vehicles to look at the traffic  
6 incident posing a hazard to themselves and others traveling in their direction.

7 The use of emergency-vehicle lighting can be reduced if good traffic control has been established at a  
8 traffic incident scene. This is especially true for major traffic incidents that might involve a number of  
9 emergency vehicles. If good traffic control is established through placement of advance warning signs and  
10 traffic control devices to divert or detour traffic, then public safety agencies can perform their tasks on scene  
11 with minimal emergency-vehicle lighting.

12 *Guidance:*

13 *Public safety agencies should examine their policies on the use of emergency-vehicle lighting, especially*  
14 *after a traffic incident scene is secured, with the intent of reducing the use of this lighting as much as possible*  
15 *while not endangering those at the scene. Special consideration should be given to reducing or extinguishing*  
16 *forward facing emergency-vehicle lighting, especially on divided roadways, to reduce distractions to*  
17 *oncoming road users.*

18 *Because the glare from floodlights or vehicle headlights can impair the nighttime vision of approaching*  
19 *road users, any floodlights or vehicle headlights that are not needed for illumination, or to provide notice to*  
20 *other road users of an incident response vehicle being in an unexpected location, should be turned off at*  
21 *night.*

22

1 CHAPTER ~~6H~~6P. TYPICAL APPLICATIONS

2 Section ~~6H.016P.01~~ 6H.016P.01 Typical Applications

3 Support:

4 Chapter ~~6G-6N~~ contains discussions of typical TTC activities. Section 6A.02 contains discussions on  
5 development of TTC plans for the various activities. ~~Added to reflect reorganization of text into new~~  
6 ~~Section 6A.02~~ This Chapter presents typical applications for a variety of situations commonly encountered.  
7 While not every situation is addressed, the information illustrated can generally be adapted to a broad range of  
8 conditions. In many instances, an appropriate TTC plan is achieved by combining features from various  
9 typical applications. For example, work at an intersection might present a near-side work zone for one street  
10 and a far-side work zone for the other street. These treatments are found in two different typical applications,  
11 while a third typical application shows how to handle pedestrian crosswalk closures. For convenience in  
12 using the typical application diagrams, Tables ~~6C-16B-1~~ and ~~6C-46B-4~~ are reproduced in this Chapter as  
13 Tables ~~6H-36P-5~~ and ~~6H-46P-4~~, respectively.

14 ~~Procedures for establishing TTC zones vary with such conditions as road configuration, location of the~~  
15 ~~work, work activity, duration of work, road user volumes, road vehicle mix (buses, trucks, cars, motorcycles,~~  
16 ~~and bicycles), and road user speeds.~~ Deleted; redundant with new Section 6B.01

17 In general, the procedures illustrated represent minimum solutions for the situations depicted. Except for  
18 the notes (which are clearly classified using headings as being Standard, Guidance, Option, or Support), the  
19 information presented in the typical applications can generally be regarded as Guidance.

20 Option:

21 TTC plans may deviate from the typical applications described in this Chapter ~~6H~~ to allow for conditions  
22 and requirements of a particular site or jurisdiction. ~~This text was relocated from existing Section 6A.01~~

23 Other devices may be added to supplement the devices and device spacing may be adjusted to provide  
24 additional reaction time or delineation. Fewer devices may be used based on field conditions.

25 Support:

26 Figures and tables found throughout Part 6 provide information for the development of TTC plans. ~~Also,~~  
27 ~~Table 6H-3 is used for the determination of sign spacing and other dimensions for various area and roadway~~  
28 ~~types.~~ Relocated to below

29 Table ~~6H6P-1~~ is an index of the 46 typical applications. Typical applications are shown on the right-hand  
30 page with notes on the facing page to the left. The legend for the symbols used in the typical applications is  
31 provided in Table ~~6H6P-2~~. In many of the typical applications, sign spacings and other dimensions are  
32 indicated by letters using the criteria provided in Table ~~6H6P-3~~. The formulas for determining taper lengths  
33 are provided in Table ~~6H-46P-4~~. ~~Also,~~ Table ~~6H-36P-4~~ is used for the determination of sign spacing and other  
34 dimensions for various area and roadway types. Relocated from above

35 Most of the typical applications show TTC devices for only one direction.

36 **Table 6P-1. Index to Typical Applications**

37 **Table 6P-2. Meaning of Symbols on Typical Application Diagrams**

38 **Table 6P-3. Meaning of Letter Codes on Typical Application Diagrams**

39 **Table 6P-4. Formulas for Determining Taper Length**

40 **Table 6P-5. Recommended Advance Warning Sign Minimum Spacing**

41

1 **Notes for Figure 6H6P-1—Typical Application 1**  
2 **Work Beyond a Shoulder**

3 *Guidance:*

- 4 1. *If the work space is in the median of a divided highway, an advance warning sign should also be*  
5 *placed on the left-hand side of the directional roadway.*

6 **Option:**

- 7 2. The ROAD WORK AHEAD sign may be replaced with other appropriate signs such as the  
8 SHOULDER WORK sign. The SHOULDER WORK sign may be used for work adjacent to the  
9 shoulder.  
10 3. The ROAD WORK AHEAD sign may be omitted where the work space is behind a barrier, more  
11 than 24 inches behind the curb, or 15 feet or more from the edge of any roadway.  
12 4. For short-term, short duration or mobile operation, all signs and channelizing devices may be  
13 eliminated if a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is  
14 used.  
15 5. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing,  
16 oscillating, or strobe lights.

17 **Standard:**

- 18 6. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating,**  
19 **flashing, oscillating, or strobe lights.**

20 **Figure 6P-1. Work Beyond the Shoulder (TA-1)**  
21

Notes for Figure 6H6P-2—Typical Application 2

Blasting Zone

Standard:

1. Whenever blasting caps are used within 1,000 feet of a roadway, the signing shown shall be used.
2. The signs shall be covered or removed when there are no explosives in the area or the area is otherwise secure.
3. Whenever a side road intersects the roadway between the BLASTING ZONE AHEAD sign and the END BLASTING ZONE sign, or a side road is within 1,000 feet of any blasting cap, similar signing, as on the mainline, shall be installed on the side road.
4. Prior to blasting, the blaster in charge shall determine whether road users in the blasting zone will be endangered by the blasting operation. If there is danger, road users shall not be permitted to pass through the blasting zone during blasting operations.

Guidance:

5. On a divided highway, the signs should be mounted on both sides of the directional roadways.

**Figure 6P-2. Blasting Zone (TA-2)**

1 **Notes for Figure ~~6H~~6P-3—Typical Application 3**

2 **Work on Shoulders**

3 *Guidance:*

- 4 1. A *SHOULDER WORK* sign should be placed on the left-hand side of the roadway for a divided or  
5 one-way street only if the left-hand shoulder is affected.

6 *Option:*

7 2. [Positive protection devices may be used per Section 6M.02.](#)

8 ~~2.3.~~ The Workers symbol signs may be used instead of SHOULDER WORK signs.

9 ~~3.4.~~ The SHOULDER WORK AHEAD sign on an intersecting roadway may be omitted where drivers  
10 emerging from that roadway will encounter another advance warning sign prior to this activity area.

11 ~~4.5.~~ For short duration operations of 60 minutes or less, all signs and channelizing devices may be  
12 eliminated if a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is  
13 used.

14 ~~5.6.~~ Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing,  
15 oscillating, or strobe lights.

16 **Standard:**

17 ~~6.7.~~ **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating,  
18 flashing, oscillating, or strobe lights.**

19 ~~7.8.~~ **When paved shoulders having a width of 8 feet or more are closed, at least one advance warning  
20 sign shall be used. In addition, channelizing devices shall be used to close the shoulder in  
21 advance to delineate the beginning of the work space and direct vehicular traffic to remain  
22 within the traveled way.**

23 **Figure 6P-3. Work on the Shoulders (TA-3)**

1 **Notes for Figure 6H6P-4 —Typical Application 4**  
2 **Short Duration or Mobile Operation on a Shoulder**

3 *Guidance:*

- 4 1. *In those situations where multiple work locations within a limited distance make it practical to place*  
5 *stationary signs, the distance between the advance warning sign and the work should not exceed 5*  
6 *miles.*  
7 2. *In those situations where the distance between the advance signs and the work is 2 miles to 5 miles, a*  
8 *Supplemental Distance plaque should be used with the ROAD WORK AHEAD sign.*

9 *Option:*

- 10 3. Additional positive protection devices may be used per Section 6M.02  
11 ~~3.4.~~ The ROAD WORK NEXT XX MILES sign may be used instead of the ROAD WORK AHEAD sign  
12 if the work locations occur over a distance of more than 2 miles.  
13 ~~4.5.~~ Stationary warning signs may be omitted for short duration or mobile operations if the work vehicle  
14 displays high-intensity rotating, flashing, oscillating, or strobe lights.  
15 ~~5.6.~~ Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing,  
16 oscillating, or strobe lights.

17 **Standard:**

- 18 ~~6.7.~~ **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating,**  
19 **flashing, oscillating, or strobe lights.**  
20 ~~7.8.~~ **If an arrow board is used for an operation on the shoulder, the caution mode shall be used.**  
21 ~~8.9.~~ **Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by**  
22 **equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from**  
23 **view when work is not in progress.**

24 **Figure 6P-4. Short Duration or Mobile Operation on a Shoulder (TA-4)**  
25

1 **Notes for Figure ~~6H6P~~-5 —Typical Application 5**  
2 **Shoulder Closure on a Freeway**

3 *Guidance:*

- 4 1. *SHOULDER CLOSED* signs should be used on limited-access highways where there is no opportunity  
5 for disabled vehicles to pull off the roadway.  
6 2. If drivers cannot see a pull-off area beyond the closed shoulder, information regarding the length of  
7 the shoulder closure should be provided in feet or miles, as appropriate.  
8 3. The use of a temporary traffic barrier should be based on engineering judgment.

9 **Standard:**

- 10 **4. Temporary traffic barriers, if used, shall comply with the provisions of Section ~~6F.85~~6M.02.**

11 *Option:*

- 12 5. The barrier shown in this typical application is an example of one method that may be used to close a  
13 shoulder of a long-term project.  
14 6. The warning lights shown on the barrier may be used.

15 **Figure 6P-5. Shoulder Closure on a Freeway (TA-5)**  
16

1 **Notes for Figure 6H6P-6 —Typical Application 6**  
2 **Shoulder Work with Minor Encroachment**

3 *Guidance:*

- 4 1. All lanes should be a minimum of 10 feet in width as measured to the near face of the channelizing  
5 devices.  
6 2. The treatment shown should be used on a minor road having low speeds. For higher-speed traffic  
7 conditions, a lane closure should be used.

8 *Option:*

- 9 3. Additional positive protection devices may be used per Section 6M.02.  
10 ~~3.4.~~ For short-term use on low-volume, low-speed roadways with vehicular traffic that does not include  
11 longer and wider heavy commercial vehicles, a minimum lane width of 9 feet may be used.  
12 ~~4.5.~~ Where the opposite shoulder is suitable for carrying vehicular traffic and of adequate width, lanes may  
13 be shifted by use of closely-spaced channelizing devices, provided that the minimum lane width of 10  
14 feet is maintained.  
15 ~~5.6.~~ Additional advance warning may be appropriate, such as a ROAD NARROWS sign.  
16 ~~6.7.~~ Temporary traffic barriers may be used along the work space.  
17 ~~7.8.~~ The shadow vehicle may be omitted if a taper and channelizing devices are used.  
18 ~~8.9.~~ A truck-mounted attenuator may be used on the shadow vehicle.  
19 ~~9.10.~~ For short-duration work, the taper and channelizing devices may be omitted if a shadow  
20 vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.  
21 ~~10.11.~~ Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing,  
22 oscillating, or strobe lights.

23 **Standard:**

- 24 ~~11.12.~~ **Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by**  
25 **equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from**  
26 **view when work is not in progress.**  
27 ~~12.13.~~ **Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or**  
28 **strobe lights.**  
29 ~~13.14.~~ **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity**  
30 **rotating, flashing, oscillating, or strobe lights.**

31 **Figure 6P-6. Shoulder Work with Minor Encroachment (TA-6)**  
32

1 Notes for Figure 6H6P-7 —Typical Application 7

2 Road Closure with a Diversion

3 Support:

- 4 1. Signs and object markers are shown for one direction of travel only.

5 Standard:

- 6 2. Devices similar to those depicted shall be placed for the opposite direction of travel.  
7 3. Pavement markings no longer applicable to the traffic pattern of the roadway shall be removed  
8 or obliterated before any new traffic patterns are open to traffic.  
9 4. Temporary barriers and end treatments shall be crashworthy.

10 Guidance:

- 11 5. If the tangent distance along the temporary diversion is more than 600 feet, a Reverse Curve sign, left  
12 first, should be used instead of the Double Reverse Curve sign, and a second Reverse Curve sign,  
13 right first, should be placed in advance of the second reverse curve back to the original alignment.  
14 6. When the tangent section of the diversion is more than 600 feet, and the diversion has sharp curves  
15 with recommended speeds of 30 mph or less, Reverse Turn signs should be used.  
16 7. Where the temporary pavement and old pavement are different colors, the temporary pavement  
17 should start on the tangent of the existing pavement and end on the tangent of the existing pavement.  
18 8. Delineators or channelizing devices should be used along the diversion. Changed from Option to

19 Guidance and relocated from below

20 Option:

21 ~~8-9.~~ Flashing warning lights and/or flags may be used to call attention to the warning signs.

22 ~~9-10.~~ On sharp curves, large arrow signs may be used in addition to other advance warning signs.

23 ~~10.~~ Delineators or channelizing devices may be used along the diversion. Changed from Option to

24 Guidance and relocated to above

25 **Figure 6P-7. Road Closure with a Diversion (TA-7)**

26

1 **Notes for Figure 6H6P-8 — Typical Application 8**  
2 **Road Closure with an Off-Site Detour**

3 *Guidance:*

- 4 1. *Regulatory traffic control devices should be modified as needed for the duration of the detour.*

5 *Option:*

- 6 2. If the road is opened for some distance beyond the intersection and/or there are significant  
7 origin/destination points beyond the intersection, the ROAD CLOSED and DETOUR signs on Type 3  
8 Barricades may be located at the edge of the traveled way.  
9 3. A Route Sign Directional assembly may be placed on the far left corner of the intersection to augment  
10 or replace the one shown on the near right corner.  
11 4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.  
12 5. Cardinal direction plaques may be used with route signs.

13 **Figure 6P-8. Road Closure with an Off-Site Detour (TA-8)**  
14

1 **Notes for Figure 6H6P-9 —Typical Application 9**  
2 **Overlapping Routes with a Detour**

3 Support:

- 4 1. TTC devices are shown for one direction of travel only.

5 **Standard:**

- 6 **2. Devices similar to those depicted shall be placed for the opposite direction of travel.**

7 *Guidance:*

- 8 3. *STOP or YIELD signs displayed to side roads should be installed as needed along the temporary*  
9 *route.*

10 Option:

- 11 4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.  
12 5. Flashing warning lights may be used on the Type 3 Barricades.  
13 6. Cardinal direction plaques may be used with route signs.

14 **Figure 6P-9. Overlapping Routes with a Detour (TA-9)**  
15

1 **Notes for Figure 6H6P-10 —Typical Application 10**  
2 **Lane Closure on a Two-Lane Road Using Flaggers**

3 Option:

4 1. [Positive protection devices may be used per Section 6M.02.](#)

5 ~~4.2.~~ For low-volume situations with short work zones on straight roadways where the flagger is visible to  
6 road users approaching from both directions, a single flagger, positioned to be visible to road users  
7 approaching from both directions, may be used (see Chapter 6E6D).

8 ~~2.3.~~ The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short-duration  
9 operations.

10 ~~3.4.~~ Flashing warning lights and/or flags may be used to call attention to the advance warning signs. A BE  
11 PREPARED TO STOP sign may be added to the sign series.

12 *Guidance:*

13 ~~4.5.~~ *The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or*  
14 *crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped*  
15 *vehicles.*

16 **Standard:**

17 ~~5.6.~~ **At night, flagger stations shall be illuminated, except in emergencies.**

18 *Guidance:*

19 ~~6.7.~~ *When used, the BE PREPARED TO STOP sign should be located between the Flagger sign and the*  
20 *ONE LANE ROAD sign.*

21 ~~7.8.~~ *When a grade crossing exists within or upstream of the transition area and it is anticipated that*  
22 *queues resulting from the lane closure might extend through the grade crossing, the TTC zone should*  
23 *be extended so that the transition area precedes the grade crossing.*

24 ~~8.9.~~ *When a grade crossing equipped with active warning devices exists within the activity area,*  
25 *provisions should be made for keeping flaggers informed as to the activation status of these warning*  
26 *devices.*

27 ~~9.10.~~ *When a grade crossing exists within the activity area, drivers operating on the left-hand side*  
28 *of the normal center line should be provided with comparable warning devices as for drivers*  
29 *operating on the right-hand side of the normal center line.*

30 ~~10.11.~~ *Early coordination with the railroad company or light rail transit agency should occur before*  
31 *work starts.*

32 Option:

33 ~~11.12.~~ A flagger or a uniformed law enforcement officer may be used at the grade crossing to  
34 minimize the probability that vehicles are stopped within 15 feet of the grade crossing, measured from  
35 both sides of the outside rails.

36 **Figure 6P-10. Lane Closure on a Two-Lane Road Using Flaggers (TA-10)**

37

1 **Notes for Figure ~~6H6P~~6P-11 —Typical Application 11**  
2 **Lane Closure on a Two-Lane Road with Low Traffic Volumes**

3 Option:

4 1. Positive protection devices may be used per Section 6M.02.

5 ~~2.~~ This TTC zone application may be used as an alternate to the TTC application shown in Figure ~~6H6P~~-  
6 10 (using flaggers) when the following conditions exist:

- 7 a. Vehicular traffic volume is such that sufficient gaps exist for vehicular traffic that must yield.
- 8 b. Road users from both directions are able to see approaching vehicular traffic through and beyond  
9 the worksite and have sufficient visibility of approaching vehicles.

10 ~~2.~~3. The Type B flashing warning lights may be placed on the ROAD WORK AHEAD and the ONE  
11 LANE ROAD AHEAD signs whenever a night lane closure is necessary.

12 **Figure 6P-11. Lane Closure on a Two-Lane Road with Low Traffic Volumes**  
13

Notes for Figure ~~6H~~6P-12 —Typical Application 12  
Lane Closure on a Two-Lane Road Using Traffic Control Signals

Standard:

1. Temporary traffic control signals shall be installed and operated in accordance with the provisions of Part 4. Temporary traffic control signals shall meet the physical display and operational requirements of conventional traffic control signals.
2. Temporary traffic control signal timing shall be established by authorized officials. Durations of red clearance intervals shall be adequate to clear the one-lane section of conflicting vehicles.
3. When the temporary traffic control signal is changed to the flashing mode, either manually or automatically, red signal indications shall be flashed to both approaches.
4. Stop lines shall be installed with temporary traffic control signals for ~~intermediate and~~ long-term closures. **Edited to improve consistency** Existing conflicting pavement markings and raised pavement marker reflectors between the activity area and the stop line shall be removed. After the temporary traffic control signal is removed, the stop lines and other temporary pavement markings shall be removed and the permanent pavement markings restored.
5. Safeguards shall be incorporated to avoid the possibility of conflicting signal indications at each end of the TTC zone.

Guidance:

6. Where no-passing lines are not already in place, they should be added.
7. Adjustments in the location of the advance warning signs should be made as needed to accommodate the horizontal or vertical alignment of the roadway, recognizing that the distances shown for sign spacings are minimums. Adjustments in the height of the signal heads should be made as needed to conform to the vertical alignment.

Option:

8. [Positive protection devices may be used per Section 6M.02.](#)
- ~~8.9.~~ Flashing warning lights shown on the ROAD WORK AHEAD and the ONE LANE ROAD AHEAD signs may be used.
- ~~9.10.~~ Removable pavement markings may be used.

Support:

- ~~10.11.~~ Temporary traffic control signals are preferable to flaggers for long-term projects and other activities that would require flagging at night.
- ~~11.12.~~ The maximum length of activity area for one-way operation under temporary traffic control signal control is determined by the capacity required to handle the peak demand.

**Figure 6P-12. Lane Closure on a Two-Lane Road Using Traffic Control Signals (TA-12)**

1 **Notes for Figure ~~6H~~6P-13 —Typical Application 13**  
2 **Temporary Road Closure**

3 Support:

- 4 1. Conditions represented are a planned closure not exceeding 20 minutes during the daytime.

5 **Standard:**

- 6 2. **A flagger or uniformed law enforcement officer shall be used for this application. The flagger,**  
7 **if used for this application, shall follow the procedures provided in Sections ~~6E.07~~6D.05 and**  
8 **~~6E.08~~6D.06.**

9 *Guidance:*

- 10 3. *The uniformed law enforcement officer, if used for this application, should follow the procedures*  
11 *provided in Sections ~~6E.07~~6D.05 and ~~6E.08~~6D.06.*

12 Option:

- 13 4. A BE PREPARED TO STOP sign may be added to the sign series.

- 14 5. [Positive protection devices may be used per Section 6M.02.](#)

15 *Guidance:*

- 16 ~~5.6.~~ *When used, the BE PREPARED TO STOP sign should be located before the Flagger symbol sign.*

17 **Figure 6P-13. Temporary Road Closure (TA-13)**  
18

Notes for Figure **6H6P-14**—Typical Application 14  
Haul Road Crossing

Guidance:

1. Floodlights should be used to illuminate haul road crossings where existing light is inadequate.
2. Where no-passing lines are not already in place, they should be added.

Standard:

3. The traffic control method selected shall be used in both directions.

**Flagging Method**

4. When a road used exclusively as a haul road is not in use, the haul road shall be closed with Type 3 Barricades and the Flagger symbol signs covered.
5. The flagger shall follow the procedures provided in Sections **6E-076D.05** and **6E-086D.06**.
6. At night, flagger stations shall be illuminated, except in emergencies.

**Signalized Method**

7. When a road used exclusively as a haul road is not in use, the haul road shall be closed with Type 3 Barricades. The signals shall either:
  - a. flash yellow on the main road and flash red on the haul road or be covered, and the Signal Ahead and STOP HERE ON RED signs shall be covered or hidden from view; or
  - b. display green on the main road and steady red on the haul road, but only if actuated signal operation is used such that green is always displayed to the main road except when a vehicle is detected on the haul road. **Edited to reflect Official Interpretation 6(09)-7(I)**
8. The temporary traffic control signals shall control both the highway and the haul road and shall meet the physical display and operational requirements of conventional traffic control signals as described in Part 4. Traffic control signal timing shall be established by authorized officials.
9. Stop lines shall be used on existing highway with temporary traffic control signals.
10. Existing conflicting pavement markings between the stop lines shall be removed. After the temporary traffic control signal is removed, the stop lines and other temporary pavement markings shall be removed and the permanent pavement markings restored.

Guidance:

Signalized Method

11. If actuated signal operation is used (see item 7.b. above) and pedestrian facilities, such as sidewalks, are present in the area of the haul road crossing, then consideration should be given to providing pedestrian actuation capability at the temporary traffic control signal to accommodate any pedestrians who might be depending upon a pedestrian phase to cross the main road. **Added to reflect Official Interpretation 6(09)-7(I)**

**Figure 6P-14. Haul Road Crossing (TA-14)**

1 **Notes for Figure 6H6P-15 —Typical Application 15**  
2 **Work in the Center of a Road with Low Traffic Volumes**

3 *Guidance:*

- 4 1. *The lanes on either side of the center work space should have a minimum width of 10 feet as*  
5 *measured from the near edge of the channelizing devices to the edge of the pavement or the outside*  
6 *edge of the paved shoulder.*

7 *Option:*

- 8 2. Positive protection devices may be used per Section 6M.02.  
9 ~~2.3.~~ Flashing warning lights and/or flags may be used to call attention to the advance warning signs.  
10 ~~3.4.~~ If the closure continues overnight, warning lights may be used on the channelizing devices.  
11 ~~4.5.~~ A lane width of 9 feet may be used for short-term stationary work on low-volume, low-speed  
12 roadways when motor vehicle traffic does not include longer and wider heavy commercial vehicles.  
13 ~~5.6.~~ A work vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights may be used  
14 instead of the channelizing devices forming the tapers or the high-level warning devices.  
15 ~~6.7.~~ Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing,  
16 oscillating, or strobe lights.

17 **Standard:**

- 18 ~~7.8.~~ **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating,**  
19 **flashing, oscillating, or strobe lights.**

20 **Figure 6P-15. Work in the Center of a Road with Low Traffic Volumes (TA-15)**  
21

1 **Notes for Figure 6H6P-16 —Typical Application 16**  
2 **Surveying Along the Center Line of a Road with Low Traffic Volumes**

3 *Guidance:*

- 4 1. *The lanes on either side of the center work space should have a minimum width of 10 feet as*  
5 *measured from the near edge of the channelizing devices to the edge of the pavement or the outside*  
6 *edge of the paved shoulder.*  
7 2. *Cones should be placed 6 to 12 inches on either side of the center line.*  
8 3. *A flagger should be used to warn workers who cannot watch road users.*

9 **Standard:**

- 10 **4. For surveying on the center line of a high-volume road, one lane shall be closed using the**  
11 **information illustrated in Figure 6H6P-10.**

12 *Option:*

- 13 5. A high-level warning device may be used to protect a surveying device, such as a target on a tripod.  
14 6. Cones may be omitted for a cross-section survey.  
15 7. ROAD WORK AHEAD signs may be used in place of the SURVEY CREW AHEAD signs.  
16 8. Flags may be used to call attention to the advance warning signs.  
17 9. If the work is along the shoulder, the flagger may be omitted.  
18 10. For a survey along the edge of the road or along the shoulder, cones may be placed along the edge  
19 line.  
20 11. A BE PREPARED TO STOP sign may be added to the sign series.

21 *Guidance:*

- 22 12. *When used, the BE PREPARED TO STOP sign should be located before the Flagger symbol sign.*

23 **Figure 6P-16. Surveying Along the Center Line of a Road with Low Traffic Volumes (TA-16)**  
24

1 Notes for Figure ~~6H~~6P-17 —Typical Application 17

2 Mobile Operations on a Two-Lane Road

3 Standard:

- 4 1. Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by  
5 equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from  
6 view when work is not in progress.  
7 2. Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe  
8 lights.  
9 3. If an arrow board is used, it shall be used in the caution mode.

10 Guidance:

- 11 4. Where practical and when needed, the work and shadow vehicles should pull over periodically to  
12 allow vehicular traffic to pass.  
13 5. Whenever adequate stopping sight distance exists to the rear, the shadow vehicle should maintain the  
14 minimum distance from the work vehicle and proceed at the same speed. The shadow vehicle should  
15 slow down in advance of vertical or horizontal curves that restrict sight distance.  
16 6. The shadow vehicles should also be equipped with two high-intensity flashing lights mounted on the  
17 rear, adjacent to the sign.

18 Option:

- 19 7. Positive protection devices may be used per Section 6M.02.  
20 ~~7.8.~~ The distance between the work and shadow vehicles may vary according to terrain, paint drying time,  
21 and other factors.  
22 ~~8.9.~~ Additional shadow vehicles to warn and reduce the speed of oncoming or opposing vehicular traffic  
23 may be used. Law enforcement vehicles may be used for this purpose.  
24 9.10. A truck-mounted attenuator may be used on the shadow vehicle or on the work vehicle.  
25 ~~10.11.~~ If the work and shadow vehicles cannot pull over to allow vehicular traffic to pass frequently,  
26 a DO NOT PASS sign may be placed on the rear of the vehicle blocking the lane.

27 Support:

- 28 ~~11.12.~~ Shadow vehicles are used to warn motor vehicle traffic of the operation ahead.

29 Standard:

- 30 ~~12.13.~~ Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity  
31 rotating, flashing, oscillating, or strobe lights.

32 **Figure 6P-17. Mobile Operations on a Two-Lane Road (TA-17)**

33

1 **Notes for Figure 6H6P-18 —Typical Application 18**

2 **Lane Closure on a Minor Street**

3 **Standard:**

- 4 **1. This TTC shall be used only for low-speed facilities having low traffic volumes.**

5 Option:

- 6 2. Where the work space is short, where road users can see the roadway beyond, and where volume is  
7 low, vehicular traffic may be self-regulating.

8 **Standard:**

- 9 **3. Where vehicular traffic cannot effectively self-regulate, one or two flaggers shall be used as**  
10 **illustrated in Figure 6H6P-10.**

11 Option:

- 12 4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.  
13 5. A truck-mounted attenuator may be used on the work vehicle and the shadow vehicle.  
14 6. Positive protection devices may be used per Section 6M.02.

15 **Figure 6P-18. Lane Closure on a Minor Street (TA-18)**

16

1 **Notes for Figure 6H6P-19 —Typical Application 19**

2 **Detour for One Travel Direction**

3 *Guidance:*

- 4 1. *This plan should be used for streets without posted route numbers.*  
5 2. *On multi-lane streets, Detour signs with an Advance Turn Arrow should be used in advance of a turn.*

6 *Option:*

- 7 3. The STREET CLOSED legend may be used in place of ROAD CLOSED.  
8 4. Additional DO NOT ENTER signs may be used at intersections with intervening streets.  
9 5. Warning lights may be used on Type 3 Barricades.  
10 6. Detour signs may be located on the far side of intersections.  
11 7. A Street Name sign may be mounted with the Detour sign. The Street Name sign may be either white  
12 on green or black on orange.

13 **Standard:**

- 14 8. **When used, the Street Name sign shall be placed above the Detour sign.**

15 **Figure 6P-19. Detour for One Travel Direction (TA-19)**

1 **Notes for Figure 6H6P-20 —Typical Application 20**

2 **Detour for a Closed Street**

3 *Guidance:*

- 4 1. *This plan should be used for streets without posted route numbers.*  
5 2. *On multi-lane streets, Detour signs with an Advance Turn Arrow should be used in advance of a turn.*

6 *Option:*

- 7 3. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.  
8 4. Flashing warning lights may be used on Type 3 Barricades.  
9 5. Detour signs may be located on the far side of intersections. A Detour sign with an advance arrow  
10 may be used in advance of a turn.  
11 6. A Street Name sign may be mounted with the Detour sign. The Street Name sign may be either white  
12 on green or black on orange.

13 **Standard:**

- 14 **7. When used, the Street Name sign shall be placed above the Detour sign.**

15 *Support:*

- 16 8. See Figure 6H6P-9 for the information for detouring a numbered highway.

17 **Figure 6P-20. Detour for a Closed Street (TA-20)**

18

1 Notes for Figure ~~6H6P~~21 —Typical Application 21  
2 Lane Closure on the Near Side of an Intersection

3 **Standard:**

- 4 1. The merging taper shall direct vehicular traffic into either the right-hand or left-hand lane, but  
5 not both.

6 *Guidance:*

- 7 2. *In this typical application, a left taper should be used so that right-turn movements will not impede*  
8 *through motor vehicle traffic. However, the reverse should be true for left-turn movements.*  
9 3. *If the work space extends across a crosswalk, the crosswalk should be closed using the information*  
10 *and devices shown in Figure ~~6H6P~~29.*

11 *Option:*

- 12 4. Positive protection devices may be used per Section 6M.02.  
13 ~~4.5.~~Flashing warning lights and/or flags may be used to call attention to the advance warning signs.  
14 ~~5.6.~~A shadow vehicle with a truck-mounted attenuator may be used.  
15 ~~6.7.~~A work vehicle with high-intensity rotating, flashing, oscillating, or strobe lights may be used with the  
16 high-level warning device.  
17 ~~7.8.~~Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing,  
18 oscillating, or strobe lights.

19 **Standard:**

- 20 ~~8.9.~~Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating,  
21 flashing, oscillating, or strobe lights.

22 **Figure 6P-21. Lane Closure on the Near Side of an Intersection (TA-21)**  
23

1 **Notes for Figure 6H6P-22 —Typical Application 22**  
2 **Right-Hand Lane Closure on the Far Side of an Intersection**

3 *Guidance:*

- 4 1. *If the work space extends across a crosswalk, the crosswalk should be closed using the information*  
5 *and devices shown in Figure 6H6P-29.*

6 *Option:*

7 2. Positive protection devices may be used per Section 6M.02.

8 ~~2.3.~~ The normal procedure is to close on the near side of the intersection any lane that is not carried  
9 through the intersection, as shown. However, ~~w~~When this results in the closure of a right-hand lane  
10 having significant right turning movements, then the right-hand lane may be restricted to right turns  
11 only, requiring through traffic to use the left lane ~~as shown~~. ~~This procedure increases the through~~  
12 ~~capacity by eliminating right turns from the open through lane.~~ **Option changed to Support and**  
13 **relocated to below**

14 ~~3.4.~~ For intersection approaches reduced to a single lane, left-turning movements may be prohibited to  
15 maintain capacity for through vehicular traffic.

16 ~~4.5.~~ Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

17 ~~5.6.~~ Where the turning radius is large, it may be possible to create a right-turn island using channelizing  
18 devices or pavement markings.

19 7. If dimension “A” is not available to create a temporary right turn lane, continuous channelizers may  
20 be installed from the end of the taper to the intersection and, as a result, the RIGHT LANE MUST  
21 TURN RIGHT signs would not be installed. **Added to improve consistency**

22 Support:

23 8. By first closing off the left-hand lane and then reopening it as a turn bay, the through capacity is  
24 increased by eliminating right turns from the open through lane. **Option changed to Support and**  
25 **relocated from above**

26 **Figure 6P-22. Right-Hand Lane Closure on the Far Side of an Intersection (TA-22)**  
27

1 **Notes for Figure 6H6P-23 —Typical Application 23**  
2 **Left-Hand Lane Closure on the Far Side of an Intersection**

3 *Guidance:*

- 4 1. *If the work space extends across a crosswalk, the crosswalk should be closed using the information*  
5 *and devices shown in Figure 6H6P-29.*

6 *Option:*

7 2. Positive protection devices may be used per Section 6M.02.

8 ~~2.3.~~ Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

9 ~~3.4.~~ The normal procedure is to close on the near side of the intersection any lane that is not carried  
10 through the intersection. However, when this results in the closure of a left-hand lane having  
11 significant left-turning movements, then the left-hand lane may be reopened as a turn bay for left turns  
12 only, as shown.

13 *Support:*

14 ~~4.5.~~ By first closing off the left-hand lane and then reopening it as a turn bay, the left-turn bay allows  
15 storage of turning vehicles so that the movement of through traffic is not impeded. A left-turn bay  
16 that is long enough to accommodate all turning vehicles during a traffic signal cycle will provide the  
17 maximum benefit for through traffic. Also, an island is created with channelizing devices that allows  
18 the LEFT LANE MUST TURN LEFT sign to be repeated on the left adjacent to the lane that it  
19 controls.

20 **Figure 6P-23. Left-Hand Lane Closure on the Far Side of an Intersection (TA-23)**  
21

1 **Notes for Figure 6H6P-24 —Typical Application 24**  
2 **Half Road Closure on the Far Side of an Intersection**

3 *Guidance:*

- 4 1. *If the work space extends across a crosswalk, the crosswalk should be closed using the information*  
5 *and devices shown in Figure 6H6P-29.*  
6 2. *When turn prohibitions are implemented, two turn prohibition signs should be used, one on the near*  
7 *side and, space permitting, one on the far side of the intersection.*

8 *Option:*

- 9 3. Positive protection devices may be used per Section 6M.02.  
10 ~~3.4.~~ A buffer space may be used between opposing directions of vehicular traffic as shown in this  
11 application.  
12 ~~4.5.~~ The normal procedure is to close on the near side of the intersection any lane that is not carried  
13 through the intersection, as shown. ~~However, if there is~~ When this results in the closure of a right-  
14 hand lane having a significant right-turning movements, then the right-hand lane may be restricted to  
15 right turns only, requiring through traffic to use the left lanes ~~as shown.~~ **Edited to improve consistency**  
16 ~~5.6.~~ Where the turning radius is large, a right-turn island using channelizing devices or pavement markings  
17 may be used.  
18 ~~6.7.~~ There may be insufficient space to place the back-to-back Keep Right sign and No Left Turn symbol  
19 signs at the end of the row of channelizing devices separating opposing vehicular traffic flows. In this  
20 situation, the No Left Turn symbol sign may be placed on the right and the Keep Right sign may be  
21 omitted.  
22 ~~7.8.~~ For intersection approaches reduced to a single lane, left-turning movements may be prohibited to  
23 maintain capacity for through vehicular traffic.  
24 ~~8.9.~~ Flashing warning lights and/or flags may be used to call attention to advance warning signs.  
25 ~~9.10.~~ Temporary pavement markings may be used to delineate the travel path through the  
26 intersection.  
27 11. If dimension “A” is not available to create a temporary right turn lane, continuous channelizers may  
28 be installed from the end of the taper to the intersection and, as a result, the RIGHT LANE MUST  
29 TURN RIGHT signs would not be installed. **Added to improve consistency**

30 *Support:*

- 31 ~~10. Keeping the right hand lane open increases the through capacity by eliminating right turns from the~~  
32 ~~open through lane.~~  
33 ~~11. A temporary turn island reinforces the nature of the temporary exclusive right turn lane and enables a~~  
34 ~~second RIGHT LANE MUST TURN RIGHT sign to be placed in the island.~~ **Deleted to improve**  
35 **consistency**

36 **Figure 6P-24. Half Road Closure on the Far Side of an Intersection (TA-24)**  
37

1 **Notes for Figure 6H6P-25 —Typical Application 25**

2 **Multiple Lane Closures at an Intersection**

3 *Guidance:*

- 4 1. If the work space extends across a crosswalk, the crosswalk should be closed using the information  
5 and devices shown in Figure 6H6P-29.
- 6 ~~2. If the left hand through lane is closed on the near side approach, the LEFT LANE MUST TURN~~  
7 ~~LEFT sign should be placed in the median to discourage through vehicular traffic from entering the~~  
8 ~~left turn bay.~~ Deleted to improve consistency

9

10 *Support:*

- 11 ~~3.2.~~ The normal procedure is to close on the near side of the intersection any lane that is not carried  
12 through the intersection, as shown. Edited to refer to figure

13 *Option:*

- 14 3. Positive protection devices may be used per Section 6M.02.
- 15 4. If the left-turning movement that normally uses the closed turn bay is small and/or the gaps in  
16 opposing vehicular traffic are frequent, left turns may be permitted on that approach.
- 17 5. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

18 **Figure 6P-25. Multiple Lane Closures at an Intersection (TA-25)**

19

1 **Notes for Figure 6H6P-26 —Typical Application 26**

2 **Closure in the Center of an Intersection**

3 *Guidance:*

- 4 1. All lanes should be a minimum of 10 feet in width as measured to the near face of the channelizing  
5 devices.

6 *Option:*

- 7 2. A high-level warning device may be placed in the work space, if there is sufficient room.  
8 3. For short-term use on low-volume, low-speed roadways with vehicular traffic that does not include  
9 longer and wider heavy commercial vehicles, a minimum lane width of 9 feet may be used.  
10 4. Flashing warning lights and/or flags may be used to call attention to advance warning signs.  
11 5. Unless the streets are wide, it may be physically impossible to turn left, especially for large vehicles.  
12 Left turns may be prohibited as required by geometric conditions.  
13 6. For short-duration work operations, the channelizing devices may be eliminated if a vehicle  
14 displaying high-intensity rotating, flashing, oscillating, or strobe lights is positioned in the work  
15 space.  
16 7. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing,  
17 oscillating, or strobe lights.

18 **Standard:**

- 19 **8. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating,**  
20 **flashing, oscillating, or strobe lights.**

21 **Figure 6P-26. Closure in the Center of an Intersection (TA-26)**

22

1 **Notes for Figure ~~6H~~6P-27 —Typical Application 27**

2 **Closure at the Side of an Intersection**

3 *Guidance:*

- 4 1. *The situation depicted can be simplified by closing one or more of the intersection approaches. If this*  
5 *cannot be done, and/or when capacity is a problem, through vehicular traffic should be directed to*  
6 *other roads or streets.*  
7 2. *Depending on road user conditions, flagger(s) or uniformed law enforcement officer(s) should be*  
8 *used to direct road users within the intersection.*

9 **Standard:**

- 10 **3. At night, flagger stations shall be illuminated, except in emergencies.**

11 *Option:*

- 12 4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.  
13 5. For short-duration work operations, the channelizing devices may be eliminated if a vehicle  
14 displaying high-intensity rotating, flashing, oscillating, or strobe lights is positioned in the work  
15 space.  
16 6. A BE PREPARED TO STOP sign may be added to the sign series.

17 *Guidance:*

- 18 7. *When used, the BE PREPARED TO STOP sign should be located before the Flagger symbol sign.*  
19 8. *ONE LANE ROAD AHEAD signs should also be used to provide adequate advance warning.*

20 *Support:*

- 21 9. Turns can be prohibited as required by vehicular traffic conditions. Unless the streets are wide, it  
22 might be physically impossible to make certain turns, especially for large vehicles.

23 *Option:*

24 [10. Positive protection devices may be used per Section 6M.02.](#)

25 ~~10.11.~~ [11.](#) Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing,  
26 oscillating, or strobe lights.

27 **Standard:**

28 ~~11.12.~~ [12.](#) Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity  
29 rotating, flashing, oscillating, or strobe lights.

30 **Figure 6P-27. Closure at the Side of an Intersection (TA-27)**

31

Notes for Figure 6H6P-28 — Typical Application 28  
Sidewalk Detour or Diversion

Standard:

- ~~1. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility. Deleted and replaced with Standards below~~
1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. A pedestrian channelizing device, Figure 6K-2, that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
2. When used, temporary ramps shall provide a 12:1 (8%) or flatter slope, with a slip-resistant surface. The ramp landing area shall provide a 48 inch x 48 inch minimum area with a 2% or flatter cross-slope.
3. When used, Longitudinal Channelizing Devices used for temporary pedestrian routes shall comply with Section 6K.02.
4. Temporary traffic barriers, if used, shall comply with the provisions of Section 6M.02.
5. SIDEWALK CLOSED CROSS HERE signs shall include audible information devices to provide adequate communication to pedestrians with visual disabilities. Added to reflect 28 CFR 35.160 (subpart a)
6. Audible information devices shall be provided where midblock closings and changed crosswalk areas cause inadequate communication to be provided to pedestrians who have visual disabilities. Guidance changed to Standard to reflect 28 CFR 35.160 (subpart a) and relocated from below

Guidance:

- ~~2. Where high speeds are anticipated, a temporary traffic barrier and, if necessary, a crash cushion should be used to separate the temporary sidewalks from vehicular traffic. Deleted and replaced with Guidance below~~
7. The surface of an alternate pathway should meet the requirements of the Americans with Disabilities Act.
8. The protective requirements of a TTC situation have priority in determining the need for temporary traffic barriers and their use in this situation should be based on engineering judgment. Added to improve accuracy
- ~~3. Audible information devices should be considered where midblock closings and changed crosswalk areas cause inadequate communication to be provided to pedestrians who have visual disabilities. Guidance changed to Standard and relocated to above~~

Option:

- ~~4.9.~~ Street lighting may be considered.
- ~~5.10.~~ Only the TTC devices related to pedestrians are shown. Other devices, such as lane closure signing or ROAD NARROWS signs, may be used to control vehicular traffic.
- ~~6.11.~~ For nighttime closures, Type A Flashing warning lights may be used on barricades that support signs and close sidewalks.
- ~~7.12.~~ Type C Steady-Burn or Type D 360-degree Steady-Burn warning lights may be used on channelizing devices separating the temporary sidewalks from vehicular traffic flow.
- ~~8.13.~~ Signs, such as KEEP RIGHT (LEFT), may be placed along a temporary sidewalk to guide or direct pedestrians.

1 [14. The width of the alternate pedestrian route may be 48 inches with a passing area of 60 inches every](#)  
2 [200 feet.](#) **Added to improve accuracy**

3 **Figure 6P-28. Sidewalk Detour or Diversion (TA-28)**

Notes for Figure 6H6P-29 — Typical Application 29  
Crosswalk Closures and Pedestrian Detours

Standard:

1. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.
2. Curb parking shall be prohibited for at least 50 feet in advance of the midblock crosswalk.
3. SIDEWALK CLOSED CROSS HERE signs shall include audible information devices to provide adequate communication to pedestrians with visual disabilities. Added to reflect 28 CFR 35.160 (subpart a)
4. Audible information devices shall be provided where midblock closings and changed crosswalk areas cause inadequate communication to be provided to pedestrians who have visual disabilities Guidance changed to Standard to reflect 28 CFR 35.160 (subpart a) and relocated from below

Guidance:

- ~~3. Audible information devices should be considered where midblock closings and changed crosswalk areas cause inadequate communication to be provided to pedestrians who have visual disabilities.~~ Guidance changed to Standard to reflect 28 CFR 35.160 (subpart a) and relocated to above
- ~~4.5. Pedestrian traffic signal displays controlling closed crosswalks should be covered or deactivated.~~

Option:

- ~~5.6.~~ Street lighting may be considered.
- ~~6.7.~~ Only the TTC devices related to pedestrians are shown. Other devices, such as lane closure signing or ROAD NARROWS signs, may be used to control vehicular traffic.
- ~~7.8.~~ For nighttime closures, Type A Flashing warning lights may be used on barricades supporting signs and closing sidewalks.
- ~~8.9.~~ Type C Steady-Burn or Type D 360-degree Steady-Burn warning lights may be used on channelizing devices separating the work space from vehicular traffic.
- ~~9.10.~~ In order to maintain the systematic use of the fluorescent yellow-green background for pedestrian, bicycle, and school warning signs in a jurisdiction, the fluorescent yellow-green background for pedestrian, bicycle, and school warning signs may be used in TTC zones.

**Figure 6P-29. Crosswalk Closures and Pedestrian Detours (TA-29)**

1 **Notes for Figure ~~6H~~6P-30 —Typical Application 30**

2 **Interior Lane Closure on a Multi-Lane Street**

3 *Guidance:*

- 4 1. *This information applies to low-speed, low-volume urban streets. Where speed or volume is higher,*  
5 *additional signing such as LEFT LANE CLOSED XX FT should be used between the signs shown.*

6 *Option:*

7 2. [Positive protection devices may be used per Section 6M.02.](#)

8 ~~2.~~3. The closure of the adjacent interior lane in the opposing direction may not be necessary, depending  
9 upon the activity being performed and the work space needed for the operation.

10 ~~3.~~4. Shadow vehicles with a truck-mounted attenuator may be used.

11 **Figure 6P-30. Interior Lane Closure on a Multi-Lane Street (TA-30)**

12

**Notes for Figure 6H6P-31 —Typical Application 31**  
**Lane Closure on a Street with Uneven Directional Volumes**

**Standard:**

1. The illustrated information shall be used only when the vehicular traffic volume indicates that two lanes of vehicular traffic shall be maintained in the direction of travel for which one lane is closed.

**Option:**

2. The procedure may be used during a peak period of vehicular traffic and then changed to provide two lanes in the other direction for the other peak.

**Guidance:**

3. For high speeds, a LEFT LANE CLOSED XX FT sign should be added for vehicular traffic approaching the lane closure, as shown in Figure 6H6P-32.
4. Conflicting pavement markings should be removed for long-term projects. For short-term and intermediate-term projects where this is not practical, the channelizing devices in the area where the pavement markings conflict should be placed at a maximum spacing of 1/2 S feet where S is the speed in mph. Temporary markings should be installed where needed.
5. If the lane shift has curves with recommended speeds of 30 mph or less, Reverse Turn signs should be used.
6. Where the shifted section is long, a Reverse Curve sign should be used to show the initial shift and a second sign should be used to show the return to the normal alignment.
7. If the tangent distance along the temporary diversion is less than 600 feet, the Double Reverse Curve sign should be used at the location of the first Two Lane Reverse Curve sign. The second Two Lane Reverse Curve sign should be omitted.

**Standard:**

8. The number of lanes illustrated on the Reverse Curve or Double Reverse Curve signs shall be the same as the number of through lanes available to road users, and the direction of the reverse curves shall be appropriately illustrated.

**Option:**

9. [Positive protection devices may be used per Section 6M.02.](#)

~~9.10.~~ A longitudinal buffer space may be used in the activity area to separate opposing vehicular traffic.

~~10.11.~~ Where two or more lanes are being shifted, a ~~W1-4~~Reverse Curve (or ~~W1-3~~Reverse Turn) sign with an ALL LANES (~~W24-1eP~~) plaque (see Figure ~~6F-46H-1~~) may be used instead of a sign that illustrates the number of lanes. **Edited to improve consistency with Figure**

~~11.12.~~ Where more than three lanes are being shifted, the Reverse Curve (or Turn) sign may be rectangular.

~~12.13.~~ A work vehicle or a shadow vehicle may be equipped with a truck-mounted attenuator.

**Figure 6P-31. Lane Closure on a Street with Uneven Directional Volumes (TA-31)**

1 Notes for Figure ~~6H~~6P-32 —Typical Application 32  
2 Half Road Closure on a Multi-Lane, High-Speed Highway

3 Standard:

- 4 1. Pavement markings no longer applicable shall be removed or obliterated as soon as practical.  
5 Except for intermediate-term and short-term situations, temporary markings shall be provided  
6 to clearly delineate the temporary travel path. For short-term and intermediate-term situations  
7 where it is not feasible to remove and restore pavement markings, channelization shall be made  
8 dominant by using a very close device spacing.

9 Guidance:

- 10 2. When paved shoulders having a width of 8 feet or more are closed, channelizing devices should be  
11 used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within  
12 the traveled way.  
13 3. Where channelizing devices are used instead of pavement markings, the maximum spacing should be  
14  $1/2 S$  feet where  $S$  is the speed in mph.  
15 4. If the tangent distance along the temporary diversion is less than 600 feet, a Double Reverse Curve  
16 sign should be used instead of the first Reverse Curve sign, and the second Reverse Curve sign should  
17 be omitted.

18 Option:

- 19 5. Positive protection devices may be used per Section 6M.02.  
20 ~~5.6.~~ Warning lights may be used to supplement channelizing devices at night.  
21 ~~6.7.~~ A truck-mounted attenuator may be used on the work vehicle and/or the shadow vehicle.

22 **Figure 6P-32. Half Road Closure on a Multi-Lane, High-Speed Highway (TA-32)**  
23

1 Notes for Figure ~~6H~~6P-33 —Typical Application 33  
2 Stationary Lane Closure on a Divided Highway

3 **Standard:**

- 4 1. This information also shall be used when work is being performed in the lane adjacent to the  
5 median on a divided highway. In this case, the LEFT LANE CLOSED signs and the  
6 corresponding Lane Ends signs shall be substituted.  
7 2. When a side road intersects the highway within the TTC zone, additional TTC devices shall be  
8 placed as needed.

9 *Guidance:*

- 10 3. *When paved shoulders having a width of 8 feet or more are closed, channelizing devices should be*  
11 *used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within*  
12 *the traveled way.*

13 **Option:**

- 14 4. A truck-mounted attenuator may be used on the work vehicle and/or shadow vehicle.  
15 ~~4.5.~~ Positive protection devices may be used per Section 6M.02.

16 **Support:**

- 17 ~~5.6.~~ Where conditions permit, restricting all vehicles, equipment, workers, and their activities to one side  
18 of the roadway might be advantageous.

19 **Standard:**

- 20 ~~6.7.~~ An arrow board shall be used when a freeway lane is closed. When more than one freeway lane  
21 is closed, a separate arrow board shall be used for each closed lane.

22 **Figure 6P-33. Stationary Lane Closure on a Divided Highway (TA-33)**  
23

1 Notes for Figure 6H6P-34 — Typical Application 34

2 Lane Closure with a Temporary Traffic Barrier

3 Standard:

- 4 1. This information also shall be used when work is being performed in the lane adjacent to the  
5 median on a divided highway. In this case, the LEFT LANE CLOSED signs and the  
6 corresponding Lane Ends signs shall be substituted.

7 Guidance:

- 8 2. For long-term lane closures on facilities with permanent edge lines, a temporary edge line should be  
9 installed from the upstream end of the merging taper to the downstream end of the downstream taper,  
10 and conflicting pavement markings should be removed.  
11 3. The use of a barrier should be based on engineering judgment.

12 Standard:

- 13 4. Temporary traffic barriers, if used, shall comply with the provisions of Section 6F.856M.02.  
14 5. The barrier shall not be placed along the merging taper. The lane shall first be closed using  
15 channelizing devices and pavement markings.

16 Option:

- 17 6. Type C Steady-Burn warning lights may be placed on channelizing devices and the barrier parallel to  
18 the edge of pavement for nighttime lane closures.  
19 7. The barrier shown in this typical application is an example of one method that may be used to close a  
20 lane for a long-term project. If the work activity permits, a movable barrier may be used and  
21 relocated to the shoulder during non-work periods or peak-period vehicular traffic conditions, as  
22 appropriate.

23 Standard:

- 24 8. If a movable barrier is used, the temporary white edge line shown in the typical application  
25 shall not be used. During the period when the right-hand lane is opened, the sign legends and  
26 the channelization shall be changed to indicate that only the shoulder is closed, as illustrated in  
27 Figure 6H6P-5. The arrow board, if used, shall be placed at the downstream end of the  
28 shoulder taper and shall display the caution mode.

29 Guidance:

- 30 9. If a movable barrier is used, the shift should be performed in the following manner. When closing the  
31 lane, the lane should be initially closed with channelizing devices placed along a merging taper using  
32 the same information employed for a stationary lane closure. The lane closure should then be  
33 extended with the movable-barrier transfer vehicle moving with vehicular traffic. When opening the  
34 lane, the movable-barrier transfer vehicle should travel against vehicular traffic from the termination  
35 area to the transition area. The merging taper should then be removed using the same information  
36 employed for a stationary lane closure.

37 **Figure 6P-34. Lane Closure with a Temporary Traffic Barrier (TA-34)**

1 Notes for Figure **6H6P-35** —Typical Application 35

2 Mobile Operation on a Multi-Lane Road

3 Standard:

- 4 1. Arrow boards shall, as a minimum, be Type B, with a size of 60 x 30 inches.
- 5 2. Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by
- 6 equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from
- 7 view when work is not in progress.
- 8 3. Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe
- 9 lights.
- 10 4. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane
- 11 is closed, a separate arrow board shall be used for each closed lane.

12 Guidance:

- 13 5. Vehicles used for these operations should be made highly visible with appropriate equipment, such as
- 14 flags, signs, or arrow boards.
- 15 6. Shadow Vehicle 1 should be equipped with an arrow board and truck-mounted attenuator.
- 16 7. Shadow Vehicle 2 should be equipped with an arrow board. An appropriate lane closure sign should
- 17 be placed on Shadow Vehicle 2 so as not to obscure the arrow board.
- 18 8. Shadow Vehicle 2 should travel at a varying distance from the work operation so as to provide
- 19 adequate sight distance for vehicular traffic approaching from the rear.
- 20 9. The spacing between the work vehicles and the shadow vehicles, and between each shadow vehicle
- 21 should be minimized to deter road users from driving in between.
- 22 10. Work should normally be accomplished during off-peak hours.
- 23 11. When the work vehicle occupies an interior lane (a lane other than the far right or far left) of a
- 24 directional roadway having a right-hand shoulder 10 feet or more in width, Shadow Vehicle 2 should
- 25 drive the right-hand shoulder with a sign indicating that work is taking place in the interior lane.

26 Option:

- 27 12. A truck-mounted attenuator may be used on Shadow Vehicle 2.
- 28 13. Positive protection devices may be used per Section 6M.02.
- 29 ~~13.~~14. On high-speed roadways, a third shadow vehicle (not shown) may be used with Shadow
- 30 Vehicle 1 in the closed lane, Shadow Vehicle 2 straddling the edge line, and Shadow Vehicle 3 on the
- 31 shoulder.
- 32 ~~14.~~15. Where adequate shoulder width is not available, Shadow Vehicle 3 may also straddle the edge
- 33 line.

34 **Figure 6P-35. Mobile Operation on a Multi-Lane Road (TA-35)**

35

1 **Notes for Figure 6H6P-36 —Typical Application 36**

2 **Lane Shift on a Freeway**

3 *Guidance:*

- 4 1. *The lane shift should be used when the work space extends into either the right-hand or left-hand lane*  
5 *of a divided highway and it is not practical, for capacity reasons, to reduce the number of available*  
6 *lanes.*

7 *Support:*

- 8 2. *When a lane shift is accomplished by using (1) geometry that meets the design speed at which the*  
9 *permanent highway was designed, (2) full normal cross-section (full lane width and full shoulders),*  
10 *and (3) complete pavement markings, then only the initial general work-zone warning sign is*  
11 *required.*

12 *Guidance:*

- 13 3. *When the conditions in Note 2 are not met, the information shown in the typical application should be*  
14 *employed and all the following notes apply.*

15 **Standard:**

- 16 4. **Temporary traffic barriers, if used, shall comply with the provisions of Section 6F.856M.02.**  
17 5. **The barrier shall not be placed along the shifting taper. The lane shall first be shifted using**  
18 **channelizing devices and pavement markings.**

19 *Guidance:*

- 20 6. *A warning sign should be used to show the changed alignment.*

21 **Standard:**

- 22 7. **The number of lanes illustrated on the Reverse Curve signs shall be the same as the number of**  
23 **through lanes available to road users, and the direction of the reverse curves shall be**  
24 **appropriately illustrated.**

25 *Option:*

- 26 8. *Where two or more lanes are being shifted, a W1-4 (or W1-3) sign with an ALL LANES (W24-1cP)*  
27 *plaque (see Figure 6F-46H-1) may be used instead of a sign that illustrates the number of lanes.*  
28 9. *Where more than three lanes are being shifted, the Reverse Curve (or Turn) sign may be rectangular.*

29 *Guidance:*

- 30 10. *Where the shifted section is longer than 600 feet, one set of Reverse Curve signs should be used to*  
31 *show the initial shift and a second set should be used to show the return to the normal alignment. If*  
32 *the tangent distance along the temporary diversion is less than 600 feet, a Double Reverse Curve sign*  
33 *should be used instead of the first Reverse Curve sign, and the second Reverse Curve sign should be*  
34 *omitted.*

- 35 11. *If a STAY IN LANE sign is used, then solid white lane lines should be used.*

36 **Standard:**

- 37 12. **The minimum width of the shoulder lane shall be 10 feet.**  
38 13. **For long-term stationary work, existing conflicting pavement markings shall be removed and**  
39 **temporary markings shall be installed before traffic patterns are changed.**

40 *Option:*

- 41 14. *For short-term stationary work, lanes may be delineated by channelizing devices or removable*  
42 *pavement markings instead of temporary markings.*

43 *Guidance:*

- 44 15. *If the shoulder cannot adequately accommodate trucks, trucks should be directed to use the travel*  
45 *lanes.*

- 46 16. *The use of a barrier should be based on engineering judgment.*

47 *Option:*

1 17. Type C Steady-Burn warning lights may be placed on channelizing devices and the barrier parallel to  
2 the edge of the pavement for nighttime lane closures.

3  
4

**Figure 6P-36. Lane Shift on a Freeway (TA-36)**

1 **Notes for Figure 6H6P-37 —Typical Application 37**

2 **Double Lane Closure on a Freeway**

3 **Standard:**

- 4 **1. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane**  
5 **is closed, a separate arrow board shall be used for each closed lane.**

6 *Guidance:*

- 7 *2. Ordinarily, the preferred position for the second arrow board is in the closed exterior lane at the*  
8 *upstream end of the second merging taper. However, the second arrow board should be placed in the*  
9 *closed interior lane at the downstream end of the second merging taper in the following situations:*
- 10 *a. When a shadow vehicle is used in the interior closed lane, and the second arrow board is*  
11 *mounted on the shadow vehicle;*
  - 12 *b. If alignment or other conditions create any confusion as to which lane is closed by the second*  
13 *arrow board; and*
  - 14 *c. When the first arrow board is placed in the closed exterior lane at the downstream end of the first*  
15 *merging taper (the alternative position when the shoulder is narrow).*

16 *Option:*

- 17 3. Flashing warning lights and/or flags may be used to call attention to the initial warning signs.  
18 4. A truck-mounted attenuator may be used on the shadow vehicle.  
19 5. Positive protection devices may be used per Section 6M.02.  
20 ~~5.6.~~ If a paved shoulder having a minimum width of 10 feet and sufficient strength is available, the left-  
21 hand and adjacent interior lanes may be closed and vehicular traffic carried around the work space on  
22 the right-hand lane and a right-hand shoulder.

23 *Guidance:*

- 24 ~~6.7.~~ *When a shoulder lane is used that cannot adequately accommodate trucks, trucks should be directed*  
25 *to use the normal travel lanes.*

26 **Figure 6P-37. Double Lane Closure on a Freeway (TA-37)**

27

Notes for Figure 6H6P-38 — Typical Application 38

Interior Lane Closure on a Freeway

Standard:

1. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.
2. If temporary traffic barriers are installed, they shall comply with the provisions and requirements in Section 6F.856M.02.
3. The barrier shall not be placed along the shifting taper. The lane shall first be shifted using channelizing devices and pavement markings.
4. For long-term stationary work, existing conflicting pavement markings shall be removed and temporary markings shall be installed before traffic patterns are changed.

Guidance:

5. For a long-term closure, a barrier should be used to provide additional safety to the operation in the closed interior lane. A buffer space should be used at the upstream end of the closed interior lane.
6. The ~~first~~ arrow board displaying an arrow pointing to the right should be on the left-hand shoulder at the beginning of the taper. ~~The arrow board displaying a double arrow should be centered in the closed interior lane and placed at the downstream end of the shifting taper.~~
- ~~7. If the two arrow boards create confusion, the 2L distance between the end of the merging taper and beginning of the shift taper should be extended so that road users can focus on one arrow board at a time.~~
- ~~8. The placement of signs should not obstruct or obscure arrow boards.~~
- ~~9.7. For long-term use, the dashed/broken lane lines should be made solid white in the two-lane section.~~

Option:

- ~~10.8.~~ As an alternative to initially closing the left-hand lane, as shown in the typical application, the right-hand lane may be closed in advance of the interior lane closure with appropriate channelization and signs. The Interior Lane Shift Ahead (W9-4) symbol sign may be mirrored to indicate a right lane shift.
- ~~11.9.~~ A short, single row of channelizing devices in advance of the vehicular traffic split to restrict vehicular traffic to their respective lanes may be added.
- ~~12.10.~~ DO NOT PASS signs may be used.
- ~~13.11.~~ If a paved shoulder having a minimum width of 10 feet and sufficient strength is available, the left-hand and center lanes may be closed and motor vehicle traffic carried around the work space on the right-hand lane and a right-hand shoulder.
12. A work vehicle with a truck mounted attenuator may be utilized within the closed interior lane between the buffer space and the work area.
13. Positive protection devices may be used per Section 6M.02.

Guidance:

14. When a shoulder lane is used that cannot adequately accommodate trucks, trucks should be directed to use the normal travel lanes.

**Figure 6P-38. Interior Lane Closure on a Freeway (TA-38)**

1 **Notes for Figure 6H6P-39 —Typical Application 39**

2 **Median Crossover on a Freeway**

3 **Standard:**

- 4 **1. Channelizing devices or temporary traffic barriers shall be used to separate opposing vehicular**  
5 **traffic.**  
6 **2. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane**  
7 **is closed, a separate arrow board shall be used for each closed lane.**

8 *Guidance:*

- 9 3. *For long-term work on high-speed, high-volume highways, consideration should be given to using a*  
10 *temporary traffic barrier to separate opposing vehicular traffic.*

11 *Option:*

- 12 4. When a temporary traffic barrier is used to separate opposing vehicular traffic, the Two-Way Traffic,  
13 DO NOT PASS, KEEP RIGHT, and DO NOT ENTER signs may be eliminated.  
14 5. The alignment of the crossover may be designed as a reverse curve.

15 *Guidance:*

- 16 6. *When the crossover follows a curved alignment, the design criteria contained in the AASHTO “Policy*  
17 *on the Geometric Design of Highways and Streets” (see Section 1A.405) should be used.*  
18 7. *When channelizing devices have the potential of leading vehicular traffic out of the intended traffic*  
19 *space, the channelizing devices should be extended a distance in feet of 2.0 times the speed limit in*  
20 *mph beyond the downstream end of the transition area as depicted.*  
21 8. *Where channelizing devices are used, the Two-Way Traffic signs should be repeated every 1 mile.*

22 *Option:*

- 23 9. NEXT XX MILES Supplemental Distance plaques may be used with the Two-Way Traffic signs,  
24 where XX is the distance to the downstream end of the two-way section.

25 *Support:*

- 26 10. When the distance is sufficiently short that road users entering the section can see the downstream end  
27 of the section, they are less likely to forget that there is opposing vehicular traffic.  
28 11. The sign legends for the four pairs of signs approaching the lane closure for the non-crossover  
29 direction of travel are not shown. They are similar to the series shown for the crossover direction,  
30 except that the left-hand lane is closed.

31 **Figure 6P-39. Median Crossover on a Freeway (TA-39)**

32

1 **Notes for Figure 6H6P-40 —Typical Application 40**

2 **Median Crossover for an Entrance Ramp**

3 *Guidance:*

- 4 1. *The typical application illustrated should be used for carrying an entrance ramp across a closed*  
5 *directional roadway of a divided highway.*  
6 2. *A temporary acceleration lane should be used to facilitate merging.*  
7 3. *When used, the YIELD or STOP sign should be located far enough forward to provide adequate sight*  
8 *distance of oncoming mainline vehicular traffic to select an acceptable gap, but should not be located*  
9 *so far forward that motorists will be encouraged to stop in the path of the mainline traffic. If needed,*  
10 *yield or stop lines should be installed across the ramp to indicate the point at which road users should*  
11 *yield or stop. Also, a longer acceleration lane should be provided beyond the sign to reduce the gap*  
12 *size needed.*

13 *Option:*

- 14 4. [Positive protection devices may be used per Section 6M.02.](#)  
15 ~~4.5.~~ *If vehicular traffic conditions allow, the ramp may be closed.*  
16 ~~5.6.~~ *A broken edge line may be carried across the temporary entrance ramp to assist in defining the*  
17 *through vehicular traffic lane.*  
18 ~~6.7.~~ *When a temporary traffic barrier is used to separate opposing vehicular traffic, the Two-Way Traffic*  
19 *signs and the DO NOT ENTER signs may be eliminated.*

20 **Figure 6P-40. Median Crossover for an Entrance Ramp (TA-40)**

21

1 **Notes for Figure 6H6P-41 —Typical Application 41**

2 **Median Crossover for an Exit Ramp**

3 *Guidance:*

- 4 1. *This typical application should be used for carrying an exit ramp across a closed directional roadway*  
5 *of a divided highway. The design criteria contained in the AASHTO “Policy on the Geometric Design*  
6 *of Highways and Streets” (see Section 1A.405) should be used for determining the curved alignment.*  
7 2. *The guide signs should indicate that the ramp is open, and where the temporary ramp is located.*  
8 *Conversely, if the ramp is closed, guide signs should indicate that the ramp is closed.*  
9 3. *When the exit is closed, a black on orange EXIT CLOSED sign panel should be placed diagonally*  
10 *across the interchange/intersection guide signs and channelizing devices should be placed to*  
11 *physically close the ramp.*  
12 4. *In the situation (not shown) where channelizing devices are placed along the mainline roadway, the*  
13 *devices’ spacing should be reduced in the vicinity of the off ramp to emphasize the opening at the*  
14 *ramp itself. Channelizing devices and/or temporary pavement markings should be placed on both*  
15 *sides of the temporary ramp where it crosses the median and the closed roadway.*  
16 5. *Advance guide signs providing information related to the temporary exit should be relocated or*  
17 *duplicated adjacent to the temporary roadway.*

18 **Standard:**

- 19 **6. A temporary EXIT sign shall be located in the temporary gore. For better visibility, it shall be**  
20 **mounted a minimum of 7 feet from the pavement surface to the bottom of the sign.**

21 *Option:*

- 22 7. Positive protection devices may be used per Section 6M.02.  
23 ~~7.8.~~ Guide signs referring to the exit may need to be relocated to the median.  
24 ~~8.9.~~ The temporary EXIT sign placed in the temporary gore may be either black on orange or white on  
25 green.  
26 ~~9.10.~~ In some instances, a temporary deceleration lane may be useful in facilitating the exiting  
27 maneuver.  
28 ~~10.11.~~ When a temporary traffic barrier is used to separate opposing vehicular traffic, the Two-Way  
29 Traffic signs may be omitted.

30 **Figure 6P-41. Median Crossover for an Exit Ramp (TA-41)**

31

1 **Notes for Figure 6H6P-42 —Typical Application 42**

2 **Work in the Vicinity of an Exit Ramp**

3 *Guidance:*

- 4 1. *The guide signs should indicate that the ramp is open, and where the temporary ramp is located.*  
5 *However, if the ramp is closed, guide signs should indicate that the ramp is closed.*  
6 2. *When the exit ramp is closed, a black on orange EXIT CLOSED sign panel should be placed*  
7 *diagonally across the interchange/intersection guide signs.*  
8 3. *The design criteria contained in the AASHTO “Policy on the Geometric Design of Highways and*  
9 *Streets” (see Section 1A. ~~H~~05) should be used for determining the alignment.*

10 **Standard:**

- 11 **4. A temporary EXIT sign shall be located in the temporary gore. For better visibility, it shall be**  
12 **mounted a minimum of 7 feet from the pavement surface to the bottom of the sign.**

13 *Option:*

14 5. Positive protection devices may be used per Section 6M.02.

15 ~~5.6.~~ The temporary EXIT sign placed in the temporary gore may be either black on orange or white on  
16 green.

17 ~~6.7.~~ An alternative procedure that may be used is to channelize exiting vehicular traffic onto the right-hand  
18 shoulder and close the lane as necessary.

19 **Standard:**

- 20 **~~7.8.~~ An arrow board shall be used when a freeway lane is closed. When more than one freeway lane**  
21 **is closed, a separate arrow board shall be used for each closed lane.**

22 **Figure 6P-42. Work in the Vicinity of an Exit Ramp (TA-42)**

23

1 **Notes for Figure 6H6P-43 —Typical Application 43**  
2 **Partial Exit Ramp Closure**

3 *Guidance:*

- 4 1. *Truck off-tracking should be considered when determining whether the minimum lane width of 10 feet*  
5 *is adequate (see Section 6G.086N.07).*

6 Option:

- 7 2. Positive protection devices may be used per Section 6M.02.

8 **Figure 6P-43. Partial Exit Ramp Closure (TA-43)**  
9

1 **Notes for Figure 6H6P-44 —Typical Application 44**

2 **Work in the Vicinity of an Entrance Ramp**

3 *Guidance:*

- 4 1. *An acceleration lane of sufficient length should be provided whenever possible as shown on the*  
5 *diagram on the left.*

6 **Standard:**

- 7 2. **For the information shown on the diagram on the right-hand side of the typical application,**  
8 **where inadequate acceleration distance exists for the temporary entrance, the YIELD sign shall**  
9 **be replaced with STOP signs (one on each side of the approach).**

10 *Guidance:*

- 11 3. *When used, the YIELD or STOP sign should be located so that ramp vehicular traffic has adequate*  
12 *sight distance of oncoming mainline vehicular traffic to select an acceptable gap in the mainline*  
13 *vehicular traffic flow, but should not be located so far forward that motorists will be encouraged to*  
14 *stop in the path of the mainline traffic. Also, a longer acceleration lane should be provided beyond*  
15 *the sign to reduce the gap size needed. If insufficient gaps are available, consideration should be*  
16 *given to closing the ramp.*  
17 4. *Where STOP signs are used, a temporary stop line should be placed across the ramp at the desired*  
18 *stop location.*  
19 5. *The mainline merging taper with the arrow board at its starting point should be located sufficiently in*  
20 *advance so that the arrow board is not confusing to drivers on the entrance ramp, and so that the*  
21 *mainline merging vehicular traffic from the lane closure has the opportunity to stabilize before*  
22 *encountering the vehicular traffic merging from the ramp.*  
23 6. *If the ramp curves sharply to the right, warning signs with advisory speeds located in advance of the*  
24 *entrance terminal should be placed in pairs (one on each side of the ramp).*

25 *Option:*

26 7. Positive protection devices may be used per Section 6M.02.

27 ~~7.8.~~ A Stop Beacon (see Section 4L4S.05) or a Type B high-intensity warning flasher with a red lens may  
28 be placed above the STOP sign.

29 ~~8.9.~~ Where the acceleration distance is significantly reduced, a supplemental plaque may be placed below  
30 the Yield Ahead sign reading NO MERGE AREA.

31 **Standard:**

32 ~~9.10.~~ **An arrow board shall be used when a freeway lane is closed. When more than one**  
33 **freeway lane is closed, a separate arrow board shall be used for each closed lane.**

34 **Figure 6P-44. Work in the Vicinity of an Entrance Ramp (TA-44)**

1 **Notes for Figure 6H6P-45 —Typical Application 45**  
2 **Temporary Reversible Lane Using Movable Barriers**

3 **Support:**

- 4 1. This application addresses one of several uses for movable barriers (see Section 6F.856M.02) in  
5 highway work zones. In this example, one side of a 6-lane divided highway is closed to perform the  
6 work operation, and vehicular traffic is carried in both directions on the remaining 3-lane roadway by  
7 means of a median crossover.

8 To accommodate unbalanced peak-period vehicular traffic volumes, the direction of travel in the  
9 center lane is switched to the direction having the greater volume, with the transfer typically being  
10 made twice daily. Thus, there are four vehicular traffic phases described as follows:

- 11 a. Phase A—two travel lanes northbound and one lane southbound;  
12 b. Transition A to B—one travel lane in each direction;  
13 c. Phase B—one travel lane northbound and two lanes southbound; and  
14 d. Transition B to A—one travel lane in each direction.

15 The typical application on the left illustrates the placement of devices during Phase A. The typical  
16 application on the right shows conditions during the transition (Transition A to B) from Phase A to  
17 Phase B.

18 **Guidance:**

- 19 2. *For the reversible-lane situation depicted, the ends of the movable barrier should terminate in a*  
20 *protected area or a crash cushion should be provided. During Phase A, the transfer vehicle should be*  
21 *parked behind the downstream end of the movable barrier for southbound traffic as shown in the*  
22 *typical application on the left. During Phase B, the transfer vehicle should be parked behind between*  
23 *the downstream ends of the movable barriers at the north end of the TTC zone as shown in the typical*  
24 *application on the right.*

25 *The transition shift from Phase A to B should be as follows:*

- 26 a. *Change the signs in the northbound advance warning area and transition area from a LEFT*  
27 *LANE CLOSED AHEAD to a 2 LEFT LANES CLOSED AHEAD. Change the mode of the second*  
28 *northbound arrow board from Caution to Right Arrow.*  
29 b. *Place channelizing devices to close the northbound center lane.*  
30 c. *Move the transfer vehicle from south to north to shift the movable barrier from the west side to*  
31 *the east side of the reversible lane.*  
32 d. *Remove the channelizing devices closing the southbound center lane.*  
33 e. *Change the signs in the southbound transition area and advance warning area from a 2 LEFT*  
34 *LANES CLOSED AHEAD to a LEFT LANE CLOSED AHEAD. Change the mode of the second*  
35 *southbound arrow board from Right Arrow to Caution.*

- 36 3. *Where the lane to be opened and closed is an exterior lane (adjacent to the edge of the traveled way*  
37 *or the work space), the lane closure should begin by closing the lane with channelizing devices placed*  
38 *along a merging taper using the same information employed for a stationary lane closure. The lane*  
39 *closure should then be extended with the movable-barrier transfer vehicle moving with vehicular*  
40 *traffic. When opening the lane, the transfer vehicle should travel against vehicular traffic. The*  
41 *merging taper should be removed in a method similar to a stationary lane closure.*

42 **Option:**

- 43 4. The procedure may be used during a peak period of vehicular traffic and then changed to provide two  
44 lanes in the other direction for the other peak.  
45 5. A longitudinal buffer space may be used in the activity area to separate opposing vehicular traffic.  
46 6. A work vehicle or a shadow vehicle may be equipped with a truck-mounted attenuator.

47 **Standard:**

- 48 7. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane**  
49 **is closed, a separate arrow board shall be used for each closed lane.**

50 **Figure 6P-45. Temporary Reversible Lane Using Movable Barriers (TA-45)**

1 **Notes for Figure 6H6P-46 —Typical Application 46**

2 **Work in the Vicinity of a Grade Crossing**

3 *Guidance:*

- 4 1. *When grade crossings exist either within or in the vicinity of roadway work activities, extra care*  
5 *should be taken to minimize the probability of conditions being created, by lane restrictions, flagging,*  
6 *or other operations, where vehicles might be stopped within the grade crossing, considered as being*  
7 *15 feet on either side of the closest and farthest rail.*

8 **Standard:**

- 9 **2. If the queuing of vehicles across active rail tracks cannot be avoided, a uniformed law**  
10 **enforcement officer or flagger shall be provided at the grade crossing to prevent vehicles from**  
11 **stopping within the grade crossing (as described in Note 1), even if automatic warning devices**  
12 **are in place.**

13 *Guidance:*

- 14 3. *Early coordination with the railroad company or light rail transit agency should occur before work*  
15 *starts.*  
16 4. *In the example depicted, the buffer space of the activity area should be extended upstream of the*  
17 *grade crossing (as shown) so that a queue created by the flagging operation will not extend across the*  
18 *grade crossing.*  
19 5. *The DO NOT STOP ON TRACKS sign should be used on all approaches to a grade crossing within*  
20 *the limits of a TTC zone.*

21 *Option:*

- 22 6. [Positive protection devices may be used per Section 6M.02.](#)  
23 ~~6.7.~~ *Flashing warning lights and/or flags may be used to call attention to the advance warning signs.*  
24 ~~7.8.~~ *A BE PREPARED TO STOP sign may be added to the sign series.*

25 *Guidance:*

- 26 ~~8.9.~~ *When used, the BE PREPARED TO STOP sign should be located before the Flagger symbol sign.*

27 **Standard:**

- 28 **9.10. At night, flagger stations shall be illuminated, except in emergencies.**

29 **Figure 6P-46. Work in the Vicinity of a Grade Crossing (TA-46)**

1 Notes for Figure 6P-47–Typical Application 47

2 Bicycle Lane Closure without Detour

3 **Added to improve accuracy and consistency with new Section 6N.04**

4 Guidance:

- 5 1. If a bicycle lane on a roadway having a speed limit of 35 mph or higher is closed and conditions are  
6 not appropriate to direct bicyclists into a shared lane, a separate bicycle facility or detour route  
7 should be considered. Refer to Figure 6P-48 or Figure 6P-51.

8 Option:

- 9 2. If a bicycle lane on a roadway having a speed limit of 30 mph or less is closed, and the adjacent travel  
10 lane is less than 17 feet wide, then BICYCLES MAY USE FULL LANE signs may be used.  
11 3. If a bicycle lane on a roadway having a speed limit of 30 mph or less is closed, and the adjacent  
12 travel lane is at least 17 feet wide throughout the TTC zone, then Bicycle Warning signs in  
13 association with ON STREET or ON ROADWAY plaques may be used.

14 **Figure 6P-47. Bicycle Lane Closure without Detour (TA-47)**

15

1 Notes for Figure 6P-48 –Typical Application 48

2 Bicycle Lane Closure with On-Road Detour

3 **Added to improve accuracy and consistency with new Section 6N.04**

4 Guidance:

- 5 1. A detour route for bicycle traffic where a section of bicycle lane is closed should use the most direct  
6 route practical on roadways where conditions are appropriate for bicycling.  
7 2. Bicycle related regulatory and/or warning signs should be considered along the bicycle detour based  
8 on engineering judgment and traffic conditions.  
9 3. A Street Name sign or Bike Route Name sign should be mounted with the Bike Detour sign. The Street  
10 Name sign or Bike Route Name sign may be either white on green or black on orange.

11 Standard:

- 12 4. Where used, the Street Name sign or Bike Route Name sign shall be placed above the Bike  
13 Detour sign.

14 **Figure 6P-48. Bicycle Lane Closure with On-Road Detour (TA-48)**  
15

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Notes for Figure 6P-49–Typical Application 49

Shared-Use Path Closure with a Diversion

**Added to improve accuracy and consistency with new Section 6N.04**

Guidance:

1. The temporary paved shared-use path should be at least as wide as the shared-use path that was temporarily closed.

**Figure 6P-49. Shared-Use Path Closure with a Diversion (TA-49)**

1 Notes for Figure 6P-50–Typical Application 50

2 On-Road Detour for Shared-Use Path

3 **Added to improve accuracy and consistency with new Section 6N.04**

4 Guidance:

- 5 1. The on-road detour route for bicycle traffic should use the most direct route practical on roadways  
6 where conditions are appropriate for bicycling.
- 7 2. Bicycle related regulatory and/or warning signs should be considered along the bicycle detour based  
8 on engineering judgment and traffic conditions.
- 9 3. A Street Name sign or Bike Route Name sign should be mounted with the Bike Detour sign. The Street  
10 Name sign or Bike Route Name sign may be either white on green or black on orange.

11 Standard:

- 12 4. Where used the Street Name sign or Bike Route Name sign shall be placed above the Bike  
13 Detour sign.

14 **Figure 6P-50. On-Road Detour for Shared-Use Path (TA-50)**

1 Notes for Figure 6P-51–Typical Application 51

2 Paved Shoulder Closure with Bicycle Diversion onto Temporary Path

3 **Added to improve accuracy and consistency with new Section 6N.04**

4 Option:

- 5 1. This plan may be used where a paved shoulder is closed and a temporary paved path is provided  
6 for bicyclists.

7  
8 Guidance:

- 9 2. This plan should be used where a paved shoulder is closed on a roadway having a speed limit  
10 greater than or equal to 45 mph that is part of a bikeway system (local, county or state) and a  
11 temporary paved path is provided for bicyclists.

- 12 3. The A, B, C dimensions should be based on anticipated bicycle speeds.

13 **Figure 6P-51. Paved Shoulder Closure with Bicycle Diversion onto Temporary Path (TA-51)**

1 Notes for Figure 6P-52 –Typical Application 52  
2 Short-Term or Short Duration Work in a Roundabout

3 **Added to improve consistency**  
4

5 Option:

- 6 1. Flashing warning lights and/or flags may be used to call attention to the advance warning signs. A BE  
7 PREPARED TO STOP sign may be added to the sign series.  
8 2. If closure continues overnight, warning lights may be used on the channelizing devices.

9 Standard:

- 10 3. Where a quadrant of the roundabout is closed as shown in Figure 6P-47, only one direction of  
11 approach traffic shall be released at a time.  
12 4. At night, flagger stations shall be illuminated, except in emergencies.  
13 5. WRONG WAY signs shall be covered.

14 Guidance:

- 15 6. When used, the BE PREPARED TO STOP sign should be located between the Flagger sign and the  
16 ONE LANE ROAD sign.  
17 7. YIELD, ONE WAY, and Directional arrow signs should be covered or removed.  
18 8. Confusing or misleading guide or lane-use control signs should be covered.

19 Option:

- 20 9. Crosswalks may be closed.  
21 10. As an alternative to closing crosswalks, warning signs may be added informing pedestrians that there  
22 is traffic coming from the left.

23 Guidance:

- 24 11. Since the geometrics of the roundabout will be temporarily altered, consideration should be given to  
25 establishing a truck detour for the duration of the project.  
26 12. For intermediate or long-term work, the roundabout should be closed and traffic detoured, with  
27 appropriate detour signing provided.

28 **Figure 6P-52. Short-Term or Short Duration Work in a Roundabout (TA-52)**  
29

Notes for Figure 6P-53 – Typical Application 53  
Flagging Operation on a Single-Lane Roundabout  
**Added to improve consistency**

**Standard:**

- 1. Flaggers shall follow the procedures provided in Sections 6D.05 and 6D.06.**
- 2. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility. See Figure 6P-29. Crosswalk Closures and Pedestrian Detours (TA-29).**
- 3. At night, flagger stations shall be illuminated, except in emergencies.**

**Guidance:**

4. Flaggers on each approach to the intersection should coordinate with each other so that traffic may proceed through the roundabout from only one entry point at any one time.
5. When designing the temporary traffic control and installing the channelizing devices for work activities at roundabouts, accommodations for the turning radius of wider heavy commercial vehicles should be considered.
6. Since the geometrics of the roundabout will temporarily be altered, consideration should be given to establishing a truck detour for the duration of the project.
7. For intermediate or long-term work, the roundabout should be closed if traffic cannot be accommodated, and traffic detoured with appropriate detour signing provided. See Figure 6P-8, Road Closure with an Off-Site Detour (TA-8).
8. Conflicting pavement markings should be removed for long-term projects. For short-term and intermediate-term projects where this is not practical, the channelizing devices in the area where the pavement markings conflict should be placed at a maximum spacing of 1/2 S feet where S is the speed in mph. Temporary markings should be installed where needed.
9. When used, the BE PREPARED TO STOP sign should be located between the 96 Flagger sign and the ONE LANE ROAD sign.
10. The buffer space should be extended so that the two-way traffic taper is placed before a 98 horizontal (or crest vertical) curve to provide adequate sight distance for the flagger 99 and a queue of stopped vehicles.
11. Care should be exercised when establishing the limits of the work zone to ensure adequate sight distance in advance of the transition.

**Option:**

12. Periodic adjustments to the channelizing devices may be allowed in an active work zone to accommodate the turning movements of tractor trailer vehicles and other large vehicles.
13. On the approaches where traffic flow will be split, two pilot vehicles may be used to guide traffic through the roundabout.

**Figure 6P-53. Flagging Operation on a Single-Lane Roundabout (TA-53)**

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Notes for Figure 6P-54 --Typical Application 54  
Inside Lane Closure on a Multi-Lane Roundabout  
**Added to improve consistency**

**Standard:**

- 1. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility. See Figure 6P-29. Crosswalk Closures and Pedestrian Detours (TA-29).

Guidance:

- 2. Care should be exercised when establishing the limits of the work zone to sight distance in advance of the transition.
- 3. When designing the temporary traffic control and installing the channelizing devices for work activities at roundabouts, accommodations for the turning radius of wider heavy commercial vehicles should be considered.
- 4. Since the geometrics of the roundabout will temporarily be altered, consideration should be given to establishing a truck detour for the duration of the project.
- 5. For intermediate or long-term work, the roundabout should be closed if traffic cannot be accommodated, and traffic detoured with appropriate detour signing provided. See Figure 6P-8, Road Closure with an Off-Site Detour (TA-8).
- 6. Conflicting pavement markings should be removed for long-term projects. For short-term and intermediate-term projects where this is not practical, the channelizing devices in the area where the pavement markings conflict should be placed at a maximum spacing of 1/2 S feet where S is the speed in mph. Temporary markings should be installed where needed.

Option:

- 7. A portable changeable message sign may be utilized as part of the temporary traffic control plan to provide clear guidance to motorist on all approaches of the roundabout.
- 8. On a multi-lane approach, either lane may be closed.

**Figure 6P-54. Inside Lane Closure on a Multi-Lane Roundabout (TA-54)**

1 CHAPTER 7A. GENERAL

2 **Section 7A.0401 Introduction Scope** Content relocated from existing Section 7A.04

3 **Standard**Support:

4 Part 7 sets forth basic principles and prescribes standards ~~that shall be followed in the~~for the design,  
5 application, installation, and maintenance of all traffic control devices (including signs, signals, and  
6 markings) and other controls (including adult crossing guards) ~~required that are necessary~~ for the special  
7 pedestrian conditions in school areas.

8 **Support:**

9 ~~Sections 1A.01 and 1A.08 contain information regarding unauthorized devices and messages. Sections~~  
10 ~~1A.02 and 1A.07 contain information regarding the application of standards. Section 1A.05 contains~~  
11 ~~information regarding the maintenance of traffic control devices. Section 1A.08 contains information~~  
12 ~~regarding placement authority for traffic control devices. Section 1A.09 contains information regarding~~  
13 ~~engineering studies and the assistance that is available to jurisdictions that do not have engineers on their~~  
14 ~~staffs who are trained and/or experienced in traffic control devices.~~

15 ~~Provisions contained in Chapter 2A and Section 2B.06 are applicable in school areas.~~

16 ~~Part 3 contains provisions regarding pavement markings that are applicable in school areas.~~

17 ~~Part 4 contains provisions regarding highway traffic signals that are applicable in school areas.~~ The  
18 School Crossing signal warrant is described in Section 4C.06.

19 ~~Section 7A.01 Need for Standards~~ Section not needed, Guidance relocated to Section 7A.02

20 **Section 7A.02 School Route Plans and Established School Crossings**

21 **Guidance:** Relocated four Guidance paragraphs from existing Section 7A.01

22 *A school route plan for each school serving elementary to high school students should be prepared in*  
23 *order to develop uniformity in the use of school area traffic controls and to serve as the basis for a school*  
24 *traffic control plan for each school.*

25 *The school route plan, developed in a systematic manner by the school, law enforcement, and traffic*  
26 *officials responsible for school pedestrian safety, should consist of a map (see Figure 7A-1) showing streets,*  
27 *the school, existing traffic controls, established school walk routes, and established school crossings.*

28 *The type(s) of school area traffic control devices used, either warning or regulatory, should be related to*  
29 *the volume and speed of vehicular traffic, street width, and the number and age of the students using the*  
30 *crossing.*

31 *School area traffic control devices should be included in a school traffic control plan.*

32 **Support:**

33 To establish a safer route to and from school for schoolchildren, the application of planning criterion for  
34 school walk routes might make it necessary for children to walk an indirect route to an established school  
35 crossing located where there is existing traffic control and to avoid the use of a direct crossing where there is  
36 no existing traffic control.

37 **Guidance:**

38 *School walk routes should be planned to take advantage of existing traffic controls.*

39 *The following factors should be considered when determining the feasibility of requiring children to walk*  
40 *a longer distance to a crossing with existing traffic control:*

- 41 A. *The availability of adequate sidewalks or other pedestrian walkways to and from the location with*  
42 *existing control,*
- 43 B. *The number of students using the crossing,*
- 44 C. *The age levels of the students using the crossing, and*
- 45 D. *The total extra walking distance.*

46 ~~Section 7A.03 School Crossing Control Criteria~~ Separate section not needed

47 **Support:**

1 The frequency of gaps in the traffic stream that are sufficient for student crossing is different at each  
2 crossing location. When the delay between the occurrences of adequate gaps becomes excessive, students  
3 might become impatient and endanger themselves by attempting to cross the street during an inadequate gap.  
4 In these instances, the creation of sufficient gaps needs to be considered to accommodate the crossing  
5 demand. **Not necessary**

6 A recommended method for determining the frequency and adequacy of gaps in the traffic stream is given  
7 in the "Traffic Control Devices Handbook" (see Section 1A.11). **Relocated to Section 7D.01**

8 **~~Section 7A.04 Scope~~ Relocated and revised to become new Section 7A.01 and title changed**

9 **Figure 7A-1. Example of School Route Plan Map**

10

1 CHAPTER 7B. SIGNS

2 Section 7B.01 ~~Size~~ Design of School Signs

3 Standard:

4 Except as provided in Section 2A.~~1107~~, the sizes of signs and plaques to be used on conventional  
5 roadways in school areas shall be as shown in Table 7B-1.

6 ~~The sizes in the Conventional Road column shall be used unless engineering judgment determines  
7 that a minimum or oversized sign size would be more appropriate.~~

8 ~~The sizes in the Minimum column shall be used only where traffic volumes are low and speeds are  
9 30 mph or lower, as determined by engineering judgment.~~

10 ~~The sizes in the Oversized column shall be used on expressways.~~ Not needed, redundant with  
11 Section 2A.11

12 *Guidance:*

13 ~~The sizes in the Oversized column should be used on roadways that have four or more lanes with posted  
14 speed limits of 40 mph or higher.~~

15 Option:

16 ~~The sizes in the Oversized column may also be used at other locations that require increased emphasis,  
17 improved recognition, or increased legibility.~~ Not needed, redundant with Section 2A.11

18 Signs and plaques larger than those shown in Table 7B-1 may be used (see Section 2A.~~1107~~).

19 ~~Section 7B.02 – Illumination and Reflectorization~~ Section title deleted; text combined with  
20 Section 7B.01

21 Standard:

22 School warning signs, including the “SCHOOL” portion of the School Speed Limit (S5-1) sign and  
23 including any supplemental plaques used in association with these warning signs, shall have a  
24 fluorescent yellow-green background with a black legend and border unless otherwise provided in this  
25 Manual for a specific sign.

26 The signs used for school area traffic control shall be ~~retroreflectorized~~ retroreflective or  
27 illuminated.

28 ~~Section 7B.03 – Position of Signs~~ Section title deleted; text combined with Section 7B.01

29 Support:

30 Sections 2A.~~16-12~~ and 2A.~~17-13~~ contain provisions regarding the installation, placements, and locations  
31 of signs. Relocated from existing Section 7B.06

32 Section 2A.~~18-14~~ contains provisions regarding the mounting height of signs. Relocated from existing  
33 Section 7B.04

34 Section 2A.~~19-15~~ contains provisions regarding the lateral offsets of signs. Relocated from existing  
35 Section 7B.06

36 The “Standard Highway Signs and Markings” book (see Section 1A.~~1105~~) contains information regarding  
37 sign lettering. Relocated from existing Section 7B.06

38 Option:

39 In-roadway signs for school traffic control areas may be used consistent with the requirements of Sections  
40 2B.~~1221~~, and 7B.~~1103~~, and 7B.~~12~~.

41 **Table 7B-1 . School Area Sign and Plaque Sizes**

42 ~~Section 7B.04 – Height of Signs~~ Section title deleted, text combined with Section 7B.01

43 ~~Section 7B.05 – Installation of Signs~~ Section title deleted, text combined with Section 7B.01

44 ~~Section 7B.06 – Lettering~~ Section title deleted, text combined with Section 7B.01

1 ~~Section 7B.07 Sign Color for School Warning Signs~~ Section title deleted, text combined with  
2 ~~Section 7B.01~~

3 ~~Section 7B.08~~ Section 7B.02 School Area Signs (S1-1) and Plaques

4 Support:

5 Many state and local jurisdictions find it beneficial to advise road users that they are approaching a school  
6 that is adjacent to a highway, where additional care is needed, even though no school crossing is involved and  
7 the speed limit remains unchanged. Additionally, some jurisdictions designate school zones that have a  
8 unique legal standing in that fines for speeding or other traffic violations within designated school zones are  
9 increased or special enforcement techniques such as photo radar systems are used. It is important and  
10 sometimes legally necessary to mark the beginning and end points of these designated school zones so that the  
11 road user is given proper notice.

12 The School (S1-1) sign (see Figure 7B-1) has the following four applications:

- 13 A. School Area – the S1-1 sign can be used to warn road users that they are approaching a school area  
14 that might include school buildings or grounds, a school crossing, or school related activity adjacent  
15 to the highway.
- 16 B. School Zone – the S1-1 sign can be used to identify the location of the beginning of a designated  
17 school zone (~~see Section 7B.09~~).
- 18 C. School Advance Crossing – if combined with an AHEAD (W16-9P) plaque or an XX FEET (W16-2P  
19 or W16-2aP) plaque to comprise the School Advance Crossing assembly, the S1-1 sign can be used to  
20 warn road users that they are approaching a crossing where schoolchildren cross the roadway (see  
21 Section 7B.~~4~~03).
- 22 D. School Crossing – if combined with a diagonal downward pointing arrow (W16-7P) plaque to  
23 comprise the School Crossing assembly, the S1-1 sign can be used to warn approaching road users of  
24 the location of a crossing where schoolchildren cross the roadway (see Section 7B.~~4~~203).

25 Option:

26 If a school area is located on a cross street in close proximity to the intersection, a School (S1-1) sign with  
27 a supplemental arrow (W16-5P or W16-6P) plaque may be installed on each approach of the street or highway  
28 to warn road users making a turn onto the cross street that they will encounter a school area soon after making  
29 the turn.

30 ~~Section 7B.09 School Zone Sign (S1-1) and Plaques (S4-3P, S4-7P) and END SCHOOL ZONE~~  
31 ~~Sign (S5-2)~~ Section title deleted, text combined with new Section 7B.02

32 **Standard:**

33 **If a school zone has been designated under State or local statute, a School (S1-1) sign (see Figure**  
34 **7B-1) shall be installed to identify the beginning point(s) of the designated school zone (see Figure 7B-2).**

35 Option:

36 A School Zone (S1-1) sign may be supplemented with a SCHOOL (S4-3P) plaque (see Figure 7B-1).

37 A School Zone (S1-1) sign may be supplemented with an ALL YEAR (S4-7P) plaque (see Figure 7B-1) if  
38 the school operates on a 12-month schedule.

39 The downstream end of a designated school zone may be identified with an END SCHOOL ZONE (S5-2)  
40 sign (see Figures 7B-1 and 7B-2).

41 If a school zone is located on a cross street in close proximity to the intersection, a School Zone (S1-1)  
42 sign with a supplemental arrow (W16-5P or W16-6P) plaque may be installed on each approach of the street  
43 or highway to warn road users making a turn onto the cross street that they will encounter a school zone soon  
44 after making the turn.

45 ~~Section 7B.10 Higher Fines Zone Signs (R2-10, R2-11) and Plaques~~ Combined with new  
46 ~~Section 7B.02~~

47 **Standard:** Guidance: Standard changed to Guidance

1 Where increased fines are imposed for traffic violations within a designated school zone, a BEGIN  
2 HIGHER FINES ZONE (R2-10) sign (see Figure 7B-1) or a FINES HIGHER (R2-6P), FINES DOUBLE (R2-  
3 6aP), or \$XX FINE (R2-6bP) plaque (see Figure 2B-3) ~~shall~~ should be installed as a supplement to the School  
4 Zone (S1-1) sign to identify the beginning point of the higher fines zone (see Figures 7B-2 and 7B-3).

5 If the portion of the roadway that is subject to higher fines does not begin at the location of the School  
6 Zone (S1-1) sign, a BEGIN HIGHER FINES ZONE (R2-10) sign should be placed at the point where the  
7 higher fines begin. Paragraph added per Official Interpretation 7(09)-3 (I)

8 Option:

9 If a BEGIN HIGHER FINES ZONE (R2-10) sign is used, a FINES HIGHER (R2-6P), FINES DOUBLE  
10 (R2-6aP), or \$XX FINE (R2-6bP) plaque may be placed beneath the School Zone (S1-1) sign.

11 Where appropriate, one of the following plaques may be mounted below the sign that identifies the  
12 beginning point of the higher fines zone:

- 13 A. An S4-1P plaque (see Figure 7B-1) specifying the times that the higher fines are in effect,
- 14 B. A WHEN CHILDREN ARE PRESENT (S4-2P) plaque (see Figure 7B-1), or
- 15 C. A WHEN FLASHING (S4-4P) plaque (see Figure 7B-1) if used in conjunction with a yellow flashing  
16 beacon.

17 **Standard:**

18 Where a BEGIN HIGHER FINES ZONE (R2-10) sign or a FINES HIGHER (R2-6P), FINES  
19 DOUBLE (R2-6aP), or \$XX FINE (R2-6bP) plaque supplementing a School Zone (S1-1) sign is posted  
20 to notify road users of increased fines for traffic violations, an END HIGHER FINES ZONE (R2-11)  
21 sign (see Figure 7B-1) or an END SCHOOL ZONE (S5-2) sign shall be installed at the downstream end  
22 of the zone to notify road users of the termination of the increased fines zone (see Figures 7B-2 and 7B-  
23 3).

24 If exceeding the speed limit is the only traffic violation that is subject to higher fines, a FINES  
25 HIGHER (R2-6P), FINES DOUBLE (R2-6aP), or \$XX FINE (R2-6bP) plaque shall not be posted  
26 beneath the School Zone (S1-1) sign. Paragraph added per Official Interpretation 7(09)-3 (I)

### 27 **Figure 7B-1. School Area Signs**

#### 28 **Section ~~7B.11~~ 7B.03 School Advance Crossing Assembly Signs**

29 **Standard:**

30 The School Advance Crossing assembly (see Figure 7B-1) shall consist of a School (S1-1) sign  
31 supplemented with an AHEAD (W16-9P) plaque or an XX FEET (W16-2P or W16-2aP) plaque.

32 Except as provided in Paragraph 3, a School Advance Crossing assembly shall be used in advance  
33 (see Table 2C-4 for advance placement guidelines) of the first School Crossing assembly (see Section  
34 7B.12) that is encountered in each direction as traffic approaches a school crosswalk (see Figure 7B-4).

35 Option:

36 The School Advance Crossing assembly may be omitted (see Figure 7B-5) where a School Zone (S1-1)  
37 sign (see Section 7B.09) is installed to identify the beginning of a school zone in advance of the School  
38 Crossing assembly.

39 If a school crosswalk is located on a cross street in close proximity to an intersection, a School Advance  
40 Crossing assembly with a supplemental arrow (W16-5P or W16-6P) plaque may be installed on each approach  
41 of the street or highway to warn road users making a turn onto the cross street that they will encounter a  
42 school crosswalk soon after making the turn. A 12-inch reduced size in-street School (S1-1) sign (see Figure  
43 7B-6), installed in compliance with the mounting height and special mounting support requirements for In-  
44 Street Pedestrian Crossing (R1-6 or R1-6a) signs (see Section 2B.12), may be used in advance of a school  
45 crossing to supplement the post-mounted school warning signs. A 12 x 6-inch reduced size AHEAD (W16-  
46 9P) plaque may be mounted below the reduced size in-street School (S1-1) sign.

#### 47 **~~Section 7B.12 School Crossing Assembly~~ Combined with new Section 7B.03**

48 **Standard:**

1 If used, the School Crossing assembly (see Figure 7B-1) shall be installed at the school crossing (see  
2 Figures 7B-4 and 7B-5), or as close to it as possible, and shall consist of a School (S1-1) sign  
3 supplemented with a diagonal downward pointing arrow (W16-7P) plaque to show the location of the  
4 crossing.

5 The School Crossing assembly shall not be used at crossings other than those adjacent to schools  
6 and those on established school pedestrian routes.

7 The School Crossing assembly shall not be installed on an approaches controlled by a STOP ~~or~~  
8 ~~YIELD~~ sign.

9 *Guidance:*

10 The School Crossing assembly should not be installed on an approach controlled by a YIELD sign.

11 Option:

12 The School Crossing assembly may be installed on an approach to a roundabout where the crosswalk is at  
13 least one car length in advance of the yield point at the entrance to the roundabout.

14 At a signalized or Stop-controlled intersection the School Crossing assembly may be installed on an  
15 approach to a channelized right turn lane controlled by a YIELD sign.

16 A Yield Here To (Stop Here For) Pedestrians (R1-5a or R1-5c) sign (see Figure 7B-6) may be used, in  
17 accordance with the provisions of Section 2B.20, in advance of a marked crosswalk that crosses an  
18 uncontrolled multi-lane approach within school zones.

19 The In-Street Pedestrian Crossing (R1-6 or R1-6a) sign (see Section 2B.12 and Figure 7B-6) or the In-  
20 Street ~~Schoolchildren~~ School Crossing (R1-6b or R1-6c) sign (see Figure 7B-6) may be used at ~~unsignalized~~  
21 school crossings on approaches that are not controlled by a traffic control signal, a pedestrian hybrid beacon,  
22 or emergency vehicle hybrid beacon. If used at a school crossing, a 12 x 4-inch SCHOOL (S4-3P) plaque (see  
23 Figure 7B-6) may be mounted above the sign. The STATE LAW legend on the R1-6 series signs may be  
24 omitted.

25 The In-Street Pedestrian Crossing (R1-6 or R1-6a) sign or In-Street School Crossing (R1-6b or R1-6c)  
26 sign may be used at intersections or midblock crossings with flashing beacons.

27 The Overhead ~~Pedestrian~~ School Crossing (R1-9b or R1-9a9c) sign (~~see Section 2B.12 and Figure 2B-2)~~  
28 ~~may be modified to replace the standard pedestrian symbol with the standard schoolchildren symbol and~~ may  
29 be used at ~~unsignalized~~ school crossings on approaches that are not controlled by a traffic control signal,  
30 pedestrian hybrid beacon, or an emergency vehicle hybrid beacon. The STATE LAW legend on the R1-9  
31 series signs may be omitted.

32 A 12-inch reduced size in-street School (S1-1) sign (see Figure 7B-6) may be used ~~at an unsignalized~~  
33 ~~school crossing~~ instead of the In-Street Pedestrian Crossing (R1-6 or R1-6a) or the In-Street ~~Schoolchildren~~  
34 ~~School~~ Crossing (R1-6b or R1-6c) sign at a school crossing on approaches that are not controlled by a traffic  
35 control signal, pedestrian hybrid beacon, or an emergency vehicle hybrid beacon. A 12 x 6-inch reduced size  
36 diagonal downward pointing arrow (W16-7P) plaque may be mounted below the reduced size in-street School  
37 (S1-1) sign.

38 **Standard:**

39 **If an In-Street Pedestrian Crossing sign, an In-Street School~~children~~ Crossing sign, or a reduced**  
40 **size in-street School (S1-1) sign is placed in the roadway, the sign support shall comply with the**  
41 **mounting height and special mounting support requirements for In-Street Pedestrian Crossing (R1-6 or**  
42 **R1-6a) signs (see Section 2B.12).**

43 **The In-Street Pedestrian Crossing sign, the In-Street ~~Schoolchildren~~ School Crossing sign, the**  
44 **Overhead Pedestrian Crossing sign, and the reduced size in-street School (S1-1) sign shall not be used ~~at~~**  
45 **~~signalized locations~~ on approaches that are controlled by a traffic control signal, pedestrian hybrid**  
46 **beacon, or an emergency vehicle hybrid beacon.**

47 **~~Section 7B.13~~ Section 7B.04 **School Bus Stop Ahead Signs ~~(S3-1)~~****

48 *Guidance:*

49 *The School Bus Stop Ahead (S3-1) sign (see Figure 7B-1) should be installed in advance of locations*  
50 *where a school bus, when stopped to pick up or discharge passengers, is not visible to road users for an*

1 adequate distance and where there is no opportunity to relocate the school bus stop to provide adequate sight  
2 distance.

3 ~~Section 7B.14 SCHOOL BUS TURN AHEAD Sign (S3-2)~~ Combined with new Section 7B.04

4 Option:

5 The SCHOOL BUS TURN AHEAD (S3-2) sign (see Figure 7B-1) may be installed in advance of  
6 locations where a school bus turns around on a roadway at a location not visible to approaching road users for  
7 a distance as determined by the “0” column under Condition B of Table 2C-4, and where there is no  
8 opportunity to relocate the school bus turn around to provide the distance provided in Table 2C-4.

9 Section 7B.05 School Bus Stop When Flashing Sign

10 Option:

11 A “STOP FOR SCHOOL BUS WHEN RED LIGHTS FLASH” (S5-4) sign may be used to remind  
12 drivers of the requirement to stop for school buses when the flashing red lights on the school bus are in  
13 operation.

14 Standard:

15 The legend “STATE LAW” shall be used with black letters on yellow background on the top line of  
16 the sign.

17 Support:

18 A “STOP FOR SCHOOL BUS WHEN RED LIGHTS FLASH” (S5-4) sign is typically used where  
19 special regulatory emphasis is needed. This sign provides regulatory notice to inform drivers of applicable  
20 laws along sections of roadway with multiple bus stops or those that have a particularly high incidence of  
21 drivers passing or not stopping for school buses when the red lights are flashing.

22 ~~Section 7B.15-06 School Speed Limit Assembly (S4-1P, S4-2P, S4-3P, S4-4P, S4-6P, S5-1) and~~  
23 ~~END SCHOOL SPEED LIMIT Sign (S5-3) Signs and Plaques~~

24 **Standard:**

25 A School Speed Limit assembly (see Figure 7B-1) or a School Speed Limit (S5-1) sign (see Figure  
26 7B-1) shall be used to indicate the speed limit where a reduced school speed limit zone has been  
27 established based upon an engineering study or where a reduced school speed limit is specified for such  
28 areas by statute. The School Speed Limit assembly or School Speed Limit sign shall be placed at or as  
29 near as practical to the point where the reduced school speed limit zone begins (see Figures 7B-3 and  
30 7B-5).

31 If a reduced school speed limit zone has been established, a School (S1-1) sign shall be installed in  
32 advance (see Table 2C-4 for advance placement guidelines) of the first School Speed Limit sign  
33 assembly or S5-1 sign that is encountered in each direction as traffic approaches the reduced school  
34 speed limit zone (see Figures 7B-3 and 7B-5).

35 ~~Where increased fines are imposed for traffic violations within a reduced school speed limit zone, a~~  
36 ~~FINES HIGHER (R2-6P), FINES DOUBLE (R2-6aP), or \$XX FINE (R2-6bP) plaque (see Figure 2B-3)~~  
37 ~~shall be installed as a supplement to the reduced school speed limit sign to notify road users.~~ **Changed to**  
38 **Guidance and relocated below**

39 Except as provided in Paragraph 5, the downstream end of an authorized and posted reduced  
40 school speed limit zone shall be identified with an END SCHOOL SPEED LIMIT (S5-3) sign (see  
41 Figures 7B-1, 7B-3, and 7B-5).

42 Option:

43 If a reduced school speed limit zone ends at the same point as a higher fines zone, an END SCHOOL  
44 ZONE (S5-2) sign may be used instead of a combination of an END HIGHER FINES ZONE (R2-11) sign  
45 and an END SCHOOL SPEED LIMIT (S5-3) sign.

46 A standard Speed Limit sign showing the speed limit for the section of highway that is downstream from  
47 the authorized and posted reduced school speed limit zone may be mounted on the same post above the END  
48 SCHOOL SPEED LIMIT (S5-3) sign or the END SCHOOL ZONE (S5-2) sign.

1 Guidance:

2 The beginning point of a reduced school speed limit zone should be at least 200 feet in advance of the  
3 school grounds; ~~or a school crossing, or other school related activities~~; however, this 200-foot distance  
4 should be increased if the reduced school speed limit is 30 mph or higher. The maximum beginning point of a  
5 reduced school speed limit zone should not be greater than 500 feet.

6 Where increased fines are imposed for traffic violations within a reduced school speed limit zone, a  
7 FINES HIGHER (R2-6P), FINES DOUBLE (R2-6aP), or \$XX FINE (R2-6bP) plaque (see Figure 2B-37B-3  
8 and 7B-5) ~~shall~~ should be installed as a supplement to the reduced school speed limit sign to notify road  
9 users. **Relocated from above and changed to Guidance**

10 If other traffic violations in addition to exceeding the speed limit are subject to higher fines, then the  
11 duplicate FINES HIGHER (R2-6P), FINES DOUBLE (R2-6aP), or \$XX FINE (R2-6bP) plaque should be  
12 omitted (see Section 7B.02). **Added per Official Interpretation 7(09)-3 (I)**

13 **Standard:**

14 **The School Speed Limit assembly shall be either a fixed-message sign assembly or a changeable**  
15 **message sign.**

16 **The fixed-message School Speed Limit assembly shall consist of a top plaque (S4-3P) with the**  
17 **legend SCHOOL, a Speed Limit (R2-1) sign, and a bottom plaque (S4-1P, S4-2P, S4-4P, or S4-6P)**  
18 **indicating the specific periods of the day and/or days of the week that the special school speed limit is in**  
19 **effect (see Figure 7B-1).**

20 Option:

21 Changeable message signs (see Chapter 2L and Section ~~6F-606L.05~~) may be used to inform drivers of the  
22 school speed limit. If the sign is internally illuminated, it may have a white legend on a black background.  
23 Changeable message signs with flashing beacons may be used for situations where greater emphasis of the  
24 special school speed limit is needed.

25 Guidance:

26 *Even though it might not always be practical because of special features to make changeable message*  
27 *signs conform in all respects to the standards in this Manual for fixed-message signs, during the periods that*  
28 *the school speed limit is in effect, their basic shape, message, legend layout, and colors should comply with*  
29 *the standards for fixed-message signs.*

30 *A confirmation light or device to indicate that the speed limit message is in operation should be*  
31 *considered for inclusion on the back of the changeable message sign.*

32 **Standard:**

33 **Fluorescent yellow-green pixels shall be used when the “SCHOOL” message is displayed on a**  
34 **changeable message sign for a school speed limit.**

35 Option:

36 Changeable message signs may use blank-out messages or other methods in order to display the school  
37 speed limit only during the periods it applies.

38 A Vehicle Speed Feedback plaque (W13-20aP) ~~Changeable message signs~~ that displays the speed of  
39 approaching drivers (see Section 2B.2+3 and 2C.13) may be used in a school speed limit zone.

40 A Speed Limit Sign Beacon (see Section 4L4S.04) also may be used, with a WHEN FLASHING legend,  
41 to identify the periods that the school speed limit is in effect.

42 ~~Section 7B.16 Reduced School Speed Limit Ahead Sign (S4-5, S4-5a)~~ **Section titled deleted;**  
43 **text combined with new Section 7B.06**

44 Guidance:

45 *A Reduced School Speed Limit Ahead (S4-5, S4-5a) sign (see Figure 7B-1) should be used to inform road*  
46 *users of a reduced speed zone where the speed limit is being reduced by more than 10 mph, or where*  
47 *engineering judgment indicates that advance notice would be appropriate.*

48 **Standard:**

1 If used, the Reduced School Speed Limit Ahead sign shall be followed by a School Speed Limit sign  
2 or a School Speed Limit assembly.

3 The speed limit displayed on the Reduced School Speed Limit Ahead sign shall be identical to the  
4 speed limit displayed on the subsequent School Speed Limit sign or School Speed Limit assembly.

5 **Section 7B.1707 Parking and Stopping Signs (R7 and R8 Series)**

6 Option:

7 Parking and stopping regulatory signs may be used to prevent parked or waiting vehicles from blocking  
8 pedestrians' views, and drivers' views of pedestrians, and to control vehicles as a part of the school traffic  
9 plan.

10 Support:

11 Parking signs and other signs governing the stopping and standing of vehicles in school areas cover a  
12 wide variety of regulations. Typical examples of regulations are as follows:

- 13 A. ~~No Parking~~ **NO PARKING** X:XX AM to X:XX PM ~~School Days Only,~~ **SCHOOL DAYS ONLY**
- 14 B. ~~No Stopping~~ **NO STOPPING** X:XX AM to X:XX PM **SCHOOL DAYS ONLY** ~~School Days Only,~~
- 15 C. ~~XX Min Loading~~ **XX MIN LOADING** X:XX AM to X:XX PM **SCHOOL DAYS ONLY** ~~School Days-~~  
16 ~~Only,~~ and
- 17 D. ~~No Standing~~ **NO STANDING** X:XX AM to X:XX PM **SCHOOL DAYS ONLY** ~~School Days Only.~~

18 Sections 2B.4654, 2B.4755, and 2B.48-56 contain information regarding the signing of parking  
19 regulations in school zone areas.

20 **Figure 7B-2. Example of Signing for a Higher Fines School Zone without a School Crossing**

21 **Figure 7B-3. Example of Signing for a Higher Fines School Zone with a School Speed**  
22 **Limit**

23 **Figure 7B-4. Example of Signing for a School Zone Crossing Outside of a School Zone**

24 **Figure 7B-5. Example of Signing for a School Zone with a School Speed Limit and a School**  
25 **Crossing**

26 **Figure 7B-6. Pedestrian Crossing ~~In-Street~~ Signs in School Areas**

27

1 CHAPTER 7C. MARKINGS

2 ~~Section 7C.01 Functions and Limitations~~ Not needed, redundant with Section 3A.01

3 ~~Section 7C.02~~ Section 7C.01 Crosswalk Markings

4 Guidance:

5 Crosswalks should be marked at all intersections on established routes to a school where there is  
6 substantial conflict between motorists, bicyclists, and student movements; where students are encouraged to  
7 cross between intersections; where students would not otherwise recognize the proper place to cross; or  
8 where motorists or bicyclists might not expect students to cross (see Figure 7A-1).

9 Crosswalk lines should not be used indiscriminately. An engineering study considering the factors  
10 described in Section ~~3B.18~~ 3C.02 should be performed before a marked crosswalk is installed at a location  
11 away from a traffic control signal or an approach controlled by a STOP or YIELD sign.

12 Because non-intersection school crossings are generally unexpected by the road user, warning signs (see  
13 Sections ~~7B.11~~ 03 ~~and 7B.12~~) should be installed for all marked school crosswalks at non-intersection  
14 locations. Adequate visibility of students by approaching motorists and of approaching motorists by students  
15 should be provided by parking prohibitions or other appropriate measures.

16 Support:

17 Section ~~3B.18~~ 3C.03 contains provisions regarding the placement and design of crosswalks, and Section  
18 ~~3B.16-19~~ contains provisions regarding the placement and design of the stop lines and yield lines that are  
19 associated with them. Provisions regarding the curb markings that can be used to establish parking  
20 regulations on the approaches to crosswalks are contained in Section 3B. ~~18~~ 23.

21 ~~Section 7C.03~~ Section 7C.02 Pavement Word, Symbol, and Arrow Markings

22 Option:

23 If used, the SCHOOL word marking may extend to the width of two approach lanes (see Figure 7C-1).

24 Guidance:

25 *If the two-lane SCHOOL word marking is used, the letters should be 10 feet or more in height.*

26 Support:

27 Section 3B.20 contains provisions regarding other word, symbol, and arrow pavement markings that can  
28 be used to guide, warn, or regulate traffic.

29 **Figure 7C-1. Two-Lane Pavement Marking of “SCHOOL”**

30

## CHAPTER 7D. CROSSING SUPERVISION

~~Section 7D.01 Types of Crossing Supervision~~ Section deleted, not needed

~~Section 7D.02 Adult Crossing Guards~~ Relocated to new Section 7D.01

~~Section 7D.03~~ 7D.01 Qualifications of Adult Crossing Guards

Option:

Adult crossing guards may be used to provide gaps in traffic at school crossings where an engineering study has shown that adequate gaps need to be created (~~see Section 7A.03~~), and where authorized by law.

~~Relocated from existing Section 7D.02~~

A recommended method for determining the frequency and adequacy of gaps in the traffic stream is given in the "Traffic Control Devices Handbook" (see Section 1A.~~H~~05). ~~Relocated from existing Section 7A.03~~

Support:

High standards for selection of adult crossing guards are essential because they are responsible for the safety of and the efficient crossing of the street by schoolchildren within and in the immediate vicinity of school crosswalks.

Guidance:

*Adult crossing guards should possess the following minimum qualifications:*

- A. *Average intelligence;*
- B. *Good physical condition, including sight, hearing, and ability to move and maneuver quickly in order to avoid danger from errant vehicles;*
- C. *Ability to control a STOP paddle effectively to provide approaching road users with a clear, fully direct view of the paddle's STOP message during the entire crossing movement;*
- D. *Ability to communicate specific instructions clearly, firmly, and courteously;*
- E. *Ability to recognize potentially dangerous traffic situations and warn and manage students in sufficient time to avoid injury.*
- F. *Mental alertness;*
- G. *Neat appearance;*
- H. *Good character;*
- I. *Dependability; and*
- J. *An overall sense of responsibility for the safety of students.*

~~Section 7D.04 Uniform of Adult Crossing Guards~~ Relocated to new Section 7D.02

~~Section 7D.05~~ 7D.02 Operating Procedures for Adult Crossing Guards

Standard:

Law enforcement officers performing school crossing supervision and adult crossing guards shall wear high-visibility retroreflective safety apparel labeled as ANSI 107-2004 standard performance for Class 2 as described in Section ~~6E.02~~6C.05. ~~Relocated from existing Section 7D.04~~

Adult crossing guards shall not direct traffic in the usual law enforcement regulatory sense. In the control of traffic, they shall pick opportune times to create a sufficient gap in the traffic flow. At these times, they shall stand in the roadway to indicate that pedestrians are about to use or are using the crosswalk, and that all vehicular traffic must stop.

Adult crossing guards shall use a STOP paddle. The STOP paddle shall be the primary hand-signaling device.

The STOP paddle shall comply with the provisions for a STOP/SLOW paddle (see Section 6D.02) except both sides shall be a STOP face. ~~Added a reference to Section 6D.02~~

~~The STOP (R1-1) paddle shall be an octagonal shape. The background of the STOP face shall be red with at least 6-inch series upper-case white letters and border. The paddle shall be at least 18-inches in size and have the word message STOP on both sides.~~ ~~Removed redundant text~~ The paddle shall be ~~retroreflectorized~~ retroreflective or illuminated when used during hours of darkness.

1 ~~Option:~~ **Removed – redundant with Section 6D.02 (existing Section 6E.03)**

2 ~~The STOP paddle may be modified to improve conspicuity by incorporating white or red flashing lights~~  
3 ~~on both sides of the paddle. Among the types of flashing lights that may be used are individual LEDs or~~  
4 ~~groups of LEDs.~~

5 ~~The white or red flashing lights or LEDs may be arranged in any of the following patterns:~~

6 ~~A. Two white or red lights centered vertically above and below the STOP legend,~~

7 ~~B. Two white or red lights centered horizontally on each side of the STOP legend,~~

8 ~~C. One white or red light centered below the STOP legend,~~

9 ~~D. A series of eight or more small white or red lights having a diameter of 1/4 inch or less along the outer~~  
10 ~~edge of the paddle, arranged in an octagonal pattern at the eight corners of the STOP paddle (more~~  
11 ~~than eight lights may be used only if the arrangement of the lights is such that it clearly conveys the~~  
12 ~~octagonal shape of the STOP paddle), or~~

13 ~~E. A series of white lights forming the shapes of the letters in the legend.~~

14 **Standard:** **Removed – redundant with Section 6D.02 (existing Section 6E.03)**

15 ~~If flashing lights are used on the STOP paddle, the flash rate shall be at least 50, but no more than~~  
16 ~~60, flash periods per minute.~~

1 CHAPTER 8A. GENERAL

2 Section 8A.01 Introduction Paragraphs 8 through 12 have been relocated to a new Section  
3 8A.02

4 Support:

5 Whenever the acronym “LRT” is used in Part 8, it refers to “light rail transit.”

6 ~~Part 8 Chapters 8A, 8B, 8C, and 8D~~ describes the traffic control devices that are used at highway-rail and  
7 highway-LRT grade crossings. Unless otherwise provided in the text or on a figure or table, the provisions of  
8 Part 8 are applicable to both highway-rail and highway-LRT grade crossings. When the phrase “grade  
9 crossing” is used by itself without the prefix “highway-rail” or “highway-LRT,” it refers to both highway-rail  
10 and highway-LRT grade crossings.

11 Chapter 8E describes the traffic control devices that are used at pathway and sidewalk grade crossings.

12 Traffic control for grade crossings includes all signs, signals, markings, other warning devices, and their  
13 supports along highways approaching and at grade crossings. The function of this traffic control is to promote  
14 safety and provide effective operation of rail and/or LRT and highway traffic at grade crossings.

15 For purposes of design, installation, operation, and maintenance of traffic control devices at grade  
16 crossings, it is recognized that the crossing of the highway and rail tracks is situated on a right-of-way  
17 available for the joint use of both highway traffic and railroad or LRT traffic.

18 Grade crossings and the traffic control devices that are associated with them are unique in that in many  
19 cases, both the highway agency or authority with jurisdiction, and the regulatory agency with statutory  
20 authority (if applicable), and the railroad company or transit agency are jointly ~~determine the need and~~  
21 ~~selection of devices at a grade crossing~~ involved in the development of engineering judgment or the  
22 performance of an engineering study. This joint process is accomplished through the efforts of a Diagnostic  
23 Team. **Edited to improve consistency**

24 In Part 8, the combination of traffic control devices selected or installed at a specific grade crossing is  
25 referred to as a “traffic control system.”

26 The combination of railroad or LRT active traffic control devices used to inform road users at a grade  
27 crossing of the approach or presence of rail traffic and the necessary control equipment for the devices are  
28 referred to as a “grade crossing warning system.” Part 1.1.1 of the “AREMA Communications & Signals  
29 Manual” (see Section 1A.05) published by the American Railway Engineering & Maintenance-of-Way  
30 Association (AREMA) contains further information about grade crossing warning systems. **Added to**  
31 **improve accuracy**

32 **Standard:**

33 Except at private grade crossings of privately-owned roadways (see Definition 159 in Section 1A.13), the  
34 traffic control devices, systems, and practices described in this Manual shall be used at all grade crossings  
35 open to public travel, consistent with Federal, State, and local laws and regulations. **Edited for consistency**  
36 **with changes to Part 1 and deletion of Part 5**

37 ~~Support:~~ **This text was relocated to new Section 8A.02**

38 ~~Part 8 also describes the traffic control devices that are used in locations where light rail LRT~~  
39 ~~vehicles are operating along streets and highways in mixed traffic with automotive vehicles.~~  
40 ~~LRT is a mode of metropolitan transportation that employs LRT vehicles (commonly known as light~~  
41 ~~rail vehicles, streetcars, or trolleys) that operate on rails in streets in mixed traffic, and LRT~~  
42 ~~traffic that operates in semi-exclusive rights of way, or in exclusive rights of way. Grade~~  
43 ~~crossings with LRT can occur at intersections or at midblock locations, including public and~~  
44 ~~private driveways.~~

45 ~~An initial educational campaign along with an ongoing program to continue to educate new drivers is~~  
46 ~~beneficial when introducing LRT operations to an area and, hence, new traffic control~~  
47 ~~devices.~~

48 ~~LRT alignments can be grouped into one of the following three types:~~

49 ~~A. Exclusive: An LRT right of way that is grade-separated or protected by a fence or traffic~~  
50 ~~barrier. Motor vehicles, pedestrians, and bicycles are prohibited within the right of way.~~

~~Subways and aerial structures are included within this group. This type of alignment does not have grade crossings and is not further addressed in Part 8.~~

~~B. Semi-exclusive: An LRT alignment that is in a separate right-of-way or along a street or railroad right-of-way where motor vehicles, pedestrians, and bicycles have limited access and cross at designated locations only.~~

~~C. Mixed-use: An alignment where LRT operates in mixed traffic with all types of road users. This includes streets, transit malls, and pedestrian malls where the right-of-way is shared.~~

**Standard:**

~~Where LRT and railroads use the same tracks or adjacent tracks, the traffic control devices, systems, and practices for highway rail grade crossings shall be used.~~

**Support:**

~~To promote an understanding of common terminology between highway and railroad and LRT signaling issues, definitions and acronyms pertaining to Part 8 are provided in Sections 1A.13 and 1A.14.~~

**Section 8A.02 Highway-LRT Grade Crossings** This section is comprised primarily of Paragraphs 8 through 12 of existing Section 8A.01 and edited to improve consistency

**Support:**

Part 8 also describes the traffic control devices that are used in locations where light rail transit (LRT) vehicles are operating along streets and highways in mixed traffic with ~~automotive vehicles~~ all types of road users.

LRT is a mode of metropolitan public transportation that employs LRT vehicles (commonly known as light rail vehicles, streetcars, or trolleys) that operate on rails in streets in mixed traffic, and LRT traffic that operates in semi-exclusive rights-of-way, or in exclusive rights-of-way. Grade crossings with LRT can occur at intersections or at midblock locations, including public and private driveways.

An initial educational campaign along with an ongoing program to continue to educate new drivers is beneficial when introducing LRT operations to an area and, hence, new traffic control devices.

LRT alignments can be grouped into one of the following three types (see definitions in Section A.131C.02):

- A. Exclusive: An LRT right-of-way that is grade-separated or protected by a fence or traffic barrier. Motor vehicles, pedestrians, and bicycles are prohibited within the right-of-way. ~~Subways and aerial structures are included within this group.~~ This type of alignment does not have grade crossings and is not further addressed in Part 8.
- B. Semi-exclusive: An LRT alignment that is in a separate right-of-way or along a street or railroad right-of-way where motor vehicles, pedestrians, and bicycles have limited access and cross at designated locations only, such as at grade crossings where road users must yield the right-of-way to the light rail transit or the bus rapid transit traffic.
- C. Mixed-use: An alignment where LRT operates in mixed traffic with all types of road users. ~~This includes streets, transit malls, and pedestrian malls where the right-of-way is shared.~~ In a mixed-use alignment, the light rail transit traffic does not have the right-of-way over other road users at grade crossings and intersections. If the LRT traffic is controlled by traffic control signals or LRT signal faces at an intersection with a roadway, the alignment is considered to be mixed-use even if some of the approaches to the intersection are used exclusively by LRT traffic.

**Guidance:**

~~If/When~~ a highway-LRT grade crossing is equipped with a flashing-light signal system and is located within 200 feet of an intersection or midblock location controlled by a traffic control signal, a pedestrian hybrid beacon, or an emergency-vehicle hybrid beacon, the highway traffic control signal should be provided with preemption in accordance with Section 4D.274F.19 and 8D.10 unless otherwise determined by a Diagnostic Team. **Text relocated from existing section 8C.10 and edited to improve accuracy**

**Option:**

1 Where LRT vehicles are operating in a mixed-use alignment, traffic signal priority or preemption may be  
2 used as determined by a Diagnostic Team. **Added to improve consistency**

3 **Standard:**

4 **Where LRT and railroads use the same tracks or adjacent tracks, the traffic control devices,**  
5 **systems, and practices for highway-rail grade crossings shall be used.**

6 **Section ~~8A.02~~ 8A.03 Use of Standard Devices, Systems, and Practices at Highway-Rail Grade**  
7 **Crossings**

8 **Support:**

9 Because of the large number of significant variables to be considered, no single standard system of traffic  
10 control devices is universally applicable for all ~~highway-rail~~ grade crossings.

11 *Guidance:*

12 *The appropriate traffic control system to be used at a highway-LRT grade crossing should be determined*  
13 *by an engineering study conducted by the LRT or highway agency in cooperation with other appropriate State*  
14 *and local organizations.*

15 *Option:*

16 *The engineering study may include the Highway-Rail Intersection (HRI) components of the National*  
17 *Intelligent Transportation Systems (ITS) architecture, which is a USDOT accepted method for linking the*  
18 *highway, vehicles, and traffic management systems with rail operations and wayside equipment.*

19 *Support:*

20 *More detail on Highway-Rail Intersection components is available from the USDOT's Federal Railroad*  
21 *Administration, 1200 New Jersey Avenue, SE, Washington, DC 20590, or [www.fra.dot.gov](http://www.fra.dot.gov).* **Paragraphs 2-4**  
22 **relocated to new Section 8A.05**

23 **Standard:**

24 ~~**Traffic control devices, systems, and practices shall be consistent with the design and application of**~~  
25 ~~**the Standards contained in this Manual.**~~ **Deleted; redundant with new Section 1B**

26 **Before any new ~~highway-rail~~ grade crossing traffic control system is installed or before**  
27 **modifications are made to an existing system, approval shall be obtained from the highway agency with**  
28 **~~the jurisdictional and/or~~ the regulatory agency with statutory authority (if applicable), and from the**  
29 **railroad company and/or transit agency.**

30 The Diagnostic Team members shall reach a determination, documented in an engineering study  
31 (see Section 8A.05), on new grade crossing traffic control systems and on proposed changes to an  
32 existing grade crossing traffic control system. The Diagnostic Team determination shall be made after  
33 the Diagnostic Team members reach a consensus during site visits, meetings, conference calls, or a  
34 combination of some or all of these methods. **Added to improve consistency**

35 Except as provided in Paragraph 5, operational changes made to a grade crossing traffic control  
36 system requiring the use of engineering judgment or an engineering study shall be conducted and  
37 approved by a Diagnostic Team. Among the types of changes at a grade crossing for which a Diagnostic  
38 Team shall conduct an engineering study are additions to or modifications of the lanes approaching or  
39 traversing the grade crossing; additions or modifications to sidewalks; additions or modifications to  
40 bicycle lanes, especially if a counter-flow bike lane is added on a one-way street; changes to roadway  
41 use, including conversion to or from one-way operation or reversible lanes; implementation of quiet  
42 zones; and the installation of or significant operational changes to traffic control signals that might  
43 affect the grade crossing. **Added to improve consistency**

44 Option:

45 When determined by the responsible public agency, the railroad company, and/or the transit agency,  
46 general maintenance activities or minor operational changes to the grade crossing traffic control system that  
47 do not have a negative impact on the overall operation of the traffic control system may be made without a  
48 review and determination by a Diagnostic Team. **Added to improve consistency**

49 **Support:**

1 Many other details of ~~highway-rail~~ grade crossing traffic control systems that are not set forth in Part 8 are  
2 contained in the publications listed in Section 1A.11.05, including the ~~“2000 latest version of the “AREMA~~  
3 ~~Communications & Signals Manual”~~ published by the American Railway Engineering & Maintenance-of-  
4 Way Association (AREMA) and the ~~2006 edition latest version~~ of “Preemption of Traffic Signals Near  
5 Railroad Crossings” published by the Institute of Transportation Engineers (ITE).

6 **Section ~~8A.03~~ 8A.04 Use of Standard Devices, Systems, and Practices at Highway-LRT Grade**  
7 **Crossings**

8 Support:

9 The combination of devices selected or installed at a specific highway-LRT grade crossing is referred to  
10 as a “Light Rail Transit Traffic Control System.”

11 ~~Because of the large number of significant variables to be considered, no single standard system of traffic~~  
12 ~~control devices is universally applicable for all highway-LRT grade crossings.~~ Deleted; redundant with new  
13 **Section 8A.03**

14 ~~For the safety and integrity of operations by highway and LRT users, the highway agency with~~  
15 ~~jurisdiction, the regulatory agency with statutory authority, if applicable, and the LRT authority jointly~~  
16 ~~determine the need and selection of traffic control devices and the assignment of priority to LRT at a~~  
17 ~~highway-LRT grade crossing.~~ Deleted; redundant with new Standard in new Section 8A.03

18 The normal rules of the road and traffic control priority identified in the “Uniform Vehicle Code” and its  
19 successor documents govern the order assigned to the movement of vehicles at an intersection unless the local  
20 agency determines that it is appropriate to assign a higher priority to LRT vehicles. Examples of different  
21 types of LRT priority control include separate traffic control signal phases for LRT movements, restriction of  
22 movement of roadway vehicles in favor of LRT operations, and preemption of highway traffic signal control  
23 to accommodate LRT movements.

24 *Guidance:* **This text has been relocated to new Section 8A.05**

25 ~~The appropriate traffic control system to be used at a highway-LRT grade crossing should be determined~~  
26 ~~by an engineering study conducted by the LRT or highway agency in cooperation with other appropriate State~~  
27 ~~and local organizations.~~

28 **Standard:**

29 ~~Traffic control devices, systems, and practices shall be consistent with the design and application of~~  
30 ~~the Standards contained in this Manual.~~ Deleted; redundant with new Section 1B

31 ~~The traffic control devices, systems, and practices described in this Manual shall be used at all~~  
32 ~~highway-LRT grade crossings.~~ Deleted; redundant with new Section 1B

33 ~~Before any new highway-LRT grade crossing traffic control system is installed or before~~  
34 ~~modifications are made to an existing system, approval shall be obtained from the highway agency with~~  
35 ~~the jurisdictional and/or statutory authority, and from the LRT agency.~~ Deleted; redundant with new  
36 **Standard in new Section 8A.03**

37 *Guidance:*

38 ~~To stimulate effective responses from road users, these devices, systems, and practices should use the five~~  
39 ~~basic considerations employed generally for traffic control devices and described fully in Section 1A.02:~~  
40 ~~design, placement, operation, maintenance, and uniformity.~~ Deleted; redundant with new Section 1D.01

41 Support:

42 Many other details of highway-LRT grade crossing traffic control systems that are not set forth in Part 8  
43 are contained in the publications listed in Section 1A.11. Deleted; redundant with new Section 8A.03

44 **Standard:**

45 Highway-LRT grade crossings in semi-exclusive alignments outside of a roadway shall be equipped  
46 ~~with a combination of automatic gates and flashing-light signals, with or flashing light signals~~  
47 ~~only without automatic gates, or traffic control signals, unless an engineering study a Diagnostic Team~~  
48 ~~indicates determines~~ that the use of Crossbuck Assemblies, STOP signs, or YIELD signs alone would be  
49 adequate. Edited to improve accuracy and consistency

50 **Option:**

1 Highway LRT grade crossings in mixed-use alignments may be equipped with traffic control signals  
2 unless an engineering study indicates that the use of Crossbuck Assemblies, STOP signs, or YIELD signs  
3 alone would be adequate. Deleted; redundant with new Section 8A.05

4 Support:

5 Sections 8B.03 and 8B.04 contain provisions regarding the use and placement of Crossbuck signs and  
6 Crossbuck Assemblies. Section 8B.05 describes the appropriate conditions for the use of STOP or YIELD  
7 signs alone at a highway LRT grade crossing. Sections 8C.10 and 8C.11 contain provisions regarding the use  
8 of traffic control signals at highway LRT grade crossings. Deleted; redundant with other Part 8 sections

9 **Section 8A.04 Uniform Provisions** This section has been relocated to new Section 8A.06

10 **Section 8A.05 Engineering Studies at Grade Crossings** This section is comprised of

11 Paragraphs 2 through 4 of existing Section 8A.02 and Paragraph 5 of existing Section  
12 8A.03, and edited to improve consistency

13 **Guidance Standard:** Guidance changed to Standard

14 The appropriate traffic control system to be used at a ~~highway rail~~ grade crossing ~~should shall~~ be  
15 determined by an engineering study conducted by a Diagnostic Team involving ~~both~~ the highway  
16 agency with jurisdiction, the regulatory agency with statutory authority (if applicable), and the railroad  
17 company and/or transit agency (as applicable).

18 **Guidance:** Added to improve consistency

19 *Among the factors that should be considered in the determination by a Diagnostic Team of which traffic*  
20 *control devices would be appropriate to install at a grade crossing are road geometrics, stopping sight*  
21 *distance, clearing sight distance, the proximity of nearby roadway intersections (including the traffic control*  
22 *devices at the intersections), adjacent driveways, traffic volume across the grade crossing, extent of queuing*  
23 *upstream or downstream from the grade crossing, train volume, pedestrian volume, operation of passenger*  
24 *trains, presence of nearby passenger station stops, variable train speeds, accelerating and decelerating trains,*  
25 *multiple tracks, high-speed train operation, number of school buses or hazardous material haul vehicles, and*  
26 *the crash history at or near the location.*

27 Option:

28 The engineering study may include the Highway-Rail Intersection (HRI) components of the National  
29 Intelligent Transportation Systems (ITS) architecture, which is a USDOT accepted method for linking the  
30 highway, vehicles, and traffic management systems with rail operations and wayside equipment.

31 Support:

32 More detail on Highway-Rail Intersection components is available from the USDOT's Federal Railroad  
33 Administration, 1200 New Jersey Avenue, SE, Washington, DC 20590, or www.fra.dot.gov.

34 **Section ~~8A.04~~ 8A.06 Uniform Provisions** This section has been relocated from existing section  
35 **8A.04**

36 **Standard:**

37 All signs used in grade crossing traffic control systems shall be ~~retroreflectorized~~ **retroreflective** or  
38 illuminated as described in Section 2A.0720 to show the same shape and similar color to an approaching  
39 road user during both day and night.

40 No sign or signal shall be located in the center of an undivided highway, unless it is crashworthy  
41 (breakaway, yielding, or shielded with a longitudinal barrier or crash cushion) or unless it is placed on  
42 a raised island.

43 **Guidance:**

44 Any signs or signals placed on a raised island in the center of an undivided highway should be installed  
45 with a clearance of at least 2 feet from the outer edge of the raised island to the nearest edge of the sign or  
46 signal, except as permitted in Section 2A.195.

47 Where the distance between tracks, measured along the highway between the inside rails, exceeds 100  
48 feet, additional signs or other appropriate traffic control devices should be used to inform approaching road  
49 users of the long distance to cross the tracks.

1 Where a raised median island is installed supplemental to an automatic gate to discourage road users  
2 from driving around a lowered gate, the Diagnostic Team should consider the length of the vehicle queues  
3 that typically form on the approach to the grade crossing when determining how far in advance of the grade  
4 crossing to extend the island.

5 If the roadway at a grade crossing includes a two-way left-turn lane (see Section 3B.05), the two-way left-  
6 turn lane should be discontinued in the immediate vicinity of the grade crossing by installing median islands,  
7 by designating the lane for left turns in one direction only, or by installing yellow diagonal markings in the  
8 lane (see Figure 3B-5). If yellow diagonal markings are used, the use of channelizing devices (see Section  
9 3I.01), such as supplemental tubular markers, should also be considered. **Added to improve consistency**

10 **Section 8A.07 Minimum Track Clearance Distance** **New section added to improve accuracy**  
11 **and consistency**

12 Support:

13 The upstream point of the minimum track clearance distance is determined in the following manner:

- 14 A. If an automatic gate is present on the approach, the upstream point is the portion of the automatic gate  
15 arm that is farthest from the nearest rail.  
16 B. If an automatic gate is not present on the approach, the upstream point is the portion of the stop line  
17 that is farthest from the nearest rail.  
18 C. If the roadway is not paved, the upstream point is the point that is farthest from the nearest rail that is  
19 10 feet measured perpendicular from the nearest rail.

20 The downstream point of the minimum track clearance distance is 6 feet beyond the track(s) measured  
21 perpendicular to the farthest rail, along the center line or edge line of the highway, as appropriate, to obtain  
22 the longer distance. Where an Exit Gate system (see Section 8D.05) is present, the downstream point is the  
23 point where the rear of the vehicle would be clear of the exit gate arm. In cases where the exit gate arm is not  
24 perpendicular to the highway, the distance is measured either along the center line or edge line of the  
25 highway, as appropriate, to obtain the longer distance.

26 Where two adjacent grade crossings are located within 200 feet of each other as measured along the  
27 highway, the minimum track clearance distance is measured from a point that is upstream of the first grade  
28 crossing to a point that is downstream from the second grade crossing.

29 Where a highway-highway intersection is located beyond a grade crossing, the clear storage distance  
30 defines on a lane-by-lane basis the area of the roadway between the downstream point of the minimum track  
31 clearance distance and the intersection stop line, yield line, or normal stopping point on the highway.

32 The minimum track clearance distance and the clear storage distance are used by the Diagnostic Team to  
33 determine the appropriate traffic control devices and/or roadway treatments to be used at the grade crossing,  
34 and to determine the queue start-up and queue clearance time necessary where a traffic signal or hybrid  
35 beacon is interconnected with a grade crossing active warning system.

36 **Section 8A.08 Adjacent Grade Crossings** **New section added to improve consistency**

37 Support:

38 Adjacent grade crossings sometimes exist within 200 feet of each other as measured along the highway.  
39 These closely-spaced grade crossings sometimes result from separate railroads or from a railroad and an LRT  
40 alignment operating in parallel corridors.

41 Guidance:

42 Where adjacent grade crossings are located within 200 feet of each other along the highway, the  
43 Diagnostic Team should consider the possibility that rail traffic might arrive at a grade crossing when rail  
44 traffic is already occupying the adjacent grade crossing.

45 Where the distance between the tracks at adjacent grade crossings, measured along the highway between  
46 the inside rails, is 100 feet or less, the grade crossings should be treated as one individual grade crossing.

47 Where the distance between the tracks at adjacent grade crossings, measured along the highway between  
48 the inside rails, is more than 100 feet, additional signs or other appropriate traffic control devices should be  
49 used to inform approaching road users of the long distance to cross the tracks.

1 Where active traffic control devices are installed between adjacent grade crossings that are less than 200  
2 feet apart, the operation of the devices should provide additional time for vehicles to clear the extended  
3 minimum track clearance distance (see Section 8A.07) that results from the closely-spaced grade crossings.

4 Where the distance between the tracks at adjacent grade crossings, measured along the highway between  
5 the inside rails, is more than 200 feet, the grade crossings should be treated as individual grade crossings and  
6 traffic control devices should be installed between the grade crossings.

7 Support:

8 Part 3.1.11 of the “AREMA Communications & Signals Manual” (see Section 1A.05) published by the  
9 American Railway Engineering & Maintenance-of-Way Association (AREMA) contains further information  
10 and recommendations about the location and operation active traffic control devices at adjacent grade  
11 crossings that are located within 200 feet of each other.

## 12 Section ~~8A.05~~ 8A.09 **Grade Crossing Elimination**

13 Option:

14 If a particular grade crossing appears to be redundant or unnecessary, an engineering study may be  
15 conducted to determine the costs and benefits of eliminating the crossing. **Added to improve consistency**

16 Guidance:

17 If an engineering study is conducted, the costs associated with any necessary improvements to adjacent  
18 grade crossings and the surrounding roadway network to accommodate diverted traffic should also be  
19 included in the analysis. **Added to improve consistency**

20 If the conclusion of the engineering study is that the grade crossing should be eliminated, a Diagnostic  
21 Team should use the engineering study to determine the appropriate steps that need to be taken to accomplish  
22 the grade crossing elimination. **Added to improve consistency**

23 ~~Because grade crossings are a potential source of crashes and congestion, agencies should conduct~~  
24 ~~engineering studies to determine the cost and benefits of eliminating these crossings.~~ **Deleted; redundant**  
25 **with new guidance statements above**

26 ~~Standard:~~ **Standards changed to Guidance**

27 When a grade crossing is eliminated, the traffic control devices for the crossing ~~shall~~ should be removed.

28 If the existing traffic control devices at a multiple-track grade crossing become improperly placed or  
29 ~~inaccurate~~ are no longer applicable because of the removal of some of the tracks, the existing devices ~~shall~~  
30 should be relocated and/or modified.

31 ~~Guidance:-~~

32 ~~Any grade crossing that cannot be justified should be eliminated.~~ **Deleted; redundant with new**  
33 **guidance statements above**

34 Where a roadway is removed from a grade crossing, the roadway approaches in the railroad or LRT  
35 right-of-way should also be removed and appropriate signs and object markers should be placed at the  
36 roadway end in accordance with Section 2C.6671.

37 Where a railroad or LRT is eliminated at a grade crossing, the tracks should be removed or covered.

38 Option:

39 Based on engineering judgment, the TRACKS OUT OF SERVICE (R8-9) sign (see Figure 8B-1) may be  
40 temporarily installed until the tracks are removed or covered. The length of time before the tracks will be  
41 removed or covered may be considered in making the decision as to whether to install the sign.

## 42 Section ~~8A.06~~ ~~8A.10~~ 8A.10 **Illumination at Grade Crossings**

43 Support:

44 Illumination is sometimes installed at or adjacent to a grade crossing in order to provide better nighttime  
45 visibility of trains or LRT equipment and the grade crossing (for example, where a substantial amount of  
46 railroad or LRT operations are conducted at night, where grade crossings are blocked for extended periods of  
47 time, or where crash history indicates that road users experience difficulty in seeing trains or LRT equipment  
48 or traffic control devices during hours of darkness).

1 Recommended types and locations of luminaires for illuminating grade crossings are contained in the  
2 American National Standards Institute’s (ANSI) “Practice for Roadway Lighting RP-8,” which is available  
3 from the Illuminating Engineering Society (see Section 1A.0511).

#### 4 **Section ~~8A.07~~ 8A.11 Quiet Zone Treatments at Highway-Rail Grade Crossings**

5 Support:

6 49 CFR Part 222 (Use of Locomotive Horns at Highway-Rail Grade Crossings; Final Rule) prescribes  
7 Quiet Zone requirements and treatments.

8 **Standard:**

9 **Any traffic control device and its application where used as part of a Quiet Zone shall comply with**  
10 **all applicable provisions of the MUTCD.**

#### 11 **Section ~~8C.12~~ 8A.12 Grade Crossings Within or In Close Proximity to Circular Intersections**

12 **This section was relocated from existing section 8C.12**

13 Support:

14 At circular intersections, such as roundabouts and traffic circles, that include or are within close proximity  
15 to a grade crossing, a queue of vehicular traffic could cause highway vehicles to stop on the grade crossing.

16 ~~Standard~~ **Guidance: Standard changed to Guidance**

17 *Where circular intersections include or are within 200 feet of a grade crossing, an engineering study ~~shall~~*  
18 *should be made to determine if queuing could impact the grade crossing. If traffic queues impact the grade*  
19 *crossing, provisions ~~shall~~ should be made to clear highway traffic from the grade crossing prior to the arrival*  
20 *of rail traffic.*

21 Support:

22 Among the actions that can be taken to keep the grade crossing clear of traffic or to clear traffic from the  
23 grade crossing prior to the arrival of rail traffic are the following:

24 ~~A. Elimination of the circular intersection,~~

25 ~~B. Geometric design revisions,~~

26 A. Grade crossing regulatory and warning devices,

27 B. Highway traffic signals,

28 C. Traffic metering devices,

29 D. Activated signs,

30 E. Geometric design revisions, including reconstruction or elimination of the circular intersection, or

31 F. A combination of these or other actions. Edited to improve clarity

#### 32 **Section 8A.13 Busway Grade Crossings** **New section added to improve consistency**

33 Support:

34 A busway can be operated either as an exclusive or as a semi-exclusive alignment. An exclusive  
35 alignment does not have grade crossings and is not further addressed in Part 8.

36 Because the design and operation of a busway in a semi-exclusive alignment is similar to light-rail transit  
37 in a semi-exclusive alignment, all of the provisions in Part 8 that pertain to the traffic control devices used at  
38 LRT grade crossings in semi-exclusive alignments also pertain to the traffic control devices used at busway  
39 grade crossings in semi-exclusive alignments unless otherwise specified in this Manual. The primary  
40 difference between a busway and an LRT system is that a busway is used by transit vehicles with rubber tires  
41 on pavement and an LRT system is used by transit vehicles with steel wheels that operate on rails.

42 Busway grade crossings can occur at intersections or at midblock locations, including public and private  
43 driveways.

44 Guidance:

45 Highway-busway grade crossings should be equipped with an active busway grade crossing warning  
46 system unless an engineering study indicates that the use of STOP signs or YIELD signs alone would be  
47 adequate.

48 **Standard:**

1 Where a busway grade crossing and a railroad or LRT grade crossing are adjacent to one another  
2 such that the active railroad or LRT grade crossing warning system and the active busway grade  
3 crossing warning system share common grade crossing traffic control devices, the warning system for  
4 the railroad or LRT grade crossing shall control the operation of all grade crossing traffic control  
5 devices, and the warning system for the busway shall be interconnected with the active railroad or LRT  
6 grade crossing warning system to provide notification of an approaching bus to the active grade  
7 crossing warning system.

8 Option:

9 Automatic gates may be used at highway-busway grade crossings.

10 DO NOT BLOCK INTERSECTION (R10-7) signs (see Section 2B.63) may be installed at highway-  
11 busway grade crossings.

12 Standard:

13 Busway automatic gates, if used, shall comply with the provisions set forth in Section 8D.03 for  
14 automatic gates and shall be standard railroad size, striped with 16-inch alternate vertical, fully  
15 retroreflective red and white stripes. Flashing red lights shall be included on the gate arm and they  
16 shall only be operated if the gate is closed or in the process of being opened or closed. In the horizontal  
17 position, the top of the gate shall be approximately 4 feet above the pavement.

18 Busway automatic entrance gates shall be designed to fail-safe in the down position unless other  
19 provisions, such as activated blank-out signs or LRT Signals, are used to ensure the bus operator is  
20 alerted to slow down and proceed with caution when gates are malfunctioning.

21 Four-Quadrant Busway automatic gates shall comply with the provisions set forth in Section 8D.05.

22 If an active busway grade crossing warning system is used at a pathway-busway or sidewalk-  
23 busway grade crossing, a bell or other audible warning device shall be provided for each pathway or  
24 sidewalk approach to the crossing.

25 BUSWAY CROSSING (W10-21) signs with SIGNAL AHEAD (W10-21aP) supplemental plaques  
26 shall be used in advance of busway crossings.

27 On paved roadways, pavement markings in advance of a busway grade crossing shall consist of a  
28 word message BUS XING and a no-passing zone marking (on two-lane, two-way highways with center  
29 line markings in compliance with Section 3B.01). The symbol X and the transverse lines used in  
30 advance of a railroad or LRT grade crossing shall not be used for a busway grade crossing.

### 31 Section ~~8A.08~~ 8A.14 Temporary Traffic Control Zones

32 Support:

33 Temporary traffic control planning provides for continuity of operations (such as movement of traffic,  
34 pedestrians and bicycles, transit operations, and access to property/utilities) when the normal function of a  
35 roadway at a grade crossing is suspended because of temporary traffic control operations. Temporary traffic  
36 control planning is also needed when traffic is detoured over an existing passive grade crossing.

37 Standard:

38 Traffic controls for temporary traffic control zones that include grade crossings shall be as ~~outlined~~  
39 provided in Part 6.

40 Guidance: **Standard changed to Guidance**

41 When a grade crossing exists either within or in the vicinity of a temporary traffic control zone, lane  
42 restrictions, flagging (see Chapter 6D), or other operations ~~shall~~ should not be performed in a manner that  
43 would cause highway vehicles to stop on the ~~railroad or LRT~~ tracks, unless a flagger or uniformed law  
44 enforcement officer is provided at the grade crossing to minimize the possibility of highway vehicles stopping  
45 on the tracks, even if automatic warning devices are in place.

46 When a temporary traffic control zone extends over a grade crossing equipped with automatic gates and  
47 either one-lane two-way or reversible lane operation is used, any improperly located gate arms that might  
48 cause vehicles to stop within the minimum track clearance distance (see Section 8A.07) should be removed.  
49 At locations where a gate arm is removed, a railroad company or transit agency employee serving as a  
50 flagger and at least one uniformed law enforcement officer should be in place at all times that rail traffic  
51 might approach or occupy the grade crossing.

1 When traffic is detoured over an existing passive grade crossing, a temporary traffic control plan (see  
2 Section 6B.01) should be prepared. **Added to improve consistency**

3 *Guidance:*

4 Public and private agencies, ~~including~~ emergency services, businesses, and railroad ~~or LRT~~ companies or  
5 transit agencies, should meet to plan appropriate traffic detours and the necessary signing, marking,  
6 signalization, and flagging requirements for operations during temporary traffic control zone activities or  
7 during the period when traffic is being detoured over an existing passive grade crossing. Consideration  
8 should be given to the length of time that the grade crossing is to be closed, the length of time that a detour is  
9 to be in place, the type of rail or LRT and highway traffic affected, the time of day, and the materials and  
10 techniques of repair. **Edited to improve accuracy**

11 The agencies responsible for the operation of the LRT and highway should be contacted when the initial  
12 planning begins for any temporary traffic control zone that might directly or indirectly influence the flow of  
13 traffic on ~~mixed-use~~ facilities where LRT vehicles and road users operate on a mixed-use alignment. **Edited**  
14 **to improve accuracy**

15 Temporary traffic control operations should minimize the inconvenience, delay, and crash potential to  
16 affected traffic. Prior notice should be given to affected public or private agencies, emergency services,  
17 businesses, railroad ~~or LRT~~ companies or transit agencies, and road users before the free movement of road  
18 users or rail traffic is infringed upon or blocked.

19 Temporary traffic control zone activities should not be permitted to extensively prolong the closing of ~~the~~  
20 a grade crossing.

21 The width, grade, alignment, and riding quality of the highway surface at a grade crossing should, at a  
22 minimum, be restored to correspond with the quality of the approaches to the grade crossing.

23 Support:

24 Section ~~6G.18~~6N.17 contains additional information regarding temporary traffic control zones in the  
25 vicinity of grade crossings, and Figure 6H-46 shows an example of a typical situation that might be  
26 encountered.

27

1 CHAPTER 8B. SIGNS ~~AND MARKINGS~~

2 Section 8B.01 Purpose and Application

3 Support:

4 Passive traffic control systems, consisting of signs and pavement markings only, identify and direct  
5 attention to the location of a grade crossing and advise road users to ~~slow down~~ reduce their speed or stop at  
6 the grade crossing as necessary in order to yield to any rail traffic occupying, or approaching and in proximity  
7 to, the grade crossing.

8 Signs and markings regulate, warn, and guide the road users so that they, as well as LRT vehicle operators  
9 on mixed-use alignments, can take appropriate action when approaching a grade crossing.

10 ~~Standard:~~ **Standard changed to Support**

11 Unless otherwise provided in this Chapter, the ~~design and location of signs shall comply with the~~  
12 provisions of Part 2 are applicable to the design and location of signs at grade crossings, and the ~~design and~~  
13 ~~location of pavement markings shall comply with the~~ provisions of Part 3 are applicable to the design and  
14 location of pavement markings at grade crossings.

15 Section 8B.02 Sizes of Grade Crossing Signs

16 Standard:

17 The minimum sizes of grade crossing signs shall be as shown in Table 8B-1. **Edited to reflect Official**  
18 **Interpretation 8(09)-7(I)**

19 Option:

20 Signs larger than those shown in Table 8B-1 may be used (see Section 2A. ~~407~~).

21 Section 8B.03 Grade Crossing (Crossbuck) Sign (R15-1) and Number of Tracks Plaque (R15-  
22 2P) at Active and Passive Grade Crossings

23 Standard:

24 The Grade Crossing (R15-1) sign (see Figure 8B-1), commonly identified as the Crossbuck sign,  
25 shall be ~~retroreflectorized~~ retroreflective white with the words RAILROAD CROSSING in black  
26 lettering, mounted as shown in Figure 8B-2.

27 Support:

28 In most States, the Crossbuck sign requires road users to yield the right-of-way to rail traffic at a grade  
29 crossing.

30 Standard:

31 As a minimum, one Crossbuck sign shall be used on each highway approach to every highway-rail  
32 grade crossing, alone or in combination with other traffic control devices.

33 As a minimum, one Crossbuck sign shall be used on each highway approach to every gated  
34 highway-LRT grade crossing on a semi-exclusive alignment, alone or in combination with other traffic  
35 control devices. **Added to improve consistency**

36 Option:

37 A Crossbuck sign may be used on a highway approach to a highway-LRT grade crossing on a ~~semi-~~  
38 ~~exclusive or~~ mixed-use alignment or non-gated semi-exclusive alignment, alone or in combination with other  
39 traffic control devices. **Edited to improve consistency**

40 Standard:

41 ~~If automatic gates are not present and if~~ there are two or more tracks at a grade crossing, the  
42 number of tracks shall be indicated on a supplemental Number of Tracks (R15-2P) plaque (see Figure  
43 8B-1) of inverted T shape mounted below the Crossbuck sign in the manner shown in Figure 8B-2.

44 On each approach to a highway-rail grade crossing and, if used, on each approach to a highway-  
45 LRT grade crossing, the Crossbuck sign shall be installed on the right-hand side of the highway on each  
46 approach to the grade crossing. Where restricted sight distance or unfavorable highway geometry  
47 exists on an approach to a grade crossing, or where there is a one-way multi-lane approach, an  
48 additional Crossbuck sign shall be installed on the left-hand side of the highway, possibly placed back-

1 to-back with the Crossbuck sign for the opposite approach, or otherwise located so that two Crossbuck  
2 signs are displayed for that approach.

3 At all passive grade crossings where Crossbuck signs have been installed, a strip of retroreflective  
4 white material not less than 2 inches in width shall be used on the back of each blade of each Crossbuck  
5 sign for the length of each blade, ~~at all grade crossings where Crossbuck signs have been installed,~~  
6 except those where Crossbuck signs have been installed back-to-back or where double-faced Crossbuck  
7 signs have been installed.

8 Except as provided in Paragraph 14, where there is a curb, a lateral offset of at least 2 feet shall be  
9 provided from the face of the vertical curb to the closest part of the Crossbuck sign.

10 Except as provided in Paragraph 14, where there is no curb, a lateral offset to the closest part of the  
11 Crossbuck sign of at least 6 feet from the edge of the traveled way, and at least 2 feet from the edge of a  
12 paved or surfaced shoulder shall be provided. Added to improve accuracy

13 Guidance:

14 Crossbuck signs should be located such that all physical aspects of the sign and its support are at least 12  
15 feet from the center of the nearest track. Added to improve consistency

16 *Crossbuck signs should be located with respect to the highway pavement or shoulder in accordance with*  
17 *the criteria in Chapter 2A and Figures 2A-2 and 2A-3,* ~~and should be located with respect to the nearest track~~  
18 ~~in accordance with Figure 8C-2.~~

19 *The minimum lateral offset for the nearest edge of the Crossbuck sign should be 6 feet from the edge of*  
20 *the shoulder (or ~~12~~ 6 feet from the edge of the traveled way if no shoulder is present) in rural areas-*  
21 ~~(whichever is greater), and 2 feet from the face of the curb in urban areas.~~

#### 22 **Table 8B-1. Grade Crossing Sign and Plaque Minimum Sizes**

#### 23 **Figure 8B-1. Regulatory Signs and Plaques for Grade Crossings**

#### 24 **Figure 8B-2. Crossbuck Assembly with a YIELD or STOP Sign on the Crossbuck Sign Support**

#### 25 **Figure 8B-3. Crossbuck Assembly with a YIELD or STOP Sign on a Separate Sign Support**

26 *Where unusual conditions make variations in location and lateral offset appropriate, engineering*  
27 *judgment should be used to provide the best practical combination of view and ~~safety~~ clearances(see Section*  
28 *2A.15).*

29 Except as provided in Paragraph 16, the mounting height of Crossbuck signs, measured vertically from  
30 the center of the sign to the elevation of the nearest edge of the pavement, should be approximately 9 feet (see  
31 Figure 8B-2).

32 Option:

33 The 9-foot mounting height for the Crossbuck sign may be varied as required by local conditions and may  
34 be increased to accommodate signs mounted below the Crossbuck sign. Added to improve consistency

### 35 **Section 8B.04 Crossbuck Assemblies with YIELD or STOP Signs at Passive Grade Crossings**

36 Standard:

37 A ~~grade crossing~~ Crossbuck Assembly shall consist of a Crossbuck (R15-1) sign, and a Number of  
38 Tracks (R15-2P) plaque if two or more tracks are present, that complies with the provisions of Section  
39 8B.03, and either a YIELD (R1-2) or STOP (R1-1) sign installed on the same support, except as  
40 provided in Paragraph 10. ~~If used at a passive grade crossing, a~~ YIELD or STOP signs used at passive  
41 grade crossings shall be installed in compliance with the provisions of ~~Part 2,~~ Section 2B.2030, and  
42 Figures 8B-2 and 8B-3.

43 At all public highway-rail grade crossings that are not equipped with the active traffic control  
44 systems that are described in Chapter 8D, except crossings where road users are directed by an  
45 authorized person on the ground to not enter the crossing at all times that an approaching train is  
46 about to occupy the crossing, a Crossbuck Assembly shall be installed on the right-hand side of the  
47 highway on each approach to the highway-rail grade crossing.

48 If a Crossbuck sign is used on a highway approach to a public highway-LRT grade crossing that is  
49 not equipped with the active traffic control systems that are described in Chapter 8D, a Crossbuck  
50 Assembly shall be installed on the right-hand side of the highway on each approach to the highway-  
51 LRT grade crossing.

1 Where restricted sight distance or unfavorable highway geometry exists on an approach to a grade  
2 crossing that has a Crossbuck Assembly, or where there is a one-way multi-lane approach, an  
3 additional Crossbuck Assembly shall be installed on the left-hand side of the highway.

4 A YIELD sign shall be the default traffic control device for Crossbuck Assemblies on all highway  
5 approaches to passive grade crossings unless an engineering study performed by the regulatory agency  
6 or highway authority having jurisdiction over the roadway approach determines that a STOP sign is  
7 appropriate.

8 *Guidance:*

9 *The use of STOP signs at passive grade crossings should be limited to unusual conditions where requiring*  
10 *all highway vehicles to make a full stop is deemed essential by an engineering study. Among the factors that*  
11 *should be considered in the engineering study are the line of sight to approaching rail traffic (giving due*  
12 *consideration to seasonal crops or vegetation beyond both the highway and railroad or LRT rights-of-ways),*  
13 *the number of tracks, the speeds of trains or LRT equipment and highway vehicles, and the crash history at*  
14 *the grade crossing.*

15 Where a passive grade crossing on the stem of a T-intersection creates an inadequate clear storage  
16 distance between the tracks and the parallel roadway, and where adequate sight distance to oncoming traffic  
17 on the parallel roadway is available to road users stopped on the approach to the grade crossing,  
18 consideration should be given to installing a STOP sign at the Crossbuck Assembly instead of at the highway-  
19 highway intersection for traffic approaching the T-intersection. If the STOP sign is installed at the Crossbuck  
20 Assembly instead of at the highway-highway intersection, consideration should be given to installing a YIELD  
21 sign or some other intersection traffic control device at the highway-highway intersection. Added to improve  
22 consistency

23 **Standard:**

24 If a Crossbuck Assembly is installed on the approach to a passive grade crossing located at a  
25 highway-highway intersection controlled by a traffic control signal that is not interconnected with the  
26 grade crossing and not preempted by the approach of rail traffic, a YIELD sign with a TO TRAINS  
27 (R15-9P) supplemental plaque shall be installed on the Crossbuck Assembly. A STOP sign shall not be  
28 installed on a Crossbuck Assembly in this situation. Added to improve consistency

29 **Support:**

30 Sections 8A.01 through 8A.05 contain information regarding the responsibilities of the highway agency  
31 and the railroad company or LRT agency regarding the selection, design, and operation of traffic control  
32 devices placed at grade crossings.

33 **Option:**

34 If a YIELD or STOP sign is installed for a Crossbuck Assembly at a grade crossing, it may be installed on  
35 the same support as the Crossbuck sign or it may be installed on a separate support at a point where the  
36 highway vehicle is to stop, or as near to that point as practical, but in either case, the YIELD or STOP sign is  
37 considered to be a part of the Crossbuck Assembly.

38 **Standard:**

39 If a YIELD or STOP sign is installed on an existing Crossbuck sign support, the ~~minimum~~  
40 mounting height, measured vertically from the bottom of the YIELD or STOP sign to the top of the  
41 curb, or in the absence of curb, measured vertically from the bottom of the YIELD or STOP sign to the  
42 elevation of the nearest edge of the traveled way, shall be at least 4 feet (see Figure 8B-2).

43 If a Crossbuck Assembly is installed on a new sign support (see Figure 8B-2) or if the YIELD or  
44 STOP sign is installed on a separate support (see Figure 8B-3), the ~~minimum~~ mounting height,  
45 measured vertically from the bottom of the YIELD or STOP sign to the top of the curb, or in the  
46 absence of curb, measured vertically from the bottom of the YIELD or STOP sign to the elevation of  
47 the nearest edge of the traveled way, shall be at least 5 feet in rural areas and shall be at least 7 feet ~~if~~  
48 ~~the Crossbuck Assembly is installed in an~~ areas where parking or pedestrian movements are likely to  
49 occur.

50 *Guidance:*

51 *If a YIELD or STOP sign is installed for a Crossbuck Assembly at a grade crossing on a separate support*  
52 *than the Crossbuck sign (see Figure 8B-3), the YIELD or STOP sign should be placed ~~at a point where the~~*

1 ~~highway vehicle is to stop, or as near to that point as practical, but no closer than 15 feet measured~~  
2 ~~perpendicular from the nearest rail in the same plane as the Crossbuck sign and closer to the traveled way~~  
3 ~~than the Crossbuck sign. The minimum separation between the nearest point of the YIELD or STOP sign and~~  
4 ~~the nearest point of the Crossbuck sign should be 2 inches as shown in Figure 8B-3. On roadways where no~~  
5 ~~curb exists, the minimum lateral offset of the YIELD or STOP sign should be 6 feet from the edge of the~~  
6 ~~traveled way. Except as provided in Paragraph 14 in Section 8B.03, on roadways where a curb exists, the~~  
7 ~~minimum lateral offset of the YIELD or STOP sign should be 2 feet from the face of the curb.~~ **Added to**  
8 **improve accuracy and support the dimensions shown in Figure 8B-3**

9 Support:

10 The meaning of a Crossbuck Assembly that includes a YIELD sign is that a road user approaching the  
11 grade crossing needs to be prepared to decelerate, and when necessary, yield the right-of-way to any rail  
12 traffic that might be occupying the crossing or might be approaching and in such close proximity to the  
13 crossing that it would be unsafe for the road user to cross.

14 Certain commercial motor vehicles and school buses are required to stop at all grade crossings in  
15 accordance with 49 CFR 392.10 even if a YIELD sign (or just a Crossbuck sign) is posted.

16 The meaning of a Crossbuck Assembly that includes a STOP sign is that a road user approaching the  
17 grade crossing must come to a full ~~and complete~~ stop not less than 15 feet short of the nearest rail, and remain  
18 stopped while the road user determines if there is rail traffic either occupying the crossing or approaching and  
19 in such close proximity to the crossing that the road user must yield the right-of-way to rail traffic. The road  
20 user is permitted to proceed when it is safe to cross.

21 **Standard:**

22 A vertical strip of retroreflective white material, not less than 2 inches in width, shall be used on  
23 each Crossbuck support at passive grade crossings for the full length of the back of the support from  
24 the Crossbuck sign or Number of Tracks plaque to within 2 feet above the ground or elevation of the  
25 near edge of the traveled way (whichever is higher), except as provided in Paragraph 18. A white  
26 retroreflective strip wrapped around a round support shall satisfy this requirement as long as the  
27 round support has an outside diameter of at least 2 inches. **Added to reflect Official Interpretation**  
28 **8(09)-001(I)**

29 Option:

30 The vertical strip of retroreflective material may be omitted from the back sides of Crossbuck sign  
31 supports installed on one-way streets and at pathway or sidewalk grade crossings (see Section 8E.05).

32 If a YIELD or STOP sign is installed on the same support as the Crossbuck sign, a vertical strip of red  
33 (see Section 2A. ~~1721~~) or white retroreflective material that is at least 2 inches wide may be used on the front  
34 of the support from the YIELD or STOP sign to within 2 feet above the ground or elevation of the near edge  
35 of the traveled way (whichever is higher). **Edited to improve consistency**

36 **Standard:**

37 If a Crossbuck sign support at a passive grade crossing does not include a YIELD or STOP sign  
38 (either because the YIELD or STOP sign is placed on a separate support or because a YIELD or STOP  
39 sign is not present on the approach), a vertical strip of retroreflective white material, not less than 2  
40 inches in width, shall be used for the full length of the front of the support from the Crossbuck sign or  
41 Number of Tracks plaque to within 2 feet above the ground or elevation of the near edge of the traveled  
42 way (whichever is higher). A white retroreflective strip wrapped around a round support shall satisfy  
43 this requirement as long as the round support has an outside diameter of at least 2 inches. **Added to**  
44 **reflect Official Interpretation 8(09)-001(I)**

45 At all grade crossings where YIELD or STOP signs are installed, Yield Ahead (W3-2) or Stop  
46 Ahead (W3-1) signs shall also be installed if the criteria for their installation in Section 2C.36 is met.

47 Support:

48 Section ~~8B.28~~8C.03 contains provisions regarding the use of stop lines or yield lines at grade crossings.

49 **Section 8B.05 Use of STOP (R1-1) or YIELD (R1-2) Signs without Crossbuck Signs at**  
50 **Highway-LRT Grade Crossings**

51 **Standard:-Relocated to below**

1 ~~For all highway-LRT grade crossings where only STOP (R1-1) or YIELD (R1-2) signs are installed,~~  
2 ~~the placement shall comply with the requirements of Section 2B.10. Stop Ahead (W3-1) or Yield Ahead~~  
3 ~~(W3-2) Advance Warning signs (see Figure 2C-6) shall also be installed if the criteria for their~~  
4 ~~installation given in Section 2C.36 is met.~~

5 Guidance:

6 The use of only STOP or YIELD signs for road users at highway-LRT grade crossings should be limited to  
7 those crossings where the need and feasibility is established by an engineering study. Such crossings should  
8 have all of the following characteristics:

- 9 A. The crossing roadways ~~should be~~ are secondary in character (such as a minor street with one lane in  
10 each direction, an alley, or a driveway) with low traffic volumes and low speed limits. The specific  
11 thresholds of traffic volumes and speed limits should be determined by the local agencies.  
12 ~~B. LRT speeds do not exceed 25 mph.~~  
13 B. The line of sight for an approaching LRT operator is adequate from a sufficient distance such that the  
14 operator can sound an audible signal and bring the LRT equipment to a stop before arriving at the  
15 crossing.  
16 C. The road user has sufficient sight distance at the stop line to permit the vehicle to cross the tracks  
17 before the arrival of the LRT equipment.  
18 D. If at an intersection of two roadways, the intersection does not meet the warrants for a traffic control  
19 signal as provided in Chapter 4C.  
20 E. The LRT tracks are located such that highway vehicles are not likely to stop on the tracks while  
21 waiting to enter a cross street or highway.

22 Standard: **Relocated from above**

23 For all highway-LRT grade crossings where only STOP (R1-1) or YIELD (R1-2) signs are installed,  
24 the placement shall comply with the requirements of Section 2B.10~~20~~. Stop Ahead (W3-1) or Yield  
25 Ahead (W3-2) Advance Warning signs (~~see Figure 2C-6~~) shall also be installed if the criteria for their  
26 installation given in Section 2C.36 is met.

## 27 Section 8B.06 Grade Crossing Advance Warning Signs (W10-1 through W10-4 Series)

28 Standard:

29 A ~~Highway-Rail~~ Grade Crossing Advance Warning (W10-1) sign (see Figure 8B-4) shall be used on  
30 each highway in advance of every ~~highway-rail~~ grade crossing, ~~and every highway-LRT grade crossing~~  
31 ~~in semi-exclusive alignments~~, except in the following circumstances:

- 32 A. On an approach to a grade crossing from an ~~T~~ T-intersection with a parallel highway if the  
33 distance from the edge of the track to the edge of the parallel roadway is less than 100 feet and  
34 W10-2, W10-3, or W10-4 signs are used on ~~both the~~ approaches of the parallel highway (see  
35 Paragraph 5);  
36 B. On low-volume, low-speed highways crossing minor spurs or other tracks that are infrequently  
37 used and road users are directed by an authorized person on the ground to not enter the  
38 crossing at all times that approaching rail traffic is about to occupy the crossing;  
39 C. In business or commercial areas where active grade crossing traffic control ~~devices~~ systems are  
40 in use; ~~or~~  
41 D. Where physical conditions do not permit even a partially effective display of the sign; or  
42 E. At highway-LRT grade crossings where Crossbuck signs are not used.

43 The placement of the Grade Crossing Advance Warning sign shall be in accordance with Section  
44 2C.05~~4~~ and Table 2C-4~~3~~.

45 If a YIELD or STOP sign is present at a passive grade crossing, a Yield Ahead (W3-2) or Stop  
46 Ahead (W3-1) Advance Warning sign (~~see Figure 2C-6~~) shall also be installed if the criteria for their  
47 installation given in Section 2C.36 is met. If a Yield Ahead or Stop Ahead sign is installed on the  
48 approach to the crossing, the W10-1 sign shall be installed upstream from the Yield Ahead or Stop  
49 Ahead sign. The Yield Ahead or Stop Ahead sign shall be located in accordance with Table 2C-4~~3~~. The  
50 minimum distance between the signs shall be in accordance with Section 2C.05~~4~~ and Table 2C-4~~3~~.

51 Option:

1 On divided highways and one-way streets, an additional W10-1 sign may be installed on the left-hand side  
2 of the roadway.

3 **Standard:**

4 **If the distance between the tracks and a parallel highway, from the edge of the tracks to the edge of**  
5 **the parallel roadway, is less than 100 feet, W10-2, W10-3, or W10-4 signs (see Figure 8B-4) shall be**  
6 **installed on each approach of the parallel highway to warn road users making a turn that they will**  
7 **encounter a grade crossing soon after making a turn, and a W10-1 sign for the approach to the tracks**  
8 **shall not be required to be between the tracks and the parallel highway.**

9 **If the W10-2, W10-3, or W10-4 signs are used, sign placement in accordance with the guidelines for**  
10 **Intersection Warning signs in Table 2C-43 using the speed of through traffic shall be measured from**  
11 **the highway intersection.**

12 *Guidance:*

13 *If the distance between the tracks and the parallel highway, from the edge of the tracks to the edge of the*  
14 *parallel roadway, is 100 feet or more, a W10-1 sign should be installed in advance of the grade crossing, and*  
15 *the W10-2, W10-3, or W10-4 signs should not be used on the parallel highway.*

16 **Figure 8B-4. Warning Signs and Plaques for Grade Crossings**

17 ~~Section 8B.07 EXEMPT Highway-Rail Grade Crossing Plaques (R15-3P, W10-1aP)~~ This section has  
18 **been relocated to new Section 8B.11**

19 ~~Section 8B.08 Turn Restrictions During Preemption~~ This section has been relocated to Section 8D.11

20 ~~Section 8B.09~~ **8B.07 DO NOT STOP ON TRACKS Sign (R8-8)**

21 *Guidance:*

22 ~~A DO NOT STOP ON TRACKS (R8-8) sign (see Figure 8B-1) should be installed whenever an~~  
23 ~~engineering study determines that the potential for highway vehicles stopping on the tracks at a grade~~  
24 ~~crossing is significant. Placement of the R8-8 sign should be determined as part of the engineering study. The~~  
25 ~~sign, if used, should be located on the right hand side of the highway on either the near or far side of the~~  
26 ~~grade crossing, depending upon which position provides better visibility to approaching drivers.~~ Relocated to  
27 **below**

28 *If a STOP or YIELD sign is installed at a location, including at a circular intersection, that is downstream*  
29 *from the grade crossing such that highway vehicle queues are likely to extend ~~beyond~~ onto the tracks, a DO*  
30 *NOT STOP ON TRACKS (R8-8) sign should be used.*

31 *Except where a pre-signal (see Section 8D.12) is installed for the purpose of keeping the area between the*  
32 *tracks and a nearby downstream traffic control signal clear of vehicles, if a traffic control signal is installed*  
33 *within 200 feet downstream from the grade crossing such that highway vehicle queues are likely to extend*  
34 *onto the tracks, a DO NOT STOP ON TRACKS (R8-8) sign should be used.* Added to improve consistency

35 *A DO NOT STOP ON TRACKS (R8-8) sign should be installed whenever an engineering study determines*  
36 *that the potential for highway vehicles stopping on the tracks at a grade crossing is significant.*

37 ~~Placement of the R8-8 sign should be determined as part of the engineering study.~~ The R8-8 sign, if used,  
38 should be located on the right-hand side of the highway on either the near or far side of the grade crossing,  
39 depending upon which position provides better visibility to approaching drivers. Deleted to improve clarity

40 **Option:**

41 DO NOT STOP ON TRACKS signs may be placed on both sides of the track.

42 On divided highways and one-way streets, a second DO NOT STOP ON TRACKS sign may be placed on  
43 the near or far left-hand side of the highway at the grade crossing to further improve visibility of the sign.

44 ~~Section 8B.10~~ **8B.08 TRACKS OUT OF SERVICE Sign (R8-9)**

45 **Option:**

46 The TRACKS OUT OF SERVICE (R8-9) sign (see Figure 8B-1) may be used at a grade crossing instead  
47 of a Crossbuck (R15-1) sign and a Number of Tracks (R15-2P) plaque or instead of a Crossbuck Assembly  
48 when railroad or LRT tracks have been temporarily or permanently abandoned, but only until such time that  
49 the tracks are removed or covered.

1 **Standard:**

2 When tracks are out of service, except as provided in Paragraphs 3 and 4, traffic control devices  
3 and gate arms shall be removed and the signal heads shall be removed or hooded or turned from view  
4 to clearly indicate that they are not in operation.

5 When tracks are out of service, even if TRACKS OUT OF SERVICE (R8-9) signs have been  
6 installed, Emergency Notification System (I-13) signs (see Section 8B.26) shall be retained at the grade  
7 crossing and shall be visible to road users. Added to improve consistency

8 Option:

9 Warning signs, such as the Low Ground Clearance Grade Crossing (W10-5) sign and the Skewed  
10 Crossing (W10-12) sign, that warn road users about physical roadway conditions that are still present at the  
11 grade crossing may be left in place after the tracks are taken out of service until the tracks have been removed  
12 or covered. Added to improve consistency

13 Standard:

14 The R8-9 sign shall be removed when the tracks have been removed or ~~covered~~ paved over or when  
15 the grade crossing is returned to service. The Emergency Notification System (I-13) signs shall be  
16 removed when the tracks have been removed or paved over. Added to improve consistency

17 **Section ~~8B.11~~ 8B.09 STOP HERE WHEN FLASHING Sign (R8-10, R8-10a)**

18 Option:

19 The STOP HERE WHEN FLASHING (R8-10, R8-10a) sign (see Figure 8B-1) may be used at a grade  
20 crossing to inform drivers of the location of the stop line or the point at which to stop when the flashing-light  
21 signals (see Section 8D.02) are activated.

22 **Section ~~8B.12~~ 8B.10 STOP HERE ON RED Sign (R10-6, R10-6a)**

23 Support:

24 The STOP HERE ON RED (R10-6, R10-6a) sign (see Figure 8B-1) defines and facilitates observance of  
25 stop lines at traffic control signals.

26 Option:

27 A STOP HERE ON RED sign may be used at locations where highway vehicles frequently violate the  
28 stop line or where it is not obvious to road users where to stop.

29 Guidance:

30 *If possible, stop lines should be placed at a point where the highway vehicle driver has adequate sight*  
31 *distance along the track.*

32 **Section ~~8B.07~~ 8B.11 EXEMPT ~~Highway Rail~~ Grade Crossing Plaques (R15-3P, W10-1aP)** This  
33 Section relocated from existing Section 8B.07

34 Option:

35 When authorized by law or regulation, an ~~supplemental~~ EXEMPT (R15-3P) plaque (see Figure 8B-1)  
36 with a white background may be used below the Crossbuck sign or Number of Tracks plaque, if present, at the  
37 grade crossing, and an ~~supplemental~~ EXEMPT (W10-1aP) plaque (see Figure 8B-4) with a yellow  
38 background may be used below the Grade Crossing Advance Warning (W10-1 through W10-4 ~~Series~~) sign.

39 Where neither the Crossbuck sign nor the advance warning signs exist for a particular highway-LRT  
40 grade crossing, an EXEMPT (R15-3P) plaque with a white background may be placed on its own post on the  
41 near right-hand side of the approach to the crossing.

42 Support:

43 These ~~supplemental~~ plaques inform drivers of highway vehicles carrying passengers for hire, school buses  
44 carrying students, or highway vehicles carrying hazardous materials that a stop is not required at certain  
45 designated grade crossings, except when rail traffic is approaching or occupying the grade crossing, or the  
46 driver's view is blocked.

47 **Section ~~8B.13~~ 8B.12 Light Rail Transit Only Lane Signs (R15-4 Series)**

48 Support:

1 The Light Rail Transit Only Lane (R15-4 Series) signs (see Figure 8B-1) are used for multi-lane  
2 operations, where road users might need additional guidance on lane use and/or restrictions.

3 Option:

4 Light Rail Transit Only Lane signs may be used on a roadway lane limited to only LRT use to indicate the  
5 restricted use of a lane in semi-exclusive and mixed alignments.

6 *Guidance:*

7 *If used, the R15-4a, R15-4b, and R15-4c signs should be installed on posts adjacent to the roadway*  
8 *containing the LRT tracks or overhead above the LRT only lane.*

9 Option:

10 If the trackway is paved, preferential lane markings (see Chapter 3E) may be installed, but only in  
11 combination with Light Rail Transit Only Lane signs.

12 Support:

13 The trackway is the continuous way designated for LRT, including the entire dynamic envelope. Section  
14 8C.06 contains more information regarding the dynamic envelope.

### 15 **Section 8B.14 8B.13 Do Not Pass Light Rail Transit Signs (R15-5, R15-5a)**

16 Support:

17 A Do Not Pass Light Rail Transit (R15-5) sign (see Figure 8B-1) is used to indicate that motor vehicles  
18 are not allowed to pass LRT vehicles that are loading or unloading passengers where there is no raised  
19 platform or physical separation from the lanes upon which other motor vehicles are operating.

20 Option:

21 The R15-5 sign may be used in mixed-use alignments and may be mounted overhead where there are  
22 multiple lanes.

23 Instead of the R15-5 symbol sign, a regulatory sign with the word message DO NOT PASS STOPPED  
24 TRAIN (R15-5a) may be used (see Figure 8B-1).

25 *Guidance:*

26 *If used, the R15-5 sign should be located immediately before the LRT boarding area.*

### 27 **Section 8B.15 8B.14 No Motor Vehicles On Tracks Signs (R15-6, R15-6a)**

28 Support:

29 The No Motor Vehicles On Tracks (R15-6) sign (see Figure 8B-1) is used where there are adjacent traffic  
30 lanes separated from the LRT lane by a curb or pavement markings.

31 *Guidance:*

32 *The DO NOT ENTER (R5-1) sign should be used where a road user could wrongly enter an LRT only*  
33 *street.*

34 Option:

35 A No Motor Vehicles On Tracks sign may be used to deter motor vehicles from driving on the trackway.  
36 It may be installed on a 3-foot flexible post between double tracks, on a post alongside the tracks, or overhead.

37 Instead of the R15-6 symbol sign, a regulatory sign with the word message DO NOT DRIVE ON  
38 TRACKS (R15-6a) may be used (see Figure 8B-1).

39 A reduced size of 12 x 12 inches may be used if the R15-6 sign is installed between double tracks.

40 **Standard:**

41 **The smallest size for the R15-6 sign shall be 12 x 12 inches.**

### 42 **Section 8B.16 8B.15 Divided Highway with Light Rail Transit Crossing Signs (R15-7 Series)**

43 Option:

44 The Divided Highway with Light Rail Transit Crossing (R15-7) sign (see Figure 8B-1) may be used as a  
45 supplemental sign on the approach legs of a roadway that intersects with a divided highway where LRT  
46 equipment operates in the median. The sign may be placed beneath a STOP sign or mounted separately.

47 *Guidance:*

1 The number of tracks displayed on the R15-7 sign should be the same as the actual number of tracks.

2 **Standard:**

3 When the Divided Highway With Light Rail Transit Crossing sign is used at a four-legged  
4 intersection, the R15-7 sign shall be used. When used at a T-intersection, the R15-7a sign shall be used.

5 ~~Section 8B.17 LOOK Sign (R15-8)~~ Deleted; redundant with new Section 8E.03

6 ~~Section 8B.18 Emergency Notification Sign (I-13)~~ This Section relocated to new Section 8B.26

7 ~~Section 8B.23~~ **8B.16 Low Ground Clearance Grade Crossing Sign (W10-5)** This Section  
8 relocated from existing Section 8B.23

9 *Guidance:*

10 *If the highway profile conditions are sufficiently abrupt to create a hang-up situation for long wheelbase*  
11 *vehicles or for trailers with low ground clearance, the Low Ground Clearance Grade Crossing (W10-5) sign*  
12 *(see Figure 8B-4) should be installed in advance of the grade crossing.*

13 **Standard:**

14 Because this symbol might not be readily recognizable by the public, the Low Ground Clearance  
15 Grade Crossing (W10-5) warning sign shall be accompanied by a LOW GROUND CLEARANCE  
16 (W10-5P) educational plaque. The LOW GROUND CLEARANCE educational plaque shall remain in  
17 place for at least 3 years after the initial installation of the W10-5 sign (see Section 2A.1209).

18 *Guidance:*

19 *Because other vehicle types and combinations also face the potential risk of hanging up at a grade*  
20 *crossing, word message warning signs and selective exclusion regulatory signs (see Section 2B.52) for*  
21 *specific vehicle types and combinations should be used in addition to, or in place of, the Low Ground*  
22 *Clearance Grade Crossing (W10-5) sign.*

23 *Support:*

24 *While not all inclusive, some potential low ground clearance vehicles and combinations include single-*  
25 *unit trucks, buses, motor coaches, low-boy trailers, car carriers, and recreational vehicles.* Added to improve  
26 **clarity**

27 *Guidance:*

28 *Auxiliary plaques such as AHEAD, NEXT CROSSING, or USE NEXT CROSSING (with appropriate*  
29 *arrows), or a supplemental distance plaque should be placed below the W10-5 sign at the nearest intersecting*  
30 *highway where a vehicle can detour or at a point on the highway wide enough to permit a U-turn.*

31 *If engineering judgment of roadway geometric and operating conditions confirms that highway vehicle*  
32 *speeds across the tracks should be below the posted speed limit, a W13-1P advisory speed plaque should be*  
33 *posted.*

34 *Guidance:*

35 *A signed detour should be installed to guide potential hang-up vehicles to alternate nearby crossings to*  
36 *avoid the potential hang-up condition.* Added to improve clarity

37 ~~Option:~~

38 ~~If the grade crossing is rough, word message signs such as BUMP, DIP, or ROUGH CROSSING may be~~  
39 ~~installed. A W13-1P advisory speed plaque may be installed below the word message sign in advance of~~  
40 ~~rough crossings.~~ This text was relocated to new Section 8B.24

41 *Support:*

42 Information on ground clearance requirements at grade crossings is available in the “American Railway  
43 Engineering and Maintenance-of-Way Association’s Engineering Manual,” or the American Association of  
44 State Highway and Transportation Officials’ “Policy on Geometric Design of Highways and Streets” (see  
45 Section 1A.1105).

46 *An inventory of crossings with low ground clearance concerns, including a list of potential vehicle types*  
47 *that could hang-up on the crossing, can be useful in tracking locations of low ground clearance crossings.*  
48 *Specific geometric conditions, known incidents, or anecdotal evidence of vehicle hang-ups can also be used to*  
49 *identify crossings with low ground clearance concerns.* Added to improve clarity

1 **Section ~~8B.19~~ 8B.17 Light Rail Transit Approaching-Activated Blank-Out Warning Sign**  
2 **(W10-7)**

3 Support:

4 The Light Rail Transit Approaching-Activated Blank-Out (W10-7) warning sign (see Figure 8B-4)  
5 supplements the traffic control devices to warn road users crossing the tracks of approaching LRT equipment.

6 Option:

7 A Light Rail Transit Approaching-Activated Blank-Out warning sign may be used at signalized  
8 intersections near highway-LRT grade crossings or at crossings controlled by STOP signs or automatic gates.

9 Support:

10 The provisions contained in Chapter 2L for blank-out signs are applicable to the W10-7 sign. Added to  
11 improve consistency

12 **Section ~~8B.20~~ 8B.18 TRAINS MAY EXCEED 80 MPH Sign (W10-8)**

13 *Guidance:*

14 *Where trains are permitted to travel at speeds exceeding 80 mph, a TRAINS MAY EXCEED 80 MPH*  
15 *(W10-8) sign (see Figure 8B-4) should be installed facing road users approaching the highway-rail grade*  
16 *crossing.*

17 *If used, the TRAINS MAY EXCEED 80 MPH signs should be installed between the Grade Crossing*  
18 *Advance Warning (W10-1 through W10-4Series) sign (see Figure 8B-4) and the highway-rail grade crossing*  
19 *on all approaches to the highway-rail grade crossing. The locations should be determined based on specific*  
20 *site conditions.*

21 **Section ~~8B.21~~ 8B.19 NO TRAIN HORN Sign or Plaque (W10-9, W10-9P)**

22 **Standard:**

23 **Either a NO TRAIN HORN (W10-9) sign (see Figure 8B-4) or a NO TRAIN HORN (W10-9P)**  
24 **plaque shall be installed in each direction at each highway-rail grade crossing where a quiet zone has**  
25 **been established in compliance with 49 CFR Part 222. If a W10-9P plaque is used, it shall supplement**  
26 **and be mounted directly below the Grade Crossing Advance Warning (W10-1 through W10-4Series)**  
27 **sign (see Figure 8B-4).**

28 **Section ~~8B.24~~ 8B.20 Storage Space Signs (W10-11, W10-11a, W10-11b) This Section relocated**  
29 **from existing Section 8B.24**

30 *Guidance:*

31 *A Storage Space (W10-11) sign supplemented by a word message Storage Distance (W10-11a) sign (see*  
32 *Figure 8B-4) should be used where there is a highway intersection in close proximity to the grade crossing*  
33 *and an engineering study determines that adequate space is not available to store a design vehicle(s) between*  
34 *the highway intersection and the train or LRT equipment dynamic envelope.*

35 *The Storage Space (W10-11 and W10-11a) signs should be mounted in advance of the grade crossing at*  
36 *an appropriate location to advise drivers of the space available for highway vehicle storage between the*  
37 *highway intersection and the grade crossing.*

38 Option:

39 A Storage Space (W10-11b) sign (see Figure 8B-4) may be mounted beyond the grade crossing at the  
40 highway intersection under the STOP or YIELD sign or just prior to the signalized intersection to remind  
41 drivers of the storage space between the tracks and the highway intersection.

42 Standard:

43 The Storage Space sign shall not be used as a replacement for the required Advance Warning  
44 (W10-1) sign. If used, the Storage Space sign shall supplement the W10-1 sign and shall be mounted on  
45 a separate post. Added to improve consistency

46 **Section ~~8B.25~~ 8B.21 Skewed Crossing Sign (W10-12) This Section relocated from existing Section**  
47 **8B.25**

48 Option:

1 The Skewed Crossing (W10-12) sign (see Figure 8B-4) may be used at a skewed grade crossing to warn  
2 road users that the tracks are not perpendicular to the highway.

3 *Guidance:*

4 *If the Skewed Crossing sign is used, the symbol should show the direction of the crossing (near left to far*  
5 *right as shown in Figure 8B-4, [the sign image](#), or the mirror image if the track goes from far left to near*  
6 *right). ~~If the Skewed Crossing sign is used where the angle of the crossing is significantly different than 45-~~*  
7 *degrees, the symbol should show the approximate angle of the crossing.*

8 **Standard:**

9 The Skewed Crossing sign shall not be used as a replacement for the required Advance Warning  
10 (W10-1) sign. If used, the Skewed Crossing sign shall supplement the W10-1 sign and shall be mounted  
11 on a separate post.

## 12 **Section 8B.22 NO GATES OR LIGHTS Plaque (W10-13P)**

13 Option:

14 The NO GATES OR LIGHTS (W10-13P) plaque (see Figure 8B-4) may be mounted below the Grade  
15 Crossing Advance Warning (W10-1 through W10-4 ~~Series~~) sign at grade crossings that are not equipped with  
16 [automatic gates or](#) automated signals.

17 ~~Section 8B.23 Low Ground Clearance Grade Crossing Sign (W10-5)~~ This Section relocated to new  
18 Section 8B.16. The fifth paragraph was relocated to new section 8B.24

19 ~~Section 8B.24 Storage Space Signs (W10-11, W10-11a, W10-11b)~~ This Section relocated to new Section  
20 8B.20

21 ~~Section 8B.25 Skewed Crossing Sign (W10-12)~~ This Section relocated to new Section 8B.21

22 **Section 8B.23 Next Crossing Plaques (W10-14P, W10-14aP)** Added to improve consistency

23 Option:

24 [The NEXT CROSSING \(W10-14P\) plaque may be mounted below the Low Ground Clearance \(W10-5\)](#)  
25 [sign \(see Section 8B.16\) or Skewed Crossing \(W10-12\) sign to indicate to a road user that the warning is](#)  
26 [associated with the next grade crossing. This plaque may be used where multiple grade crossings exist in](#)  
27 [close proximity to one another.](#)

28 [The USE NEXT CROSSING \(W10-14aP\) plaque may be mounted below the Low Ground Clearance](#)  
29 [\(W10-5\) sign \(see Section 8B.16\) to advise a road user with a low clearance load to use the crossing after the](#)  
30 [upcoming crossing to avoid encountering a low ground clearance situation.](#)

31 **Section 8B.24 ROUGH CROSSING Plaque (W10-15P)** Added to improve consistency

32 Option:

33 [The ROUGH CROSSING \(W10-15P\) plaque may be mounted below the Grade Crossing Advance](#)  
34 [Warning \(W10-1 through W10-4\) sign on the approach to a grade crossing to provide supplemental](#)  
35 [information that the surface or condition of the grade crossing might require a reduced speed or some other](#)  
36 [appropriate action by the road user.](#)

37 If the grade crossing is rough, word message signs such as BUMP, DIP, or ROUGH CROSSING may be  
38 installed. A W13-1P advisory speed plaque may be installed below the word message sign in advance of  
39 rough crossings. **This text was relocated from existing Section 8B.23**

40 ~~Section 8B.26~~ **Section 8B.25 Light Rail Transit Station Sign (I-12)**

41 Option:

42 The Light Rail Transit Station (I-12) sign (see ~~Figure 2H-1~~ [Section 2H.01](#)) may be used to direct road  
43 users to an LRT station or boarding location. It may be supplemented by the name of the transit system and  
44 by arrows as provided in Section 2D.08.

45 ~~Section 8B.18~~ **Section 8B.26 Emergency Notification System Sign (I-13)** This section was relocated from  
46 existing Section 8B.18 and the sequence of paragraphs was revised.

47 ~~Guidance~~ **Standard:** Guidance changed to Standard to comply with CFR 234.311

1 Emergency Notification System (I-13) signs (see Figure 8B-5) ~~should~~shall be installed on each  
2 approach at all highway-rail grade crossings, and at all highway-LRT grade crossings on semi-exclusive  
3 alignments, to provide information to road users so that they can notify the railroad company or LRT  
4 agency about emergencies or malfunctioning traffic control devices.

5 ~~Standard:~~

6 When Emergency Notification System signs are used at a highway-rail grade crossing, they shall, at  
7 a minimum, include the USDOT grade crossing inventory number and the emergency contact telephone  
8 number.

9 When Emergency Notification System signs are used at a highway-LRT grade crossing, they shall,  
10 at a minimum, include a unique crossing identifier and the emergency contact telephone number.

11 The minimum width of the Emergency Notification System sign shall be 12 inches and the minimum  
12 height shall be 9 inches. The lettering on Emergency Notification System signs for the telephone  
13 number, the grade crossing inventory number, and the explanation of the purpose of the sign shall be  
14 composed of numerals and upper-case letters that are at least 1 inch in height. Added to comply with  
15 CFR 234.309

16 Emergency Notification System signs ~~should~~shall be retroreflective. Relocated from below and  
17 edited to comply with CFR 234.309

18 Except as provided in Paragraph 7, Emergency Notification System signs shall have a white legend  
19 and border on a blue background.

20 ~~The Emergency Notification signs shall be positioned so as to not obstruct any traffic control~~  
21 ~~devices or limit the view of rail traffic approaching the grade crossing. Relocated to below~~

22 Option:

23 The seven-character grade crossing inventory number may be shown on the sign as a black legend on a  
24 white rectangular background. Added to comply with CFR 234.309

25 Guidance:

26 ~~Emergency Notification signs should be retroreflective. Relocated to above~~

27 Except as provided in Paragraph 12, Emergency Notification System signs should be attached to the  
28 Crossbuck Assemblies or grade crossing signal masts on the right-hand side of each roadway approach to the  
29 grade crossing rather than on the railroad or LRT signal control equipment housings. Emergency  
30 Notification System signs should be oriented so ~~as to the face~~ highway vehicles stopped on or at the grade  
31 crossing or on the traveled way near the grade crossing of the sign is approximately parallel to the edge of  
32 the roadway or pathway and is visible to road users or pathway users. Edited to improve consistency

33 ~~At station crossings, Emergency Notification signs or information should be posted in a conspicuous~~  
34 ~~location. Relocated to below~~

35 The Emergency Notification System signs ~~shall~~should be positioned so as to not obstruct any traffic  
36 control devices or limit the view of rail traffic approaching the grade crossing. Relocated from above,  
37 Standard changed to Guidance to be consistent with CRF 234.311

38 Emergency Notification System signs mounted on Crossbuck Assemblies or signal masts should only be  
39 large enough to provide the necessary contact information. Use of larger signs that might obstruct the view of  
40 rail traffic or other highway vehicles should be avoided.

41 At station crossings, Emergency Notification System signs or information should be posted in a  
42 conspicuous location. Relocated from above

43 Option: Added to improve consistency

44 Emergency Notification System signs may be located on a separate post.

45 Additional Emergency Notification System signs may be installed at a grade crossing.

46 **Figure 8B-5. Example of an Emergency Notification Sign**

47 ~~Section 8B.27 Pavement Markings~~ This Section relocated to new Section 8C.02

48 ~~Section 8B.28 Stop and Yield Lines~~ This Section relocated to new Section 8C.03

49 ~~Section 8B.29 Dynamic Envelope Markings~~ This Section relocated to new Section 8C.06

1 CHAPTER 8C. MARKINGS

2 Section 8C.01 Purpose and Application Added to improve consistency

3 Support:

4 Passive traffic control systems, consisting of signs and pavement markings only, identify and direct  
5 attention to the location of a grade crossing and advise road users to reduce their speed or stop at the grade  
6 crossing as necessary in order to yield to any rail traffic occupying, or approaching and in proximity to, the  
7 grade crossing.

8 Signs and markings regulate, warn, and guide the road users so that they, as well as LRT vehicle operators  
9 on mixed-use alignments, can take appropriate action when approaching a grade crossing.

10 Unless otherwise provided in this Chapter, the provisions of Part 3 are applicable to the design and  
11 location of pavement markings at grade crossings.

12 Section ~~8B-27~~ 8C.02 Pavement Markings This Section relocated from existing Section 8B.27 and  
13 edited to improve consistency

14 Standard:

15 ~~All grade crossing pavement markings shall be retroreflectorized white. All other markings shall be~~  
16 ~~in accordance with Part 3.~~ Relocated to below

17 ~~On paved roadways, pavement markings in advance of a grade crossing shall consist of an X, the~~  
18 ~~letters RR, a no-passing zone marking (on two-lane, two-way highways with center line markings in~~  
19 ~~compliance with Section 3B.01), and certain transverse lines as shown in Figures 8B-6 and 8B-7.~~

20 Relocated to below

21 Except as provided in Paragraphs 2 and 3, ~~Identical~~ pavement markings shall be placed in each  
22 approach lane on all paved approaches to highway-rail grade crossings where signals or automatic  
23 gates are located, and at all other grade crossings where the posted or statutory highway speed is 40  
24 mph or ~~greater~~ higher.

25 Pavement markings shall not be required at highway-rail grade crossings where the posted or  
26 statutory highway speed is less than 40 mph if an engineering study indicates that other installed  
27 devices provide suitable warning and control.

28 Pavement markings shall not be required at highway-rail grade crossings in urban areas if an  
29 engineering study indicates that other installed devices provide suitable warning and control.

30 Pavement markings shall be placed in each approach lane on all paved approaches to highway-LRT  
31 grade crossings where a Crossbuck sign is placed at the grade crossing.

32 If pavement markings are used on a multi-lane approach to a grade crossing, identical markings  
33 shall be placed in each approach lane that crosses the tracks. Added to improve consistency

34 All grade crossing pavement markings shall be ~~retroreflectorized~~ retroreflective white. All other  
35 markings shall be in accordance with Part 3. Relocated from above

36 On paved roadways, pavement markings in advance of a grade crossing shall consist of an X, the  
37 letters RR, a no-passing zone marking (on two-lane, two-way highways with center line markings in  
38 compliance with Section 3B.01), and certain transverse lines as shown with detailed dimensions in  
39 Figures ~~8B-6~~ 8C-1 and ~~8B-7~~ 8C-2. Relocated from above

40 Guidance:

41 *When pavement markings are used, a portion of the X symbol should be directly opposite the Grade*  
42 *Crossing Advance Warning sign. ~~The X symbol and letters should be elongated to allow for the low angle at~~*  
43 *~~which they will be viewed.~~* Deleted to improve consistency with Figure 8C-1 and 8C-2

44 Option:

45 When justified by engineering judgment, supplemental pavement marking symbol(s) may be placed  
46 between the Grade Crossing Advance Warning sign and the grade crossing.

47 Guidance:

48 If supplemental pavement marking symbol(s) are placed between the Grade Crossing Advance Warning  
49 sign and the grade crossing, the downstream transverse line should be at least 50 feet upstream from the stop  
50 or yield line at the grade crossing. Added to improve consistency with Figure 8C-1 and 8C-2

1 **Figure 8C-1. Example of Placement of Warning Signs and Pavement Markings at Grade**  
2 **Crossings**

3 **Figure 8C-2. Grade Crossing Pavement Markings**

4 **Section 8B.28 8C.03 Stop and Yield Lines** **This Section relocated from existing Section 8B.28 and**  
5 **edited to improve consistency**

6 **Standard:**

7 ~~On paved roadways at grade crossings that are equipped with active control devices such as~~  
8 ~~flashing-light signals, gates, or traffic control signals, a stop line (see Section 3B.16) shall be installed to~~  
9 ~~indicate the point behind which highway vehicles are or might be required to stop.~~ **Relocated to below**

10 *Guidance:*

11 *On paved roadway approaches to passive grade crossings where a STOP sign is installed in conjunction*  
12 *with the Crossbuck sign, a stop line should be installed to indicate the point behind which highway vehicles*  
13 *are required to stop or as near to that point as practical.*

14 ~~If a stop line is used, it should be a transverse line at a right angle to the traveled way and should be~~  
15 ~~placed approximately 8 feet in advance of the gate (if present), but no closer than 15 feet in advance of the~~  
16 ~~nearest rail.~~ **Relocated to below**

17 *Option:*

18 *On paved roadway approaches to passive grade crossings where a YIELD sign is installed in conjunction*  
19 *with the Crossbuck sign, a yield line (see Section 3B.196) or a stop line may be installed to indicate the point*  
20 *behind which highway vehicles are required to yield or stop or as near to that point as practical.*

21 *Guidance:*

22 ~~If a yield line (see Figure 3B-16) or stop line is used at a passive grade crossing, it should be a transverse~~  
23 ~~line (see Figure 3B-16) at a right angle to the traveled way and should be placed no closer than 15 feet in~~  
24 ~~advance of the nearest rail (see Figure 8B-7).~~

25 **Standard:**

26 **On paved roadways at grade crossings that are equipped with active control devices such as**  
27 **flashing-light signals, automatic gates, or traffic control signals, a stop line (see Section 3B.196) shall be**  
28 **installed to indicate the point behind which highway vehicles are or might be required to stop.**  
29 **Relocated from above**

30 *Guidance:*

31 ~~If a stop line is used at an active grade crossing where road users are controlled by flashing-light signals,~~  
32 ~~it should be a transverse line at a right angle to the traveled way and should be placed approximately 8 feet in~~  
33 ~~advance of the flashing-light signals or automatic gate (if present), whichever is further from the track(s), but~~  
34 ~~no closer than 15 feet in advance of the nearest rail (see Figure 8C-1).~~ **Relocated from above**

35 ~~If a stop line is used at an active grade crossing where road users are controlled by a traffic control~~  
36 ~~signal, it should be a transverse line at a right angle to the traveled way and should be placed no closer than~~  
37 ~~15 feet in advance of the nearest rail.~~ **Added to improve consistency**

38 **Standard:**

39 **If a stop line is used at an active grade crossing where road users are controlled by a traffic control**  
40 **signal, it shall be placed such that the lateral and longitudinal positions of the signal faces for the**  
41 **approach comply with the provisions of Sections 4D.06 and 4D.07.** **Added to improve consistency**

42 **Section 8C.04 Lane-Use Arrow Markings** **Added to improve consistency**

43 **Standard:**

44 **Lane-use arrow markings (see Section 3B.23) that indicate that a turning movement must be made**  
45 **or is permitted to be made from a lane that crosses a grade crossing shall not be placed between the**  
46 **stop line for the grade crossing and the track(s).**

47 *Guidance:*

1 Lane-use arrow markings that indicate that a turning movement must be made or is permitted to be made  
2 from a lane that crosses a grade crossing should not be placed less than 100 feet upstream from the stop line  
3 for the grade crossing or less than 20 feet beyond the farthest rail.

#### 4 **Section 8C.05 Edge Lines, Lane Lines, Raised Pavement Markers, and Tubular Markers**

5 **Added to improve consistency**

##### 6 Guidance:

7 Except as provided in Paragraph 2, if edge lines (see Section 3B.09) or lane lines (see Section 3B.06) are  
8 used on an approach to a grade crossing, the edge lines and lane lines should extend up to and across the  
9 track(s) to reduce the likelihood that road users might inadvertently turn into the track area.

##### 10 Option:

11 The edge lines and lane lines may be omitted from the highway surface at a grade crossing if the surface  
12 cannot retain the application of the edge line or lane line marking.

13 If recommended by a Diagnostic Team, raised pavement markers (see Section 3B.16) may be used to  
14 supplement the edge lines or lane lines that extend up to and across the track(s).

15 If recommended by a Diagnostic Team, tubular markers (see Section 3I.01) may be used to supplement  
16 the edge lines that extend up to and across the track(s).

##### 17 Guidance:

18 Tubular markers should not be installed within 6 feet of any rail.

##### 19 Standard:

20 The color under both daytime and nighttime conditions of raised pavement markers or tubular  
21 markers that are used at a grade crossing shall be the same color as the edge line or lane line that they  
22 supplement.

#### 23 **Section ~~8B.29~~ 8C.06 Dynamic Envelope Markings** **This Section relocated from existing Section**

24 **8B.29 and edited to improve consistency**

##### 25 Support:

26 The dynamic envelope (see Figures 8B-8 and 8B-9) markings indicate the clearance required for the train-  
27 or LRT equipment overhang resulting from any combination of loading, lateral motion, or suspension failure.

##### 28 Option:

29 Dynamic envelope markings may be installed at ~~all~~ a grade crossings, ~~unless a Four Quadrant Gate-~~  
30 system (see Section 8C.06) is used to mark the edges of the train dynamic envelope.

##### 31 Standard:

32 If used, pavement markings for indicating the dynamic envelope shall comply with the provisions of  
33 Part 3 and shall ~~be a 4-inch normal solid white line not less than 4 inches nor greater than 24 inches in~~  
34 width ~~be a 4-inch normal solid white line~~ or contrasting pavement color (see Section 3A.035 and  
35 Chapter 3HG) and/or contrasting pavement texture.

##### 36 Guidance:

37 If ~~pavement markings are a 4-inch normal solid white line~~ is used to convey the dynamic envelope, ~~they~~  
38 the line should be placed completely outside of the dynamic envelope. If used, dynamic envelope pavement  
39 markings should be placed ~~on the highway~~ at a distance of 6 feet from and parallel to the nearest rail unless  
40 the operating railroad company or LRT agency advises otherwise. ~~The~~ If used, dynamic envelope pavement  
41 markings should extend across the roadway as shown in Figure 8B-88C-3. ~~The~~ Dynamic envelope pavement  
42 markings should not be placed perpendicular to the roadway at skewed grade crossings.

##### 43 Option:

44 If 4-inch normal solid white lines are used to indicate the dynamic envelope, white cross-hatching lines  
45 may also be placed on the highway pavement within the dynamic envelope as a supplement to, but not as a  
46 substitute for, the 4-inch normal solid white lines. White cross-hatching lines (see Section 3B.26 Do Not  
47 Block intersection markings) may also be placed on the pavement to mark areas adjacent to the dynamic  
48 envelope where vehicles are not intended to stop or stand as shown in Figure 8C-4. **Added to improve**  
49 **consistency**

1 In semi-exclusive LRT alignments, the dynamic envelope markings may be along the LRT trackway  
2 between intersections where the trackway is immediately adjacent to travel lanes and no physical barrier is  
3 present.

4 In mixed-use LRT alignments, the dynamic envelope markings may be continuous between intersections  
5 (see Figure ~~8B-9~~8C-5).

6 In mixed-use LRT alignments, pavement markings for adjacent travel or parking lanes may be used  
7 instead of dynamic envelope markings if the lines are outside the dynamic envelope.

8 **Figure 8C-3. Example of Dynamic Envelope Pavement Markings at Grade Crossings**

9 **Figure 8C-4. Example of Do Not Block Pavement Markings at Grade Crossings**

10 **Figure 8C-5. Examples of Light Rail Transit Vehicle Dynamic Envelope Markings for Mixed-Use**  
11 **Alignments**

12

1 CHAPTER ~~8C~~ 8D. FLASHING-LIGHT SIGNALS, AUTOMATIC GATES, AND TRAFFIC  
2 CONTROL SIGNALS

3 Section ~~8C.01~~ 8D.01 Introduction

4 Support:

5 Active traffic control systems inform road users of the approach or presence of rail traffic at grade  
6 crossings. These systems include ~~Four-Quadrant-Exit~~ Gate systems, automatic gates, flashing-light signals,  
7 traffic control signals, actuated blank-out and variable message signs, and other active traffic control devices  
8 that are used in conjunction with the signs and pavement markings that are described in Chapters 8B and 8C,  
9 respectively.

10 A composite drawing (see Figure 8CD-1) shows a post-mounted flashing-light signal (two light units  
11 mounted in a horizontal line), a flashing-light signal mounted on an overhead structure, and an automatic gate  
12 assembly.

13 When LRT speed is cited in this Part, it refers to the maximum speed at which LRT equipment is  
14 permitted to traverse a particular grade crossing. **Relocated from below**

15 Option:

16 Post-mounted and overhead flashing-light signals may be used separately or in combination with each  
17 other as determined by an engineering study. Also, flashing-light signals may be used without automatic gate  
18 assemblies, as determined by an engineering study.

19 Standard:

20 The meaning of flashing-light signals and automatic gates shall be as stated in the ~~“Uniform Vehicle~~  
21 ~~Code” UVC~~ (see Sections 11-701 and 11-703) ~~of the UVC), which is available from the National~~  
22 ~~Committee on Uniform Traffic Laws and Ordinances (see Page i for the address).~~

23 Location and clearance dimensions for flashing-light signals and automatic gates shall be as shown  
24 in Figure 8CD-1.

25 When there is a curb, a horizontal offset of at least 2 feet shall be provided from the face of the  
26 vertical curb to the ~~closest~~ nearest part of the signal or automatic gate arm in its upright position.  
27 When a cantilevered-arm flashing-light signal is used, the vertical clearance shall be at least 17 feet  
28 above the crown of the highway to the lowest point of the signal unit.

29 Where there is a shoulder, but no curb, a horizontal offset of at least 2 feet from the edge of a paved  
30 or surfaced shoulder shall be provided, with an offset of at least 6 feet from the edge of the traveled  
31 way.

32 Where there is no curb or shoulder, the minimum horizontal offset shall be 6 feet from the edge of  
33 the traveled way.

34 Minimum clearance dimensions for flashing lights and automatic gates relative to the proximity to  
35 the closest track shall conform to standards provided by the railroad company and/or transit agency.

36 **Added to improve clarity**

37 Guidance:

38 When the automatic gate is in its upright position, no portion of the physical features of flashing-light  
39 signals and gates, including the support hardware, should be closer than 12 feet from the center of the nearest  
40 track. **Added to improve consistency**

41 *Equipment housings (controller cabinets) should have a lateral offset of at least 30 feet from the edge of*  
42 *the highway, and where railroad or LRT property and conditions allow, at least 25 feet from the nearest rail.*

43 *If a pedestrian route is provided, sufficient clearance from supports, posts, and automatic gate*  
44 *mechanisms should be maintained for pedestrian travel.*

45 *When determined by an engineering study, a lateral escape route to the right of the highway in advance of*  
46 *the grade crossing traffic control devices should be kept free of guardrail or other ground obstructions.*  
47 *Where guardrail is not deemed necessary or appropriate, barriers should not be used for protecting signal*  
48 *supports.*

49 *The same lateral offset and roadside safety features should apply to flashing-light signal and automatic*  
50 *gate locations on both the right-hand and left-hand sides of the roadway.*

1 Option:

2 In industrial or other areas involving only low-speed highway traffic or where signals are vulnerable to  
3 damage by turning truck traffic, guardrail may be installed to provide protection for the signal assembly.

4 *Guidance:*

5 *Where both traffic control signals and flashing-light signals (with or without automatic gates) are in*  
6 *operation at the same highway-LRT grade crossing, the operation of the devices should be coordinated to*  
7 *avoid any display of conflicting signal indications.*

8 **Support:**

9 ~~LRT typically operates through grade crossings in semi-exclusive and mixed-use alignments at speeds~~  
10 ~~between 10 and 65 mph.~~ Deleted to improve accuracy

11 ~~When LRT speed is cited in this Part, it refers to the maximum speed at which LRT equipment is~~  
12 ~~permitted to traverse a particular grade crossing.~~ Relocated to above

13 Option:

14 If highway traffic signals must be located within close proximity to the flashing-light signal system, the  
15 highway traffic signals may be mounted on the same overhead structure as the flashing-light signals. This  
16 text was relocated from existing Section 8C.09

17 **Figure 8D-1. Composite Drawing of Active Traffic Control Devices for Grade Crossings Showing**  
18 **Clearances**

## 19 Section ~~8C.02~~ 8D.02 Flashing-Light Signals

20 Support:

21 Section ~~8C.03~~ 8D.04 contains additional information regarding flashing-light signals at highway-LRT  
22 grade crossings in semi-exclusive and mixed-use alignments.

23 **Standard:**

24 **If used, the flashing-light signal assembly (shown in Figure 8DC-1) on the side of the highway shall**  
25 **include a standard Crossbuck (R15-1) sign, and where there is more than one track, a supplemental**  
26 **Number of Tracks (R15-2P) plaque, all of which indicate to motorists, bicyclists, and pedestrians the**  
27 **location of a grade crossing.**

28 *Guidance:*

29 *The bottom of the Number of Tracks (R15-2P) plaque (when used) should be located as low as practical*  
30 *above the flashing-light backgrounds. The Crossbuck (R15-1) sign should be located just above the Number of*  
31 *Tracks (R15-2P) plaque or, if no plaque is present, the bottom of the Crossbuck sign should be located as low*  
32 *as practical above the flashing-light backgrounds.* Added to improve consistency

33 **Support:**

34 Additional information regarding sizes and clearances of components used on flashing-light signals can be  
35 found in Part 3 of the current edition of the American Railway Engineering and Maintenance-of-Way  
36 Communication and Signal Manual of Recommended Practice. Added to improve consistency

37 Option:

38 At highway-rail grade crossings, bells or other audible warning devices may be included in the assembly  
39 and may be operated in conjunction with the flashing lights to provide additional warning for pedestrians,  
40 bicyclists, and/or other non-motorized road users.

41 **Standard:**

42 **When indicating the approach or presence of rail traffic, the flashing-light signal shall display**  
43 **toward approaching highway traffic two red lights mounted in a horizontal line flashing alternately.**

44 **If used, flashing-light signals shall be placed to the right of approaching highway traffic on all**  
45 **highway approaches to a grade crossing. They shall be located laterally with respect to the highway in**  
46 **compliance with Figure 8DC-1 except where such location would adversely affect signal visibility.**

47 **If used at a grade crossing with highway traffic in both directions, back-to-back ~~pairs of lights~~**  
48 **flashing-light signals shall be placed on each side of the tracks. On multi-lane one-way streets and**  
49 **divided highways, flashing-light signals shall be placed on the approach side of the grade crossing on**  
50 **both sides of the roadway or shall be placed above the highway.**

1 Each red signal unit in the flashing-light signal shall flash alternately. The number of flashes per  
2 minute for each lamp shall be 35 minimum and 65 maximum. Each lamp shall be illuminated  
3 approximately the same length of time. The total time of illumination of each pair of lamps shall be the  
4 entire operating time.

5 **Flashing-light units shall use either 8-inch or 12-inch nominal diameter lenses.**

6 *Guidance:*

7 *In choosing between the 8-inch or 12-inch nominal diameter lenses for use in grade crossing flashing-*  
8 *light signals, consideration should be given to the principles stated in Section ~~4D.074E.02~~.*

9 *If flashing-light signals are used, at least one pair of flashing lights should be provided for each approach*  
10 *lane of the roadway.* **Added to improve consistency**

11 *The center to center distance between the two red lights in a flashing-light unit should be approximately*  
12 *30 inches.* **Added to support dimensions shown in Figure 8D-1**

13 *The mounting height of the flashing-light units, measured from the bottom of the flashing-light unit*  
14 *housing to the elevation of the crown of the roadway, should be between 8 feet and 9 feet .* **Added to support**  
15 **dimensions shown in Figure 8D-1**

16 *The top of the support pole foundation should be no more than 4 inches above the surface of the ground*  
17 *and should be at the same elevation as the crown of the roadway.* **Added to support dimensions shown in**  
18 **Figure 8D-1**

19 **Standard:**

20 **Grade crossing flashing-light signals shall operate at a low voltage using storage batteries either as a**  
21 **primary or stand-by source of electrical energy. Provision shall be made to provide a source of energy**  
22 **for charging batteries.**

23 *Option:*

24 Additional ~~pairs of~~ flashing-light ~~units~~ ~~signals~~ may be mounted on the same supporting post and directed  
25 toward vehicular traffic approaching the grade crossing from other than the principal highway route, such as  
26 where there are approaching routes on highways closely adjacent to and parallel to the track(s).

27 *Guidance:* **Added to improve consistency**

28 *Where the storage distance for vehicles approaching a grade crossing is less than a design vehicle*  
29 *length, the Diagnostic Team should consider providing additional flashing-light signals aligned toward*  
30 *the movement turning toward the grade crossing.*

31 *The Diagnostic Team should consider the use of additional flashing-light signals to provide*  
32 *supplemental warning to pedestrians, especially on one way streets and divided highways.*

33 **Standard:**

34 **References to lenses in this Section shall not be used to limit flashing-light signal optical units to**  
35 **incandescent lamps within optical assemblies that include lenses.**

36 *Support:*

37 Research has resulted in flashing-light signal optical units that are not lenses, such as, but not limited to,  
38 light emitting diode (LED) flashing-light signal modules.

39 *Option:*

40 *If a Diagnostic Team determines that it is appropriate, the* flashing-light signals may be installed on  
41 overhead structures or cantilevered supports as shown in Figure 8~~CD~~-1 where needed for additional emphasis,  
42 or for better visibility to approaching traffic, particularly on multi-lane approaches or highways with profile  
43 restrictions.

44 If it is determined by ~~an engineering study~~ a Diagnostic Team that one ~~set of~~ flashing-light ~~signal~~ ~~signal~~  
45 on the cantilever arm is not sufficiently visible to road users, one or more additional ~~sets of~~ flashing-light ~~signals~~  
46 signals may be mounted on the supporting post and/or on the cantilever arm.

47 **Standard:**

48 **Breakaway or frangible bases shall not be used ~~on the supporting posts~~ on the supporting posts for**  
49 **overhead structures or cantilevered ~~supports~~ arms that support overhead flashing-light signals.**

1 ~~Except as otherwise provided in Paragraphs 13 through 15, flashing-light signals mounted overhead~~  
2 ~~shall comply with the applicable provisions of this Section.~~ Deleted; redundant with other text in this  
3 Section

4 ~~Section 8C.03 Flashing Light Signals at Highway-LRT Grade Crossings~~ This Section was relocated to  
5 new Section 8D.04

#### 6 Section ~~8C.04~~ 8D.03 Automatic Gates

7 Support:

8 An automatic gate is a traffic control device used in conjunction with flashing-light signals.

9 Standard:

10 The automatic gate (see Figure 8CD-1) shall consist of a drive mechanism and a fully  
11 ~~retroreflectorized~~ retroreflective red- and white-striped gate arm with lights. When in the down  
12 position, the gate arm shall extend across the approaching lanes of highway traffic.

13 In the normal sequence of operation, unless constant warning time detection or other advanced  
14 system requires otherwise, the flashing-light signals and the lights on the gate arm (in its normal  
15 upright position) shall be activated immediately upon detection of approaching rail traffic. The gate  
16 arm shall start its downward motion not less than 3 seconds after the flashing-light signals start to  
17 operate, shall reach its horizontal position at least 5 seconds before the arrival of the rail traffic, and  
18 shall remain in the down position ~~as long as the rail traffic occupies~~ until the rail traffic completely  
19 clears the grade crossing.

20 When the rail traffic clears the grade crossing, and if no other rail traffic is detected, the gate arm  
21 shall ascend to its upright position, following which the flashing-light signals and the lights on the gate  
22 arm shall cease operation.

23 Gate arms shall be fully ~~retroreflectorized~~ retroreflective on both sides and shall have vertical  
24 stripes alternately red and white at 16-inch intervals measured horizontally. The width (which becomes  
25 the height of the retroreflective sheeting when the automatic gate is in the down position) of the  
26 retroreflective sheeting on the front of the gate arm shall be at least 4 inches. Added to support the  
27 dimensions in Figure 8D-1

28 Support:

29 It is acceptable to replace a damaged gate arm with a gate ~~arm~~ arm having vertical stripes even if the other  
30 existing gates ~~arms~~ arms at the same grade crossing have diagonal stripes; however, it is also acceptable to replace a  
31 damaged gate arm with a gate arm having diagonal stripes if the other existing gates ~~arms~~ arms at the same grade  
32 crossing have diagonal stripes in order to maintain consistency per the provisions of Paragraph 24 of the  
33 Introduction.

34 Standard:

35 Gate arms shall have at least three red lights as ~~provided~~ shown in Figure 8CD-1.

36 When activated, the gate arm light nearest the tip shall be illuminated continuously and the other  
37 lights shall flash alternately in unison with the flashing-light signals such that the left-most flashing gate  
38 arm light(s) flashes simultaneously with the left-hand light of the flashing-light signals and the right-  
39 most flashing gate arm light(s) flashes simultaneously with the right-hand light of the flashing-light  
40 signals. Edited to improve clarity

41 Support:

42 The red lights mounted on a gate arm are typically approximately 4 inches in diameter if they are circular.  
43 Rectangular red lights of approximately the same size are sometimes used on gate arms instead of circular  
44 lights. Added to improve consistency

45 Standard:

46 The entrance gate arm mechanism shall be designed to fail safe in the down position.

47 Guidance:

48 *The gate arm should ascend to its upright position in 12 seconds or less.*

49 *In its normal upright position, when no rail traffic is approaching or occupying the grade crossing, the*  
50 *gate arm should be either vertical or nearly so (see Figure 8CD-1).*

1 In the design of individual installations, consideration should be given to timing the operation of the gate  
2 arm to accommodate large and/or slow-moving highway vehicles.

3 The gates ~~arms~~ should cover the approaching highway to block all highway vehicles from being driven  
4 around the gate ~~arms~~ without crossing the center line.

5 The tip of the gate arm when it is in the down position should be at least 10 feet from the center of the  
6 nearest track.

7 The height of the gate arm when it is in the down position should be between 3.5 feet and 4.5 feet above  
8 the crown of the roadway.

9 When the gate arm is in the upright position, no portion of the gate arm or support pole hardware should  
10 extend more than 25.4 inches further from the roadway than the outside edge of the support pole. When the  
11 gate arm is in the down position, no portion of the counterweight should extend more than 4.25 feet further  
12 from the roadway than the center of the support pole. Added to support the dimensions shown in Figure

13 **8D-1**

14 Option:

15 The effectiveness of automatic gates may be enhanced by the use of channelizing devices or raised  
16 median islands to discourage driving around lowered automatic gates.

17 Where automatic gates are located in the median, additional median width may be required to provide the  
18 minimum clearance for the counterweight supports.

19 Automatic gates may be supplemented by cantilevered flashing-light signals (see Figure 8ED-1) where  
20 there is a need for additional emphasis or better visibility.

21 ~~Section 8C.05 Use of Automatic Gates at LRT Grade Crossings~~ This Section has been replaced by new

22 **Section 8D.04**

23 **Section 8D.04 Use of Active Traffic Control Systems at LRT Grade Crossings** This Section

24 **relocated from existing Sections 8C.03 and 8C.05 and edited**

25 **Support:**

26 ~~Section 8C.02 contains additional provisions regarding the design and operation of flashing light signals,~~  
27 ~~including those installed at highway LRT grade crossings.~~ Relocated to below

28 **Standard:**

29 ~~At Highway-LRT grade crossings in semi-exclusive alignments shall be equipped with flashing-~~  
30 ~~light signals where LRT speeds exceed 35~~40 mph, active traffic control systems (see Section 8D.01),  
31 including automatic gates, shall be used. ~~Flashing light signals shall be clearly visible to motorists,~~  
32 ~~pedestrians, and bicyclists.~~

33 ~~If flashing light signals are in operation at a highway LRT crossing that is used by pedestrians,~~  
34 ~~bicyclists, and/or other non-motorized road users, an audible device such as a bell shall also be provided~~  
35 ~~and shall be operated in conjunction with the flashing light signals.~~ Relocated to below

36 At highway-LRT grade crossings ~~Where the crossing is at a location other than an intersection~~  
37 ~~and~~ LRT operating speeds exceed 25 mph, flashing light signals ~~active traffic control systems~~  
38 should ~~shall~~ be used ~~installed~~. Guidance changed to Standard and edited

39 **Guidance:** Added to improve consistency

40 At highway-LRT grade crossings where LRT operating speeds are 25 mph or less, active traffic control  
41 systems should be used unless an engineering study indicates that the use of Crossbuck Assemblies, STOP  
42 signs alone, or YIELD signs alone would be adequate.

43 Traffic control signals alone should not be used where the highway-LRT grade crossing is at a location  
44 other than an intersection and LRT operating speeds exceed 20 mph.

45 Support:

46 Sections 8ED.02 and 8D.03 contain additional provisions regarding the design and operation of flashing-  
47 light signals and automatic gates, respectively ~~including those installed at highway LRT grade crossings.~~

48 **Relocated from above and edited**

49 **Standard:**

1 If flashing-light signals are in operation at a highway-LRT crossing that is used by pedestrians,  
2 bicyclists, and/or other non-motorized road users, an audible device such as a bell shall also be provided  
3 and shall be operated in conjunction with the flashing-light signals. **Relocated from above**

#### 4 Section ~~8C.06~~ 8D.05 Exit Gate and Four-Quadrant Gate Systems

5 Option:

6 ~~Four-Quadrant-Exit~~ Gate systems may be installed to improve safety at grade crossings based on an  
7 engineering study when less restrictive measures, such as automatic gates and median islands, are not  
8 effective.

9 Support: **Added to improve clarity**

10 A grade crossing that includes exit gates on some, but not all, of the exiting lanes is an Exit Gate system,  
11 but is not considered to be a Four-Quadrant Gate system.

12 The term Four-Quadrant Gate system is used in a generic sense in that it refers to the fact that all  
13 entrances and exits from a grade crossing are controlled by automatic gates in order to provide a full closure to  
14 all entering and exiting lanes. The term Four-Quadrant Gate system does not refer to the number of gates  
15 installed, but rather the fact that a full closure is provided.

16 Standard:

17 The ~~Four-Quadrant-Exit~~ Gate system shall use a series of ~~drive mechanisms and~~ automatic gates  
18 with fully ~~retroreflectorized~~retroreflective red- and white-striped gate arms with lights, and when in the  
19 down position the gate arms extend individually across the entrance and exit lanes of the roadway as  
20 shown in Figure 8CD-2. Standards contained in Section ~~8C.01~~8D.02 for flashing-light signals shall be  
21 followed for signal specifications, location, and clearance distances.

22 Gate arm design, colors, and lighting requirements shall be in accordance with the Standards  
23 contained in Section ~~8C.04~~8D.03. **Relocated from below**

24 Support:

25 The provisions contained in Section 8D.03 for automatic gates are applicable to exit gates.

26 Standard:

27 In the normal sequence of operation, unless constant warning time detection or other advanced  
28 system requires otherwise, the flashing-light signals and the lights on the gate arms (in their normal  
29 upright positions) shall be activated immediately upon the detection of approaching rail traffic. The  
30 entrance gate arms ~~for the entrance lanes of traffic~~ shall start their downward motion not less than 3  
31 seconds after the flashing-light signals start to operate and shall reach their horizontal position at least  
32 5 seconds before the arrival of the rail traffic. Exit gate arm activation and downward motion shall be  
33 based on detection or timing requirements established by ~~an engineering study of the individual site a~~  
34 Diagnostic Team. If an Exit Gate system is present, the queue clearance time (see Section 8D.10) shall  
35 be long enough to permit the exit gate arm to lower after a design vehicle of maximum length is clear of  
36 the minimum track clearance distance (see Section 8A.07). The gate arms shall remain in the down  
37 position as long as the rail traffic occupies the grade crossing. **Edited to improve consistency with**  
38 **Queue Clearance Time definition in Part 1**

39 When the rail traffic clears the grade crossing, and if no other rail traffic is detected, the gate arms  
40 shall ascend to their upright positions, following which the flashing-light signals and the lights on the  
41 gate arms shall cease operation.

42 ~~Gate arm design, colors, and lighting requirements shall be in accordance with the Standards~~  
43 ~~contained in Section 8C.04.~~ **Relocated to above**

44 Except as provided in Paragraph 1920, the exit gate arm mechanism shall be designed to fail-safe in  
45 the up position.

46 At locations where gate arms are offset a sufficient distance for highway vehicles to drive between  
47 the entrance and exit gate arms, median islands (see Figure 8CD-2) shall be installed in accordance with  
48 the needs established by an engineering study.

49 *Guidance:*

50 *The gate arm should ascend to its upright position in 12 seconds or less.*

1 ~~Four-Quadrant Gate systems should only be used in locations with~~ Constant warning time detection  
2 ~~circuits should be used with Exit Gate systems where practical.~~

3 The operating mode of the exit gates should be determined ~~based upon an engineering study, with input~~  
4 ~~from the affected railroad company or LRT agency~~ by a Diagnostic Team.

5 If the Timed Exit Gate Operating Mode is used, the ~~engineering study, with input from the affected~~  
6 ~~railroad company or LRT agency,~~ Diagnostic Team should also determine the Exit Gate Clearance Time (see  
7 definition in Section 1C.021A.13).

8 If the Dynamic Exit Gate Operating Mode is used, highway vehicle intrusion detection devices that are  
9 part of a system that incorporates processing logic to detect the presence of highway vehicles within the  
10 minimum track clearance distance (see Section 8A.07) should be installed to control exit gate operation. Exit  
11 gates should be independently controlled for each direction of roadway traffic.

12 Regardless of which exit gate operating mode is used, the Exit Gate Clearance Time should be considered  
13 when determining additional time requirements for the Minimum Warning Time.

14 If an ~~Four-Quadrant Exit~~ Gate system is used at a location that is adjacent to an intersection that could  
15 cause highway vehicles to queue within the minimum track clearance distance (see Section 8A.07), the  
16 Dynamic Exit Gate Operating Mode should be used unless an engineering study indicates otherwise.

17 If an ~~Four-Quadrant Exit~~ Gate system is interconnected with a highway traffic signal (see Section 8D.10),  
18 backup or standby power should be considered for the highway traffic signal. Also, circuitry should be  
19 installed to prevent the highway traffic signal from leaving the track clearance green interval until all of the  
20 gates are lowered.

21 ~~At locations where sufficient space is available, exit gates should be positioned downstream from the~~  
22 ~~track a distance that provides a safety zone long enough to accommodate at least one design vehicle between~~  
23 ~~the exit gate and the nearest rail.~~

24 ~~Four-Quadrant Exit~~ Gate systems should include remote health (status) monitoring capable of  
25 automatically notifying railroad or LRT signal maintenance personnel when anomalies have occurred within  
26 the system.

27 Option:

28 Exit gate arms may fail in the down position if the grade crossing is equipped with remote health (status)  
29 monitoring.

30 ~~Four-Quadrant Exit~~ Gate system installations may include median islands between opposing lanes on an  
31 approach to a grade crossing.

32 Guidance:

33 Where sufficient space is available, median islands should be at least 60 feet in length.

34 **Figure 8D-2. Example of Location Plan for Flashing-Light Signals and Four-Quadrant Gates**

35 **Section ~~8C.07~~ 8D.06 Wayside Horn Systems**

36 Option:

37 A wayside horn system (see definition in Section ~~1A.13~~ 1C.02) may be installed in compliance with 49  
38 CFR Part 222 to provide audible warning directed toward the road users at a highway-rail ~~or highway-LRT~~  
39 grade crossing or at a pathway grade crossing.

40 Standard:

41 **Wayside horn systems used at grade crossings where the locomotive horn is not sounded shall be**  
42 **equipped and shall operate in compliance with the requirements of Appendix E to 49 CFR Part 222.**

43 Guidance:

44 The same lateral clearance and roadside safety features should apply to wayside horn systems as  
45 described in the Standards contained in Section ~~8C.D~~ 01. Wayside horn systems, when mounted on a separate  
46 pole assembly, should be installed no closer than 15 feet from the center of the nearest track and should be  
47 positioned to not obstruct the motorists' line of sight of the flashing-light signals.

48 **Section 8D.07 Another Train Coming**

49 Support:

1 Conflicts between pedestrians and multiple trains can occur at multi-track crossings on sidewalks,  
2 pathways, and at crossings in station areas where grade crossing users might not consider the arrival of  
3 another train on a different track.

4 Guidance:

5 The decision to provide notification of another train should be made by a diagnostic team. In making this  
6 determination, the diagnostic team should consider the pedestrian utilization, pedestrian collision history,  
7 train speeds and volumes, operating plans and/or schedules, and the presence of a nearby station or transit  
8 center.

9 Option:

10 An ANOTHER TRAIN COMING train-activated blank-out sign may be used to provide notification of  
11 another train coming. For added sign conspicuity, a Warning Beacon may be used in accordance with the  
12 requirements of Section 4S.03.

13 **Section ~~8C.08~~ 8D.08 Rail Traffic Detection**

14 **Standard:**

15 **The devices employed in active traffic control systems shall be actuated by some form of rail traffic**  
16 **detection.**

17 **Rail traffic detection circuits, insofar as practical, shall be designed on the fail-safe principle.**

18 **Flashing-light signals shall operate for at least 20 seconds before the arrival of any rail traffic,**  
19 **except as provided in Paragraph 4.**

20 **Option:**

21 On tracks where all rail traffic operates at less than 20 mph and where road users are directed by an  
22 authorized person on the ground to not enter the crossing at all times that approaching rail traffic is about to  
23 occupy the crossing, a shorter signal operating time for the flashing-light signals may be used.

24 Additional warning time may be provided when determined by an engineering study.

25 *Guidance:*

26 *Where the speeds of different rail traffic on a given track vary considerably under normal operation,*  
27 *special devices or circuits should be installed to provide reasonably uniform notice in advance of all rail*  
28 *traffic movements over the grade crossing. Special control features should be used to eliminate the effects of*  
29 *station stops and switching operations within approach control circuits to prevent excessive activation of the*  
30 *traffic control devices while rail traffic is stopped on or switching upon the approach track control circuits.*

31 **Section ~~8C.09~~ 8D.09 Use of Traffic Control Signals at ~~or Near Highway-Rail~~ Grade Crossings**

32 **This Section has been reorganized into new Sections 8D.09, 8D.10, and 8D.12**

33 **Standard:**

34 **Except as provided in Paragraph 2, traffic control signals shall not be used instead of flashing-light**  
35 **signals to control road users at a ~~mainline~~ highway-rail grade crossing. Relocated from below**

36 **Option:**

37 Traffic control signals may be used instead of flashing-light signals to control road users at industrial  
38 highway-rail grade crossings and other places where ~~train movements are very slow, such as in switching~~  
39 ~~operations~~ the maximum speed of trains is 10 mph or less. **Edited to improve accuracy**

40 **Support:**

41 Section 8D.04 contains information regarding the use of traffic control signals at highway-LRT grade  
42 crossings. **Added to improve clarity**

43 **Standard:**

44 **The appropriate provisions of Part 4 relating to traffic control signal design, installation, and**  
45 **operation shall be applicable where traffic control signals are used to control road users instead of**  
46 **flashing-light signals at ~~highway-rail~~ grade crossings.**

47 **~~Traffic control signals shall not be used instead of flashing-light signals to control road users at a~~**  
48 **~~mainline highway-rail grade crossing.~~** **Relocated to above**

49 ***Guidance:*** **These paragraphs relocated to new Section 8D.10**

1 ~~If a highway-rail grade crossing is equipped with a flashing-light signal system and is located within 200-~~  
2 ~~feet of an intersection or midblock location controlled by a traffic control signal, the traffic control signal-~~  
3 ~~should be provided with preemption in accordance with Section 4D.27.~~

4 ~~Coordination with the flashing light signal system, queue detection, or other alternatives should be~~  
5 ~~considered for traffic control signals located farther than 200 feet from the highway rail grade crossing.~~  
6 ~~Factors to be considered should include traffic volumes, highway vehicle mix, highway vehicle and train~~  
7 ~~approach speeds, frequency of trains, and queue lengths.~~

8 ~~The highway agency or authority with jurisdiction and the regulatory agency with statutory authority, if~~  
9 ~~applicable, should jointly determine the preemption operation and the timing of traffic control signals~~  
10 ~~interconnected with highway rail grade crossings adjacent to signalized highway intersections.~~

11 **Support:** **This text was relocated to new Section 8D.10**

12 ~~Section 4D.27 includes a recommendation that traffic control signals that are adjacent to highway rail~~  
13 ~~grade crossings and that are coordinated with the flashing light signals or that include railroad preemption~~  
14 ~~features be provided with a back up power supply.~~

15 **Standard:** **These paragraphs relocated to new Section 8D.10**

16 ~~Information regarding the type of preemption and any related timing parameters shall be provided~~  
17 ~~to the railroad company so that they can design the appropriate train detection circuitry.~~

18 ~~If preemption is provided, the normal sequence of traffic control signal indications shall be~~  
19 ~~preempted upon the approach of trains to avoid entrapment of highway vehicles on the highway-rail~~  
20 ~~grade crossing.~~

21 ~~This preemption feature shall have an electrical circuit of the closed-circuit principle, or a~~  
22 ~~supervised communication circuit between the control circuits of the highway rail grade crossing~~  
23 ~~warning system and the traffic control signal controller. The traffic control signal controller preemptor~~  
24 ~~shall be activated via the supervised communication circuit or the electrical circuit that is normally~~  
25 ~~energized by the control circuits of the highway rail grade crossing warning system. The approach of a~~  
26 ~~train to a highway rail grade crossing shall de-energize the electrical circuit or activate the supervised~~  
27 ~~communication circuit, which in turn shall activate the traffic control signal controller preemptor. This~~  
28 ~~shall establish and maintain the preemption condition during the time the highway rail grade crossing~~  
29 ~~warning system is activated, except that when crossing gates exist, the preemption condition shall be~~  
30 ~~maintained until the crossing gates are energized to start their upward movement. When multiple or~~  
31 ~~successive preemptions occur, train activation shall receive first priority.~~

32 **Guidance:** **This text was relocated to new Section 8D.12**

33 ~~If a highway rail grade crossing is located within 50 feet (or within 75 feet for a highway that is regularly~~  
34 ~~used by multi-unit highway vehicles) of an intersection controlled by a traffic control signal, the use of pre-~~  
35 ~~signals to control traffic approaching the grade crossing should be considered.~~

36 **Standard:** **This text was relocated to new Section 8D.12**

37 ~~If used, the pre-signals shall display a steady red signal indication during the track clearance~~  
38 ~~portion of a signal preemption sequence to prohibit additional highway vehicles from crossing the~~  
39 ~~railroad track.~~

40 **Guidance:** **This text was relocated to new Section 8D.12**

41 ~~Consideration should be given to using visibility limited signal faces (see definition in Section 1A.13) at~~  
42 ~~the intersection for the downstream signal faces that control the approach that is equipped with pre-signals.~~

43 **Option:** **This text was relocated to new Section 8D.12**

44 ~~The pre-signal phase sequencing may be timed with an offset from the downstream signalized intersection~~  
45 ~~such that the railroad track area and the area between the railroad track and the downstream signalized~~  
46 ~~intersection is generally kept clear of stopped highway vehicles.~~

47 **Standard:** **This text was relocated to new Section 8D.12**

48 ~~If a pre-signal is installed at an interconnected highway rail grade crossing near a signalized~~  
49 ~~intersection, a STOP HERE ON RED (R10-6) sign shall be installed near the pre-signal or at the stop~~  
50 ~~line if used. If there is a nearby signalized intersection with insufficient clear storage distance for a~~  
51 ~~design vehicle, or the highway rail grade crossing does not have gates, a No Turn on Red (R10-11, R10-~~

1 ~~11a, or R10-11b) sign (see Section 2B.53) shall be installed for the approach that crosses the railroad~~  
2 ~~track, if applicable.~~

3 Option:

4 ~~At locations where a highway rail grade crossing is located more than 50 feet (or more than 75 feet for a~~  
5 ~~highway regularly used by multi-unit highway vehicles) from an intersection controlled by a traffic control~~  
6 ~~signal, a pre-signal may be used if an engineering study determines a need.~~ **This text was relocated to new**  
7 **Section 8D.12**

8 ~~If highway traffic signals must be located within close proximity to the flashing light signal system, the~~  
9 ~~highway traffic signals may be mounted on the same overhead structure as the flashing light signals.~~ **This text**  
10 **was relocated to new Section 8D.01**

11 **Support:** **These paragraphs relocated to new Section 8D.10**

12 ~~Section 4C.10 describes the Intersection Near a Grade Crossing signal warrant that is intended for use at a~~  
13 ~~location where the proximity to the intersection of a grade crossing on an intersection approach controlled by a~~  
14 ~~STOP or YIELD sign is the principal reason to consider installing a traffic control signal.~~

15 ~~Section 4D.27 describes additional considerations regarding preemption of traffic control signals at or~~  
16 ~~near highway rail grade crossings.~~

17 **Section 8D.10 Preemption of Highway Traffic Signals at or Near Grade Crossings** **New Section**  
18 **with paragraphs from existing Section 8C.09**

19 **Support:** **Added to improve consistency**

20 Traffic signal preemption for grade crossings is a complex topic that requires a specific understanding of  
21 grade crossing warning systems and highway traffic signal operations. While most traffic signal operations  
22 are governed only by the traffic signal controller unit and the associated traffic signal equipment, preemption  
23 for grade crossings is also governed by the grade crossing warning system. Active grade crossing warning  
24 systems include flashing-light signals and possibly automatic gates, as well as various types of train detection  
25 equipment. When the traffic signal controller unit is interconnected with the grade crossing warning system  
26 for the purpose of preemption, a combined system is created. It is the combined system that requires a  
27 thorough understanding of the design and operating parameters in order to provide proper operation of the  
28 preemption system.

29 The Federal Railroad Administration (FRA) has issued two documents that provide additional information  
30 relating to preemption of highway traffic signals at or near grade crossings. The first document is “Technical  
31 Bulletin S-12-01, Guidance Regarding the Appropriate Process for the Inspection of Highway-Rail Grade  
32 Crossing Warning System Pre-emption Interconnections with Highway Traffic Signals” and the second  
33 document is “Safety Advisory 2010-02, Signal Recording Devices for Highway-Rail Grade Crossing Active  
34 Warning Systems that are Interconnected with Highway Traffic Signal Systems.”

35 *Guidance:*

36 *If a ~~highway rail~~ grade crossing is equipped with a flashing-light signal system and is located within 200*  
37 *feet of ~~an intersection or midblock location controlled by a traffic control signal or hybrid beacon~~, the*  
38 *highway traffic ~~control~~ signal should be provided with preemption in accordance with Section ~~4D.27~~4F.18.*

39 *Coordination with the flashing-light signal system, such as using queue detection and queue cutter*  
40 *signals, blank-out signs, or other alternatives, should be considered for highway traffic ~~control~~ signals*  
41 *located farther than 200 feet from the highway-rail grade crossing. Factors to be considered should include*  
42 *traffic volumes, highway vehicle mix, highway vehicle and train approach speeds, frequency of trains,*  
43 *presence of midblock driveways or unsignalized intersections, and ~~queue lengths~~ the potential for vehicular*  
44 *queues resulting from an adjacent downstream grade crossing or highway traffic signal to extend into the*  
45 *minimum track clearance distance (see Section 8A.07).*

46 *The highway agency or authority with jurisdiction and the regulatory agency with statutory authority, if*  
47 *applicable, should jointly determine the preemption operation and the timing of highway traffic ~~control~~*  
48 *signals interconnected with ~~highway rail~~ grade crossings adjacent to signalized ~~highway~~*  
49 *intersections locations.*

50 *If a highway traffic signal is installed near a passive grade crossing and traffic is likely to queue onto the*  
51 *tracks, an active grade crossing warning system should be installed at the grade crossing to provide a means*

1 to preempt the highway traffic signal in order to clear vehicles from the minimum track clearance distance  
2 (see Section 8A.07) upon approach of rail traffic.

3 If a highway traffic signal is interconnected with a flashing-light signal system, the flashing-light signal  
4 system should be provided with automatic gates to prevent additional vehicles from being drawn into the  
5 minimum track clearance distance (see Section 8A.07) during the track clearance interval prior to the arrival  
6 of rail traffic unless a Diagnostic Team determines otherwise.

7 The highway agency or authority with jurisdiction, and the regulatory agency with statutory authority, if  
8 applicable, and the railroad company or transit agency should jointly inspect and verify the preemption  
9 operation, the amount of warning time and/or advanced preemption time being provided by the grade  
10 crossing warning system, and the timing of highway traffic signals interconnected and/or coordinated with the  
11 flashing-light signals at least once per year. Paragraphs added to improve clarity and consistency

12 Support:

13 Section 4F.19~~4D.27~~ includes a recommendation that traffic control signals that are adjacent to highway-  
14 rail grade crossings and that are coordinated with the flashing-light signals at the grade crossing or that  
15 include railroad preemption features be provided with a back-up power supply.

16 Standard:

17 Information regarding the type of preemption and any related timing parameters shall be provided  
18 to the railroad company or transit agency so that ~~they~~ the railroad company or transit agency can  
19 design the appropriate train detection circuitry.

20 If preemption is provided, unless otherwise determined by a Diagnostic Team, the normal sequence  
21 of ~~traffic control~~ highway traffic signal indications shall be preempted upon the approach of through  
22 trains to ~~avoid entrapment of~~ provide a track clearance interval to provide an opportunity for highway  
23 vehicles ~~on at the highway-rail~~ grade crossing to clear the minimum track clearance distance (see  
24 Section 8A.07) prior to the arrival of rail traffic.

25 Where a flashing-light signal system is in place at a grade crossing, any highway traffic signal faces  
26 installed within 50 feet of any rail shall be preempted upon the approach of rail traffic. The highway  
27 traffic signal faces that control movements across the grade crossing shall display RED indications in  
28 accordance with Section 4F.18 in order to avoid the display of signal indications that conflict with the  
29 flashing-light signal system. Added to improve consistency

30 Guidance:

31 Where a flashing-light signal system is in place at a grade crossing, the operation of any flashing yellow  
32 beacon installed within 50 feet of any rail should be considered by a Diagnostic Team to determine whether  
33 the operation of the beacon should be terminated during the approach and passage of rail traffic. Added to  
34 improve consistency

35 Standard:

36 ~~This~~ The preemption ~~feature~~ special control mode shall ~~have an electrical circuit of the closed-~~  
37 ~~circuit principle, or be activated by a supervised communication circuit~~ preemption interconnection  
38 using fail-safe design principles (such as “1570-2002 - Institute of Electrical and Electronics Engineers  
39 Standard for the Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail  
40 Intersection”) between the control circuits of the ~~highway-rail~~ grade crossing warning system and the  
41 traffic ~~control~~ signal controller unit. ~~The traffic control signal controller preceptor shall be activated~~  
42 ~~via the supervised communication circuit or the electrical circuit that is normally energized by the~~  
43 ~~control circuits of the highway-rail grade crossing warning system.~~ The approach of ~~a train-rail traffic~~  
44 to a ~~highway-rail~~ grade crossing shall de-energize the ~~electrical circuit or activate the supervised-~~  
45 ~~communication circuit~~ the interconnection or send a message via a fail-safe data communication  
46 protocol, which in turn shall activate the traffic ~~control~~ signal controller preceptor preemption  
47 sequence. This shall establish and maintain the preemption condition during the time the ~~highway-rail~~  
48 grade crossing warning system is activated, except that when automatic ~~crossing~~ gates exist, the  
49 preemption condition shall not be ~~maintained until terminated until the automatic crossing~~ gates are  
50 energized to start their upward movement. ~~When multiple or successive preemptions occur, train~~  
51 ~~activation shall receive first priority.~~

52 Support: The following paragraphs added to improve clarity and consistency

1 The right-of-way transfer time is the amount of time needed prior to display of the track clearance  
2 interval. This includes any time needed by the railroad, light rail transit, busway, or highway traffic signal  
3 control equipment to react to a preemption call, and any traffic control signal green, pedestrian walk and  
4 clearance if used (see Section 4F.18), yellow change, and red clearance intervals for conflicting traffic.

5 A supervised preemption interconnection is one that incorporates both a normally-open and a normally-  
6 closed circuit from the grade crossing warning system to verify the proper operation of the interconnection.

7 Option:

8 Instead of supervision, a double-break preemption interconnection circuit that uses two normally-closed  
9 circuits that open both the source and return energy circuits may be used.

10 A preemption interconnection may incorporate both supervision and double-break circuits.

11 Guidance:

12 Where train detection circuits are present at a passive grade crossing, the operation of the preemption  
13 interconnection should be treated as if active traffic control devices exist at the crossing and the preemption  
14 operation should be determined by a Diagnostic Team.

15 Where left turns are permitted at a downstream highway-highway traffic control signal from the roadway  
16 approach that crosses the track and a delayed or impeded left-turn movement could prevent vehicles from  
17 clearing the track, a protected left-turn movement should be provided during the track clearance interval if  
18 green signal indications are displayed to the approach for track clearance.

19 The decision to implement simultaneous or advance preemption should include consideration of the right-  
20 of-way transfer time, the queue clearance time, and the separation time in order to determine the maximum  
21 preemption time. These time periods should be compared to and verified with the operation of the grade  
22 crossing traffic control devices in order to evaluate the operation of the highway traffic signal and the  
23 preemption operation. These factors should be considered regardless of whether simultaneous or advance  
24 preemption operation is implemented as they are based on traffic signal minimum timing, vehicle acceleration  
25 characteristics, and physical distances along the roadway.

26 Support:

27 Preemption time variability occurs when the traffic signal controller enters the preemption clearance  
28 interval with less than the maximum design right-of-way transfer time or when the speed of a train  
29 approaching the grade crossing varies.

30 The time interval between the initiation of advance preemption and the operation of the grade crossing  
31 warning system for rail traffic will decrease in situations when rail traffic is accelerating.

32 Guidance:

33 Where preemption is used and automatic gates are present, the possibility that an automatic gate might  
34 descend upon a vehicle should be analyzed.

35 If simultaneous preemption is used, an analysis of extended grade crossing warning times should be  
36 conducted, as this condition is frequently encountered with simultaneous preemption operation.

37 If advance preemption is used, an analysis of preemption operation and sequencing should be conducted  
38 to identify preemption time variability. The analysis should include both the condition requiring the longest  
39 amount of time to enter the track clearance interval and the condition requiring the shortest amount of time to  
40 enter the track clearance interval.

41 Support:

42 The condition requiring the shortest amount of time to enter the track clearance interval occurs when the  
43 currently-displayed signal indications are the same as the track clearance interval signal indications.

44 Standard:

45 Where automatic gates are present and green signal indications are displayed at the downstream  
46 traffic control signal during the track clearance interval, the preemption sequence shall be designed  
47 such that the green signal indications are not terminated until the automatic gate(s) that controls access  
48 over the grade crossing towards the downstream intersection is fully lowered.

49 Support:

50 The following are two examples of mutually-exclusive methods to resolve preemption time variability:

1 A. Gate down circuitry provides a means to hold the traffic signal controller sequence in the track  
2 clearance interval until the automatic gate(s) that controls access over the grade crossing towards the  
3 downstream intersection is fully lowered.

4 B. Timing correction resolves preemption time variability by adding the right-of-way transfer time to the  
5 track clearance interval in the traffic signal controller unit and setting a fixed maximum period of time  
6 between the start of advance preemption and the operation of the flashing-light signals.

7 **Standard:**

8 **Where gate down circuitry is used to resolve preemption time variability and an automatic gate is**  
9 **broken or is not fully lowered, the crossing control circuits shall not terminate the track clearance**  
10 **interval before the rail traffic has entered the grade crossing.**

11 **Where timing correction is used to resolve preemption time variability, a timing circuit shall be**  
12 **used to maintain a maximum time interval between the initiation of advance preemption and the**  
13 **operation of the grade crossing warning system when the approaching rail traffic is decelerating.**

14 **Guidance:**

15 *When a highway-highway intersection controlled by traffic control signals is interconnected with a grade*  
16 *crossing equipped with exit gates, advance preemption should be used because of the additional operating*  
17 *time that is required for the exit gates.*

18 *Where rail traffic routinely stops and re-starts within or just outside of the approaches to a grade*  
19 *crossing that is interconnected with highway traffic signals, the effects of rail traffic operations on the*  
20 *preemption operation should be analyzed.*

21 *Highway traffic signal control equipment should be capable of providing immediate re-service of*  
22 *successive requests for preemption from the railroad warning devices, even if the initial preemption sequence*  
23 *has not been completed. As appropriate, the highway traffic signal control equipment should be able to*  
24 *promptly return to the start of the track clearance interval at any time that the demand for preemption is*  
25 *cancelled and then reactivated. The highway traffic signal control equipment should have the ability to*  
26 *provide this immediate re-service at any point in the preemption sequence.*

27 **Standard:**

28 **Where traffic control signals are programmed to operate in a flashing mode during the preemption**  
29 **dwell interval (the period following the track clearance interval that lasts for the duration of the**  
30 **preemption interconnection activation), the beginning of the preemption dwell flashing mode shall not**  
31 **occur until the grade crossing equipment indicates that the rail traffic has entered the grade crossing.**

32 **At locations where conflicting preemption calls might be received to serve boats and trains, the**  
33 **Diagnostic Team shall determine which mode shall receive first priority when conflicting preemption**  
34 **calls occur. Where the boat and the train do not conflict with each other, the Diagnostic Team shall**  
35 **determine the preemption sequence when both preemption calls are occurring simultaneously. The**  
36 **United States Coast Guard or other appropriate authority that regulates the operation of the waterway**  
37 **shall be invited to participate on the Diagnostic Team and/or to provide input to the Diagnostic Team.**

38 **Support:**

39 Section 4C.10 describes the Intersection Near a Grade Crossing signal warrant that is intended for use at a  
40 location where the proximity to the intersection of a grade crossing on an intersection approach controlled by  
41 a STOP or YIELD sign is the principal reason to consider installing a traffic control signal.

42 Section ~~4D.27~~4F.19 describes additional considerations regarding preemption of traffic control signals at  
43 or near ~~highway-rail~~ grade crossings.

44 **Section ~~8B.08~~ 8D.11 ~~Turn Restrictions~~ Movements Prohibited During Preemption This section**  
45 **has been relocated from existing Section 8B.08 and edited**

46 **Guidance:**

47 *At a signalized intersection that is located within ~~200~~ 100 feet of a ~~highway-rail~~ grade crossing, ~~measured from the edge of the track to the edge of the roadway, where~~ and the intersection traffic control*  
48 *signals are preempted by the approach of ~~a train~~ rail traffic, all existing permissive turning movements toward*  
49 *the ~~highway-rail~~ grade crossing should be prohibited, steady red arrow signal indications should be shown to*  
50 *all existing protected-only turning movements toward the grade crossing, and red signal indications should be*  
51 *shown to all other traffic.*

1 shown to the straight-through movement toward the grade crossing during the signal preemption sequences.  
2 The prohibition of a permissive turning movement toward the grade crossing should be accomplished through  
3 the installation of a blank-out turn prohibition (R3-1a or R3-2a) sign. Edited to improve consistency

4 **Option:** Paragraphs added to improve consistency

5 All movements toward the track may be prohibited at a signalized intersection that is preempted by the  
6 approach of rail traffic, even if the clear storage distance is more than 100 feet.

7 **Support:**

8 Including the word “TRAIN” as part of the blank-out turn prohibition sign informs road users that the turn  
9 prohibition being displayed by the sign is in effect because rail traffic is approaching or occupying a nearby  
10 rail grade crossing, and that the turn prohibition will be terminated after the rail traffic has cleared the grade  
11 crossing.

12 Rail operations can include the use of activated blank-out turn prohibition (R3-1a or R3-2a) signs at  
13 unsignalized highway-highway intersections in the vicinity of grade crossings, such as where a semi-exclusive  
14 or mixed-use alignment is within or parallel to the roadway where road users are normally permitted to turn  
15 across the tracks.

16 **Option:** Deleted; replaced with Option and Support paragraphs above

17 ~~A blank-out or changeable message sign and/or appropriate highway traffic signal indication or other~~  
18 ~~similar type sign may be used to prohibit turning movements toward the highway rail grade crossing during~~  
19 ~~preemption. The R3-1a and R3-2a signs shown in Figure 8B-1 may be used for this purpose.~~

20 **Support:**

21 ~~LRT operations can include the use of activated blank-out sign technology for turn prohibition signs. The~~  
22 ~~signs are typically used on roads paralleling a semi-exclusive or mixed-use LRT alignment where road users~~  
23 ~~might turn across the LRT tracks. A blank-out sign displays its message only when activated. When not~~  
24 ~~activated, the sign face is blank.~~

25 **Guidance:**

26 ~~An LRT-activated blank-out turn prohibition (R3-1a or R3-2a) sign should be used where *an intersection*~~  
27 ~~adjacent to a highway LRT crossing is controlled by STOP signs, or is controlled by traffic control signals~~  
28 ~~with permissive turn movements for road users crossing the tracks. *all three of the following conditions are*~~  
29 ~~present:~~

30 A. There is no active warning system for the LRT grade crossing, and

31 B. Vehicles travelling along a parallel roadway would normally be permitted to turn left or right to  
32 travel across tracks that are located within 100 feet of the highway-highway intersection or within the  
33 median of the intersection, and

34 C. The drivers turning at the highway-highway intersection are not controlled by a traffic control signal.

35 Edited to improve accuracy and consistency

36 **Option:** Deleted; redundant with Paragraphs 1-4

37 ~~An LRT-activated blank-out turn prohibition (R3-1a or R3-2a) sign may be used for turning movements~~  
38 ~~that cross the tracks.~~

39 ~~As an alternative to LRT-activated blank-out turn prohibition signs at intersections with traffic control~~  
40 ~~signals, exclusive traffic control signal phases such that all movements that cross the tracks have a steady red~~  
41 ~~indication may be used in combination with No Turn on Red (R10-11, R10-11a, or R10-11b) signs (see~~  
42 ~~Section 2B-53).~~

43 **Standard:**

44 Blank-out turn prohibition signs that are associated with preemption shall be visible or activated  
45 display their message only when the grade crossing restriction is in effect a preemption signal is being  
46 received from the railroad or LRT equipment. Edited to improve consistency

47 **Support:**

48 The provisions contained in Chapter 2L for blank-out signs are applicable to R3-1a and R3-2a signs.  
49 Added to improve consistency

1 **Section 8D.12 Pre-Signals at or Near Grade Crossings** **New Section with paragraphs from**  
2 **existing Section 8C.09 and edited to improve consistency**

3 *Guidance:*

4 If a ~~highway rail~~ grade crossing is located ~~within 50 feet (or within 75 feet for a highway that is regularly~~  
5 ~~used by multi-unit highway vehicles)~~ of in close proximity to an intersection controlled by a traffic control  
6 signal and the clear storage distance is less than the design vehicle length, the use of pre-signals to control  
7 traffic approaching the grade crossing in the direction towards the intersection should be considered.

8 If a grade crossing equipped with flashing-light signals, but without automatic gates, is located within  
9 200 feet of an intersection controlled by a traffic control signal, a pre-signal should be provided.

10 **Standard:**

11 ~~If used, the~~ Pre-signals faces shall display a steady red signal indication during the track clearance  
12 ~~portion interval of a~~ the signal preemption sequence to prohibit additional highway vehicles from  
13 ~~crossing the railroad track entering the minimum track clearance distance (see Section 8A.07).~~

14 Pre-signal faces shall not display green signal indications when the grade crossing flashing-light  
15 signal system is displaying flashing red indications.

16 *Guidance:*

17 Consideration should be given to using visibility-limited signal faces (see definition in Section  
18 ~~1A.13~~ 1C.02) at the intersection for the downstream signal faces that control the approach that is equipped  
19 with pre-signals.

20 A traffic control signal that is located downstream from a pre-signal should be evaluated for measures  
21 during normal (non-preempted) signal phasing that would minimize the possibility of left-turn vehicles  
22 queuing across the minimum track clearance distance (see Section 8A.07), such as providing an additional  
23 left-turn lane, reducing the cycle length, using split phasing or a lagging left-turn phase, and/or providing an  
24 extended green interval for the approach.

25 *Option:*

26 The duration of the extended green interval may be adjusted by vehicle detection located between the pre-  
27 signal and the downstream signalized intersection.

28 The pre-signal phase sequencing may be timed with an offset from the downstream signalized intersection  
29 such that the pre-signal's green signal indication terminates prior to the downstream intersection's green  
30 signal indication to minimize the possibility of stopping highway vehicles within the ~~railroad track area and~~  
31 ~~the area between the railroad track and the downstream signalized intersection~~ minimum track clearance  
32 distance (see Section 8A.07) and the clear storage distance ~~is generally kept clear of stopped highway~~  
33 ~~vehicles.~~

34 **Standard:**

35 If pre-signals are used, the queue clearance time (see Section 8D.10) shall be long enough to allow a  
36 design vehicle of maximum length stopped just inside the minimum track clearance distance (see  
37 Section 8A.07) to start up and move through the intersection, or to clear the tracks if there is sufficient  
38 clear storage distance. **Added to improve consistency with Queue Clearance Time definition in Part 1**

39 *Support:*

40 The storage area for left-turn and right-turn lanes at signalized intersections that are downstream from  
41 grade crossings sometimes extends from the signalized intersection back to and across the grade crossing. In  
42 such cases, drivers that are in the turn lane are required to make a straight-through movement when they cross  
43 the track(s) and then are required to make a turning movement when they reach the downstream signalized  
44 intersection.

45 *Guidance:*

46 A separate pre-signal face for the left-turn lane and/or right-turn lane should be provided in addition to  
47 the pre-signal signal faces provided for the through movement where both of the following conditions are met:

- 48 A. The storage area for the turn lane extends from the downstream signalized intersection back to and  
49 across the grade crossing, and

1 B. The green interval for the turning movement at the downstream intersection does not always begin  
2 and end simultaneously with the green interval for the adjacent through movement at the downstream  
3 intersection.

4 **Standard:**

5 All of the signal faces at a pre-signal shall be capable of displaying the following signal indications:  
6 CIRCULAR RED, CIRCULAR YELLOW, and straight-through GREEN ARROW. Left-turn  
7 GREEN ARROW, right-turn GREEN ARROW, and CIRCULAR GREEN signal indications shall not  
8 be used in pre-signal faces.

9 If a separate signal face is provided at a pre-signal for a left-turn and/or right-turn lane that  
10 extends from the downstream signalized intersection back to and across the grade crossing, the separate  
11 signal face shall be devoted exclusively to controlling traffic in the turn lane and:

12 A. Shall be visibility-limited from the adjacent through movement, or

13 B. A LEFT (RIGHT) LANE SIGNAL (R10-10b) sign shall be mounted adjacent to the separate  
14 signal face controlling traffic in a single turn lane or in the turn lane that is farthest from the  
15 adjacent through lane(s) if multiple turn lanes are present for a particular turning movement,  
16 and a LEFT (RIGHT) TURN LANE SIGNAL (R10-10c) sign shall be mounted adjacent to the  
17 separate signal face controlling traffic in the other turn lanes if multiple turn lanes are present  
18 for a particular turning movement.

19 **Support:**

20 Because the signal faces at a pre-signal do not always display the same signal indications as the  
21 downstream signalized intersection, the approach to the pre-signal is considered to be a separate approach  
22 from the approach to the downstream signalized intersection. This means that the provisions in Sections  
23 4D.04 through 4D.07 regarding the number of signal faces, the visibility and aiming of the signal faces, and  
24 the lateral and longitudinal positioning of the signal faces apply separately to the approach to the pre-signal.

25 The provisions in Section 4D.06 regarding the lateral positioning of separate turn signal faces are  
26 applicable to the separate signal faces that are provided at pre-signals for a turn lane that extends from the  
27 downstream signalized intersection back to and across the grade crossing.

28 **Standard-Guidance: Standard changed to Guidance**

29 ~~*If a pre-signal is installed at an interconnected highway-rail grade crossing near a signalized*~~  
30 ~~*intersection, A STOP HERE ON RED (R10-6 or R10-6a) sign shall should be installed near-at the pre-*~~  
31 ~~*signal's or at the stop line if used.*~~

32 **Standard:**

33 ~~**If there is a nearby pre-signal is installed upstream from a signalized intersection with insufficient**~~  
34 ~~**clear storage distance for a design vehicle, or the highway-rail grade crossing does not have gates,**~~ a No  
35 **Turn on Red (R10-11, R10-11a, or R10-11b) sign (see Section 2B.5464) shall be installed at the**  
36 **downstream intersection** for the approach that crosses the ~~railroad~~-track, if **applicable turns on red**  
37 **would otherwise be permitted.**

38 **Option:**

39 DO NOT STOP ON TRACKS (R8-8) signs may be installed in conjunction with a pre-signal.

40 ~~*At locations where a highway-rail grade crossing is located more than 50 feet (or more than 75 feet for a*~~  
41 ~~*highway regularly used by multi-unit highway vehicles) from an intersection controlled by a traffic control*~~  
42 ~~*signal, a pre-signal may be used if an engineering study determines a need.*~~

43 Pre-signal faces may be located either upstream or downstream from the grade crossing in order to  
44 provide the most effective display to road users approaching the grade crossing.

45 If pre-signal faces must be located within close proximity to the flashing-light signal system, the pre-  
46 signal faces may be mounted on the same overhead structure as the flashing-light signals.

47 **Section 8D.13 Queue Cutter Signals at or Near Grade Crossings** **New Section to improve**  
48 **consistency**

49 **Support:**

50 A queue cutter signal is a traffic control signal that controls one direction of traffic at a grade crossing to  
51 minimize the possibility of vehicles stopping within the minimum track clearance distance (see Section

1 8A.07). Although a queue cutter signal has a similar purpose as a pre-signal (see Section 8D.12), the  
2 difference is that a queue cutter signal is operated independently from the downstream signalized intersection,  
3 whereas a pre-signal is coordinated with the downstream signal.

4 Option:

5 At grade crossing locations where the queue from a bottleneck (usually a signalized intersection) that is  
6 downstream from the grade crossing frequently extends back to and across the grade crossing, a queue cutter  
7 signal may be installed.

8 A queue cutter signal may be operated in one of the following modes:

9 A. Actuated mode – the queue cutter signal operation is dependent on downstream detection of a  
10 growing queue.

11 B. Non-actuated mode – the queue cutter signal operates on a time-of-day plan based on anticipated  
12 downstream queues. This mode could be similar to the functional operation of a pre-signal.

13 C. Variable mode – the queue cutter signal operation varies between the actuated mode and the non-  
14 actuated mode based on the time of day, on queue detection, or both.

15 Support:

16 A pre-signal is generally used where the grade crossing is located less than 200 feet from a downstream  
17 signalized intersection. A non-actuated queue cutter signal is generally used where the grade crossing is  
18 located between 200 feet and 400 feet from a downstream bottleneck. An actuated queue cutter signal is  
19 generally used where the grade crossing is located more than 400 feet from a downstream bottleneck.

20 Standard:

21 All of the signal faces at a queue cutter signal shall be capable of displaying the following signal  
22 indications: CIRCULAR RED, CIRCULAR YELLOW, and straight-through GREEN ARROW. Left-  
23 turn GREEN ARROW, right-turn GREEN ARROW, and CIRCULAR GREEN signal indications shall  
24 not be used in queue cutter signal faces.

25 Option:

26 Queue cutter signal faces may be located either upstream or downstream from the grade crossing in order  
27 to provide the most effective display to road users approaching the grade crossing.

28 If queue cutter signal faces must be located within close proximity to the flashing-light signal system, the  
29 queue cutter signal faces may be mounted on the same overhead structure as the flashing-light signals.

30 Guidance:

31 A STOP HERE ON RED (R10-6 or R10-6a) sign should be installed at the queue cutter signal's stop line.

32 Option:

33 DO NOT STOP ON TRACKS (R8-8) signs may be installed in conjunction with a queue cutter signal.

34 Guidance:

35 Where a queue cutter signal operates in an actuated mode based on vehicle presence detection, the queue  
36 detector should be located to provide adequate distance to detect a growing queue, permit the queue cutter  
37 signal to complete any programmed minimum green or yellow change interval time, and then allow a design  
38 vehicle that lawfully crosses the queue cutter signal's stop line during the yellow change interval to clear the  
39 minimum track clearance distance (see Section 8A.07) before the growing queue extends to the grade  
40 crossing.

41 A queue cutter signal that is operating in an actuated mode and that is displaying CIRCULAR RED signal  
42 indications should continue to display CIRCULAR RED signal indications as long as the downstream  
43 detection system continues to detect the presence of a vehicular queue at the detection point on the departure  
44 side of the grade crossing.

45 Where a queue cutter signal operates in actuated mode based on vehicle presence detection,  
46 consideration should be given to the potential for turning movements between the grade crossing and the  
47 downstream bottleneck that could create an intermediate queue of vehicles. Supplemental queue detectors  
48 should be considered to detect the formation of these intermediate queues to activate the queue cutter signal.

49 When a queue cutter signal is always operated in a non-actuated mode based on anticipated queues,  
50 consideration should be given to operating the queue cutter signal in a flashing mode at times when the  
51 downstream queues are not expected to extend back to and across the grade crossing.

1 When a queue cutter signal is operated in a non-actuated mode, consideration should be given to  
2 coordinating the queue cutter signal with adjacent signals to provide for the progressive movement of traffic.

3 Option:

4 When a variable-mode queue cutter signal is operating in the non-actuated mode, the queue detector may  
5 be used to extend the display of the CIRCULAR RED signal indication as long as the downstream detection  
6 system continues to detect the presence of a vehicular queue at the detection point on the departure side of the  
7 grade crossing.

8 Standard:

9 A queue cutter signal shall be interconnected with the flashing-light signal system at the grade  
10 crossing.

11 Queue cutter signal faces shall not display green signal indications when the grade crossing  
12 flashing-light signal system is displaying flashing red indications.

13 When a queue cutter signal that is displaying straight-through GREEN ARROW signal indications  
14 (when operating in a steady, stop-and-go mode) or flashing CIRCULAR YELLOW signal indications  
15 (when operating in a flashing mode) is preempted by the approach of rail traffic, it shall immediately  
16 display steady CIRCULAR YELLOW signal indications during the yellow change interval (see Section  
17 4F.17) followed by steady CIRCULAR RED signal indications. The queue cutter signal shall continue  
18 to display the steady CIRCULAR RED signal indications until the rail traffic clears the grade crossing  
19 and no other rail traffic is detected.

20 A queue cutter signal operating in an actuated mode shall display straight-through GREEN  
21 ARROW signal indications except when it receives an actuation from the downstream vehicle presence  
22 detection system or is preempted by the approach of rail traffic. When it receives an actuation from the  
23 vehicle presence detection system, the queue cutter signal shall finish timing any active minimum green  
24 interval, if used, and then display steady CIRCULAR YELLOW signal indications during the yellow  
25 change interval (see Section 4F.17) followed by steady CIRCULAR RED signal indications. When no  
26 preemption call is present and the queue length is such that no vehicles are detected in the detection  
27 zone of the downstream vehicle presence detection system, the queue cutter signal shall finish timing  
28 any active minimum red interval, if used, and then return to the display of straight-through GREEN  
29 ARROW signal indications.

30 The failure modes of the queue cutter signal control system and vehicle presence detection circuitry  
31 shall be evaluated and accounted for in the design of any such system. Fail-safe design techniques shall  
32 be used in the system design. The vehicle presence detection system shall incorporate health monitoring  
33 and self-check operation to validate the proper functioning of the system. If the queue detector fails to  
34 properly self-check or the health circuit indicates a fault, the queue cutter signal shall display flashing  
35 CIRCULAR RED signal indications until the normal functioning of the system is restored.

36 Support:

37 The storage area for left-turn and right-turn lanes at signalized intersections that are downstream from  
38 grade crossings sometimes extends from the signalized intersection back to and across the grade crossing. In  
39 such cases, drivers that are in the turn lane are required to make a straight-through movement when they cross  
40 the track(s) and then are required to make a turning movement when they reach the downstream signalized  
41 intersection.

42 Guidance:

43 A separate queue cutter signal face for the left-turn lane and/or right-turn lane should be provided in  
44 addition to the queue cutter signal faces provided for the through movement where both of the following  
45 conditions are met:

46 A. The storage area for the turn lane extends from the downstream signalized intersection back to and  
47 across the grade crossing, and

48 B. The green interval for the turning movement at the downstream intersection does not always begin  
49 and end simultaneously with the green interval for the adjacent through movement at the downstream  
50 intersection.

51 **Standard: Added to reflect Official Interpretation 8(09)-19(I)**

1 If a separate signal face is provided at a queue cutter signal for a left-turn and/or right-turn lane  
2 that extends from the downstream signalized intersection back to and across the grade crossing, the  
3 separate signal face shall be devoted exclusively to controlling traffic in the turn lane and:

4 A. Shall be visibility-limited from the adjacent through movement, or

5 B. A LEFT (RIGHT) LANE SIGNAL (R10-10b) sign shall be mounted adjacent to the separate  
6 signal face controlling traffic in a single turn lane or in the turn lane that is farthest from the  
7 adjacent through lane(s) if multiple turn lanes are present for a particular turning movement,  
8 and a LEFT (RIGHT) TURN LANE SIGNAL (R10-10c) sign shall be mounted adjacent to the  
9 separate signal face controlling traffic in the other turn lanes if multiple turn lanes are present  
10 for a particular turning movement.

11 Support:

12 Because the signal faces at a queue cutter signal do not always display the same signal indications as the  
13 downstream signalized intersection, the approach to the queue cutter signal is considered to be a separate  
14 approach from the approach to the downstream signalized intersection. This means that the provisions in  
15 Sections 4D.04 through 4D.07 regarding the number of signal faces, the visibility and aiming of the signal  
16 faces, and the lateral and longitudinal positioning of the signal faces apply separately to the approach to the  
17 queue cutter signal.

18 The provisions in Section 4D.06 regarding the lateral positioning of separate turn signal faces are  
19 applicable to the separate signal faces that are provided at queue cutter signals for a turn lane that extends  
20 from the downstream signalized intersection back to and across the grade crossing.

21 While queue cutter signals and queue jumping signals have similar names, their purpose, design, and  
22 operation are quite different. Care must be taken to avoid confusion between queue cutter signals used in  
23 conjunction with a grade crossing and queue jumping signals used with transit operations.

24 **Section 8D.14 Warning Beacons or LED-Enhanced Warning Signs at Grade Crossings** **New**  
25 **Section to improve consistency**

26 Option:

27 Warning Beacons (see Section 4S.03) or LEDs within the legend, symbol, or border of the sign (see  
28 Section 2A.20) may be used to supplement warning signs installed at or on an approach to a grade crossing if  
29 additional emphasis is desired for the warning sign. The Warning Beacon or LED-enhanced sign may operate  
30 continuously or be activated upon the approach or presence of rail traffic.

31 Support:

32 Most of the warning signs that are used at or on an approach to a grade crossing warn of physical  
33 conditions that exist at the grade crossing regardless of whether rail traffic is approaching or occupying the  
34 grade crossing. In these cases, a Warning Beacon or LED-enhanced sign would typically be operated  
35 continuously to enhance the conspicuity of the sign.

36 Some warning signs, such as a BE PREPARED TO STOP (W3-4) sign (see Section 2C.36), if used in  
37 advance of a grade crossing and supplemented with a WHEN FLASHING (W16-13P) plaque, provide  
38 information that is typically not applicable except when rail traffic is approaching or occupying the grade  
39 crossing. Likewise, a special word message sign (see Section 2A.04) with a legend such as TRAIN WHEN  
40 FLASHING provides notice of a condition that only exists when rail traffic is approaching or occupying the  
41 grade crossing. These signs would not typically be operated continuously, but instead only when the  
42 condition is present.

43 Standard:

44 If a Warning Beacon or LEDs within the legend, symbol, or border of the sign is activated by the  
45 approach or presence of rail traffic in conjunction with a warning sign that includes the legend WHEN  
46 FLASHING either on the sign itself or on a supplemental plaque, the activation of the Warning Beacon  
47 or LEDs shall be accomplished by a supervised preemption interconnection using fail-safe design  
48 principles (see Section 8D.10) between the control circuits of the grade crossing warning system and the  
49 Warning Beacon or LED-enhanced sign.

50 Support:

1 In the event of a system failure, the normal fault state using a fail-safe interconnection for a Warning  
2 Beacon or LED-enhanced sign that is activated by the approach or presence of rail traffic at the grade crossing  
3 would be for the Warning Beacon or LEDs to operate when no rail traffic is present.

4 Option:

5 A Warning Beacon or LED-enhanced sign that is activated by the approach or presence of rail traffic at  
6 the grade crossing may continue to operate for a period of time following the passage of the rail traffic to  
7 permit the standing queue to dissipate.

8 Guidance:

9 If a Warning Beacon or LED-enhanced sign is activated by the approach or presence of rail traffic at the  
10 grade crossing, the Warning Beacon or LED-enhanced sign should begin operating prior to the activation of  
11 the flashing-light signals at the grade crossing based upon the typical travel time from the location of the  
12 Warning Beacon or LED-enhanced sign to the stop line for the grade crossing.

13 If a Warning Beacon or LED-enhanced sign that is activated by the approach or presence of rail traffic at  
14 the grade crossing is operated by commercial AC power, a back-up power system that is capable of providing  
15 a minimum operating period sufficient to allow the implementation of alternative traffic control measures  
16 should be provided.

17 **Section ~~8C.10~~ 8D.15 Traffic Control Signals at or Near Highway-LRT Grade Crossings**

18 **Support:**

19 There are two types of traffic control signals for controlling vehicular and LRT movements at interfaces  
20 of the two modes. The first is the standard traffic control signal described in Part 4, which is the focus of this  
21 Section. The other type of signal is referred to as an LRT signal and is discussed in Section ~~8C.11~~ 8D.16.

22 **Standard:**

23 **The provisions of Part 4 and Sections ~~8C.09~~ 8D.09 through 8D.13 relating to traffic control signal**  
24 **design, installation, and operation, including interconnection with nearby automatic gates or flashing-**  
25 **light signals, shall be applicable as appropriate where traffic control signals are used at highway-LRT**  
26 **grade crossings.**

27 **If traffic control signals are in operation at an LRT grade crossing that is used by pedestrians,**  
28 **bicyclists, and/or other non-motorized road users, an audible device such as a bell shall also be provided**  
29 **and shall be operated in conjunction with the traffic control signals.**

30 *Guidance:*

31 ~~*When a highway-LRT grade crossing equipped with a flashing light signal system is located within 200*~~  
32 ~~*feet of an intersection or midblock location controlled by a traffic control signal, the traffic control signal*~~  
33 ~~*should be provided with preemption in accordance with Section 4D.27.*~~ **This text was relocated to new**  
34 **Section 8A.02**

35 ~~*Coordination with the flashing light signal system should be considered for traffic control signals located*~~  
36 ~~*more than 200 feet from the crossing. Factors to be considered should include traffic volumes, highway*~~  
37 ~~*vehicle mix, highway vehicle and LRT approach speeds, frequency of LRT traffic, and queue lengths.*~~  
38 **Paragraph deleted; redundant with new Section 8D.10**

39 *If the highway traffic signal has emergency-vehicle preemption capability, it should be coordinated with*  
40 *LRT operation.*

41 *Where LRT operates in a wide median, highway vehicles crossing the tracks and being controlled by both*  
42 *near and far side traffic signal faces should receive a protected left-turn ~~green~~ phase from the far side signal*  
43 *face to clear highway vehicles from the crossing when LRT ~~equipment~~ traffic is approaching the crossing.*

44 **Option:**

45 Green indications may be provided during LRT phases for highway vehicle, pedestrian, and bicycle  
46 movements that do not conflict with LRT movements.

47 A traffic control signals may be installed in addition to ~~Four-Quadrant Exit~~ Gate systems and automatic  
48 gates at a highway-LRT grade crossing if the crossing occurs within a highway-highway intersection and if  
49 the installation of the traffic control signals ~~meet~~ can be justified based on the warrants described in Chapter  
50 4C.

1 At a location other than an intersection, when LRT speeds are less than 25 mph, traffic control signals  
2 alone may be used to control road users at highway-LRT grade crossings only when justified by ~~an~~  
3 ~~engineering study~~ [a Diagnostic Team](#).

4 **Support:**

5 Typical circumstances ~~may~~ **might** include:

- 6 A. Geometric conditions preclude the installation of highway-LRT grade crossing warning devices.
- 7 B. LRT vehicles share the same roadway with road users.
- 8 C. Traffic control signals already exist.

9 **Support:**

10 Section ~~4D.27~~[4F.18](#) contains information regarding traffic control signals at or near highway-LRT grade  
11 crossings that are not equipped with highway-LRT grade crossing warning devices.

12 Section 4C.10 describes the Intersection Near a Grade Crossing signal warrant that is intended for use at a  
13 location where the proximity to the intersection of a grade crossing on an intersection approach controlled by  
14 a STOP or YIELD sign is the principal reason to consider installing a traffic control signal.

15 **Guidance:**

16 *When a highway-LRT grade crossing exists within a signalized intersection, consideration should be*  
17 *given to providing separate turn signal faces (see definition in Section ~~1A.13~~[1C.02](#)) for the movements*  
18 *crossing the tracks.*

19 **Standard:**

20 **Separate turn signal faces that are provided for turn movements toward the crossing shall display a**  
21 **steady red indication during the approach and/or passage of LRT traffic.**

22 **Guidance:**

23 *When a signalized intersection that is located within 200 feet of a highway LRT grade crossing is*  
24 *preempted, all existing turning movements toward the highway LRT grade crossing should be prohibited.*

25 **Deleted; redundant with new Section 8D.11**

26 **Support:**

27 Section ~~8B-08~~[8D.11](#) contains information regarding the prohibition of turning movements toward the  
28 crossing during preemption.

29 ~~Part 4 contains information regarding signal phasing and timing requirements.~~

30 **Section ~~8C.11~~[8D.16](#) Use of ~~Traffic Control~~ LRT Signals for Control of LRT Vehicles at**  
31 **~~Highway-LRT~~ Grade Crossings**

32 **Guidance: Deleted to improve clarity and consistency**

33 *LRT movements in semi-exclusive alignments at non-gated grade crossings that are equipped with traffic-*  
34 *control signals should be controlled by special LRT signal indications.*

35 *LRT traffic control signals that are used to control LRT movements only should display the signal*  
36 *indications illustrated in Figure ~~8C-3~~.*

37 **Support:**

38 ~~Section 4D.27 contains information about the use of the signal indications shown in Figure 8C-3 for the~~  
39 ~~control of exclusive bus movements at “queue-jumper lanes” and for the control of exclusive bus rapid transit~~  
40 ~~movements on semi-exclusive or mixed-use alignments.~~ **Relocated to below**

41 **Option: Deleted to improve clarity and consistency**

42 ~~Standard traffic control signals may be used instead of LRT traffic control signals to control the~~  
43 ~~movement of LRT vehicles (see Section ~~8C.10~~).~~

44 **Option:**

45 LRT signals [indications](#) may be used at grade crossings and at intersections in mixed-use alignments in  
46 conjunction with standard traffic control signals where special LRT signal phases are used to accommodate  
47 turning LRT vehicles or where additional LRT clearance time is desirable. **Relocated from below**

48 **Standard: The order of these paragraphs has been reversed**

1 If the LRT crossing control is separate from the intersection control, the two shall be  
2 interconnected. The LRT signal phase shall not be terminated until after the LRT vehicle has cleared  
3 the crossing or intersection.

4 If a separate set of standard traffic control signal indications (red, yellow, and green circular and  
5 arrow indications) is used to control LRT movements, the indications shall be positioned so they are not  
6 visible to motorists, pedestrians, and bicyclists (see Section 4D.1205).

7 Guidance:

8 If a signal face used to control LRT movements cannot be positioned where the indications are not visible  
9 to road users, the LRT signal indications shown in Figure 8D-3 should be used. Added to improve  
10 consistency

11 Standard:

12 If special LRT signal indications such as those shown in Figure 8D-3 are used, the color of the signal  
13 indications shall be white. Added to improve consistency

14 Option:

15 If used, individual LRT signal sections may be displayed to form clustered signal faces or multiple LRT  
16 signal indications may be displayed in an individual housing.

17 Option:

18 ~~LRT signals may be used at grade crossings and at intersections in mixed-use alignments in conjunction with~~  
19 ~~standard traffic control signals where special LRT signal phases are used to accommodate turning LRT~~  
20 ~~vehicles or where additional LRT clearance time is desirable.~~ Relocated to above

21 Guidance:

22 ~~LRT signal faces should be separated~~ located at least 3 feet ~~vertically or horizontally~~ from the nearest  
23 highway traffic signal face for the same approach ~~by at least 3 feet measured either horizontally~~  
24 ~~perpendicular to the approach between the centers of the signal faces or vertically from the center of the~~  
25 ~~lowest signal indication of the top signal face to the center of the highest signal indication of the bottom signal~~  
26 ~~face.~~ Edited to improve clarity

27  
28 Support:

29 Section ~~4D.27~~4F.18 contains information about the use of the LRT signal indications shown in Figure 8D-  
30 4 for the control of exclusive bus movements at “queue jumper lanes” and for the control of exclusive bus  
31 rapid transit movements on ~~semi-exclusive or~~ mixed-use alignments. Relocated from above

32 **Figure 8D-3. Light Rail Transit Signals**

33 ~~Section 8C.12 Grade Crossings Within or In Close Proximity to Circular Intersections~~ This section has  
34 been relocated to new Section 8A.12

35 ~~Section 8C.13 Pedestrian and Bicycle Signals and Crossings at LRT Grade Crossings~~

36 Guidance:

37 ~~Where LRT tracks are immediately adjacent to other tracks or a road, pedestrian signalization should be~~  
38 ~~designed to avoid having pedestrians wait between sets of tracks or between the tracks and the road. If~~  
39 ~~adequate space exists for a pedestrian refuge and is justified based on engineering judgment, additional~~  
40 ~~pedestrian signal heads, signing, and detectors should be installed (see Section 4E.08).~~ The first sentence of  
41 this paragraph was relocated to new Section 8E.10 and the second sentence was relocated to new  
42 Section 8E.07

43 Standard:

44 ~~When used at LRT crossings, pedestrian signal heads shall comply with the provisions of Section~~  
45 ~~4E.04.~~ Deleted; redundant with new Section 8E.08

46 Guidance:

47 ~~Flashing light signals (see Figure 8C-4) with a Crossbuck (R15-1) sign and an audible device should be~~  
48 ~~installed at pedestrian and bicycle crossings where an engineering study has determined that the sight~~  
49 ~~distance is not sufficient for pedestrians and bicyclists to complete their crossing prior to the arrival of the~~

1 ~~LRT traffic at the crossing, or where LRT speeds exceed 35 mph.~~ **This paragraph was relocated to new**  
2 **Section 8E.08**

3 ~~If an engineering study shows that flashing light signals with a Crossbuck sign and an audible device~~  
4 ~~would not provide sufficient notice of an approaching LRT traffic, the LOOK (R15-8) sign (see Figure 8C-4)~~  
5 ~~and/or pedestrian gates should be considered (see Figures 8C-5 through 8C-7).~~ **This paragraph was**  
6 **relocated to new Section 8E.08**

7 Support:

8 ~~A pedestrian gate is similar to an automatic gate except the gate arm is shorter.~~ **Deleted; redundant with**  
9 **new Section 8E.09**

10 ~~The swing gate alerts pedestrians to the LRT tracks that are to be crossed. Swing gates are designed to~~  
11 ~~open away from the tracks, requiring users to pull the gate open to cross, but permitting a quick exit from the~~  
12 ~~trackway, and to automatically close.~~ **Deleted; redundant with new Section 8E.06**

13 Option:

14 ~~Swing gates may be installed across pedestrian and bicycle walkways (see Figure 8C-8).~~ **Deleted;**  
15 **redundant with new Section 8E.06**

16 ~~Pedestrian barriers at offset crossings may be used at pedestrian and bicycle crossings as passive devices~~  
17 ~~that force users to face approaching LRT before entering the trackway (see Figures 8C-9 and 8C-10).~~ **This**  
18 **paragraph was relocated to new Section 8E.06**

1 **CHAPTER ~~8D~~8E. PATHWAY AND SIDEWALK GRADE CROSSINGS**

2 **Section ~~8D.01~~8E.01 Purpose**

3 Support:

4 Traffic control for pathway and sidewalk grade crossings includes all signs, signals, markings, other  
5 warning devices, and their supports at pathway and sidewalk grade crossings and along pathway and sidewalk  
6 approaches to grade crossings. The function of this traffic control is to promote safety and provide effective  
7 operation of both rail and pathway or sidewalk traffic at pathway or sidewalk grade crossings.

8 ~~Except as specifically provided in this Chapter, sidewalks are considered to be part of a highway rail or~~  
9 ~~highway LRT grade crossing rather than a pathway grade crossing, and are covered by the provisions of~~  
10 ~~Chapters 8B and 8C rather than by the provisions of this Chapter. However, many of The Other physical~~  
11 ~~treatments that are outlined described in this Chapter that are also applicable to pathways and sidewalks~~  
12 ~~adjacent to highway rail or highway LRT at grade crossings, including such as detectable warnings, swing~~  
13 ~~gates, and automatic gates fencing, provide increased safety for pathway and sidewalk users.~~ Edited to reflect  
14 reorganization of Part 8

15 Crosswalks markings at intersections where pedestrians cross LRT tracks in mixed-use alignments are  
16 covered by the provisions of Chapter 3C rather than by the provisions of this Chapter.

17 Figure 8E-1 illustrates the difference between a pathway grade crossing and a sidewalk grade crossing. A  
18 pathway is frequently placed in its own right-of-way on an alignment that is independent of any roadway. If a  
19 pathway is built parallel to a roadway, it is physically separated from the roadway by an open space or barrier  
20 such that the traffic control devices for the roadway grade crossing do not exert an influence over or provide  
21 adequate warning to pathway users. A sidewalk runs parallel to a roadway within the highway right-of-way  
22 and is close enough to the edge of the roadway’s traveled way that the traffic control devices for the roadway  
23 grade crossing can frequently exert an influence over or provide adequate warning to pathway users.  
24 Pathways are typically used by both pedestrians and bicyclists, whereas sidewalks are typically used only by  
25 pedestrians. Added to improve clarity and to support Figure 8E-1

26 **Figure 8E-1. Example of Pathway and Sidewalk Placements**

27 **Section ~~8D.02~~8E.02 Use of Standard Devices, Systems, and Practices**

28 *Guidance:*

29 The pathway or sidewalk user’s ability to detect the presence of approaching rail traffic should be  
30 considered in determining the type and placement of traffic control devices at pathway or sidewalk grade  
31 crossings.

32 The traffic control devices, including the appropriate traffic control system to be used, and other physical  
33 treatments at a pathway or sidewalk grade crossing should be designed and developed by a Diagnostic Team  
34 that includes the public agency with jurisdiction over the pathway or sidewalk and the regulatory agency with  
35 statutory authority, if applicable, should jointly determine the need and selection of devices at a pathway  
36 grade crossing, including the appropriate traffic control system to be used. Edited to improve consistency  
37 with next Guidance in Section 8A.01

38 At skewed grade crossings, the adjustment, re-alignment, or relocation of existing sidewalk grade  
39 crossings should be considered when determining the placement of traffic control devices for roadway users.  
40 Edited to improve consistency

41 Support: Paragraphs added to improve clarity consistency

42 Pedestrian safety is enhanced when pathways and sidewalks are designed such that they cross the tracks at  
43 as close to a right angle as practical. The casters of wheelchairs and the wheels of bicycles could fall into and  
44 might be constrained in the flangeway gap at a skewed crossing. The flangeway gap is typically 2.5 inches at  
45 LRT grade crossings and 3 inches at railroad grade crossings.

46 It is desirable that pathways and sidewalks be designed such that they maintain a relatively consistent  
47 horizontal alignment and profile from the nearest rail to the detectable warning (if present), from the nearest  
48 rail to the stop line (if present), or within 12 feet from the nearest rail, whichever distance is longer, on each  
49 approach to the crossing. Providing a pedestrian refuge area in advance of the stop line or the detectable  
50 warning surface so that pedestrians have a place to wait while rail traffic approaches and occupies the crossing  
51 can be beneficial to pedestrian safety.

1 When designing new sidewalk grade crossings, placing the sidewalk outside of the area occupied by grade  
2 crossing traffic control devices for vehicular traffic is desirable (see Figures 8E-2 and 8E-3). This includes  
3 making sure that the counterweights and support arms for the automatic gates for vehicular traffic do not  
4 obstruct the sidewalk when the gate is fully lowered.

5 Additional information regarding the design and alignment of pathways and sidewalks is contained in the  
6 “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)” (see  
7 Section 1A.05).

8 **Figure 8E-2. Example of Sidewalk Placements Outside of a Grade Crossing Gate (Right**  
9 **Angle)**

10 **Figure 8E-3. Example of Sidewalk Placements Outside of a Grade Crossing Gate (Skewed**  
11 **Crossing)**

## 12 Section ~~8D.03~~ 8E.03 Pathway and Sidewalk Grade Crossing Signs and Markings

### 13 Standard:

14 Pathway grade crossing signs shall be standard in shape, legend, and color.

15 ~~Traffic control devices mounted adjacent to pathways at a height of less than 8 feet measured~~  
16 ~~vertically from the bottom edge of the device to the elevation of the near edge of the pathway surface~~  
17 ~~shall have a minimum lateral offset of 2 feet from the near edge of the device to the near edge of the~~  
18 ~~pathway (see Figure 9B-1).~~ Relocated to below

19 The minimum sizes of sidewalk grade crossing signs that are intended to be viewed only by  
20 pedestrians and of pathway grade crossing signs shall be as shown in the shared-use path column in  
21 Tables 9B-1 and 9C-1. Relocated from below

22 Guidance: Relocated from below, Standard changed to Guidance, and edited to improve clarity

23 *Pathway grade crossing traffic control devices ~~shall~~ should be located such that no portion of the physical*  
24 *features of the device, including the support hardware, is closer than a minimum of 12 feet from the center of*  
25 *the nearest track.*

### 26 Standard:

27 The minimum mounting height for post-mounted signs ~~on~~ adjacent to pathways and sidewalks shall  
28 be 4 feet, measured vertically from the bottom edge of the sign to the elevation of the nearest edge of the  
29 pathway or sidewalk surface (see Figure 9AB-1).

30 ~~Pathway grade crossing traffic control devices shall be located a minimum of 12 feet from the center~~  
31 ~~of the nearest track.~~ Relocated to above

32 ~~The minimum sizes of pathway grade crossing signs shall be as shown in the shared-use path~~  
33 ~~column in Table 9B-1.~~ Relocated to above

34 ~~When~~ If overhead traffic control devices are ~~used on~~ placed above pathways, the clearance from the  
35 bottom edge of the device to the pathway surface directly under the sign or device shall be at least 8  
36 feet.

37 *Guidance:*

38 *If overhead traffic control devices are placed above pathways that are used by equestrians, the clearance*  
39 *from the bottom edge of the device to the pathway surface directly under the sign or device should be at least*  
40 *10 feet.* Added to improve consistency

### 41 Standard:

42 If overhead traffic control devices are placed above sidewalks, the clearance from the bottom edge  
43 of the device to the sidewalk surface directly under the sign or device shall be at least 7 feet. Added to  
44 improve clarity and consistency

45 Traffic control devices mounted adjacent to pathways at a height of less than 8 feet measured  
46 vertically from the bottom edge of the device to the elevation of the nearest edge of the pathway surface  
47 shall have a minimum lateral offset of 2 feet from the nearest edge of the device to the nearest edge of  
48 the pathway (see Figure 9AB-1). Relocated from above

49 Traffic control devices mounted adjacent to sidewalks at a height of less than 7 feet measured  
50 vertically from the bottom edge of the device to the elevation of the nearest edge of the sidewalk surface

1 shall have a minimum lateral offset of 2 feet from the nearest edge of the device to the nearest edge of  
2 the sidewalk. **Added to improve consistency**

3 Guidance:

4 *If pathway users include those who travel faster than pedestrians, such as bicyclists or skaters, ~~the use of~~*  
5 *warning signs ~~and pavement markings~~ should be installed in advance of the pathway grade crossing (see*  
6 *Figure ~~8D-1~~8E-4) ~~should be considered.~~*

7 Option:

8 The Skewed Crossing (W10-12) sign (see Section 8B.21) may be used at a skewed pathway or sidewalk  
9 grade crossing to warn pathway or sidewalk users that the tracks are not perpendicular to the pathway or  
10 sidewalk. **Added to improve consistency**

11 The LOOK (R15-8) sign may be used at a pathway or sidewalk grade crossing to inform pathway or  
12 sidewalk users to look in both directions prior to crossing the track(s). **Added to improve consistency and**  
13 **due to deletion of existing Section 8B.17**

14 Guidance:

15 *If a LOOK (R15-8) sign is used at a pathway or sidewalk grade crossing, it should be mounted on a*  
16 *separate post that is further from the pathway or sidewalk than the Crossbuck sign or Crossbuck Assembly.*  
17 **Added to increase consistency and due to deletion of existing Section 8B.17**

### 18 **Figure 8E-4. Example of Signing and Markings for a Pathway Grade Crossing**

### 19 **Section ~~8D.04~~8E.04 Stop Lines, Edge Lines, and Detectable Warnings**

20 Guidance: **Added to improve consistency**

21 *If pathway users include those who travel faster than pedestrians, such as bicyclists or skaters, pavement*  
22 *markings should be installed in advance of the pathway grade crossing (see Figure 8E-4).*

23 *A stop line should be provided at a pathway grade crossing if the surface where the marking is to be*  
24 *applied is capable of retaining the application of the marking.*

25 Option: **Added to improve consistency**

26 A stop line may be provided at a sidewalk grade crossing if the surface where the marking is to be applied  
27 is capable of retaining the application of the marking.

28 Guidance:

29 *If used at pathway or sidewalk grade crossings, the ~~pathway~~ stop line should be a transverse line at the*  
30 *point where a pathway or sidewalk user is to stop. The ~~pathway~~ stop line should be placed at least 2 feet*  
31 *~~further-upstream~~ from ~~the nearest rail than~~ the automatic gate, counterweight, ~~or~~ flashing-light signals, or*  
32 *Crossbuck assembly (if any of these are present) ~~is placed~~, and at least 12 feet from the nearest rail.*

33 Option:

34 Edge lines (see Section 3B.069) to delineate the designated user route may be used on the approach to and  
35 across the tracks at a pathway grade crossing, a sidewalk ~~at a highway rail or highway LRT~~ grade crossing, or  
36 a station crossing ~~to delineate the designated pathway user route~~ if the surface where the marking is to be  
37 applied is capable of retaining the application of the marking. **Edited to improve consistency**

38 Support:

39 Edge line delineation can be beneficial where the distance across the tracks is long, commonly because of  
40 a skewed grade crossing or because of multiple tracks, or where the pathway or sidewalk surface is  
41 immediately adjacent to a traveled way.

42 ~~Detectable warning surfaces (see Section 3B.18) that contrast visually with adjacent walking surfaces,~~  
43 ~~either light on dark or dark on light, can be used to warn pedestrians about the locations of the tracks at a~~  
44 ~~grade crossing. Information regarding the design and placement of detectable warning surfaces is contained~~  
45 ~~in the “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)” (see~~  
46 ~~Section 1A.1105) contains specifications for design and placement of detectable warning surfaces.~~ **Edited to**  
47 **improve consistency**

48 Standard: **Edited to improve consistency**

1 Detectable warnings (see Chapter 3C) shall be used at pathway grade crossings where pedestrian  
2 travel is permitted and at sidewalk grade crossings and shall extend across the full width of the pathway  
3 or sidewalk.

4 **Guidance:** Added to improve consistency and support the dimensions in Figure 8E-5

5 *The width of the detectable warning should be at least 2 feet.*

6 *Detectable warnings should be placed immediately downstream from the pathway or sidewalk stop line (if*  
7 *a stop line is present) or should be incorporated into and made a part of the stop line. The downstream edge*  
8 *of the detectable warning should be located no less than 12 feet from the center of the nearest track (see*  
9 *Figures 8E-4).*

10 *If the distance between the centers of two adjacent tracks at a sidewalk or pathway grade crossing is more*  
11 *than 38 feet, additional detectable warnings should be used to designate the limits of the pedestrian refuge*  
12 *area (see Figure 8E-5).*

13 **Figure 8E-5. Example of a Refuge Area and the Use of Markings on a Sidewalk Grade**  
14 **Crossing**

15 **Section ~~8D.05~~ 8E.05 Passive Traffic Control Devices for Pathway Grade Crossings—**  
16 **Crossbuck Assemblies**

17 **Standard:**

18 ~~Except as provided in Paragraph 2, where active traffic control devices are not used~~ Where the  
19 nearest edge of a passive pathway or sidewalk grade crossing is located more than 25 feet from the  
20 center of the nearest traffic control warning device at a grade crossing, a Crossbuck Assembly (see  
21 Figure 8E-6) shall be installed on each approach to a the pathway or sidewalk grade crossing. The  
22 distance shall be measured perpendicular to the traveled way from the center of the support post of a  
23 Crossbuck Assembly at a passive grade crossing or from the center of the mast of an active traffic  
24 control warning device at an active grade crossing to the nearest edge of the pathway or sidewalk  
25 surface where it crosses the track(s) (see Figure 8E-2). Edited to improve clarity and support the  
26 **dimensions in Figure 8E-2**

27 **Option:**

28 ~~The A~~ Crossbuck Assembly may be ~~omitted at station crossings and~~ installed on the approaches to a  
29 pathway or sidewalk grade crossing ~~that where the nearest edge of the pathway or sidewalk is located within~~  
30 25 feet or less from ~~of the traveled way~~ center of the nearest traffic control warning device at a ~~highway rail~~  
31 ~~or highway LRT~~ grade crossing. **Edited to improve clarity**

32 The Crossbuck Assembly may be omitted at station crossings. **This sentence is being retained from**  
33 **Paragraph 2 of existing Section 8D.05**

34 **Guidance:** **These paragraphs relocated to new Section 8E.06**

35 *The pathway user's ability to detect the presence of approaching rail traffic should be considered in*  
36 *determining the type and placement of traffic control devices or design features (such as fencing or swing*  
37 *gates).*

38 *Nighttime visibility should be considered if design features (such as fencing or swing gates) are used to*  
39 *channelize pathway users.*

40 *If automatic gates and swing gates are used, the pathway should be channelized to direct users to the*  
41 *entrance to and exit from the pathway grade crossing.*

42 **Standard:** **This text was relocated to new Section 8E.06**

43 ~~If used, swing gates shall be designed to open away from the track(s) so that pathway users can~~  
44 ~~quickly push the gate open when moving away from the track(s). If used, swing gates shall be designed~~  
45 ~~to automatically return to the closed position after each use.~~

46 **Option:** **These paragraphs relocated to new Section 8E.06**

47 ~~When used in conjunction with automatic gates at pathway grade crossings, swing gates may be equipped~~  
48 ~~with a latching device that permits the gate to be opened only from the track side of the gate.~~

49 **Support:**

1 The “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)”  
2 (see Section 1A.11) contains information regarding spring hinges and door and gate opening forces for swing  
3 gates.

4 The retroreflective strip on the back of the support may be omitted on the Crossbuck support at a pathway  
5 or sidewalk grade crossing. **Added to improve clarity**

6 **Standard:** **Added to support dimensions in Figure 8E-6**

7 The minimum height, measured vertically from the bottom of the YIELD or STOP sign to the  
8 elevation of the near edge of the pathway or sidewalk, of Crossbuck Assemblies installed on pathways  
9 or sidewalks shall be 4 feet where the lateral offset to the nearest edge of the sign is at least 2 feet and  
10 shall be 7 feet where the lateral offset to the nearest edge of the sign is less than 2 feet (see Figure 8E-6).

11 The minimum lateral offset, measured horizontally from the nearest edge of the pathway or  
12 sidewalk to the nearest edge of the Crossbuck Assembly signs, shall be 0 feet for sidewalks and 2 feet for  
13 pathways (see Figure 8E-6).

#### 14 **Figure 8E-6. Example of a Crossbuck Assembly for a Pathway or Sidewalk Grade** 15 **Crossing**

### 16 Section 8E.06 Passive Traffic Control Devices – Swing Gates, Fencing, and Pedestrian 17 Barriers **New section with paragraphs relocated from existing Section 8D.05**

18 *Guidance:*

19 *The pathway or sidewalk user’s ability to detect the presence of approaching rail traffic should be*  
20 *considered in determining the type and placement of ~~traffic control devices or design features (such as fencing~~*  
21 *~~or swing gates, fencing, and pedestrian barriers).~~*

22 *Nighttime visibility should be considered if design features (such as fencing or swing gates) are used to*  
23 *channelize pathway users.* **Deleted; redundant with new Support paragraph below**

24 **Support:** **Guidance changed to Support**

25 If Where automatic gates and swing gates are used, it is desirable to design the pathway or sidewalk  
26 should be in a manner that channelized ~~s to or~~ directs users to the entrance to and exit from the pathway or  
27 sidewalk grade crossing.

28 **Standard:** **Standard changed to Support**

29 ~~If used,~~ Swing gates (see Figures 8E-5, 8E-7, 8E-11, and 8E-12) ~~shall be~~ are designed to open away from  
30 the track(s) so that pathway or sidewalk users can quickly push the swing gate open when moving away from  
31 the track(s). ~~If used, swing gates shall be designed, and~~ to automatically return to the closed position after  
32 each use.

33 It is important to use retroreflective material, appropriate object markers (see Section 9C.09), and/or signs  
34 on swing gates, maze fencing, or pedestrian barriers that are placed at pathway or sidewalk grade crossings.  
35 Illumination of such areas can also be beneficial. **Added to improve clarity**

36 *Option:*

37 When used in conjunction with automatic gates at a pathway or sidewalk grade crossings, swing gates  
38 may be equipped with a latching device that permits the swing gate to be opened only from the track side of  
39 the swing gate.

40 **Support:**

41 Latching devices that are used on swing gates need to be designed in a manner such that they are operable  
42 by all users of the pathway or sidewalk. **Added to improve consistency**

43 *Guidance:*

44 A swing gate should be equipped with a PUSH TO EXIT (I13-2) sign on the track side of the swing gate,  
45 and a DO NOT ENTER (R5-1) sign on the side of the swing gate facing away from the tracks. **Added to**  
46 **improve consistency**

47 *Option:*

48 A push bar, kick plate, or similar device may be used on a swing gate. **Added to improve consistency**

49 **Support:**

1 The “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)”  
2 (see Section 1A.1105) contains information regarding ~~spring hinges and door and gate opening forces for the~~  
3 ~~design of~~ swing gates and related hardware.

4 Where fencing (see Figures 8E-7, 8E-8, and 8E-11) is installed to direct pathway or sidewalk users to the  
5 grade crossing, it is desirable that this fencing be connected to any continuous existing or new fencing or  
6 channelization that has been installed parallel to the track(s) to discourage pedestrians from circumventing the  
7 grade crossing. Added to support new figures

8 Pedestrian barriers ~~at offset crossings may be used at pedestrian and bicycle crossings as passive devices~~  
9 ~~that force or fencing, sometimes referred to as a “maze fencing,”~~ direct pathway or sidewalk users to face  
10 approaching LRT rail traffic before entering the trackway (see Figures ~~8C-9 and 8C-10~~ 8E-8). **This text was**  
11 **relocated from existing Section 8C.13**

12 Where used, maze fencing or pedestrian barriers need to be designed to permit the passage of wheelchairs  
13 and power-assisted mobility devices, and if bicycles are permitted, to permit the passage of dismounted  
14 bicyclists with tandem bicycles or bicycles with trailers. Added to improve consistency

15 **Figure 8E-7. Example of Pedestrian Gate and Emergency Exit Gate Placement for a**  
16 **Pathway Grade Crossing**

17 **Figure 8E-8. Example of Barriers at a Pedestrian-Only Pathway Grade Crossing**

18 **Section ~~8D.06~~ 8E.07 Active Traffic Control Systems ~~for Pathway Grade Crossings~~**

19 **Standard:**

20 If used at a pathway or sidewalk grade crossing, an active traffic control system (see Section 8D.01)  
21 shall include flashing-light signals ~~for on~~ each ~~direction of the pathway.~~ approach to the crossing and a  
22 bell or other audible warning device ~~shall also be provided~~(see Figure 8E-9).

23 Except as provided in Paragraph 4, at pathway-LRT and sidewalk-LRT grade crossings where  
24 LRT operating speeds on a semi-exclusive alignment exceed 25 mph, active traffic control systems shall  
25 be used. Added to improve consistency with new Section 8D.04

26 Except as provided in Paragraph 4, at pathway-LRT and sidewalk-LRT grade crossings where  
27 LRT operating speeds on a semi-exclusive alignment exceed 40 mph, active traffic control systems,  
28 including automatic gates, shall be used. Added to improve consistency with new Section 8D.04

29 **Option:**

30 ~~Separate active traffic control~~ Flashing-light signals, bells, and other audible warning devices may be  
31 omitted at a pathway or sidewalk grade crossings that ~~is~~ are located within 25 feet of ~~the traveled way of a~~  
32 ~~highway rail or highway LRT grade crossing that is equipped with~~ an active ~~traffic control system~~ warning  
33 device at a grade crossing that is equipped with those devices.

34 Additional pairs of flashing-light signals, bells, or other audible warning devices may be installed on the  
35 active traffic control devices at a grade crossing for pathway or sidewalk users approaching the grade crossing  
36 from the back side of those devices. Added to improve consistency

37 **Guidance:**

38 Where railroad or LRT tracks in a semi-exclusive alignment are immediately adjacent to a roadway and if  
39 adequate space exists, a pedestrian refuge area or island should be provided between the tracks and the  
40 roadway to permit pedestrians to stand clear of the tracks while waiting to cross the roadway and to stand  
41 clear of the roadway while waiting to cross the tracks. ~~If adequate space exists for a pedestrian refuge area~~  
42 ~~or island is provided and is justified based on engineering judgment,~~ additional pedestrian features (see  
43 Chapter 4I), such as signal heads, signing, and detectors, should be installed ~~(see Section 4E.08)~~ in the refuge  
44 area or on the island. This text was relocated from existing Section 8C.13

45 **Figure 8E-9. Example of Flashing-Light Assembly for a Pathway or Sidewalk Grade Crossing**

46 **Standard:** **These paragraphs relocated to new Section 8E.08**

47 ~~If used at pathway grade crossings, alternately flashing red lights shall be aligned horizontally and~~  
48 ~~the light units shall have a diameter of at least 4 inches. The minimum mounting height of the flashing~~  
49 ~~red lights shall be 4 feet, measured vertically from the bottom edge of the lights to the elevation of the~~  
50 ~~near edge of the pathway surface.~~

1 Option:

2 Traffic control devices may be installed between the tracks at multiple track crossings at stations.

3 **Standard:**

4 ~~The mounting height for flashing lights that are installed between the tracks at multiple track~~  
5 ~~crossings at stations shall be a minimum of 1 foot, measured vertically from the bottom edge of the~~  
6 ~~lights to the elevation of the near edge of the pathway surface.~~

7 **These paragraphs relocated to new Section 8E.09**

8 Option:

9 Automatic gates may be used at pathway grade crossings.

10 *Guidance:*

11 ~~If used at a pathway grade crossing, the height of the automatic gate arm when in the down~~  
12 ~~position should be a minimum of 2.5 feet and a maximum of 4 feet above the sidewalk.~~

13 ~~If used, the gate configuration, which might include a combination of automatic gates and swing~~  
14 ~~gates, should provide for full width coverage of the pathway on both approaches to the track.~~

15 **Standard:**

16 ~~Where a sidewalk is located between the edge of a roadway and the support for a gate arm~~  
17 ~~that extends across the sidewalk and into the roadway, the location, placement, and height~~  
18 ~~prescribed for vehicular gates shall be used (see Section 8C.04).~~

19 *Guidance:*

20 ~~If a separate automatic gate is used for a sidewalk, the height of the gate arm when in the down~~  
21 ~~position should be a minimum of 2.5 feet and a maximum of 4 feet above the sidewalk.~~

22 ~~If a separate automatic gate is used for a sidewalk at a highway rail or highway LRT grade~~  
23 ~~crossing, instead of a supplemental or auxiliary gate arm installed as a part of the same mechanism~~  
24 ~~as the vehicular gate, a separate mechanism should be provided for the sidewalk gate to prevent a~~  
25 ~~pedestrian from raising the vehicular gate.~~

26 **Section 8E.08 Active Traffic Control Devices – Signals** **New section with paragraphs from**  
27 **existing Section 8D.06**

28 Support:

29 Pedestrian signal heads are typically used at highway-highway intersections where pedestrians have an  
30 expectation that motorists will sometimes be legally required to yield the right-of-way to them. At grade  
31 crossings where rail traffic does not stop, pedestrians will not have the right-of-way yielded to them.  
32 Therefore, pedestrian signal heads are not an appropriate traffic control device to use at a pathway or sidewalk  
33 grade crossing where rail traffic does not stop. Instead, the universal application of horizontally-aligned,  
34 alternately-flashing red lights are the uniform active traffic control device for all grade crossings where rail  
35 traffic does not stop including pathway and sidewalk grade crossings. **Added to improve consistency**

36 **Standard:**

37 **Except as provided in Paragraph 3, pedestrian signal heads as described in Chapter 4I comprised of**  
38 **Upraised Hand and Walking Person symbols shall not be used at a pathway or sidewalk grade crossing.**  
39 **Added to improve consistency**

40 Option:

41 Pedestrian signal heads may be used at a pathway or sidewalk grade crossing where the movement of  
42 LRT vehicles is controlled by a traffic control signal or by special LRT signals (see Section 8D.16). **Added to**  
43 **improve consistency**

44 **Standard:**

45 **If used at a pathway or sidewalk grade crossings, alternately flashing red lights shall be aligned**  
46 **horizontally and the light units shall have a diameter of at least 4 inches. For 4-inch diameter light**  
47 **units, the light centers shall be spaced approximately 16 inches apart and, if used, the flashing light unit**  
48 **backgrounds shall be at least 8 inches in diameter.** **Added to improve consistency**

1 The red signal indications in the flashing-light signal shall flash alternately with each indication  
2 flashing at a rate of not less than 35 or more than 65 times per minute. Each indication shall be  
3 displayed for approximately the same length of time. The total time of display of each pair of  
4 indications shall be the entire operating time. Added to improve consistency

5 The minimum mounting height of the flashing red lights shall be 4 feet, measured vertically from  
6 the bottom edge of the lights to the elevation of the nearest edge of the pathway or sidewalk surface.

7 Option:

8 At station, pathway, or sidewalk grade crossings with multiple tracks, traffic control devices may be  
9 installed between the tracks ~~at multiple track crossings at stations~~ in compliance with any railroad clearance  
10 requirements.

11 **Standard:**

12 The mounting height for flashing lights that are installed between the tracks at multiple track  
13 crossings ~~at stations~~ shall be a minimum of 1 foot, measured vertically from the bottom edge of the  
14 lights to the elevation of the nearest edge of the pathway surface.

15 *Guidance:*

16 If a subsequent engineering study finds that a flashing-light signal with a Crossbuck sign and an audible  
17 device is still not resulting in appropriate pedestrian behavior, consideration should be given to also  
18 installing an automatic pedestrian gate (see Section 8E.09).

19 Flashing-light signals (see Figure ~~8C-4~~8E-9) with a Crossbuck (R15-1) sign and an audible device should  
20 be installed ~~at pedestrian and bicycle~~ along semi-exclusive LRT alignments at station, pathway, or sidewalk  
21 grade crossings where an engineering study has determined that the sight distance is not sufficient for  
22 ~~pedestrians and bicyclists~~ pathway or sidewalk users to complete their crossing prior to the arrival of the LRT  
23 traffic at the crossing, or where LRT speeds exceed 35 mph. This text was relocated from existing Section  
24 **8C.13**

25 If an engineering study shows that flashing-light signals with a Crossbuck sign and an audible device  
26 would not provide sufficient notice of an approaching LRT traffic, consideration should be given to also  
27 installing the LOOK (R15-8) sign (see Figure 8C-4) and/or an automatic pedestrian gate\* (see Section 8E.09)  
28 with appropriate channelization or fencing should be considered (see Figures 8C-5 through 8C-7). This text  
29 **was relocated from existing Section 8C.13**

30 **Section 8E.09 Active Traffic Control Devices – Automatic Pedestrian Gates** New section with  
31 **paragraphs from existing Section 8D.06**

32 Option:

33 Automatic pedestrian gates (see Figures 8E-7, 8E-10, 8E-13, and 8E-14) may be used at pathway or  
34 sidewalk grade crossings.

35 **Standard:**

36 A pathway or sidewalk grade crossing across tracks where trains are permitted to travel at speeds  
37 of 80 mph or higher shall be equipped with a system of automatic pedestrian gates and an escape area  
38 with swing gates and fencing installed in the vicinity of the crossing to direct users to the pathway or  
39 sidewalk grade crossing (see Figure 8E-7) unless an engineering study determines that other safety  
40 treatments for the crossing would be more appropriate. Added to improve consistency

41 *Guidance:*

42 Where automatic pedestrian gates are installed across a pathway or sidewalk at a grade crossing, or  
43 where a sidewalk is located between the edge of a roadway and the support for an automatic gate arm that  
44 extends across the sidewalk and into the roadway, an emergency escape route (see Figures 8E-5, 8E-7, 8E-11  
45 and 8E-12) should be provided to allow pedestrians to egress away from the track area when the automatic  
46 pedestrian gates are activated. Added to improve support new Figures

47 **Standard:**

48 Except as provided in Paragraph 6, automatic pedestrian gate arms shall be provided with at least  
49 one red light as shown in Figures 8E-10, 8E-12, 8E-13, and 8E-14. This light shall be continuously  
50 illuminated whenever the warning system is active. Added to improve consistency

1 If any red lights in addition to the continuously-illuminated red light that is required in Paragraph  
2 4 are provided on the automatic pedestrian gate arm, they shall be installed in pairs and shall be flashed  
3 alternately in unison with the other flashing-light units at the crossing. Added to improve consistency

4 Option:

5 The red light on an automatic pedestrian gate arm may be omitted if the pathway or sidewalk grade  
6 crossing is located within 25 feet of the traveled way at a highway-rail or highway-LRT grade crossing that is  
7 equipped with active warning devices (see Figure 8E-13). Added to improve consistency

8 **Figure 8E-10. Example of Pedestrian Gate Placement at a Pathway or Sidewalk Grade Crossing**

9 **Figure 8E-11. Example of Placement of Pedestrian Gates at a Grade Crossing**

10 **Figure 8E-12. Example of Existing Sidewalk Between the Roadway and a Grade Crossing Gate**  
11 **with Optional Swing Gate**

12 **Figure 8E-13. Example of a Separate Pedestrian Gate**

13 *Guidance:*

14 *If used at a pathway or sidewalk grade crossing, the height of the automatic pedestrian gate arm when in*  
15 *the down position should be a minimum of ~~2.5~~ 3 feet and a maximum of 4 feet above the pathway or sidewalk.*

16 *If used at a pathway or sidewalk grade crossing, the gate configuration, which might include a*  
17 *combination of automatic pedestrian gates and swing gates, should provide for full-width coverage of the*  
18 *pathway or sidewalk on ~~both each~~ approaches to the ~~track~~ crossing.*

19 **Standard:**

20 **Where a sidewalk is located between the edge of a roadway and the support for ~~a~~ an automatic gate**  
21 **arm that extends across the sidewalk and into the roadway, the location, placement, and height**  
22 **prescribed for vehicular gates shall be used (see Section 8D.03).**

23 *Guidance:*

24 ~~*If a separate automatic gate is used for a sidewalk, the height of the gate arm when in the down position*~~  
25 ~~*should be a minimum of 2.5 feet and a maximum of 4 feet above the sidewalk.*~~ Combined with pathway

26 **Guidance statement above**

27 Except as provided in Paragraph 11, if a separate automatic pedestrian gate is used for a sidewalk at a  
28 highway-rail or highway-LRT grade crossing, instead of a supplemental or auxiliary gate arm installed as a  
29 part of the same mechanism as the vehicular gate, a separate mechanism (see Figure 8E-13) should be  
30 provided for the ~~sidewalk-separate automatic pedestrian gate to prevent a pedestrian from raising so that if a~~  
31 pedestrian manually raises the pedestrian gate arm, it will have no effect on the vehicular gate. Edited to

32 **reflect Official Interpretation 8(09)-3(I)**

33 Option:

34 A supplemental or auxiliary pedestrian gate arm installed as a part of the same mechanism as the  
35 vehicular gate may be used if the operating mechanism is designed to prevent the vehicular gate from being  
36 raised as a result of a pedestrian manually raising the pedestrian gate arm. Added to reflect Official  
37 **Interpretation 8(09)-3(I)**

38 A horizontal hanging bar (see Figure 8E-14) may be attached to an automatic pedestrian gate at a pathway  
39 or sidewalk grade crossing to inform pedestrians who have visual disabilities that the automatic pedestrian  
40 gate is in the down position and to reduce the likelihood that pedestrians will violate a lowered crossing gate.  
41 **Added to reflect FRA research report Effect of Gate Skirts on Pedestrian Behavior at Highway-Rail**  
42 **Grade Crossings**

43 *Guidance:*

44 *If a horizontal hanging bar is attached to an automatic pedestrian gate, the height of the horizontal*  
45 *hanging bar when in the down position should be a maximum of 15 inches above the pathway or sidewalk.*

46 **Added to support dimensions in new Figure**

47 **Figure 8E-14. Example of Pedestrian Gate with Horizontal Hanging Bar at a Pathway or**  
48 **Sidewalk Grade Crossing**

49 **Section 8E.10 Active Traffic Control Devices – Multiple-Track Pathway or Sidewalk Grade**  
50 **Crossings** New Section with text from existing Section 8C.13

1 Guidance:

2 Where railroad or LRT tracks are immediately adjacent to other tracks ~~or a road~~, the traffic control  
3 devices that control pedestrian ~~signalization~~ movements should be designed to avoid having pedestrians wait  
4 between sets of tracks ~~or between the tracks and the road~~.

1 CHAPTER 9A. GENERAL

2 Section 9A.01 ~~Requirements for Bicyclist Traffic Control Devices~~ General

3 Support:

4 ~~General information and definitions concerning traffic control devices are found in Part 1.~~ Deleted (Not  
5 needed)

6 Part 9 covers signs, and pavement markings, ~~and highway traffic signals~~ specifically related to bicycle  
7 operation on ~~both~~ roadways, separated bikeways, and shared-use paths. Part 4 contains information on  
8 highway traffic signals and bicycle signal faces. Part 6 contains information on work zones for bicycle  
9 facilities and the mitigation of bicycle travel through work zones.

10 Definitions and acronyms pertaining to Part 9 are provided in Sections ~~1A.13-1C.01~~ and ~~1A.14-1C.03~~.  
11 Relocated from Section 9A.03

12 Section 9A.02 ~~Scope~~ Combined with Section 9A.01

13 *Guidance:*

14 ~~Parts 1, 2, 3, and 4 should be reviewed for general provisions, signs, pavement markings, and signals.~~

15 With only a few exceptions, such as when allowed to ride on a sidewalk or where some bicycle-specific  
16 traffic control devices are installed, bicycles are either legally defined as vehicles or give the operator of a  
17 bicycle the same rights and duties of an operator of a motor vehicle.

18 Designing bicycle facilities and the traffic control devices on those facilities in a manner that encourages  
19 predictable behavior and compliance with traffic laws can increase public acceptable of bicyclists from other  
20 road users. The use, or misuse of traffic control devices for improperly designed bicycle facilities can produce  
21 ineffective or counterproductive results.

22 **Standard:**

23 The absence of a marked bicycle lane or any of the other traffic control devices discussed in this  
24 Chapter on a particular roadway ~~shall not be construed to~~ mean that bicyclists are not permitted to  
25 travel on that roadway.

26 Section 9A.03 ~~Definitions Relating to Bicycles~~ Combined with Section 9A.01

27 Section 9A.04 ~~Maintenance~~ Combined with Section 9A.01

28 *Guidance:*

29 All signs, signals, and markings, including those on bicycle facilities, should be properly maintained to  
30 command respect from both the motorist and the bicyclist. When installing signs and markings on bicycle  
31 facilities, an agency should be designated to maintain these devices.

32 Section 9A.05 ~~Relation to Other Documents~~ Section Deleted (not needed)

33 Support:

34 ~~“The Uniform Vehicle Code and Model Traffic Ordinance” published by the National Committee on~~  
35 ~~Uniform Traffic Laws and Ordinances (see Section 1A.11) has provisions for bicycles and is the basis for the~~  
36 ~~traffic control devices included in this Manual.~~

37 ~~Informational documents used during the development of the signing and marking recommendations in~~  
38 ~~Part 9 include the following:~~

39 ~~A. “Guide for Development of Bicycle Facilities,” which is available from the American Association of~~  
40 ~~State Highway and Transportation Officials (see Page i for the address); and~~

41 ~~B. State and local government design guides.~~

42 ~~Other publications that relate to the application of traffic control devices in general are listed in Section~~  
43 ~~1A.11.~~

44 Section 9A.06 ~~Placement Authority~~ Section Deleted (not needed)

45 Support:

1 ~~Section 1A.08 contains information regarding placement authority for traffic control devices.~~

2 ~~Section 9A.07 Meaning of Standard, Guidance, Option, and Support~~ **Section Deleted (not needed)**

3 ~~Support:~~

4 ~~Paragraph 1 of Section 1A.13 contains information regarding the meaning of the headings Standard,~~  
5 ~~Guidance, Option, and Support, and the use of the words “shall,” “should,” and “may.”~~

6 ~~Section 9A.08 Colors~~ **Section Deleted (not needed)**

7 ~~Support:~~

8 ~~Section 1A.12 contains information regarding the color codes.~~

9 **Section 9A.02 Standardization of Application for Signing** **These paragraphs are from existing**  
10 **Sections 9B.01 and 9B.02**

11 Support:

12 The installation of nonstandard signing on bikeways or modifying standard signing in a manner  
13 inconsistent with Chapter 2A to draw special attention, educate users or the community, or brand a bicycle  
14 facility can contribute to public acceptance and enforcement problems.

15 **Standard:**

16 **Bicycle signs shall be standard in shape, legend, and color.**

17 **All signs shall be ~~retroreflectorized~~ retroreflective for use on bikeways, including shared-use paths,**  
18 **and bicycle lane facilities.**

19 **Where signs serve both bicyclists and other road users, vertical mounting height and lateral**  
20 **placement shall be as provided in Part 2.**

21 **~~Standard:~~ Guidance: **Standard changed to Guidance****

22 *Where used on a shared-use path, no portion of a sign or its support ~~shall~~ should be placed less than 2*  
23 *feet laterally from the near edge of the path, or less than 8 feet vertically over the entire width of the shared-*  
24 *use path (see Figure ~~9B-1~~ 9A-1).*

25 *Mounting height for post-mounted signs on shared-use paths ~~shall~~ should be a minimum of 4 feet,*  
26 *measured vertically from the bottom of the sign to the elevation of the near edge of the path surface (see*  
27 *Figure ~~9B-1~~ 9A-1).*

28 **Guidance:**

29 *Signs for the exclusive use of bicyclists should be located so that other road users are not confused by*  
30 *them.*

31 *The clearance for overhead signs on shared-use paths should be adjusted when appropriate to*  
32 *accommodate path users requiring more clearance, such as equestrians, or typical maintenance or emergency*  
33 *vehicles.*

### **Figure 9A-1. Sign Placement on Shared-Use Paths**

35 **Standard:**

36 **If the sign or plaque applies to motorists and bicyclists, then the size shall be as shown for**  
37 **conventional roads in Tables 2B-1, 2C-~~2~~1, or 2D-~~1~~2.**

38 **The minimum sign and plaque sizes for signs specific to bicycle-only facilities and shared-use paths**  
39 **shall be those shown in Tables 9B-1, 9C-1, and 9D-1; and shall be used only for signs and plaques**  
40 **installed specifically for bicycle traffic applications. ~~The minimum sign and plaque sizes for bicycle-~~**  
41 **~~facilities shall not be used for signs or plaques that are placed in a location that would have any~~**  
42 **~~application to other vehicles.~~**

### **Table 9A-1. Bicycle Facility Sign and Plaque Minimum Sizes**

43 **Option:**

1 Larger size signs and plaques may be used on bicycle facilities when appropriate (see Section ~~2A.11~~  
2 [2A.07](#)).

3 [Any diamond-shaped warning sign that is placed such that it is only applicable to bicyclists and](#)  
4 [pedestrians may be 18” x 18”.](#)

5 *Guidance:*

6 *Except for size, the design of signs and plaques for bicycle facilities should be identical to that provided in*  
7 *this Manual for signs and plaques for streets and highways.*

8 *Support:*

9 Uniformity in design of bicycle signs and plaques includes shape, color, symbols, arrows, wording,  
10 lettering, and illumination or [retroreflectivity](#) ~~retroreflectorization~~.

11 **Section 9A.03 Standardization of Application for Markings** **These paragraphs are from**  
12 **existing Sections 9C.01 and 9C.02**

13 *Support:*

14 Markings indicate the separation of the lanes for road users, assist the bicyclist by indicating assigned  
15 travel paths, indicate correct position for traffic control signal actuation, and provide advance information for  
16 turning and crossing maneuvers.

17 *Guidance:*

18 ~~*Bikeway design guides (see Section 9A.05) should be used when designing markings for bicycle facilities.*~~

19 **Paragraph deleted (not needed)**

20 ***Standard:***

21 ~~**Markings used on bikeways shall be retroreflectorized.**~~ **This paragraph relocated to later in this**  
22 **Section and modified.**

23 *Guidance:*

24 *Pavement marking word messages, symbols, and/or arrows should be used in bikeways where*  
25 *appropriate.*

26 *Consideration should be given to selecting pavement marking materials that will minimize loss of traction*  
27 *for bicycles under wet conditions.* **Split into two paragraphs for clarity.**

28 ***Standard:***

29 **Pavement markings on bicycle facilities that must be visible at night shall be retroreflective unless**  
30 **the markings are adequately visible under provided lighting**

31 **The colors, width of lines, patterns of lines, symbols, and arrows used for marking bicycle facilities**  
32 **shall be as defined in ~~Sections 3A.05, 3A.06, and 3B.20~~ Part 3.**

33 *Support:*

34 [Section 3H.06 contains information on green-colored pavement for use with certain traffic control](#)  
35 [devices for bicycles and bicycle facilities.](#)

36 ~~*Figures 9B-7 and 9C-1 through 9C-9 show examples of the application of lines, word messages, symbols,*~~  
37 ~~*and arrows on designated bikeways.*~~

38 ***Option:***

39 ~~*A dotted line may be used to define a specific path for a bicyclist crossing an intersection (see Figure 9C-*~~  
40 ~~*1) as described in Sections 3A.06 and 3B.08.*~~ **This provision was relocated to new Section 9E.03**

41 *Guidance:*

42 [Raised pavement markers should not be used with bicycle lanes or shared-use paths.](#)

43 [If used around bicycle facilities, raised pavement markers should not be placed immediately adjacent to](#)  
44 [the travel path of bicycles in a bicycle lane or on a shared-use path.](#)

45 *Support:*

1 Using raised pavement markers ~~devices~~ creates a collision potential for bicyclists by placing fixed objects  
2 immediately adjacent to the travel path of the bicyclist. Raised pavement markers can cause a bicyclist to lose  
3 balance and fall, and may not be visible to a bicyclist following another. ~~In addition, raised devices can prevent~~  
4 ~~vehicles turning right from merging with the bicycle lane, which is the preferred method for making the right-~~  
5 ~~turn. Raised devices used to define a bicycle lane can also cause problems in cleaning and maintaining the-~~  
6 ~~bicycle lane.~~ **This paragraph was relocated from existing Section 9C.04 and edited**

7

1 CHAPTER 9B. REGULATORY SIGNS

2 ~~Section 9B.01 Application and Placement of Signs~~ Paragraphs relocated to new Section 9A.02

3 ~~Section 9B.02 Design of Bicycle Signs~~ Paragraphs relocated to new Section 9A.02

4 **Figure 9B-1 Regulatory Signs and Plaques for Bicycle Facilities**

5 **TABLE 9B-1 Bicycle Facility Sign and Plaque Minimum Sizes**

6 Section ~~9B.03~~ 9B.01 STOP and YIELD Signs (R1-1, R1-2)

7 **Standard:**

8 STOP (R1-1) signs (~~see Figure 9B-2~~) shall be installed on shared-use paths, separated bikeways, or  
9 other bicycle facilities at points where bicyclists are required to stop.

10 YIELD (R1-2) signs (~~see Figure 9B-2~~) shall be installed on shared-use paths, separated bikeways, or  
11 other bicycle facilities at points where bicyclists have an adequate view of conflicting traffic as they  
12 approach the sign, and where bicyclists are required to yield the right-of-way to that conflicting traffic.

13 A STOP sign or a YIELD sign shall not be installed in conjunction with a bicycle signal face (see  
14 Chapter 4H).

15 **Option:**

16 A 30 x 30-inch STOP sign or a 36 x 36 x 36-inch YIELD sign may be used on shared-use paths for added  
17 emphasis.

18 **Guidance:**

19 *Where conditions require path users or bicyclists on separated bikeways, but not roadway users, to stop*  
20 *or yield, the STOP or YIELD sign should be placed or shielded so that it is not readily visible to road users.*

21 *When placement of STOP or YIELD signs is considered, priority at a shared-use path/roadway*  
22 *intersection should be assigned with consideration of the following:*

- 23 A. *Relative speeds of shared-use path and roadway users,*
- 24 B. *Relative volumes of shared-use path and roadway traffic, and*
- 25 C. *Relative importance of shared-use path and roadway.*

26 *Speed should not be the sole factor used to determine priority, as it is sometimes appropriate to give*  
27 *priority to a high-volume shared-use path crossing a low-volume street, or to a regional shared-use path*  
28 *crossing a minor collector street.*

29 *When priority is assigned, the least restrictive control that is appropriate should be placed on the lower*  
30 *priority approaches. STOP signs should not be used where YIELD signs would be acceptable.*

31 **Section 9B.02 Except Bicycles Plaque (R3-7bP)**

32 **Support:**

33 There are circumstances where it might be appropriate to exempt bicyclists from regulatory restrictions  
34 applied to other traffic.

35 **Guidance:**

36 Where an engineering study demonstrates that it is appropriate to exempt bicyclists from the provisions of  
37 a regulatory sign, the Except Bicycles plaque (R3-7bP) should be used.

38 **Support:**

39 Figure 9B-2 shows examples of how the Except Bicycles plaque can be applied.

40 Section 9C.05 contains information regarding the Except Bicycles plaque when applicable to a warning  
41 sign.

42 **Standard:**

43 The Except Bicycles plaque shall not be used to circumvent the legal requirement of a STOP or  
44 YIELD sign, Yield Here To Pedestrians Signs, Stop Here For Pedestrians Signs, or a traffic signal  
45 indication.

1 Where a regulatory sign, such as the No Left Turn (R3-2) sign (see Section 2B.28), is not in conflict  
2 with a Stop sign or a Yield sign and is installed to the same post or mounting as the Stop sign or Yield  
3 sign, the Except Bicycles plaque shall not be installed in conjunction with the regulatory sign to that  
4 post or mounting that includes the Stop sign or Yield sign.

5 The Except Bicycles plaque shall be placed below the regulatory sign to which it supplements.

6 **Figure 9B-2 Example of Applications of the Except Bicycles Regulatory Plaque (Sheet 1 of**  
7 **2)**

8 **Figure 9B-2 Example of Applications of the Except Bicycles Regulatory Plaque (Sheet 2 of**  
9 **2)**

### 10 Section 9B.03 Advance Intersection Lane Control Signs for Bicycle Lanes (R3-8 Series)

#### 11 Option:

12 Advance Intersection Lane Control (R3-8 Series) signs (see Section 2B.32) may display the arrangement  
13 of a conventional, buffer-separated, or separated bicycle lane in relation to other lanes in the same direction  
14 that are present on a roadway approach to an intersection.

#### 15 Support:

16 The number and combination of permissible movements by both the motor vehicle and the bicycle on the  
17 same approach to an intersection might be practically limited by the amount of information that can be legibly  
18 displayed on signs or in signing sequences and still be readily comprehended by road users. The excessive  
19 display of all movements by more than one mode can result in unwieldy signs that are difficult to locate and  
20 install.

#### 21 Guidance:

22 On an approach to an intersection with complex geometry that can include multiple through lanes and  
23 multiple turn lanes and also includes a bicycle lane, consideration should be given to displaying all allowable  
24 movements on separate signs, such as using Mandatory Movement Lane Control (R3-5) signs (see Section  
25 2B.29) for the through lanes and Mandatory Movement Lane Control (R3-7) signs (see Section 2B.30) for the  
26 turn lanes, and guide signs for bicycle routes (see Section 9D.02 through 9D.07) and Bicycle Route Sign  
27 Auxiliary plaques (see Section 9D.08) for the bicycle movement.

#### 28 Standard:

29 The portion of the sign face for the bicycle lane shall be limited to the relationship of the bicycle  
30 lane to other lanes on the roadway approach to the intersection. The portion of the sign face for the  
31 bicycle lane shall not be modified to display specific, supplementary information about the bicycle lane  
32 such as bicycle lane extensions, contiguous buffer spaces, or other ancillary bicycle operations such as  
33 two-stage turn boxes or bicycle boxes.

34 Counter-flow bicycle lanes shall not be displayed on Advance Intersection Lane Control signs.

35 Lanes shared between motor vehicles and bicycles and/or the shared-lane marking shall not be  
36 displayed on Advance Intersection Lane Control signs.

37 Physically-separated bikeways shall not be displayed on Advance Intersection Lane Control signs.

38 Advance Intersection Lane Control signs that display the bicycle lane shall use a contrasting white  
39 legend on a black background for the bicycle lane. The portion of the display for the bicycle lane shall  
40 not use the color green on the sign face in an attempt to be consistent with green-color pavement that  
41 may be present on the intersection approach.

### 42 Section 9B.04 Bike Lane Signs and Plaques (R3-17, R3-17aP, R3-5hP)

#### 43 Standard:

44 The BIKE LANE (R3-17) sign and the R3-17aP and R3-5hP plaques (see ~~Figure 9B-2~~) shall be used  
45 only in conjunction with marked bicycle lanes as described in Sections ~~9C.04~~ 9E.01, 9E.06, and 9E.07.

#### 46 Guidance:

1 If used, Bike Lane signs and plaques should be used ~~in advance of at the upstream end beginning~~ of the  
2 bicycle lane, ~~at and in advance of the downstream end of the bicycle lane, and at periodic intervals along the~~  
3 ~~bicycle lane as determined by engineering judgment based on prevailing speed of bicycle and other traffic,~~  
4 ~~block length, distances from adjacent intersections, and other considerations.~~ **Sentence changed from**  
5 **Guidance to Option and edited**

6 Option:

7 Bike Lane signs and plaques may be used at periodic intervals along the bicycle lane as determined by  
8 engineering judgment based on operating speed of bicycle and other traffic, block length, distances from  
9 adjacent intersections, and other considerations.

10 Other regulatory plaques such as BEGIN (M4-14) and END (M4-6) may be used with Bike Lane signs.

11 Support:

12 Section 2B.35 contains information for the application of BEGIN and END plaques.

13 Section 9B.03 contains information on displaying the bicycle lane on Advance Intersection Lane Control  
14 signs.

15 Option:

16 Where two or more movements from a bicycle lane is allowed, or where the emphasis of allowed bicycle  
17 movements is needed, an Optional Movement Lane Control (see Section 2B.31) sign may be supplemented  
18 with a BIKE LANE plaque above the Optional Movement Lane Control sign.

19 Where bicycle lanes are located between travel lanes on intersection approaches or where only a single  
20 bicycle movement is permitted from a certain bicycle lane, a Mandatory Movement Lane Control sign (see  
21 Section 2B.20) may be supplemented with a R3-5hP plaque to require a bicyclist in a particular bicycle lane at  
22 an intersection to stay in the same lane and proceed straight through the intersection, or to indicate a required  
23 turn from a particular bicycle lane.

24 **Section 9B.05 BEGIN RIGHT TURN LANE YIELD TO BIKES Sign (R4-4)**

25 Option:

26 Where motor vehicles entering an exclusive right-turn lane must weave across bicycle traffic in bicycle  
27 lanes, the BEGIN RIGHT TURN LANE YIELD TO BIKES (R4-4) sign (~~see Figure 9B-2~~) may be used to  
28 inform both the motorist and the bicyclist of this weaving maneuver (see Figures ~~9C-1, 9C-4, and 9C-5~~ 9E-3  
29 and 9E-4).

30 Guidance:

31 *The R4-4 sign should not be used when bicyclists need to move left because of a right-turn lane drop*  
32 *situation.*

33 ~~Section 9B.06 Bicycles May Use Full Lane Sign~~ **This section relocated to Section 9B.14**

34 **Section ~~9B.07~~ 9B.06 Bicycle WRONG WAY Sign and RIDE WITH TRAFFIC Plaque (R5-1b,**  
35 **R9-3cP)**

36 Option:

37 The Bicycle WRONG WAY (R5-1b) sign and RIDE WITH TRAFFIC (R9-3cP) plaque (~~see Figure 9B-2~~)  
38 may be placed facing wrong-way bicycle traffic, such as on the left-hand side of a roadway.

39 This sign and plaque may be mounted back-to-back with other signs to minimize visibility to other traffic.

40 Guidance:

41 *The RIDE WITH TRAFFIC plaque should be used only in conjunction with the Bicycle WRONG WAY*  
42 *sign, and should be mounted directly below the Bicycle WRONG WAY sign.*

43 **Section ~~9B.08~~ 9B.07 NO MOTOR VEHICLES Sign (R5-3)**

44 Option:

45 The NO MOTOR VEHICLES (R5-3) sign (~~see Figure 9B-2~~) may be installed at the entrance to a shared-  
46 use path.

1 **Section ~~9B.09~~ 9B.08 Selective Exclusion Signs**

2 Option:

3 Selective Exclusion signs (~~see Figure 9B-2~~) may be installed at the entrance to a roadway or facility to  
4 notify road or facility users that designated types of traffic are excluded from using the roadway or facility.

5 **Standard:**

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

7 Support:

8 Typical exclusion messages include:

9 A. No Bicycles (R5-6),

10 B. No Pedestrians (R9-3),

11 C. No Skaters (R9-13), ~~and~~

12 D. No Equestrians (R9-14), ~~and~~

13 E. No Snowmobiles (R5-15).

14 Option:

15 Where bicyclists, pedestrians, and motor-driven cycles are all prohibited, it may be more desirable to use  
16 the R5-10a word message sign that is described in Section ~~2B.39~~ 2B.52.

17 **Section ~~9B.10~~ 9B.09 No Parking Bike Lane Signs (R7-9, R7-9a)**

18 **Standard:**

19 **If the installation of signs is necessary to restrict parking, standing, or stopping in a bicycle lane,**  
20 **appropriate signs as described in Sections ~~2B.46~~ 2B.56 through ~~2B.48~~ 2B.58, or the No Parking Bike**  
21 **Lane (R7-9 or R7-9a) signs (~~see Figure 9B-2~~) shall be installed.**

22 **Section 9B.10 Back-In Parking Sign (R7-10)**

23 Option:

24 The R7-10 sign (see Section 2B.54) may be used where back-in parking is required by motor vehicles  
25 in the presence of a bicycle lane or movement.

26 Support:

27 Angled back-in curb parking is commonly applied on streets where a bicycle lane is present so that  
28 the scanning behavior of a motorist typical with the back-in angle parking task, both entering and exiting the  
29 parking space, would place a bicyclist in a bicycle lane in a more direct view of the motor vehicle operator.

30 Figure 9B-3 shows an example of where back-in parking signs can be used in conjunction with bicycle  
31 lanes.

32 **Figure 9B-3. Examples of Applications of Bicycle Facilities Adjacent to Back-In Parking**

33 **Section 9B.11 ~~Bicycle Regulatory Signs-Bicycles Use Ped Signal (R9-5, R9-6, R10-4, R10-24,~~**  
34 **~~R10-25, and R10-26)~~**

35 Option:

36 The Bicycles Use Ped Signal (R9-5) sign (~~see Figure 9B-2~~) may be used where the crossing of a street by  
37 bicyclists is controlled by pedestrian signal indications.

38 ~~Where it is not intended for bicyclists to be controlled by pedestrian signal indications, the R10-4, R10-~~  
39 ~~24, or R10-26 sign (see Figure 9B-2 and Section 2B.52) may be used.~~ **Relocated to new Section 9B.19**

40 **Guidance:**

41 ~~If used, the R9-5, R10-4, R10-24, or R10-26 signs should be installed near the edge of the sidewalk in the~~  
42 ~~vicinity of where bicyclists will be crossing the street.~~ **Retained below and edited for consistency, and also**  
43 **uplicated to new Section 9B.19**

44 Option:

1 ~~If bicyclists are crossing a roadway where In-Roadway Warning Lights (see Section 4N.02) or other~~  
2 ~~warning lights or beacons have been provided, the R10-25 sign (see Figure 9B-2) may be used.~~ **Relocated to**  
3 **new Section 9B.19**

4 ~~The R9-6 sign (see Figure 9B-2) may be used where a bicyclist is required to cross or share a facility used~~  
5 ~~by pedestrians and is required to yield to the pedestrians.~~ **Relocated to new Section 9B.12**

6 In order to remind drivers who are making turns to yield to pedestrians or bicyclists, a Turning Vehicles  
7 Yield to Pedestrians (R10-15) or Left Turns Yield to Bicycles (R10-12b) sign may be used.

8 Guidance:

9 If used, the R9-5 sign should be installed in the vicinity of where bicyclists will be crossing the street.

10 Support:

11 More information on the use of the Left Turns Yield to Bicycles (R10-12b) sign is provided in Section  
12 9B.20.

### 13 **Section 9B.12 Bicycles Yield to Peds Sign (R9-6)**

14 Option:

15 The Bicycles Yield to Peds (R9-6) sign ~~(see Figure 9B-2)~~ may be used at locations where a bicyclist is  
16 required to cross or share a facility used by pedestrians and is required to yield to the pedestrians. **Relocated**  
17 **from existing Section 9B.11**

18 Standard:

19 Where the Bicycles Yield to Peds sign is supported by a yield line pavement marking (see Section  
20 3B.19) to establish the yielding point, the sign and the pavement marking shall be installed adjacent to  
21 each other.

22 The Bicycles Yield to Peds sign shall not be used in bicycle corridors to establish a programmatic  
23 regulation where no yielding point exists.

24 The Bicycles Yield to Peds sign shall not be used in conjunction with a STOP or YIELD sign, Yield  
25 Here To Pedestrians Sign, or a Stop Here For Pedestrians Sign.

26 Support:

27 Figure 9B-4 shows examples of applying the Bicycles Yield to Peds sign with a yield line pavement  
28 marking.

#### 29 **Figure 9B-4 Example of Applications for the Bicycles Yield to Pedestrians Sign**

### 30 **Section 9B.12-9B.13 Shared-Use Path Restriction Sign (R9-7)**

31 Option:

32 The Shared-Use Path Restriction (R9-7) sign ~~(see Figure 9B-2)~~ may be installed to supplement a solid  
33 white pavement marking line (see Section ~~9C.03~~ 9E.13) on facilities that are to be shared by pedestrians and  
34 ~~bicyclists~~ bicycles in order to provide a separate designated pavement area for each mode of travel. The  
35 symbols may be switched as appropriate.

36 Guidance:

37 If two-way operation is permitted on the facility for pedestrians and/or bicyclists, the designated  
38 pavement area that is provided for each two-way mode of travel should be wide enough to accommodate both  
39 directions of travel for that mode.

### 40 **Section 9B.06 9B.14 Bicycles May Use Full Lane Sign (R4-11)**

41 Support:

42 The ~~Uniform Vehicle Code (UVC)~~ defines a “substandard width lane” as a “lane that is too narrow for a  
43 bicycle and a vehicle to travel safely side by side within the same lane.” **Relocated from later in this Section**

44 Option:

1 The Bicycles May Use Full Lane (R4-11) sign (~~see Figure 9B-2~~) may be used on roadways where no  
2 bicycle lanes or adjacent shoulders usable by ~~bicyclist~~bicycles are present and where travel lanes are too  
3 narrow for ~~bicyclists~~bicycles and motor vehicles to operate side by side.

4 The Bicycles May Use Full Lane sign may be used in locations where it is important to inform road users  
5 that ~~bicyclists~~bicycles might occupy the travel lane.

6 Section ~~9C.07-9E.08~~ describes a ~~S~~shared-~~L~~lane ~~M~~marking that may be used in addition to or instead of  
7 the Bicycles May Use Full Lane sign to inform road users that ~~bicyclists~~bicycles might occupy the travel  
8 lane.

### 9 **Section 9B.15 Bicycle Passing Clearance Sign (R4-19)**

#### 10 Option:

11 The Bicycle Passing Clearance (R4-19) sign may be used in jurisdictions that have defined in law or  
12 ordinance a specific clearance to be provided by motor vehicles passing bicycles.

13 The specific clearance displayed on the Bicycle Passing Clearance (R4-19) sign may be adjusted to reflect  
14 the applicable law or ordinance.

#### 15 Standard:

16 The Bicycle Passing Clearance (R4-19) sign shall not be used in jurisdictions that do not have a  
17 specific passing clearance to be provided by motor vehicles passing bicycles, as defined in law or  
18 ordinance.

#### 19 Guidance:

20 The Bicycle Passing Clearance (R4-19) sign should not be used on roadways with bicycle lanes or with  
21 shoulders usable for bicycle travel.

### 22 **Section 9B.16 Bicycles Use Shoulder Only Sign (R9-21)**

#### 23 Option:

24 The Bicycles Use Shoulder Only (R9-21) sign may be used to denote locations on a freeway or  
25 expressway where bicycles are permitted, but must remain on an available and usable shoulder.

26 The On Freeway plaque (R5-10dP) may be used with an appropriate Selective Exclusion sign to denote a  
27 prohibition on ramps leading to an adjacent or parallel freeway (see Figure 9B-5).

#### 28 Guidance:

29 The Bicycles Use Shoulder Only sign should be limited to use on freeways and expressways.

30 The Bicycles Use Shoulder Only sign should be placed adjacent to the on-ramp or entrance to the freeway  
31 at or near the location where the full-width shoulder resumes beyond the entrance ramp taper.

### 32 **Section 9B.17 Signing for Bicycles on Freeways and Expressways**

#### 33 Standard:

34 The Bicycles Must Exit (R9-22) sign shall be used in advance of a location where a freeway or  
35 expressway becomes prohibited to bicycle travel, and shall be placed in advance of the intersection or  
36 ramp prior to the prohibited segment of roadway (see Figure 9B-5). If the Bicycles Must Exit sign is  
37 used, a R5-6 No Bicycles sign shall be placed downstream from the intersection or ramp where the  
38 prohibited segment of freeway begins.

#### 39 Option:

40 The Bicycles Must Exit sign may be used below a post-mounted Exit Direction sign.

#### 41 Standard:

42 A No Bicycling sign (R5-6) shall be placed downstream from the ramp departure point where the  
43 prohibited segment of freeway or expressway begins. The No Bicycling sign shall not be placed below  
44 the Exit Gore sign if an Exit Gore sign is used.

#### 45 Support:

1 Section 2B.52 contains information on regulatory signing for prohibiting bicycles from using particular  
2 roadways or facilities.

3 **Figure 9B-5. Signing for the Termination of Bicycle Access on Freeways and Expressways**

4 **Section 9B.18 Two-Stage Bicycle Turn Box Regulatory Signing (R9-23 series)**

5 Support:

6 Where two-stage bicycle turn boxes are provided in an intersection, the design of an approach to that  
7 intersection will determine if the use of a two-stage bicycle turn box is required by bicycles to facilitate a turn.

8 Standard:

9 Situations in which a two-stage bicycle turn box is required to facilitate turns shall include, but are  
10 not limited to those in which:

11 A. A separated bicycle facility is provided where upstream access to a lane used to facilitate turns  
12 by motor vehicle traffic is physically inaccessible to bicycles, or

13 B. All turns are prohibited at the intersection, or

14 C. Characteristics of the roadway approach to the intersection (volume, speed, number of lanes,  
15 width, presence of rail tracks, etc.) make it practical to prohibit the bicycle from using a lane used by  
16 motor vehicle traffic to facilitate turns.

17 Where bicycles are required to use a two-stage bicycle turn box, the Two-Stage Bicycle Turn Box  
18 Regulatory sign series (see Figure 9B-6) shall be used.

19 Where bicycles are required to use a two-stage bicycle turn box, the All Turns From Bike Lane  
20 advance regulatory sign (R9-23) shall be mounted in advance of the intersection, and at least one  
21 Bicycle Turn Must Use Turn Box sign (R9-23a, R9-23b) shall be used at the intersection.

22 Where used, the Bicycle Turn Must Use Turn Box sign (R9-23a) shall be mounted on the near side  
23 of the intersection.

24 Where used, the Bicycle Turn Must Use Turn Box location sign (R9-23b) shall be mounted on the  
25 far side of the intersection.

26 Where use of a two-stage bicycle turn box is optional, a the Two-Stage Bicycle Turn Box guide sign  
27 series (D11-20 series, see Section 9D.13) may be used to provide directional information.

28 Option:

29 If used, an appropriately sized Street Name (see Section 2D.44) sign (D3-1) may be installed below the  
30 All Turns From Bike Lane sign to identify the cross street where the turn box will be available.

31 Support:

32 Section 9E.11 contains information regarding pavement markings for two-stage turn boxes.

33 **Figure 9B-6. Example of Regulatory Signing for Two-Stage Bicycle Turn Boxes**

34 **Section 9B.19 Bicycle Jughandle Signs (R9-24, R9-25, R9-26, and R9-27 Series)**

35 Support:

36 Bicycle jughandle turns can allow bicycles to use the traffic control provided for the cross street rather  
37 than subjecting the bicycle to use the lane provided on the approach to motor vehicle traffic for facilitating a  
38 left turn (or right) or U-turn.

39 A bicycle jughandle turn initially made by a left turn would be conceivable for a bicycle lane on the left  
40 side of a one-way street or for a counter-flow bicycle lane.

41 Option:

42 An R9-24 series sign may be used where all bicycles are required to use the bicycle jughandle turn in  
43 order to facilitate all turns.

44 An R9-25 series sign may be used where bicycles are required to use a bicycle jughandle turn to facilitate  
45 U and left turns and where right-turning bicycles are exempted or the right turn is not available or possible  
46 (see Figure 9B-7).

1 An R9-26 series sign maybe used where bicycles are required to use a jughandle to facilitate a U-turn and  
2 where left- and right-turning bicycles are exempted or the left or right turn is not available or possible.

3 An R9-27 series sign may be used where bicycles are required to use a jughandle to facilitate a left turn  
4 and where U- and right-turning are exempted or the U or right turn is not available or possible (see Figure 9B-  
5 7).

6 The legend RIGHT may be substituted for the legend LEFT on Bicycle Jughandle signs to represent  
7 bicycle facilities on the left side of the roadway where facilitating a right turn would be applicable.

8 Guidance:

9 Applications of Bicycle Jughandle signs should be limited to brief independent alignments either through  
10 physical separation or islands formed by pavement markings. Bicycle Jughandle signs should not be used for  
11 the turning movement facilitated by two-stage turn boxes (see Section 9B.17).

12 Support:

13 Bicycle jughandle signs are designed to be mounted below conventional guide signs.

14 Section 9D.01 contains information regarding the use of Bicycle Destination signs that can be used for  
15 jughandles.

16 **Figure 9B-7. Examples of Applications of Bicycle Jughandle Signs (2 sheets)**

17 **Section 9B.20 Bicycle Actuation Signs (R10-4, R10-22, R10-24, R10-25, and R10-26) Section**  
18 **created from paragraphs in existing Sections 9B.11 and 9B.13**

19 Option:

20 Where it is not intended for ~~bicyel~~bicycles to be controlled by pedestrian signal indications, the R10-4,  
21 R10-24, or R10-26 sign (see ~~Figure 9B-2 and~~ Section ~~2B.52-2B.62~~) may be used.

22 Guidance:

23 If used, the ~~R9-5,~~R10-4, R10-24, or R10-26 signs should be installed ~~near the edge of the sidewalk~~ in the  
24 vicinity of where ~~bicyel~~bicycles will be crossing the street.

25 Option:

26 If ~~bicyel~~bicycles are crossing a roadway where In-Roadway Warning Lights (see Section ~~4N.02-4U.02~~)  
27 or other warning lights or beacons have been provided, the R10-25 sign (~~see Figure 9B-2~~) may be used.-

28 The Bicycle Detector (R10-22) sign may be installed at signalized intersections where markings are used  
29 to indicate the location where a bicycle is to be positioned to actuate the signal (see Section 9E.16).

30 Guidance:

31 If the Bicycle Detector sign is installed, it should be placed at the roadside adjacent to the marking to  
32 emphasize the connection between the marking and the sign.

33 **Section 9B.21 LEFT TURN YIELD TO Bicycles Sign (R10-12b)**

34 Support:

35 The LEFT TURN YIELD TO Bicycles sign is used to emphasize the requirement for motorists to yield to  
36 bicycles in situations where the motorist is turning across a bicycle movement that may be unexpected in  
37 direction, location, or some other quality that would run counter to the typical bicycle lane. See Section 2B.61.

38 **Section 9B.22 Bicycle SIGNAL Signs (R10-40, R10-40a, R10-41, R10-41a, R10-41b)**

39 Support:

40 The primary purposes of the Bicycle SIGNAL sign are to inform road users that the signal indications in  
41 the bicycle signal face are intended only for bicycles, and to inform bicycles which specific bicycle  
42 movements are controlled by the bicycle signal face.

43 Section 4H.04 contains additional information on bicycle signal signs.

44 **Standard:**

1 The Bicycle SIGNAL – Mandatory Movement (R10-40, R10-40a) sign or the Bicycle SIGNAL –  
2 Optional Movement (R10-41, R10-41a, or R10-41b) sign, if used, shall require bicycles to turn, shall  
3 permit turns where such turns would otherwise not be allowed, shall require a bicycle to stay in the  
4 same lane and proceed straight through an intersection, or shall indicate allowed movements when a  
5 GREEN BICYCLE symbol is displayed on a bicycle signal face.

6 **Section ~~8B.17~~ 9B.23 LOOK Sign (R15-8)** **This Section relocated from existing Section 8B.17 and**  
7 **edited**

8 Option:

9 At railroad or LRT grade crossings with shared-use paths or separated bikeways, the LOOK (R15-8) sign  
10 ~~(see Figure 8B-1)~~ may be mounted as a supplemental plaque on the Crossbuck support, or on a separate post  
11 in the immediate vicinity of the grade crossing on the railroad or LRT right-of-way.

12 *Guidance:*

13 *A LOOK sign should not be mounted as a supplemental plaque on a Crossbuck Assembly that has a*  
14 *YIELD or STOP sign mounted on the same support as the Crossbuck.*

15 **Section ~~9B.14~~ 9B.24 Other Regulatory Signs**

16 Option:

17 Other regulatory signs described in Chapter 2B and Chapter 8B may be installed on bicycle facilities as  
18 appropriate.

19 **Section 9B.25 General Service Signing for Bikeways**

20 Option:

21 General Service signs (See Chapter 2I) may be used on bikeways.

22 **Standard:**

23 **General Service signs intended for viewing by both bicycles and other road users shall**  
24 **conform to the sizes in Table 2I-1**

25 Option:

26 General Service signs intended for the exclusive use of bicycles may be of reduced size.

27

## CHAPTER 9C. WARNING SIGNS AND OBJECT MARKERS

### **Figure 9C-1. Warning Signs and Plaques and Object Markers for Bicycle Facilities**

#### **Section ~~9B.15~~ 9C.01 Turn or Curve Warning Signs (W1 Series)**

Guidance:

To warn bicyclists of unexpected changes in shared-use path direction, appropriate turn or curve (W1-1 through W1-7) signs (~~see Figure 9B-3~~) should be used.

The W1-1 through W1-5 signs should be installed at least 50 feet in advance of the beginning of the change of alignment.

#### **Section ~~9B.16~~ 9C.02 Intersection Warning Signs (W2 Series)**

Option:

Intersection Warning (W2-1 through W2-5) signs (~~see Figure 9B-3~~) may be used on a roadway, street, or shared-use path in advance of an intersection to indicate the presence of an intersection and the possibility of turning or entering traffic.

Guidance:

When engineering judgment determines that the visibility of the intersection is limited on the shared-use path approach, Intersection Warning signs should be used.

Intersection Warning signs should not be used where the shared-use path approach to the intersection is controlled by a STOP sign, a YIELD sign, or a traffic control signal.

#### **Section ~~9B.17~~ 9C.03 Bicycle Surface Condition Warning Sign (W8-10)**

Option:

The Bicycle Surface Condition Warning (W8-10) sign (~~see Figure 9B-3~~) may be installed where roadway or shared-use path conditions could cause a bicyclist to lose control of the bicycle.

Signs warning of other conditions that might be of concern to bicyclists, including BUMP (W8-1), DIP (W8-2), PAVEMENT ENDS (W8-3), and any other word message that describes conditions that are of concern to bicyclists, may also be used.

A supplemental plaque may be used to clarify the specific type of surface condition.

#### **Section ~~9B.18~~ 9C.04 Bicycle Warning and Combined Bicycle/Pedestrian Signs (W11-1 and W11-15)**

Support:

The Bicycle Warning (W11-1) sign (~~see Figure 9B-3~~) alerts the road user to unexpected entries into the roadway by bicyclists, and other crossing activities that might cause conflicts. These conflicts might be relatively confined, or might occur randomly over a segment of roadway.

[Section 9C.07 contains information for Bicycle Cross Traffic Warning plaques that can be used below Stop signs on cross streets or driveways that intersect with unconventional bicycle facilities.](#)

Option:

The combined Bicycle/Pedestrian (W11-15) sign (~~see Figure 9B-3~~) may be used where both bicyclists and pedestrians might be crossing the roadway, such as at an intersection with a shared-use path. A TRAIL X-ING (W11-15P) supplemental plaque (~~see Figure 9B-3~~) may be mounted below the W11-15 sign.

A supplemental plaque with the legend AHEAD or XX FEET may be used with the Bicycle Warning or combined Bicycle/Pedestrian sign.

Guidance:

1 *If used in advance of a specific crossing point, the Bicycle Warning or combined Bicycle/Pedestrian sign*  
2 *should be placed at a distance in advance of the crossing location that conforms with the guidance given in*  
3 *Table 2C-34.*

4 **Standard:**

5 **Bicycle Warning and combined Bicycle/Pedestrian signs, when used at the location of the crossing,**  
6 **shall be supplemented with a diagonal downward pointing arrow (W16-7P) plaque (see Figure 9B-3) to**  
7 **show the location of the crossing.**

8 **Option:**

9 A fluorescent yellow-green background color with a black legend and border may be used for Bicycle  
10 Warning and combined Bicycle/Pedestrian signs and supplemental plaques.

11 *Guidance:*

12 *When the fluorescent yellow-green background color is used, a systematic approach featuring one*  
13 *background color within a zone or area should be used. The mixing of standard yellow and fluorescent*  
14 *yellow-green backgrounds within a zone or area should be avoided.*

15 **Section 9C.05 Except Bicycles Plaque (W16-20P)**

16 **Option:**

17 Where it can be advantageous to notify bicyclists that the conditions or hazards depicted by a warning  
18 sign are not applicable to bicycles, the Except Bicycles (W16-20P) plaque may be used.

19 **Support:**

20 Examples of warning signs where an Except Bicycles plaque can be mounted include DEAD END (W14-  
21 1) and NO OUTLET (W14-2) signs (see Section 2C.25).

22 Sections 2C.57 and 2C.58 contain information on the design of supplemental warning plaques.

23 **Section 9C.06 Bicycle Cross Traffic Warning Plaques (W16-21P)**

24 **Standard:**

25 **When used, the Bicycle Cross Traffic Warning plaque shall be installed below a STOP sign.**

26 **Option:**

27 The Bicycle Cross Traffic Warning plaque may be used below STOP signs on cross streets and driveways  
28 to alert motor vehicle users of an unexpected bicycle movement.

29 **Support**

30 The Bicycle Cross Traffic Warning plaque can help avoid overuse and/or misapplication of other Warning  
31 signs such as the Bicycle warning (W11-1) sign.

32 **Guidance:**

33 The Bicycle Cross Traffic Warning plaque should be used in combination with a STOP sign when a  
34 counter-flow or two-way separated bicycle lane has an approach that is counter to the customary scanning  
35 behavior of a motorist at the stop sign.

36 The Bicycle Cross Traffic Warning plaque should be used at isolated locations and should not be used  
37 systematically on a bicycle facility that would encounter an excessive number of cross streets, driveways, or  
38 other conflict points.

39 **Section 9C.07 Bicycle Lane Ends Warning Sign (W9-5) and Bicycles Merging Sign (W9-5a)**

40 **Support:**

41 Where a warning sign is appropriate, the Bicycle Lane Ends Warning sign (W9-5) is intended to alert road  
42 users that a bicycle lane is ending and that bicycles will share or occupy the travel lane after merging.

43 **Option:**

44 The Bicycle Lane Ends Warning sign (see Figure 9C-X) may be used in advance of the end of a bicycle  
45 lane to warn that a bicycle lane will be ending.

1 The Bicycles Merging sign (W9-5a) may be used where a bicycle merging maneuver may occur. The  
2 Bicycles Merging sign (see Figure 9B-X) may be used in addition to the Bicycle Lane Ends Warning sign  
3 (W9-5).

4 Guidance:

5 To avoid excessive use of signs, the Bicycle Lane Ends Warning sign should not be used where a bicycle  
6 lane is dropped on the approach to an intersection and resumes immediately after the intersection.

7 Option:

8 A Bicycles May Use Full Lane sign (R4-11) and/or Shared Lane Markings (see Section 9C.07) may be  
9 installed downstream of the merge area.

10 A W16-2aP Supplemental Warning Plaque may be used to inform road users of the distance to the end of  
11 the bicycle lane and/or the bicycle merge.

12 **Section ~~9B.19~~ 9C.08 Other Bicycle Warning Signs**

13 Option:

14 Other bicycle warning signs (~~see Figure 9B-3~~) such as PATH NARROWS (W5-4a) and Hill (W7-5) may  
15 be installed on shared-use paths to warn bicyclists of conditions not readily apparent.

16 In situations where there is a need to warn ~~motorists~~ road users to watch for ~~bicyclist~~ bicycles traveling  
17 along the ~~highway~~ roadway, the BICYCLE warning sign (W11-1) may be used with the IN ROAD plaque  
18 (W16-1P and W16-1aP). ~~the SHARE THE ROAD (W16-1P) plaque (see Figure 9B-3) may be used in~~  
19 ~~conjunction with the W11-1 sign.~~

20 Guidance:

21 If used, other advance bicycle warning signs should be installed at least 50 feet in advance of the  
22 beginning of the condition.

23 Where temporary traffic control zones are present on bikeways, appropriate signs from Part 6 should be  
24 used.

25 Option:

26 Other warning signs described in Chapter 2C and Chapter 8C may be installed on bicycle facilities as  
27 appropriate.

28 **Section ~~9B.26~~ 9C.09 Object Markers**

29 **Standard:**

30 **Obstructions in the traveled way of a shared-use path shall be marked with ~~retroreflectorized-~~**  
31 **retroreflective material or appropriate object markers as described in Section 2C.69. **Moved from later****  
32 **in Section**

33 Option:

34 Fixed objects adjacent to shared-use paths may be marked with Type 1, Type 2, or Type 3 object markers-  
35 ~~(see Figure 9B-3) such as those described in Section 2C.63.~~ **Incorporated into the revision at the beginning**  
36 **of this Section** If the object marker is not intended to also be seen by motorists, a smaller version of the Type  
37 3 object marker may be used (see Table ~~9B-1~~ 9A-1).

38 **Standard:**

39 ~~All object markers shall be retroreflective.~~

40 ~~On Type 3 object markers, the alternating black and retroreflective yellow stripes shall be sloped~~  
41 ~~down at an angle of 45 degrees toward the side on which traffic is to pass the obstruction.~~

1 **CHAPTER 9D. GUIDE AND SERVICE SIGNS**

2 **Section 9B.20 9D.01 Bicycle Guide Destination Signs (D1-1b, D1-1c, D1-2b, D1-2c, D1-3b, D1-**  
3 **3c, D11-1, D11-1e)** Existing Section 9B.20 is separated into two Sections and sequence of  
4 **paragraphs was changed**

5 Support:

6 The purpose of Bicycle Destination signs is to deemphasize their messages to motor vehicle traffic when  
7 the direction(s) displayed provides access to routes or pathways where the use of motor vehicles is prohibited  
8 or discouraged. Examples include:

9 A. Bicycles can go in a direction counter to conventional traffic, or

10 B. Access to a separated bikeway or shared-use path from a street, or

11 C. Access to a bicycle route, or

12 D. Bicycles are directed to a lower class of roadway that facilitates a parallel or alternative route  
13 otherwise used by motor vehicle traffic to the same destination, or

14 E. Access to a sidewalk that provides connectivity between bicycle facilities.

15 Section 2D.36 contains information on Destination signs used for when the destinations listed would  
16 apply to both motor vehicle and bicycle traffic.

17 **Guidance-Standard: Guidance changed to Standard**

18 **Because of their smaller size, Bicycle Destination signs ~~should~~shall not be used as a substitute for**  
19 **vehicular destination signs when the message is also intended to be ~~seen by~~applicable to motoristmotor**  
20 **vehicles.**

21 Option:

22 ~~Bike Route Guide (D11-1) signs (see Figure 9B-4) may be provided along designated bicycle routes to~~  
23 ~~inform bicyclists of bicycle route direction changes and to confirm route direction, distance, and destination.~~

24 ~~If used, Bike Route Guide signs may be repeated at regular intervals so that bicyclists entering from side~~  
25 ~~streets will have an opportunity to know that they are on a bicycle route. Similar guide signing may be used~~  
26 ~~for shared roadways with intermediate signs placed for bicyclist guidance.~~

27 ~~Alternative Bike Route Guide (D11-1c) signs may be used to provide information on route direction,~~  
28 ~~destination, and/or route name in place of the “BIKE ROUTE” wording on the D11-1 sign (see Figures 9B-4~~  
29 ~~and 9B-6).~~ **Paragraphs Relocated to new Section 9D.02**

30 ~~Destination (D1-1, D1-1a) signs, Street Name (D3-1) signs, or Bicycle Destination (D1-1b, D1-1c, D1-2b,~~  
31 ~~D1-2c, D1-3b, D1-3c.) signs (see Figure 9B-4) may be installed to provide direction, destination, and distance~~  
32 ~~information as needed for bicycle travel (see Figure 9D-1). If several destinations are to be shown at a single~~  
33 ~~location, they may be placed on a single sign with an arrow (and the distance, if desired) for each name. If~~  
34 ~~more than one destination lies in the same direction, a single arrow may be used for the destinations.~~

35 Destination (D1-1, D1-1a) signs (see Section 2D.36) and Street Name (D3-1) signs (see Section 2D.44)  
36 may be installed instead of or in addition to Bicycle Destination signs as needed if the Destination or Street  
37 Name sign applies to motor vehicles and bicycles.

38 Guidance:

39 *Adequate separation should be made between any destination or group of destinations in one direction*  
40 *and those in other directions by suitable design of the arrow, spacing of lines of legend, heavy lines entirely*  
41 *across the sign, or separate signs.*

42 **Figure 9D-1. Guide Signs and Plaques for Bicycle Facilities (2 Sheets)**

43 **Standard:**

44 **An arrow pointing to the right, if used, shall be at the extreme right-hand side of the sign. An**  
45 **arrow pointing left or up, if used, shall be at the extreme left-hand side of the sign. The distance**  
46 **numerals, if used, shall be placed to the right of the destination names.**

1 ~~On Bicycle Destination signs, a~~ **Except as provided in Paragraph 9, a bicycle symbol shall be placed**  
2 **next to each destination or group of destinations. If an arrow is at the extreme left, the bicycle symbol**  
3 **shall be placed to the right of the respective arrow.**

4 Option:

5 An oversized bicycle symbol may be displayed as the top line of a Bicycle Destination sign instead of  
6 individual bicycle symbols for each of the destination/distance lines.

7 **Standard:**

8 **If an arrow is at the extreme left, the bicycle symbol shall be placed to the right of the respective**  
9 **arrow.**

10 *Guidance:*

11 Where the arrow is at the extreme right, ~~The~~ the bicycle symbol should be to the left of the destination  
12 legend.

13 *Unless a sloping arrow will convey a clearer indication of the direction to be followed, the directional*  
14 *arrows should be horizontal or vertical.*

15 *If several individual name signs are assembled into a group, all signs in the assembly should have the*  
16 *same horizontal width.*

17 **Support:**

18 ~~Figure 9B-5 shows an example of the signing for the beginning and end of a designated bicycle route on a~~  
19 ~~shared-use path. Figure 9B-6 shows an example of signing for an on roadway bicycle route. Figure 9B-7~~  
20 ~~shows examples of signing and markings for a shared-use path crossing.~~

21 Travel times should not be used on Bicycle Destination signs.

22 **Section 9D.02 BIKE ROUTE Guide Signs (D11-1, D11-1c, D11-1d, D11-1e, D11-1f, D11-1g)**

23 **Relocated paragraphs from existing Section 9B.20**

24 Support:

25 BIKE ROUTE Guide (D11-1, D11-1d, D11-1e, D11-1f, D11-1g) signs are used where no unique  
26 designation of routes is desired. Sections 9D.04 through 9D.07 contain information for Bicycle Route signs  
27 where the bicycle route is designated by number, name, or both.

28 Option:

29 Bike Route-BIKE ROUTE Guide (~~D11-1~~) signs (see Figure 9B.4) may be provided along designated ~~non-~~  
30 numbered, unnamed bicycle routes to inform bicyclists of bicycle route direction changes and to confirm route  
31 direction, distance, and destination.

32 If used, ~~Bike Route~~-BIKE ROUTE Guide signs may be repeated at regular intervals so that  
33 ~~bicyclist~~bicycles entering from side streets will have an opportunity to know that they are on a bicycle route.  
34 Similar guide signing may be used for shared roadways with intermediate signs placed for ~~bicyclist~~bicycle  
35 guidance.

36 The ~~Bicycle Route~~-BIKE ROUTE Guide (D11-1) sign (~~see Figure 9B-4~~) may be installed where no  
37 unique designation of routes is desired. **Relocated from existing Section 9B.21**

38 The Alternative ~~Bike Route~~-BIKE ROUTE Guide (D11-1c) signs may be used to display a word legend  
39 that provides information on route direction, destination, and/or route name in place of the “BIKE ROUTE”  
40 wording word legend on the D11-1 sign (see Figures ~~9B-4~~ 9D-3).

41 Guidance:

42 Travel times should not be used on BIKE ROUTE Guide signs.

43 Support:

44 ~~Figure 9B-5 shows an example of the signing for the beginning and end of a designated bicycle route on a~~  
45 ~~shared-use path. Figure 9B-6 shows an example of signing for an on roadway bicycle route. Figure 9B-7~~  
46 ~~shows examples of signing and markings for a shared-use path crossing. Figure 9D-2 shows examples of~~  
47 ~~guide sign applications for bicycle travel.~~

48 **Figure 9D-2. Example of Bicycle Guide Signing (2 Sheets)**

1  
2 **Section 9D.03 BIKE ROUTE Plaque (D11-1bP)**

3 Option:

4 The BIKE ROUTE (D11-1bP) plaque may be installed to supplement:

- 5 A. The Alternative Bike Route Guide (D11-1c) sign (see Section 9D.02), or  
6 B. The Bicycle Directional (D11-1a) sign (see Section 9D.11) for use on a shared-use path, or  
7 C. A Street Name (D3-1) sign (see Section 2D.44).

8 When installed above or below a Street Name sign, the D11-1bP supplemental plaque may include a  
9 bicycle symbol to the left of the BIKE ROUTE legend.

10 **Standard:**

11 **The bicycle symbol shall not be used on a Street Name sign.**

12 **Where a BIKE ROUTE plaque is used in conjunction with a Street Name sign to identify a street**  
13 **that is part of an overall bicycle network, one of the following signs shall also be used systematically to**  
14 **establish the designated bicycle route on the street identified by the BIKE ROUTE plaque:**

- 15 **A. BIKE ROUTE Guide signs (see Section 9D.02), or**  
16 **B. Alternative BIKE ROUTE Guide (D11-1c) sign (see Section 9D.02), or**  
17 **C. State or Local Bicycle Route (M1-8, M1-8a) sign (see Section 9D.05), or**  
18 **D. Non-Numbered Bicycle Route (M1-8b, M1-8c) sign (see Section 9D.06), or**  
19 **E. United States Bicycle Route (M1-9) sign (see Section 9D.07).**

20 **BIKE ROUTE plaques shall not incorporate replicas of the United States Bicycle Route, State or**  
21 **Local Bicycle Route, or Non-Numbered Bicycle Route sign to replace or supplement the bicycle symbol.**

22 Option:

23 The BIKE ROUTE plaque and the Street Name sign may be different widths.

24 Support:

25 Figure 9D-3 shows an example of bicycle guide signing using the BIKE ROUTE plaque.

26 **Figure 9D-3. Example of Bicycle Route Signing**

27 **Section 9D.04 Numbered Bikeway Systems**

28 Support:

29 The purpose of numbering and signing bikeways and bicycle routes is to identify routes and facilitate  
30 travel.

31 The United States Bicycle Routes are numbered by the American Association of State Highway  
32 Transportation Officials (AASHTO) upon recommendations of State highway organizations because the  
33 respective States own these systems. County and local bikeways and bicycle routes are numbered by the  
34 appropriate authorities.

35 Bicycle routes are designated under the presumption that extensive pre-trip planning is done by the  
36 bicyclist. Sign systems can therefore be limited to junctions, accomplishing turns, the beginning of routes,  
37 and route termination points and still achieve the same navigational benefits and advantages. Extensive use of  
38 reassurance markers are typically not needed.

39 Guidance:

40 Establishing bicycle route systems described in Paragraph 2 and any other bicycle route system should  
41 be followed with effective communication between affected jurisdictions. County and local jurisdictions that  
42 are establishing numbered routes should coordinate with the respective State Department of Transportation.  
43 Care should be taken to avoid the use of numbers or other designations that have been assigned to U.S.  
44 Bicycle Routes or other routes in the same geographical region or State. Overlapping numbered route should  
45 be kept to a minimum.

1 *Bicycle routes, which might be a combination of various types of bikeways, should establish a continuous*  
2 *routing.* **Relocated from existing Section 9B.21**

3 **Standard:**

4 All numbered bicycle routes shall be identified by route signs (see Sections 9D.04, Section  
5 9D.05, and Section 9D.07) and auxiliary plaques (see Section 9D.08).

6 Multiple numbered bicycle route systems shall be given preference in this order: United  
7 States, State, and county or local. The preference shall be given by installing the highest  
8 priority legend on the top or the left of the sign assembly with other numbered overlapping  
9 bicycle routes.

10 Where applicable, multiple bicycle route systems with concurrency shall be signed in  
11 accordance with Figure 9D-4.

12 **Figure 9D-4. Route Signing for Numbered or Named Bicycle Facilities**

13 *Guidance:* **Relocated from existing Section 9B.21**

14 *If used, ~~the~~ Bicycle Route ~~or U.S. Bicycle Route~~ signs should be placed at *intervals frequent**  
15 *~~enough~~ locations to keep bicyclists informed of changes in route direction ~~and to remind motorists of~~*  
16 *~~the presence of bicyclists.~~*

17 *Option:*

18 Bicycle Route ~~or U.S. Bicycle Route~~ signs may be installed on shared roadways, ~~or on~~ shared-  
19 use paths, or separated bikeways, to provide navigational guidance for bicyclists.

20 ~~The Bicycle Route Guide (D11-1) sign (see Figure 9B-4 9D-1) may be installed where no unique~~  
21 ~~designation of routes is desired.~~ **Relocated to new Section 9D.02**

22 **Section ~~9B.21~~ 9D.05 State or Local Numbered Bicycle Route Signs (M1-8, M1-8a, ~~M1-9~~)**

23 *Option:*

24 To establish a unique identification (route designation) for a State or local bicycle route, the Bicycle  
25 Route (M1-8, M1-8a) sign (~~see Figure 9B-4~~) may be used.

26 **Standard:**

27 The Numbered Bicycle Route (M1-8) sign shall contain a route designation and shall have a green  
28 background with a ~~retroreflectorized~~ white legend and border. ~~The Bicycle Route (M1-8a) sign shall~~  
29 ~~contain the same information as the M1-8 sign and in addition shall include a pictograph or words that~~  
30 ~~are associated with the route or with the agency that has jurisdiction over the route.~~ **Moved to separate**  
31 **paragraph**

32 The Numbered Bicycle Route (M1-8a) signs shall contain the same information as the M1-8 sign  
33 and in addition shall include a pictograph or words on the upper portion of the sign panel that are  
34 associated with the route or with the agency that has jurisdiction over the route.

35 *Guidance:*

36 The pictograph or legend on a Numbered Bicycle Route (M1-8a) sign used on a roadway should  
37 incorporate a bicycle symbol or a word message that clearly identifies the route as a bicycle route.

38 **Standard:**

39 If a Numbered Bicycle Route (M1-8, M1-8a) sign is used on a roadway, it shall include a bicycle  
40 symbol.

41 *Guidance:*

42 If a pictograph is used on the M1-8a sign the maximum dimension (height or width) of the pictograph  
43 should not exceed two times the height of the route numeral, and should be contained within a green border.  
44 The minimum width of the graphic on the M1-xa or M1-xb sign should be 66% of the panel width, and the  
45 maximum width should be 90% of the panel width.

1 If a bicycle symbol is used on the M1-8a sign, it should have a minimum height of 25% of the M1-8a sign  
2 panel height.

3 *Guidance:*

4 ~~*Bicycle routes, which might be a combination of various types of bikeways, should establish a continuous*~~  
5 ~~*routing.*~~ **Relocated to new Section 9D.04**

6 ~~*Where a designated bicycle route extends through two or more States, a coordinated submittal by the*~~  
7 ~~*affected States for an assignment of a U.S. Bicycle Route number designation should be sent to the American*~~  
8 ~~*Association of State Highway and Transportation Officials (see Page i for the address).*~~ **Relocated to new**

9 **Section 9D.07**

10 **Standard:**

11 ~~**The U.S. Bicycle Route (M1-9) sign (see Figure 9B-4) shall contain the route designation as assigned**~~  
12 ~~**by AASHTO and shall have a black legend and border with a retroreflectorized white background.**~~

13 **Relocated to new Section 9D.07 and edited**

14 *Guidance:*

15 ~~*If used, the Bicycle Route or U.S. Bicycle Route signs should be placed at intervals frequent enough to*~~  
16 ~~*keep bicyclists informed of changes in route direction and to remind motorists of the presence of bicyclists.*~~

17 **Relocated to new Section 9D.04 and edited**

18 *Option:*

19 ~~*Bicycle Route or U.S. Bicycle Route signs may be installed on shared roadways or on shared-use paths to*~~  
20 ~~*provide guidance for bicyclists.*~~ **Relocated to Section 9D.04 and edited**

21 ~~*The Bicycle Route Guide (D11-1) sign (see Figure 9B-4) may be installed where no unique designation of*~~  
22 ~~*routes is desired.*~~ **Relocated to new Section 9D.02 and edited**

## 23 **Section 9D.06 Non-Numbered Bicycle Route Sign (M1-8b, M1-8c)**

24 **Standard:**

25 **Non-Numbered Bicycle Route (M1-8b, M1-8c) signs shall have a green background, a white border,**  
26 **and shall include a pictograph or words identifying the route, or both a pictograph and legend.**

27 *Guidance:*

28 *The pictograph or legend on a Non-Numbered Bicycle Route (M1-8b, M1-8c) sign used on a roadway*  
29 *should incorporate a bicycle symbol or a word message that clearly identifies the route as a bicycle route.*

30 *Support:*

31 *Bicycle routes are sometimes designated specifically by name or established using a distinctive route*  
32 *identity, but are not numbered or are intentionally excluded from an overall numbered bicycle route system.*

33 *Section 9D.02 contains information for Bicycle Route signs where no unique designation routes is*  
34 *beneficial or desired.*

35 *Option:*

36 *Where a bicycle route is named or not numbered, the Non-Numbered Bicycle Route sign may be used.*

37 *Support:*

38 *Certain bicycle route systems can be uninterrupted, long-distance interstate routes that can be largely*  
39 *contained to shared-use paths, or other off-roadway facilities. In order to achieve continuity, these bicycle*  
40 *systems might have to share alignments with urban streets, rural highways, or water crossings.*

41 *Long-distance interstate bicycle routes can be administered by non-transportation organizations subject to*  
42 *independent goals and interests.*

43 *Guidance:*

44 *In order to provide signing on a facility managed by a transportation department, a statewide policy for*  
45 *encouraging independent organizations to adopt the Non-Numbered Bicycle Route sign should be established.*

46 **Section 9D.07 U.S. Bicycle Route Sign (M1-9)** **Paragraphs relocated from existing Section 9B.21**

1 Guidance:

2 Where a designated bicycle route extends through two or more States, a coordinated submittal by the  
3 affected States for an assignment of a U.S. Bicycle Route number designation should be sent to the American  
4 Association of State Highway and Transportation Officials (see Page i for the address).

5 **Standard:**

6 The U.S. Bicycle Route (M1-9) sign ~~(see Figure 9B-4)~~ shall contain the route designation as assigned  
7 by AASHTO ~~and shall have a black legend and border with a retroreflectorized white background.~~

## 8 **Section ~~9B.22~~9D.08 Bicycle Route Sign Auxiliary Plaques**

9 Support:

10 Section 2D.12 contains additional provisions for the design of route sign auxiliary plaques. Sections  
11 2D.29 through 2D.34 contain additional provisions for the general application of route signs.

12 Standard:

13 If a designated or numbered bicycle route is concurrent with a numbered highway, the route sign  
14 and auxiliary plaques for the bikeway shall be installed as independent assemblies and shall not be  
15 installed with other Route signs or confirmation assemblies for the numbered or named highway.

16 Route signs for bikeways shall not be installed on guide signs or overhead.

17 Option: Paragraphs relocated from existing Section 9B.22

18 Route assemblies for a designated or numbered bicycle route may be installed at locations or distances  
19 other than those prescribed in Sections 2D.29 through 2D.34 if engineering judgment indicates that the  
20 operation or speed of the bicycle justifies alternate locations or distances.

21 Auxiliary ~~plaques-signs~~ (See Figure 9D-1) may be used in conjunction with ~~Bike Route Guide signs,~~  
22 Bicycle Route ~~signs,~~ or ~~U.S. Bicycle Route~~ signs as needed.

23 *Guidance:*

24 *If used, Junction (M2-1), Cardinal Direction (M3 series), and Alternative Route (M4 series) auxiliary*  
25 *plaques-signs (see Figure 9B-4) should be mounted above the appropriate ~~Bike Route Guide signs,~~ Bicycle*  
26 *Route ~~signs,~~ or ~~U.S. Bicycle Route~~ signs.*

27 *If used, Advance Turn Arrow (M5 series) and Directional Arrow (M6 series) auxiliary ~~plaques-signs~~ (see*  
28 *Figure 9B-4) should be mounted below the appropriate ~~Bike Route Guide sign,~~ Bicycle Route ~~sign,~~ or ~~U.S.~~*  
29 *~~Bicycle Route~~ signs.*

30 *Except for the M4-8 plaque, all route sign auxiliary signs should match the color combination of the route*  
31 *sign that they supplement.*

32 *Route sign auxiliary signs carrying word legends that are used on bicycle routes should have a minimum*  
33 *size of 12 x 6 inches. Route sign auxiliary plaques carrying arrow symbols that are used on bicycle routes*  
34 *should have a minimum size of 12 x 9 inches.*

35 Standard:

36 If both the Junction (M2-1), Cardinal Direction (M3 series), or Alternative Route (M4 series)  
37 auxiliary plaque and the Advance Turn Arrow (M5 series) or Directional Arrow (M6 series) auxiliary  
38 plaques are used on the same sign assembly as a Bicycle Route sign, the Junction, Cardinal Direction,  
39 or Alternative Route auxiliary plaque shall be installed above the Bicycle Route sign, and the Advance  
40 Turn Arrow or Directional Arrow auxiliary plaque shall be installed below the Bicycle Route sign.

41 ~~*Except for the M4-8 plaque, all route sign auxiliary plaques should match the color combination of the*~~  
42 ~~*route sign that they supplement.*~~

43 ~~*Route sign auxiliary plaques carrying word legends that are used on bicycle routes should have a*~~  
44 ~~*minimum size of 12 x 6 inches. Route sign auxiliary plaques carrying arrow symbols that are used on bicycle*~~  
45 ~~*routes should have a minimum size of 12 x 9 inches.*~~ **Paragraphs relocated to guidance for this section**

46 Option:

47 With route signs of larger sizes, auxiliary ~~plaques-signs~~ may be suitably enlarged, but not such that they  
48 exceed the width of the route sign.

1 A route sign and any auxiliary ~~plaques-signs~~ used with it may be combined on a single sign.

2 ~~Destination (D1-1b and D1-1e) signs (see Figure 9B-4) may be mounted below Bike Route Guide signs,~~  
3 ~~Bicycle Route signs, or U.S. Bicycle Route signs to furnish additional information, such as directional~~  
4 ~~changes in the route, or intermittent distance and destination information. This Paragraph is deleted because~~  
5 ~~it is redundant with Paragraph 4 of existing Section 9D.20. Paragraph 4 of existing Section 9D.20 is~~  
6 ~~relocated to proposed new Section 9D.01 and edited.~~

7 Support:

8 An agency or jurisdiction can use several methods for bicycle route guidance, including maps,  
9 information guides, or signing.

10 Figure 9D-3 shows typical placements of bicycle route signs.

11 Standard:

12 If used, a Bicycle Route Sign assembly shall consist of a route sign and auxiliary signs that identify  
13 the route and indicate the direction.

14 Guidance:

15 If the bicycle route is signed, Bicycle Route Sign assemblies should be installed on all approaches where  
16 that route intersects with other numbered bicycle routes.

17 Standard:

18 Within groups of assemblies, information for bicycle routes intersecting from the left shall be  
19 mounted at the left in horizontal arrangements and at the top or center of vertical arrangements.  
20 Similarly, information for bicycle routes intersecting from the right shall be at the right or bottom, and  
21 for straight-through bicycle routes at the center in horizontal arrangements or top in vertical  
22 arrangements.

23 Option:

24 The Bicycle Route Sign assemblies may be mounted on common supports with numbered highway routes  
25 for general traffic.

26 Standard:

27 A Junction assembly shall consist of a Junction auxiliary sign and a bicycle route sign. The bicycle  
28 route sign shall carry the number of the intersected or joined bicycle route (See Figure 9D-4)

29 Option:

30 The Junction assembly may be installed in advance of intersections where a numbered bicycle route is  
31 intersected or joined by another numbered bicycle route (See Figure 9D-4).

32 Standard:

33 An Advance Bicycle Route Turn assembly shall consist of a bicycle route sign, an Advance Turn  
34 Arrow or word message auxiliary sign, and a Cardinal Direction auxiliary sign, if needed. If used, it  
35 shall be installed in advance of an intersection where a turn must be made to remain on the indicated  
36 route.

37 Option:

38 The Advance Bicycle Route Turn assembly may be used in advance of intersecting routes. On the  
39 approach to an intersection with a numbered bicycle route, the Advance Bicycle Route Turn assembly may be  
40 used to pre-position turning bicycles in the correct lane position from which to make their turn.

41 Standard:

42 A Directional assembly shall consist of a Cardinal Direction auxiliary sign, if needed; a route sign;  
43 and a Directional Arrow auxiliary sign.

44 Guidance:

45 The various uses of Directional assemblies should be as provided in Items A through D:

46 A: Turn movements should be marked by a Directional assembly with a route sign displaying the number  
47 of the turning route and a single-headed arrow pointing in the direction of the turn.

1 B: The beginning of a route should be marked by a Directional assembly with a route sign displaying the  
2 number of that route and a single-headed arrow pointing in the direction of the route.

3 C: An intersected route on a crossroad where the route is designated on both legs should be designated  
4 by:

5 1. Two Directional assemblies, each with a route sign displaying the number of the intersected route, a  
6 Cardinal Direction auxiliary sign, and a single-headed arrow pointing in the direction of movement on that  
7 route; or

8 2. A Directional assembly with a route sign displaying the number of the intersected route and a double-  
9 headed arrow, pointing at appropriate angles to the left, right, or ahead.

10 D: An intersected route on a side road or on a crossroad where the route is designated only on one of the  
11 legs should be designated by a Directional assembly with a route sign displaying the number of the  
12 intersected route, a Cardinal Direction auxiliary sign, and a single-headed arrow pointing in the direction of  
13 movement on that route.

14 Option:

15 Straight-through movements may be indicated by a Directional assembly with a route sign displaying the  
16 number of the continuing route and a vertical arrow.

17 Guidance:

18 A Directional assembly should not be used for a straight-through movement in the absence of other  
19 assemblies indicating right or left turns, as the Confirming assembly sign beyond the intersection normally  
20 provides adequate guidance.

21 Directional assemblies should be located on the near right corner of the intersection. Where unusual  
22 conditions exist, the location of a Directional assembly should be determined by engineering judgement.

23 Support:

24 It is more important that guide signs be readable, and that the information and direction displayed thereon  
25 be readily understood, at the appropriate time and place than to be located with absolute uniformity.

26 Figure 9B-x shows typical placements of Directional assemblies.

27 Guidance:

28 If used, Confirming or Reassurance assemblies should consist of a Cardinal Direction auxiliary sign and  
29 a route sign. Where the Confirming or Reassurance assembly is for an alternative route, the appropriate  
30 auxiliary sign for an alternative route should also be included in the assembly.

31 If used, a Confirming assembly should be installed just beyond intersections of numbered routes.

32 If used, Reassurance assemblies should be installed between intersections in urban areas as needed, and  
33 beyond the built-up area of any incorporated city or town.

34 If used, Bicycle route signs for either confirming or reassurance purposes should be spaced at such  
35 intervals as necessary to keep bicyclists informed of their routes.

## 36 **Section ~~9B.23–9D.09~~ Bicycle Parking Area Signs (D4-3, D4-4)**

37 Support:

38 Bicycle parking areas include bicycle racks or stands, parking stations or structures, sharing systems, or  
39 lockers. These facilities can be either regulated or unregulated.

40 Option:

41 The Bicycle Parking Area (D4-3) sign (~~see Figure 9B-4~~) may be installed where it is desirable to show the  
42 direction to a designated bicycle parking area. The arrow may be reversed as appropriate.

43 **Standard:**

44 **~~The legend and border of the Bicycle Parking Area sign shall be green on a retroreflectorized white~~**  
45 **~~background.~~**

46 The Bicycle-Sharing Station (D4-4) sign may be installed to provide directional information to a  
47 designated bicycle sharing system.

1 Guidance:

2 If used, the Bicycle-Sharing Station sign should be used in conjunction with a regulated bicycle-sharing  
3 system such as one that requires the user to pre-register or provide a deposit in order to acquire a bicycle.  
4 Where it is determined that unregulated bicycle-sharing parking facilities necessitate a bicycle parking sign,  
5 the Bicycle Parking Area sign should be used.

6 Standard:

7 In accordance with Section 1D.09, Bicycle Parking signs shall not include promotional advertising,  
8 business logos or other identification that would convey the involvement of a public-private partnership  
9 for operating the bicycle parking facility or sharing system.

10 **Section 9B.24-9D.10 Reference Location Signs (D10-1 through D10-3) and Intermediate**  
11 **Reference Location Signs (D10-1a through D10-3a)**

12 Support:

13 There are two types of reference location signs:

14 A. Reference Location (D10-1, 2, and 3) signs show an integer distance point along a shared-use path;  
15 and

16 B. Intermediate Reference Location (D10-1a, 2a, and 3a) signs also show a decimal between integer  
17 distance points along a shared-use path.

18 Option:

19 Reference Location (D10-1 to D10-3) signs (~~see Figure 9B-4~~) may be installed along any section of a  
20 shared-use path to assist users in estimating their progress, to provide a means for identifying the location of  
21 emergency incidents and crashes, and to aid in maintenance and servicing.

22 To augment the reference location sign system, Intermediate Reference Location (D10-1a to D10-3a)  
23 signs (~~see Figure 9B-4~~), which show the tenth of a mile with a decimal point, may be installed at one tenth of  
24 a mile intervals, or at some other regular spacing.

25 **Standard:**~~Guidance:~~ **Standard changed to Guidance**

26 *If Intermediate Reference Location (D10-1a to D10-3a) signs are used to augment the reference location*  
27 *sign system, the reference location sign at the integer mile point ~~shall~~ should display a decimal point and a*  
28 *zero numeral.*

29 ~~**If placed on shared-use paths, reference location signs shall contain 4.5-inch white numerals on a**~~  
30 ~~**green background that is at least 6 inches wide with a white border. The signs shall contain the word**~~  
31 ~~**MILE in 2.25-inch white letters. Minimum sign sizes specified in Table; sign design details specified in**~~  
32 ~~**Standard Highway Signs**~~

33 Guidance:

34 *Reference location signs for shared-use paths ~~shall~~ should have a minimum mounting height of 2 feet,*  
35 *measured vertically from the bottom of the sign to the elevation of the near edge of the shared-use path, ~~and~~*  
36 *~~shall not be governed by the mounting height requirements prescribed in Section 9B.01., and should~~*  
37 *not be governed by the mounting height requirements prescribed in 9B.01.*

38 Option:

39 Reference location signs may be installed on one side of the shared-use path only and may be installed  
40 back-to-back.

41 If a reference location sign cannot be installed in the correct location, it may be moved in either direction  
42 as much as 50 feet.

43 Guidance:

44 *If a reference location sign cannot be placed within 50 feet of the correct location, it should be omitted.*

45 *Zero distance should begin at the south and west terminus points of shared-use paths.*

46 Support:

47 Section ~~2H.05~~ 2H.10 contains additional information regarding reference location signs.

1 **Section 9B.25-9D.11 Mode-Specific Directional Guide Signs for Shared-Use Paths (D11-1a,**  
2 **D11-2, D11-3, D11-4)**

3 Option:

4 Where separate pathways are provided for different types of users, Mode-Specific Directional Guide  
5 (D11-1a, D11-2, D11-3, D11-4) signs (~~see Figure 9B-4~~) may be used to guide different types of users to the  
6 traveled way that is intended for their respective modes.

7 Mode-Specific Directional Guide signs may be installed at the entrance to shared-use paths where the  
8 signed mode(s) are permitted or encouraged, and periodically along these facilities as needed.

9 The ~~Bicycles Permitted~~ Directional (D11-1a) sign, when combined with the BIKE ROUTE supplemental  
10 plaque (D11-1bP), may be substituted for the D11-1 ~~Bicycle~~ Bike Route Guide sign on shared-use paths ~~and~~  
11 ~~shared roadways~~.

12 When some, but not all, non-motorized user types are encouraged or permitted on a shared-use path,  
13 Mode-Specific Directional Guide signs may be placed in combination with each other, and in combination  
14 with signs (see Section 9B.09-9B.08) that prohibit travel by particular modes.

15 Support:

16 Figure 9B-8-9D-5 shows an example of signing where separate pathways are provided for different non-  
17 motorized user types.

18 **Figure 9D-5. Example of Mod-Specific Guide Signing on a Shared-Use Path**

19 **Section 9D.12 Destination Guide Signs for Shared-Use Paths (D11-10a, D11-10b, D11-10c)**

20 Support:

21 This Section contains information on the application of Destination Guide signs for shared-use paths.

22 Chapter 9G contains information on applying Destination Guide signs for shared-use paths at alternative  
23 intersections.

24 Standard:

25 Where bicycle traffic is allowed on the shared-use path, Destination Guide signs for shared-use  
26 paths and any identification enhancement markers shall be retroreflective.

27 Guidance:

28 Destination Guide signs for shared-use paths should be installed on independent assemblies and should  
29 not be combined with other regulatory and warning signs.

30 Option:

31 Destination Guide signs for shared-use paths may use symbols in addition to the bicycle symbol to display  
32 other modes on the shared-use path.

33 Standard:

34 Symbols used on Destination Guide signs for shared-use paths shall be limited to those where the  
35 symbol displayed is an allowable mode on the path or pathway alignment, and where the symbol is  
36 supported by other regulatory signs to convey the operation. Symbols unrelated to the allowable mode  
37 that would be otherwise display directional navigation to a facility, activity, point of interest, etc. shall  
38 not be used.

39 Support:

40 Chapter 2M contains information for symbol signs used for facilities, activities, and points of interest.

41 Guidance:

42 Destination Guide signs for shared-use paths, exclusive of any identification marker used, should be  
43 rectangular in shape. Simplicity and uniformity in design, position, and application as described in Section  
44 2A.04 are important and should be incorporated into the sign design.

45 Destination Guide signs for shared-use paths should be limited to three destinations per sign (see Section  
46 2D.06).

1 Abbreviations (see Section 1D.10) should be kept to a minimum, and should include only those that are  
2 commonly recognized and understood.

3 Support:

4 Figure 9D-6 shows a signing system of Destination Guide signs used on shared-use paths.

5 **Figure 9D-6. Example of Destination Guide Signing on a Shared-Use Path**

6 Standard:

7 The arrow location and priority order of destinations shall follow the provisions described in  
8 Sections 2D.08 and 2D.36. Arrows shall be of the designs provided in Section 2D.08.

9 The lettering for destinations on Destination Guide signs for shared-use paths shall be a  
10 combination of lower-case letters with initial upper-case letters (see Section 2D.04). All other word  
11 messages on Destination Guide signs for shared-use paths shall be in all upper-case letters.

12 Except as provided in Paragraph 15, the lettering style used for destination and directional legends  
13 on Destination Guide signs for shared-use paths shall comply with the provisions of Section 2D.04.

14 Option:

15 The distance to the place named may be displayed on the Destination Guide sign. If several destinations  
16 are to be displayed at a single point, the several names may be placed on a single sign with an arrow (and the  
17 distance, if desired) for each name. If more than one destination lies in the same direction, a single arrow may  
18 be used for such a group of destinations.

19 A lettering style other than the Standard Alphabets provided in the "Standard Highway Signs and  
20 Markings" book may be used on Destination Guide signs for shared-use paths if an engineering study  
21 determines that the legibility and recognition values for the chosen lettering style at minimum letter heights  
22 meet or exceed the values for the Standard Alphabets for the same legend height and stroke width.

23 Standard:

24 Where a shared-use path is within the roadway right-of-way or crosses a street or highway, an  
25 alternative lettering style shall not be used.

26 Option:

27 Pictographs (see definition in Section 1C.02) may be used on Destination Guide signs for shared-use  
28 paths.

29 Standard:

30 If a pictograph is used, its height shall not exceed two times the height of the upper-case letters of  
31 the principal legend on the sign.

32 Business logos, commercial graphics, or other forms of advertising (see Section 1D.09) shall not be  
33 used on Destination Guide signs for shared-use paths or sign assemblies.

34 Option:

35 An identification marker may be used in an assembly for Destination Guide signs applied to shared-use  
36 paths, or may be incorporated into the overall design of Destination Guide sign, as a means of visually  
37 identifying the sign as part of an overall system of signs.

38 Standard:

39 The size and shape of an identification marker shall be smaller than the Destination Guide sign.  
40 Identification markers shall not be designed to have an appearance that could be mistaken by road  
41 users as being a traffic control device.

42 Guidance:

43 The area of the identification marker should not exceed 1/5 of the area of the Destination Guide sign with  
44 which it is mounted in the same sign assembly.

45 Standard:

46 Except as provided in Paragraph 27, Destination Guide signs for shared-use paths shall have a  
47 white legend and border on a green or brown background and shall be consistent with the basic design  
48 principles for guide signs.

1 Color coding or pictographs shall not be used to distinguish between different types of destinations,  
2 If used, color coding shall be accomplished by the use of different colored square or rectangular panels  
3 on the face of the sign, each positioned to the left of the named geographic area to which the color-  
4 coding panel applies. The height of the colored square or rectangular panels shall not exceed two times  
5 the height of the upper-case letters of the principal legend on the sign.

6 Option:

7 The different colored square or rectangular panels may include either a black or a white (whichever  
8 provides the better contrast with the color of the panel) letter, numeral, or other appropriate designation to  
9 identify the destination.

10 Except where a shared-use path is within the roadway right-of-way or crosses a street or highway,  
11 Destination Guide signs for shared-use paths may use background colors other than green or brown in order to  
12 provide a color identification for systematic destinations within the overall guide signing system.

13 Standard:

14 The standard colors of red, orange, yellow, purple, or the fluorescent versions thereof, fluorescent  
15 yellow-green, and fluorescent pink shall not be used as background colors for Destination Guide signs  
16 for shared-use paths, in order to minimize possible confusion with critical, higher-priority regulatory  
17 and warning sign color meanings readily understood by path users.

18 Option:

19 Destination Guide signs for shared-use paths may display phone numbers and Internet and e-mail  
20 addresses, including domain names and uniform resource locators (URL).

21 Standard:

22 If used, the use of phone numbers and Internet and e-mail addresses shall be limited to direct  
23 contact information of the jurisdiction with authority of the shared-use path, or contact information for  
24 emergency service response, or both. Contact information for advertising purposes shall not be used.

### 25 Section 9D.13 Two-Stage Bicycle Turn Box Guide Signing (D11-20 series)

26 Support:

27 Two-stage bicycle turn boxes provide a way for a bicycle to make a turn wherein a merge across general  
28 purpose lanes is not required.

29 Section 9B.18 provides situations when a two-stage bicycle turn box is required and also contains  
30 information about the Two-Stage Bicycle Turn Box Regulatory sign (R9-23 series).

31 Section 9E.11 contains information regarding pavement markings for two-stage turn boxes.

32 Standard:

33 Where a two-stage bicycle turn box is provided, the Two-Stage Bicycle Turn Box Guide sign series  
34 (see Figure 9D-7) shall be used.

35 Where used, the Two-Stage Bicycle Turn Box Advance guide sign shall be mounted in advance of  
36 the intersection where the turn box is located.

37 Where used, the Two-Stage Bicycle Turn Box guide sign shall be mounted on the far side of the  
38 intersection.

39 Option:

40 Where the Two-Stage Bicycle Turn Box Advance guide sign is used, an additional Two-Stage Bicycle  
41 Turn Box Advance guide sign may be mounted on the near side of the intersection where the turn box is  
42 located.

43 If used, an appropriately sized Street Name (see Section 2D.44) sign (D3-1) may be installed below the  
44 Two-Stage Bicycle Turn Box Advance guide sign to identify the cross street where the turn box will be  
45 available.

46 **Figure 9D-7. Example of Signing for Two-Stage Bicycle Turn Boxes**

1 CHAPTER ~~9C.9E.~~ MARKINGS

2 ~~Section 9C.01 Functions of Markings~~ Paragraph moved to new Section 9A.03

3 ~~Section 9C.02 General Principles~~ Paragraphs moved to new Section 9A.03

4 ~~Section 9C.03 Marking Patterns and Colors on Shared-Use Paths~~ Paragraphs moved to new  
5 ~~Section 9E.13~~

6 Section ~~9C.04~~9E.01 ~~Markings For~~ Markings For ~~Bicycle Lanes~~

7 Support:

8 Pavement markings designate that portion of the roadway for preferential use by ~~bicyclist~~bicycles (see  
9 Section 3D.01) Markings inform all road users of the restricted nature of the bicycle lane.

10 Standard:

11 ~~Except as provided in Paragraph 3, L~~ongitudinal pavement markings, and bicycle lane symbol or  
12 word markings (see Figure 9E-1), and the arrow marking (see Figure 9E-1) shall be used to define  
13 bicycle lanes.

14 Option:

15 The pavement word markings BIKE LANE may be used instead of the bicycle symbol.

16 **Figure 9E-1. Word, Symbol, and Arrow Markings for Bike Lanes**

17 ~~Standard:~~

18 ~~If the bicycle lane symbol marking is used in conjunction with word or arrow messages, it shall~~  
19 ~~precede them.~~

20 Guidance:

21 ~~If used, The first symbol or bicycle lane pavement word , symbol, and/or arrow~~ marking in a bicycle lane  
22 s (see Figure 9C-3) should be placed at the beginning of a the bicycle lane and any the downstream symbol or  
23 word markings should be placed at periodic intervals along the bicycle lane based on engineering judgment.

24 Option:

25 An arrow marking (see Figure 9E-1) may be used in conjunction with the bicycle lane symbol or word  
26 marking, placed downstream from the symbol or word marking.

27 ~~If the word, symbol, and/or arrow pavement markings shown in Figure 9C-3~~ Where the bicycle lane  
28 symbols or word markings are used located, Bike Lane signs (see Section 9B.04) may also be used, but to  
29 avoid overuse of the signs not necessarily adjacent to every set of pavement markings.

30 Support:

31 Section 3H.06 contains information on green colored pavement for use in bicycle lanes.

32 Standard:

33 The bicycle symbol or BIKE LANE pavement word marking and the pavement marking arrow  
34 shall not be used in a shoulder.

35 A portion of the travel way shall not be established as both a shoulder and a bicycle lane.

36 Support:

37 Where a shoulder is provided or is of sufficient width to meet the expectation of a highway user in that it  
38 can function as a space for emergency, enforcement or maintenance activities, avoidance or recovery  
39 maneuvers, Section 9B.15 contains information regarding the Bicycles Use Shoulder Only sign that can be  
40 used to convey that the shoulder may be used by bicycles.

41 ~~Standard:~~

42 ~~A through bicycle lane shall not be positioned to the right of a right turn only lane or to the left of a~~  
43 ~~left turn only lane.~~ Relocated to new Section 9E.02

44 Support:

1 A bicyclist continuing straight through an intersection from the right of a right-turn lane or from the left of  
2 a left-turn lane would be inconsistent with normal traffic behavior and would violate the expectations of right-  
3 or left-turning motorists. **Relocated to new Section 9E.02**

4 *Guidance:*

5 *When the right through lane is dropped to become a right turn only lane, the bicycle lane markings should*  
6 *stop at least 100 feet before the beginning of the right turn lane. Through bicycle lane markings should*  
7 *resume to the left of the right turn only lane. **Relocated to new Section 9E.02***

8 *An optional through-right turn lane next to a right turn only lane should not be used where there is a*  
9 *through bicycle lane. If a capacity analysis indicates the need for an optional through right turn lane, the*  
10 *bicycle lane should be discontinued at the intersection approach. **Relocated to new Section 9E.02***

11 *Posts or raised pavement markers should not be used to separate bicycle lanes from adjacent travel lanes.*  
12 **Relocated to new Section 9A.03 and new Section 9E.18**

13 *Support:*

14 Using raised devices creates a collision potential for bicyclists by placing fixed objects immediately  
15 adjacent to the travel path of the bicyclist. In addition, raised devices can prevent vehicles turning right from  
16 merging with the bicycle lane, which is the preferred method for making the right turn. Raised devices used  
17 to define a bicycle lane can also cause problems in cleaning and maintaining the bicycle lane. **Relocated to**  
18 **new Section 9A.03 and new Section 9E.18 was edited**

19 *Support:*

20 Examples of bicycle lane markings at right turn lanes are shown in Figures 9C-1, 9C-4, and 9C-5. **Relocated to new Section 9E.02**  
21 Examples of pavement markings for bicycle lanes on a two-way street are  
22 shown in Figure 9C-6 **9E-2**. Pavement word message, symbol, and arrow markings for bicycle lanes are  
23 shown in Figure 9C-3.

24 **Figure 9E-2. Example of Pavement Markings for Bike Lanes on a Two-Way Street**

25 **Section 9E.02 Bicycle Lanes at Intersection Approaches** Paragraphs relocated from existing  
26 **Section 9C.04**

27 **Standard:**

28 **Except as provided in Paragraph 26a, A a through bicycle lane shall not be positioned to the right of**  
29 **a right turn only lane or to the left of a left turn only lane.**

30 **Option:**

31 **A through bicycle lane may be positioned to the right of a right-turn only lane or to the left of a left-turn**  
32 **only lane provided that the bicycle lane is controlled by a traffic signal that displays bicycle signal indications.**  
33 **Refer to Chapter 9F for Standard, Guidance and Options regarding bicycle signals and phasing.**

34 *Support:*

35 **Unless controlled by a bicycle signal indication, a** bicyclist continuing straight through an intersection  
36 from the right of a right-turn lane or from the left of a left-turn lane would be inconsistent with normal traffic  
37 behavior and would violate the expectations of right- or left-turning motorists.

38 *Guidance:*

39 *When the right (or left) through lane is dropped to become a right- (or left-) turn only lane, the bicycle*  
40 *lane markings should stop at least 100 feet before the beginning of the right- (or left-) turn lane. Through*  
41 *bicycle lane markings should resume to the left (or right) of the right- (or left-) turn only lane.*

42 *An optional through-right (or through-left) turn lane next to a right- (or left-) turn only lane should not be*  
43 *used where there is a through bicycle lane. If a capacity analysis indicates the need for an optional through-*  
44 *right turn lane, the bicycle lane should be discontinued at the intersection approach.*

45 **Standard:**

46 **Bicycle lanes located on an intersection approach between contiguous lanes for motor vehicle**  
47 **movements shall be marked with at least one bicycle symbol and at least one arrow pavement markings**  
48 **as provided in Paragraph 9 of Section 9E.01.**

Bicycle lanes shall not be marked within a general purpose lane, either with dotted or any other line markings.

Option:

Where there is insufficient width in the roadway to include a bicycle lane and a general purpose turn lane, bicycle travel may be accommodated through the turn lane using shared-lane markings.

Support:

Examples of bicycle lane markings ~~at right turn lanes on approaches to intersections~~ are shown in Figures ~~9C-1, 9C-4, and 9C-5~~ 9E-3 and 9E-4.

Guidance:

The longitudinal line defining a bicycle lane should be dotted on approaches to intersections where turning vehicles may cross the path of through-moving bicycles.

**Figure 9E-3. Example of Bicycle Lane Markings on an Approach to an Intersection (3 Sheets)**

**Figure 9E-4. Example of Bicycle Lane Markings on an Approach to an Intersection that Transitions to a Shared Lane**

Support:

Buffer-separated and separated bicycle lanes require additional considerations at intersections, including sight distances for bicycles and other road users, user expectations, and intersection geometry.

Option:

A buffer-separated or separated bicycle lane may be shifted closer to, or further away from the adjacent general purpose lane depending upon site-specific conditions (see Figure 9E-7).

Guidance:

A buffer-separated or separated bicycle lane should not be shifted away from the adjacent general purpose lane at an intersection unless there is sufficient space for a vehicle to queue between the general purpose lane and the extension of the bicycle lane.

Support:

The purpose of shifting a buffer-separated or separated bicycle lane away from the adjacent general purpose lane is to allow the driver of a turning vehicle to undertake the tasks of turning and scanning for bicycle cross traffic in isolation versus simultaneously. Sufficient sight distance for both vehicle and bicycle is important in this design.

The purpose of shifting a buffer-separated or separated bicycle lane towards the adjacent general purpose lane is to improve the visibility of bicycles to the adjacent traffic and avoid conflicts between turning vehicles and bicycles.

Option:

Where a general purpose lane is needed at an intersection and the approach also include a separated or buffer-separated bicycle lane, a mixing zone may be established to allow general purpose traffic to share the roadway space formerly occupied by the buffer and/or bicycle lane separation (see Figure 9E-5).

Standard:

Mixing zones shall be used only where the bicycle lane is one-way in the same direction of travel as the adjacent general purpose lane.

Mixing zones shall have yield markings indicating where general purpose traffic entering the combined bicycle lane and turn lane shall yield to bicycles in the bicycle lane.

Where a mixing zone continues to the intersection itself sharing space between the bicycle lane and the general purpose turn lane, shared lane markings and turn arrows shall be provided in the lane.

Where a mixing zone allows for the re-establishment of a bicycle lane after bicycles and general purpose lanes cross paths, a buffered or physically separated space should be provided between the bicycle lane and the adjacent general purpose lane (see Figure 9E-5).

Support:

1 Mixing zones require bicycles and general traffic to share space, interrupting a buffer-separated or  
2 separated bicycle lane where bicycles are otherwise separated from general traffic. It is important to consider  
3 the use of mixing zones in the context of a bicycle facility that is otherwise free of general traffic outside of  
4 crossing points at intersections and driveways.

5 **Figure 9E-5. Example of Mixing Zone at an Intersection**

6 **Section 9E.03 Extensions of Bicycle Lanes through Intersections**

7 Support:

8 Extensions of bicycle lanes through intersections can help identify the paths of bicycles and guide them on  
9 movements that could be difficult to discern. Extensions of bicycle lanes through intersections also assist  
10 other users of the intersection to identify where bicycles are expected to operate and to recognize potentially  
11 unexpected conflict points.

12 The application of a bicycle lane extension in an intersection is important. The design, placement, and  
13 maintenance of bicycle lane extensions through intersections, especially when contiguous to a crosswalk, have  
14 the potential to confuse pedestrians with low visual acuity.

15 The width and color of lane extension markings are discussed in Section 3B.11.

16 Option:

17 The bicycle symbol, the arrow marking, pavement word markings, or a combination thereof may be used  
18 in bicycle lane extensions through intersections.

19 Green colored pavement may be used in a bicycle lane extension consistent with Section 3H.06.

20 **Standard:**

21 **Shared-lane markings or chevron markings shall not be used in bicycle lanes or bicycle lane**  
22 **extensions (see Section 9B.08).**

23 **Extensions of bicycle lanes through intersections shall use dotted line patterns.**

24 **Lane extension markings shall be used to extend a buffer-separated or separated bicycle lane**  
25 **through intersections and driveways.**

26 Support:

27 Separated and buffer-separated bicycle lanes may have alignments that are not as obvious within an  
28 intersection as a standard bicycle lane, therefore additional conspicuity is important where these types of  
29 bicycle lanes cross intersections.

30 Guidance:

31 The extension of a bicycle lane through an intersection should use two lines defining both lateral limits of  
32 the bicycle lane.

33 **Standard:**

34 **Where the path of the bicycle lane through the intersection is contiguous to a crosswalk, two**  
35 **longitudinal dotted lines shall be provided to establish the lateral limits of the bicycle lane extension.**  
36 **The transverse line establishing one side of the crosswalk, or the limit of a high-visibility crosswalk**  
37 **pattern (see Section 3C.05) that does not employ a transverse line, shall not be used to demarcate one**  
38 **side of the bicycle lane extension.**

39 **Section 9E.04 Bicycle Lanes at Driveways**

40 Support:

41 Section 3B.11 contains information to determine if a driveway can be considered an intersection.

42 Option:

43 Bicycle lanes may be continued through a driveway using solid or dotted longitudinal line(s).

44 The bicycle symbol, the arrow marking, pavement word markings, or a combination thereof may be used  
45 in bicycle lane extensions through driveways.

1 Green-colored pavement (see Section 3H.06) may be used as a background to enhance the conspicuity of  
2 the rotated bicycle symbol at driveways.

3 **Section 9E.05 Bicycle Lanes at Circular Intersections** Paragraphs relocated from existing Section  
4 **9C.04**

5 **Standard:**

6 **Bicycle lanes shall not be provided on the circulatory roadway of a ~~roundabout~~ circular intersection**  
7 **(see Chapter 3D).**

8 *Guidance:*

9 *Bicycle lane markings should stop at least 100 feet before the crosswalk, or if no crosswalk is provided, at*  
10 *least 100 feet before the yield line, or if no yield line is provided, then at least 100 feet before the edge of the*  
11 *circulatory roadway.*

12 *Support:*

13 Section 9E.10 contains information on using shared-lane markings to facilitate the bicycle movement  
14 through a circular intersection.

15 The "Guide for the Development of Bicycle Facilities" authored by the American Association of State  
16 Highway and Transportation Officials (see Section 1A.05) contains information on designing for bicycles on  
17 the sidewalk in lieu of, or in addition to, using shared-lane markings in the circular roadway of the  
18 intersection.

19 **Section 9E.06 Buffer-Separated Bicycle Lanes**

20 *Support:*

21 Buffer-separated bike lanes provide additional lateral separation between a bicycle lane and a general  
22 travel lane by a pattern of pavement markings without the presence of vertical elements or parked vehicles.  
23 Providing a buffer space between a bicycle lane and a general purpose lane can reduce vehicle encroachment  
24 into the bicycle lane.

25 Providing a buffer space between a bicycle lane and a parking lane can reduce crashes involving bicycles  
26 and the opening of vehicle doors from the parking lane.

27 **Standard:**

28 **If used, and except as provided in Paragraph 5, a buffer space shall be marked with longitudinal**  
29 **lines as follows:**

30 **A. A solid white line along both edges of the buffer space where crossing is prohibited, or**

31 **B. A broken single white line along one or both edges of the buffer space where crossing is allowed,**  
32 **with a solid white line along the other edge of the buffer space.**

33 *Guidance:*

34 *Engineering judgment should be used to establish intermittent breaks or interruptions in the buffer space,*  
35 *such as for driveways or on-street parallel parking lanes, in order to convey access points or an otherwise*  
36 *general legal movement to cross the buffer space (see Figure 9E-6).*

37 *Option:*

38 Buffer spaces may be established without specific longitudinal lines if contiguous facilities have  
39 longitudinal lines or other pavement markings themselves that, when installed, automatically demarcate the  
40 buffer space (see Drawings B and C of Figure 3E-3).

41 **Standard:**

42 **Except as provided in Paragraph 8, a through buffer-separated bicycle lane shall not be positioned**  
43 **to the right of a right turn only lane or to the left of a left turn only lane.**

44 *Option:*

45 A buffer-separated bicycle lane may be placed to the right of a right-turn lane (or to the left of a left-turn  
46 lane) only if a bicycle signal face (see Chapter 9F) is used and the signal phasing and signing eliminates any  
47 potential conflicts between the bicycle movement and the turning movement.

1 Guidance:

2 The width of the buffer space should be at least three times the width of the normal or wide longitudinal  
3 line used to mark the buffer space.

4 Option:

5 Where a buffer space is less than three feet wide, one-directional diagonal markings or no markings at all  
6 in the buffer space can be applied.

7 **Standard:**

8 **If used, one-directional diagonal markings shall slant away from traffic in the adjacent travel lane**  
9 **for motor vehicle traffic.**

10 Guidance:

11 Where used, the spacing of chevrons or one-directional diagonal markings should be 10 feet or greater.

12 Support:

13 Chevron and one-directional diagonal markings convey that the buffer space is not an additional bicycle  
14 lane or other travel lane open to traffic.

15 **Standard:**

16 **A buffer space three feet or wider shall use chevron or one-directional diagonal markings within the**  
17 **buffer.**

18 Guidance:

19 Lane extension markings should be used to extend a buffer-separated bicycle lane across intersections  
20 and driveways.

21 **Figure 9E-6. Example of Lane Markings for Buffer-Separated Bicycle Lanes**

22 **Section 9E.07 Separated Bicycle Lanes**

23 Support:

24 Separated bicycle lanes provide a physical separation between a general travel lane and a bicycle lane that  
25 contains vertical objects or vertical separation between the general travel lane and bicycle lane. Providing a  
26 physical separation between a bicycle lane and a general purpose lane can reduce vehicle encroachment into  
27 the bicycle lane beyond a marked buffer alone and can in some cases prevent that encroachment altogether.

28 Physical separation between general purpose lanes and bicycle lanes introduces additional design  
29 considerations over buffer-separated bicycle lanes, including the awareness of a potentially unexpected  
30 conflict point for turning vehicles and the provision of adequate sight distance for all users at intersections and  
31 driveway crossings.

32 Option:

33 Vertical elements used to provide separation between general purpose lanes and bicycle lanes may  
34 include, but are not limited to tubular markers, medians, or parked vehicles.

35 Support:

36 Where on-street parking is provided in the buffer area of a separated bicycle lane, pedestrians will have to  
37 access those vehicles.

38 Guidance:

39 BIKE LANE (R3-7) signing should be used where a separated bicycle lane may be confused for a general  
40 purpose lane.

41 **Standard:**

42 **Where a parking lane serves as the separation between a general travel lane and a separated bicycle**  
43 **lane, a buffer space shall be provided between the parking lane and the bicycle lane to allow for opening**  
44 **doors of parked vehicles.**

45 Support:

46 Separated bicycle lanes may be designed for one-way or two-way bicycle travel. Providing one-way  
47 separated bicycle lanes in the same direction as and on the right side of the general purpose lane, whether on a

1 one-way or two-way roadway, accommodates the expectations of road users and may create fewer conflict  
2 points at intersections or driveway crossings.

3 Option:

4 Separated bicycle lanes may be provided on one or both sides of a roadway or in a center median.

5 Support:

6 The presence of two-way separated bicycle lanes on one side of a roadway or in a center median  
7 introduces additional challenges and conflict points. The "Guide for Development of Bicycle Facilities"  
8 authored by the American Association of State Highway and Transportation Officials (see Section 1A.05)  
9 contains information on design considerations when selecting the design for a separated bicycle lane.

10 Information regarding the design requirements for pedestrians who would interact with a separated  
11 bicycle lane can be found in the "Americans with Disabilities Act Accessibility Guidelines for Buildings and  
12 Facilities (ADAAG)" (see Section 1A.05) and the Public Rights-of-Way Accessibility Guidelines (PROWAG)  
13 (see Section 1A.05).

14 Standard:

15 The edge line and lane line colors used for separated bicycle lanes shall conform to the requirements  
16 in Chapter 3A (see Figure 9E-7).

17 Where two-way separated bicycle lanes are provided on one side of a roadway or in a center  
18 median, conflicting vehicle traffic at signalized intersections shall be prohibited by signal indications to  
19 cross the two-way separated bicycle lane when bicycle traffic is allowed to proceed through the  
20 intersection.

21 Right turns on red shall be prohibited across separated bicycle lanes while bicycle traffic is allowed  
22 to proceed through the intersection.

23 Directional arrows shall be used in conjunction with the bicycle lane symbol or word marking in  
24 separated bicycle lanes, placed downstream from the symbol or word marking.

25 Support:

26 Additional information on signals for bicycle facilities is found in Chapter 4H.

27 Guidance:

28 Conflicting traffic at signalized intersections should be prohibited by signal indications to cross a one-  
29 way separated bicycle lane with the same direction of travel as the adjacent general purpose lane when  
30 bicycle traffic is allowed to proceed through the intersection.

31 Standard:

32 The buffer space for separated bicycle lane shall be marked with solid longitudinal lines.

33 A marked buffer space two feet or wider for a separated bicycle lane, including those buffer spaces  
34 where tubular markers are provided, shall use chevron or one-directional diagonal markings within the  
35 buffer, unless physical separation is provided that occupies the majority of the buffer space, such as  
36 medians or parked vehicles.

37 Guidance:

38 Where used in the buffer area of a separated bicycle lane, the spacing of chevrons or one-directional  
39 diagonal markings should be 10 feet or greater.

40 Crosswalks that cross a separated bicycle lane should be marked consistent with the style of crosswalk  
41 marking provided across the adjacent general purpose lane.

42 Support:

43 Where on-street parking is provided in the buffer area of a separated bicycle lane, the chevron or diagonal  
44 marking provisions in Section 9E.06 apply to the area outside of the marked parking area within the buffer  
45 (see Figure 9E-7).

46 Section 9B.20 contains information on the LEFT TURN YIELD TO Bicycles (R10-12b) sign used with  
47 traffic signals and counter-flow bicycle lanes.

1 Intersection treatments for separated bicycle lanes can vary depending on the geometric and operational  
2 conditions at the intersection (see Section 9E.02).

3 **Figure 9E-7. Example of Lane Markings for Separated Bicycle Lanes**

4 **Section 9E.08 Counter-Flow Bicycle Lanes**

5 **Support:**

6 Counter-flow bicycle lanes are one-directional and provide a lawful path of travel for bicycles in the  
7 opposite direction from general traffic on a roadway that allows general traffic to travel in only one direction.

8 Counter-flow bicycle lanes establish two-way traffic on a roadway.

9 Section 9B.20 contains information on the LEFT TURN YIELD TO Bicycles (R10-12b) sign used with  
10 traffic signals and counter-flow bicycle lanes.

11 **Guidance:**

12 Where used, a counter-flow bicycle lane should be marked such that bicycles in the counter-flow lane  
13 travel on their right-hand side of the road in accordance with normal rules of the road, with opposing traffic  
14 on the left.

15 **Standard:**

16 Counter-flow bicycle lanes shall use double yellow center line pavement markings (see Section  
17 3B.01) a painted median island, raised median island (see Section 3J.03) or some form of physical  
18 separation where the speed limit is 30 mph or below.

19 For speed limits 35 mph or above, a buffer per Section 3B.24, a painted or raised median island, or  
20 some form of physical separation shall be used to separate a counter-flow bicycle lane from the adjacent  
21 travel lane.

22 Counter-flow bicycle lanes shall not be used between a general purpose lane and an on-street  
23 parallel parking lane for motor vehicles.

24 **Support:**

25 Since counter-flow bicycle movements can be unexpected, lane extension markings can help road users  
26 identify where counter-flow bicycle movements cross intersections.

27 **Standard:**

28 Where signs are provided to regulate turns from streets or driveways that intersect with a roadway  
29 that has a counter-flow bicycle lane, ONE WAY signs (see Section 2B.51) shall not be used. Movement  
30 Prohibition signs (see Section 2B.28) with supplemental Except Bicycles (R3-7bP) plaque(s) shall be  
31 used (see Figure 9E-6).

32 If a DO NOT ENTER (R5-1) sign(s) is used at egress points for motor vehicle traffic, the Except  
33 Bicycles plaque(s) shall be placed under the DO NOT ENTER sign (see Figure 9E-8) where a counter-  
34 flow bicycle lane is used.

35 Where intersection traffic controls are provided (e.g. stop or yield signs, traffic signals, etc.),  
36 appropriate devices shall be provided and oriented towards bicycles in the counter-flow lane.

37 At signalized locations, appropriate bicycle signalization (See Chapter 9F) shall be provided and  
38 oriented towards bicycles in the counter-flow lane, including a method for counter-flow bicycles to  
39 actuate the green phase for the counter-flow movement.

40 **Support:**

41 Higher levels of traffic control or additional signalization, signing and/or pavement marking treatments  
42 can be helpful for intersecting traffic where the counter-flow bicycle movement is unexpected.

43 **Guidance:**

44 An appropriate Bicycle Cross Traffic Warning plaque (see Section 9C.06) should be used below a STOP  
45 sign on the cross-street at intersections where a counter-flow bicycle lane is provided on the primary street.

46 **Figure 9E-8. Example of Counter-Flow Bicycle Lanes at an Intersection**

47 **Section 9C.079E.09 Shared-Lane Marking**

1 Option:

2 The ~~S~~shared-~~L~~lane ~~M~~marking shown in Figure ~~9C-99E-9~~ may be used to:

- 3 A. Assist bicyclists with lateral positioning in a shared lane with on-street parallel parking in order to  
4 reduce the chance of a bicyclist's impacting the open door of a parked vehicle,  
5 B. Assist bicyclists with lateral positioning in lanes that are too narrow for a motor vehicle and a bicycle  
6 to travel side by side within the same traffic lane,  
7 C. Alert road users of the lateral location ~~bicyclist~~bicycles are likely to occupy within the traveled way,  
8 D. Encourage safe passing of ~~bicyclist~~bicycles by ~~motorist~~motor vehicles, and  
9 E. Reduce the incidence of wrong-way bicycling in the roadway.

10 **Figure 9E-9. Example of Shared-Lane Markings on an Approach to an Intersection**

11 *Guidance:*

12 *The ~~S~~shared-~~L~~lane ~~M~~marking should not be placed on roadways that have a speed limit ~~above 35 mph of~~  
13 40 mph or more.*

14 **Standard:**

15 ~~Shared-Llane Mmarkings shall not be used in: on-shoulders or in designated bicycle lanes.~~

16 A. Shoulders,

17 B. Bicycle lanes or in designated extensions of bicycle lanes through intersections or driveways,

18 C. A travel lane that in which light-rail transit vehicles also travel,

19 D. The transition area where a motor vehicle entering an exclusive turn lane must weave across  
20 bicycle traffic in bicycle lanes,

21 E. Two-stage turn boxes,

22 F. Bicycle Boxes,

23 G. Shared-use paths or shared-use path crossings, or

24 H. Physically separated bikeways, either in the roadway or on an independent right-of-way

25 Green-colored pavement shall not be applied as a background to shared-lane markings (see Section  
26 3H.06).

27 *Guidance:*

28 *If used in a shared lane with on-street parallel parking, ~~S~~shared-~~L~~lane ~~M~~markings should be placed so  
29 that the centers of the markings are ~~at least 11~~a minimum of 12 feet from the face of the curb, or from the  
30 edge of the pavement where there is no curb.*

31 *If used on a street without on-street parking that has an outside travel lane that is less than 14 feet wide,  
32 ~~the centers of the ~~S~~shared-~~L~~lane ~~M~~markings should be at least~~Shared Lane Markings should be placed so that  
33 the centers of the markings are a minimum of 4 feet from the face of the curb, or from the edge of the  
34 pavement where there is no curb.*

35 *~~If used, the shared lane marking should be placed immediately after an intersection and spaced at~~  
36 ~~intervals not greater than 250 feet thereafter.~~Where they are used in travel lanes that are too narrow for  
37 bicycles and motor vehicles to operate safely side-by-side, Shared Lane Markings should be placed in the  
38 center of the travel lane.*

39 *At non-intersection locations, the Shared Lane Marking should be spaced at intervals not less than 50 feet  
40 and not greater than 250 feet.*

41 *The first Shared Lane Marking downstream from an intersection should be placed no more than 50 feet  
42 from the intersection.*

43 Option:

44 Section ~~9B-06-9B.14~~ describes a Bicycles May Use Full Lane sign that may be used in addition to or  
45 instead of the ~~S~~shared-~~L~~lane ~~M~~marking to inform road users that ~~bicyclist~~bicycles might occupy the travel  
46 lane.

47 *Guidance:*

1 If the Bicycles May Use Full Lane signs (R4-11) is used as an addition to Shared Lane Marking, the  
2 marking should be placed so that the centers of the markings are in the approximate center of the travel lane.

3 Option:

4 The shared-lane marking may be used (See Figure 9E-9) where the width of the roadway is insufficient to  
5 continue a bicycle lane or separated bikeway on the approach to the intersection, or it is advantageous to  
6 terminate the bicycle lane or separated bikeway in order to provide for a shared lane.

7 The shared-lane marking may be used on approaches to intersections (See Figure 9E-4) in exclusive turn  
8 lanes to continue a bicycle lane where there is insufficient width in the roadway for both the bicycle lane and  
9 turn lane.

10 **Section 9E.10 Shared-Lane Markings for Circular Intersections**

11 Guidance:

12 Shared-lane markings should not be used in the circulatory roadway of the circular intersection if the  
13 circulatory roadway is multi-lane.

14 Support:

15 The "Guide for Development of Bicycle Facilities" authored by the American Association of State  
16 Highway and Transportation Officials (see Section 1A.05) contains information on designing for bicycles on  
17 the sidewalk in lieu of, or in addition to, using shared-lane markings in the circular roadway of the  
18 intersection.

19 **Section 9E.11 Two-Stage Bicycle Turn Boxes**

20 Support:

21 Two-stage bicycle turn boxes allow bicycles the opportunity to make turns at an intersection or crossing  
22 point that does not require them to merge into traffic upstream or to dismount and use a crosswalk at the  
23 intersection or crossing point.

24 Section 9B.17 contains information on regulatory signing that shall be used in conjunction with a two-  
25 stage bicycle turn box pavement marking where use of the turn box is required.

26 Section 9D.13 contains information on guide signing that can be used in conjunction with a two-stage  
27 bicycle turn box pavement marking where use of the turn box is optional.

28 **Standard:**

29 **If used, two-stage bicycle turn boxes shall be located:**

30 **A. In an area between the closest through bicycle or motor vehicle movement and the parallel**  
31 **crosswalk (see Drawing A of Figure 9E-10), or**

32 **B. In an area between the through bicycle movement and the parallel pedestrian crossing**  
33 **movement if no crosswalk is established (see Drawing B of Figure 9E-10), or**

34 **C. On the innermost side of the bicycle facility provided that the two-stage turn box is located in a**  
35 **portion of the intersection where parallel or motor vehicle traffic does not travel; such as projections of**  
36 **islands or parking lanes (see Drawing C of Figure 9E-10), or**

37 **D. In an area between the through bicycle movement and a pedestrian facility for T-intersections**  
38 **(see Drawing D of Figure 9E-10).**

39 **A two-stage bicycle turn box shall consist of at least one bicycle symbol pavement marking and**  
40 **at least one pavement marking arrow.**

41 **A turn arrow in the appropriate direction shall be used if a two-stage turn box is used with a one-**  
42 **way bicycle lane, and a through arrow in the appropriate direction shall be used if a two-stage turn box**  
43 **is used with a two-way bicycle lane (see Figure 9E-11). two-stage bicycle turn boxes that facilitate turns**  
44 **from a one-way bikeway, the bicycle symbol shall precede the pavement marking turn arrow in the**  
45 **direction of bicycle travel.**

46 **A two-stage bicycle turn box shall be bounded on all sides by a solid white line.**

1 For two-stage bicycle turn boxes that facilitate turns from a one-way bikeway, the bicycle symbol  
2 shall precede the pavement marking turn arrow in the direction of bicycle travel.

3 Passive detection of bicycles in the two-stage bicycle turn box shall be provided if the signal phase  
4 that permits bicycles to enter the intersection during the second stage of their turn is actuated.

5 **Figure 9E-10 Examples of Two-Stage Bicycle Turn Box Locations in Intersections**

6 **Figure 9E-11 Example of a Two-Stage Bicycle Turn Box in an Intersection with a Two-**  
7 **Way Separated Bicycle Lane**

8 Option:

9 For two-stage turn boxes that facilitate turns from a two-way bikeway, a through arrow pavement marking  
10 may be used to orientate bicycles in the direction of the movement to be accomplished by the second stage of  
11 the turn (see Figure 9E-11).

12 Guidance:

13 Engineering judgment should be used to develop the size of the two-stage bicycle turn box. Factors  
14 considered should include intersection geometry and keeping queued bicycles away from moving traffic, as  
15 well as peak hour bicycle volumes so that overflow of the two-stage turn box does not subject any bicyclist to  
16 conflicting movements.

17 Option:

18 The two-stage turn box may use green-colored pavement.

19 **Standard:**

20 **If used, green-colored pavement shall encompass the full limit of the two-stage turn box.**

21 **Where the path of vehicles lawfully turning on red would pass through a two-stage bicycle turn box,**  
22 **the cross street shall implement a full-time turns on red prohibition.**

23 **Section 9E.12 Bicycle Box**

24 Option:

25 A bicycle box (see Figure 9E-12) may be used to increase the visibility of stopped bicycles on the  
26 approach to a signalized intersection during the portion of the signal cycle when a red signal indication is  
27 being displayed to motor vehicles in the approach lane(s) that is behind the box.

28 Guidance:

29 At intersections where a discernible number of conflicts between vehicles turning across through bicycles  
30 in a bicycle lane has been demonstrated during the green interval of a signal, the bicycle box should not be  
31 used.

32 Other treatments should be considered for conflicts between turning vehicles and through bicycles such as  
33 using leading or exclusive signal phases, or separating turning traffic from through traffic through exclusive  
34 turn lanes.

35 A bicycle lane should be used on the approach to a bicycle box.

36 A bicycle box should not be contiguous with a crosswalk. A stop line on the downstream end of the  
37 bicycle box should be used to mark the location where bicycles are required to stop.

38 **Standard:**

39 **If used, the distance from the upstream edge of the bicycle box that is nearest to the stop line for**  
40 **motor vehicles to the downstream edge of the bicycle box that is nearest the crosswalk or intersection**  
41 **shall be at least 10 feet. At least one bicycle symbol marking (see Figure 9E-12) shall be used in the**  
42 **bicycle box.**

43 **Where an existing stop line for motor vehicles is relocated upstream to install a new bicycle box, the**  
44 **yellow change and red clearance intervals (see Section 4F.17) shall be recalculated and if necessary,**  
45 **reprogrammed to accommodate the length of the bicycle box.**

1 Countdown pedestrian signals (see Section 4L.05) for the crosswalk or pedestrian crossing  
2 movement that crosses the approach shall accompany bicycle boxes that extend across more than one  
3 approach lane for motor vehicles.

4 Turns on red shall be prohibited from the lane where a bicycle box is placed.

5 Guidance:

6 Countdown pedestrian signals for the crosswalk or pedestrian crossing movement that crosses the  
7 approach should accompany bicycle boxes where it is demonstrated that bicycles arrive at the intersection at  
8 or near the end of the red signal indication being displayed to traffic in the approach lane(s) that is behind the  
9 box.

10 Option:

11 Green-colored pavement may be used in a bicycle box.

12 Standard:

13 If used, green-colored pavement shall be used in the full limits of the bicycle box.

14 Support:

15 Section 9B.02 contains information on the Except Bicycles plaque that can be used below the STOP  
16 HERE ON RED (R10-6 or R10-6a) sign (see Section 2B.63) to exempt the bicycle from the requirement of  
17 the stop line.

18 **Figure 9E-12. Example of an Intersection Bicycle Box (2 Sheets)**

19 **Section ~~9C.03-9E.13~~ Marking Patterns and Colors on Shared-Use Paths**

20 Option:

21 Where shared-use paths are of sufficient width to designate two minimum width lanes, a solid yellow  
22 center line may be used to separate the two directions of travel where passing or traveling to the left of the line  
23 is not permitted., ~~and a~~ A broken yellow center line may be used where passing is permitted (see Figure ~~9C-2-~~  
24 ~~9E-13~~).

25 **Figure 9E-13. Examples of Center Line Markings for Shared-Use Paths**

26 Guidance:

27 ~~Broken lines used on shared-use paths should have the usual 1 to 3 segment to gap ratio. A~~ nominal 3-  
28 foot segment with a 9-foot gap. ~~should be used.~~

29 ~~If conditions make it desirable to separate two directions of travel on shared-use paths at particular~~  
30 ~~locations, a solid yellow line should be used to indicate no passing and no traveling to the left of the line.~~

31 ~~Markings as shown in Figure 9C-8 should be used at the location of obstructions in the center of the path,~~  
32 ~~including vertical elements intended to physically prevent unauthorized motor vehicles from entering the path.~~

33 **Paragraph relocated to new Section 9E.17**

34 Option:

35 A solid white line may be used on shared-use paths to separate different types of users in the same  
36 direction. The R9-7 sign (see Section ~~9B.12-9B.13~~) may be used to supplement the solid white line.

37 Smaller size pavement word markings and symbols may be used on shared-use paths. Where arrows are  
38 needed on shared-use paths, half-size layouts of the arrows may be used (see Section 3B.20).

39 Standard:

40 Where a shared-use path crosses a roadway, crosswalk markings shall be used (see Chapter 3C).

41 Option:

42 Where pedestrian and bicycle movements on a shared-use path are separated on the approach to a  
43 roadway crossing, parallel bicycle and pedestrian crossing markings may be used as shown in Figure 9E-14.

44 Guidance:

45 If parallel bicycle and pedestrian crossing markings are used where a shared-use path crosses a roadway,  
46 crossing areas for bicycles should use green-colored pavement if the shared-use path crossing has a high  
47 volume of either mode.

1 **Figure 9E-14. Examples of Pavement Markings for a Shared-Use Path Crossing**

2 **Section 9E.14 Bicycle Route Pavement Markings**

3 Option:

4 Pavement markings simulating guide signs for bicycle routes (see Section 9D.02 through 9D.07) and route  
5 auxiliary plaques (see Section 9D.08) may be used to supplement guide signing to help bicyclists in  
6 navigation (see Figure 9E-15).

7 Standard:

8 Pavement marking route markers shall be limited to shared-use paths or separated bicycle lanes.  
9 Pavement marking route markers shall not be used in standard bicycle lanes, buffer-separated bicycle  
10 lanes, or in shared lanes.

11 Except as provided in Paragraph 4, pavement markings simulating official guide signs for bicycle  
12 routes shall be supplemental to the sign(s) and shall not be a substitute for the sign(s).

13 Guidance:

14 A systematic methodology of locating the sign adjacent to the bicycle route pavement marking should be  
15 used that includes locations where either the sign or the pavement marking can exist alone to avoid overuse of  
16 the guide sign or the pavement marking.

17 The route marker pavement marking should not be elongated.

18 The location, size, and materials of the route marker pavement marking should be considered that will  
19 minimize loss of traction for bicycles under wet conditions.

20 **Figure 9E-15. Examples of Placement of Route Markers for Shared-Use Paths**

21 **Section 9C.05-9E.15 Bicycle Detector Symbol**

22 Option:

23 A ~~The~~ bicycle detector symbol (see Figure 9C-716) may be placed on the pavement indicating the  
24 optimum position for a ~~bicyclist~~bicycle to actuate the signal.

25 Appropriately sized WAIT HERE FOR GREEN word markings may be placed on the pavement  
26 immediately below the bicycle detector symbol.

27 ~~A~~ ~~A~~ R10-22 sign (see Section 9B.13-9B.21 and Figure 9B-2) may be installed to supplement the bicycle  
28 detector symbol pavement marking.

29 Support:

30 The Standard Highway Signs and Markings Book contains details for incorporating green-colored  
31 pavement as a background enhancement to the bicycle detector symbol.

32 **Figure 9E-16. Bicycle Detector Pavement Marking**

33 **Section 9C.06-9E.16 Pavement Markings for Obstructions**

34 Guidance:

35 Markings as shown in Figure 9C-8-9E-17 should be used at the location of obstructions in the center of  
36 ~~the~~ a shared-use path or physically separated bikeway, including vertical elements intended to physically  
37 prevent unauthorized motor vehicles from entering the path. Paragraph relocated from new Section 9E.13

38 In roadway situations where it is not practical to eliminate a drain grate or other roadway obstruction  
39 that is inappropriate for bicycle travel, white markings applied as shown in Figure 9C-8-9E-17 should be  
40 used to guide bicyclists around the condition.

41 **Figure 9E-17. Examples of Obstruction Pavement Markings**

42 **Section 9E.17 Raised Devices**

43 Support:

1 Chapter 3I contains information on using channelizing devices to emphasize pavement marking patterns  
2 associated with certain bicycle facilities. The most common application is the use of flexible raised devices in  
3 the buffer space of a buffer-separated bicycle lane (see Section 9E.06).

4 Using inflexible raised devices immediately adjacent to the travel path of the bicycle without a buffer  
5 creates a collision potential for bicyclists. ~~by placing fixed objects immediately adjacent to the travel path of~~  
6 ~~the bicyclist. In addition, raised devices can prevent vehicles turning right from merging with the bicycle~~  
7 ~~lane, which is the preferred method for making the right turn. Raised devices used to define a bicycle lane can~~  
8 ~~also cause problems in cleaning and maintaining the bicycle lane.~~ **Paragraph relocated from existing**  
9 **Section 9C.04 and edited**

10 Option:

11 In accordance with Chapter 3I, channelizing devices may be used to emphasize a pavement marking  
12 pattern that establishes a bicycle lane or other bicycle facility provided that the installation of channelizing  
13 devices does not prevent motor vehicles from turning when the turn requires the motor vehicle to merge with  
14 the bicycle lane or facility as required by law or ordinance.

15 Guidance:

16 *If used, channelizing devices for bicycle facilities should be tubular markers (see Section 3I.02).*

17 *The selection of a raised device for use with bicycle facilities should consider the collision potential of the*  
18 *both the post and the base since the base may be present in the event the post is struck and missing.*

19 **Standard:**

20 **Channelizing devices that are used to emphasize the pavement marking patterns of bicycle facilities**  
21 **shall not incorporate the color green into either the device or its retroreflective element to supplement**  
22 **the presence of green-colored pavement.**

23 Guidance:

24 *If used in buffer-separated bicycle lanes, channelizing devices should be placed in the buffer space and at*  
25 *least one foot from the longitudinal bicycle lane pavement marking.*

1 **CHAPTER ~~9D.9F.~~ SIGNALS**

2 **Section ~~9D.01~~9F.01 Application**

3 Support:

4 Part 4 contains information regarding signal warrants and other requirements relating to signal  
5 installations.

6 Option:

7 For purposes of signal warrant evaluation, ~~bicyclist~~bicycles may be counted as either vehicles or  
8 pedestrians.

9 **Section 9F.02 Bicycle Signal Face**

10 Support:

11 Chapter 4H contains information on the design and application of bicycle signal faces. Section 9B.22  
12 contains information for the Bicycle SIGNAL sign that is required to be installed with a bicycle signal face.

13 **Section ~~9D.02~~9F.03 Signal Operations for Bicycles**

14 **Standard:**

15 **At installations where visibility-limited signal faces are used, signal faces shall be adjusted so**  
16 **bicyclists for whom the indications are intended can see the signal indications. If the visibility-limited**  
17 **signal faces cannot be aimed to serve the bicyclist, then separate signal faces shall be provided for the**  
18 **bicyclist.**

19 **On bikeways, signal timing and actuation shall be reviewed and adjusted to consider the needs of**  
20 **bicyclists.**

**APPENDIX A1**  
**CONGRESSIONAL ~~LEGISLATION~~ACTIONS**

**PUBLIC LAW 102-240-DEC. 18, 1991 (INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT OF 1991)**

**Section 1077. REVISION OF MANUAL** — Not later than 90 days after the date of the enactment of this Act, the Secretary shall revise the Manual of Uniform Traffic Control Devices and such other regulations and agreements of the Federal Highway Administration as may be necessary to authorize States and local governments, at their discretion, to install stop or yield signs at any rail-highway grade crossing without automatic traffic control devices with 2 or more trains operating across the rail-highway grade crossing per day.

**PUBLIC LAW 102-388-OCT. 6, 1992 (DEPARTMENT OF TRANSPORTATION AND RELATED AGENCIES APPROPRIATIONS ACT, 1993)**

**Section 406** — The Secretary of Transportation shall revise the Manual of Uniform Traffic Control Devices to include —

- (a) a standard for a minimum level of retroreflectivity that must be maintained for pavement markings and signs, which shall apply to all roads open to public travel; and
- (b) a standard to define the roads that must have a centerline or edge lines or both, provided that in setting such standard the Secretary shall consider the functional classification of roads, traffic volumes, and the number and width of lanes.

**PUBLIC LAW 104-59-NOV. 28, 1995 (NATIONAL HIGHWAY SYSTEM DESIGNATION ACT OF 1995)**

**Section 205. RELIEF FROM MANDATES** —

(c) METRIC REQUIREMENTS —

- (1) PLACEMENT AND MODIFICATION OF SIGNS — The Secretary shall not require the States to expend any Federal or State funds to construct, erect, or otherwise place or to modify any sign relating to a speed limit, distance, or other measurement on a highway for the purpose of having such sign establish such speed limit, distance, or other measurement using the metric system.
- (2) OTHER ACTIONS — Before September 30, 2000, the Secretary shall not require that any State use or plan to use the metric system with respect to designing or advertising, or preparing plans, specifications, estimates, or other documents, for a Federal-aid highway project eligible for assistance under title 23, United States Code.
- (3) DEFINITIONS — In this subsection, the following definitions apply:
  - (A) HIGHWAY — The term ‘highway’ has the meaning such term has under section 101 of title 23, United States Code.
  - (B) METRIC SYSTEM — the term ‘metric system’ has the meaning the term ‘metric system of measurement’ has under section 4 of the Metric Conversion Act of 1975 (15 U.S.C. 205c).

**Section 306. MOTORIST CALL BOXES** — Section 111 of title 23, United States Code, is amended by adding at the end the following:

(c) MOTORIST CALL BOXES —

- (1) IN GENERAL — Notwithstanding subsection (a), a State may permit the placement of motorist call boxes on rights-of-way of the National Highway System. Such motorist call boxes may include the identification and sponsorship logos of such call boxes.
- (2) SPONSORSHIP LOGOS —
  - (A) APPROVAL BY STATE AND LOCAL AGENCIES — All call box installations displaying sponsorship logos under this subsection shall be approved by the highway agencies having jurisdiction of the highway on which they are located.
  - (B) SIZE ON BOX — A sponsorship logo may be placed on the call box in a dimension not to exceed the size of the call box or a total dimension in excess of 12 inches by 18 inches.

(C) SIZE ON IDENTIFICATION SIGN — Sponsorship logos in a dimension not to exceed 12 inches by 30 inches may be displayed on a call box identification sign affixed to the call box post.

(D) SPACING OF SIGNS — Sponsorship logos affixed to an identification sign on a call box post may be located on the rights-of-way at intervals not more frequently than 1 per every 5 miles.

(E) DISTRIBUTION THROUGHOUT STATE — Within a State, at least 20 percent of the call boxes displaying sponsorship logos shall be located on highways outside of urbanized areas with a population greater than 50,000.

(3) NONSAFETY HAZARDS — The call boxes and their location, posts, foundations, and mountings shall be consistent with requirements of the Manual on Uniform Traffic Control Devices or any requirements deemed necessary by the Secretary to assure that the call boxes shall not be a safety hazard to motorists.

**Section 353(a) SIGNS** — Traffic control signs referred to in the experimental project conducted in the State of Oregon in December 1991 shall be deemed to comply with the requirements of Section 2B-4 of the Manual on Uniform Traffic Control Devices of the Department of Transportation.

**Section 353(b) STRIPES** — Notwithstanding any other provision of law, a red, white, and blue center line in the Main Street of Bristol, Rhode Island, shall be deemed to comply with the requirements of Section 3B-1 of the Manual on Uniform Traffic Control Devices of the Department of Transportation.

**PUBLIC LAW 115-141-MAR. 23, 2018 (CONSOLIDATED APPROPRIATIONS ACT, 2018)**

**DIVISION L, TITLE I**

**Section 125 --** For this fiscal year, the Federal Highway Administration shall reinstate Interim Approval IA-5, relating to the provisional use of an alternative lettering style on certain highway guide signs, as it existed before its termination, as announced in the Federal Register on January 25, 2016 (81 Fed. Reg. 4083).

**Option:**

**Series E(modified)-Alternate may be used in place of Series E(modified) for the names of places, streets, and highways on freeway and expressway guide signs in accordance with the provisions of the following paragraph.**

**Standard:**

**The use of Series E(modified)-Alternate shall be limited to the display of names of places, streets, and highways on freeway and expressway guide signs. Words shall be composed of lower-case letters with initial upper-case letters. The design and spacing of the letters shall be as provided in the “Standard Highway Signs” publication (see Section 1A.11 of this Manual). The nominal loop height of the lower-case letters shall be 84 percent of the height of the initial upper-case letter. Interline spacing, measured from the baseline of the upper line of legend to the upper limit of the initial upper-case letter of the lower line of legend, shall be at least 96 percent of the initial upper-case letters (equivalent to 84 percent of the initial upper-case letter when measured from the baseline of the upper line of legend to the upper limit of the rising stems of the lower-case letters of the lower line of legend). Edge spacing shall be as provided in Section 2E.13 of this Manual. The size of the sign shall be suitably enlarged to accommodate the larger lower-case letters and interline spacing. When the name of a place, street, or highway contains numerals, the numerals shall be composed of the FHWA Standard Alphabet Series E(modified). Other lettering on the sign, such as for cardinal directions and distance or action messages, and all numerals or special characters, shall be composed of Series B, C, D, E, E(modified), or F of the FHWA Standard Alphabets as provided in this Manual.**

**Series E(modified)-Alternate shall not be used for any application other than as provided in the two preceding paragraphs.**

## **APPENDIX A2**

### **METRIC CONVERSIONS**

Throughout this Manual all dimensions and distances are provided in English units. Tables A2-1 through A2-4 show the equivalent Metric (International System of Units) value for each of the English unit numerical values that are used in this Manual.