January 2026

Arizona Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways

11th Edition

ARIZONA
DEPARTMENT OF
TRANSPORTATION

ARIZONA SUPPLEMENT TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) 11th Edition

- **A Section of the MUTCD contained within the Arizona Supplement shall replace the corresponding Section in the MUTCD in its entirety.**
- **Tables and Figures of the MUTCD contained within the Arizona Supplement shall either replace the corresponding Table or Figure in the MUTCD in its entirety, or, if appended with an "AZ" suffix, supplement and append the existing Table or Figure in the MUTCD.**
- **If a Section, Table, or Figure from the MUTCD is not contained within this Supplement, the section in the MUTCD shall remain unchanged.**

Within the Arizona Supplement:

- **Black text denotes content unchanged from the National MUTCD 11th Edition.**
- **Additions are noted in underline blue text.**
- **Deletions are noted in ~~strikeout red~~ text.**

Sections, Figures, and Tables of the MUTCD 11th Edition modified by the Arizona Supplement:

Part 6 - Temporary Traffic Control

Chapter 6A - General

Chapter 6G - TTC Zone Regulatory Signs

Chapter 6P – Typical Applications

Part 7 - Traffic Control for School Areas

Chapter 7A - General

Chapter 7B - Signs

Chapter 7C - Markings

Part 8 - Traffic Control for Railroad and Light Rail Transit Grade Crossings

Chapter 8B - Signs

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

Section 1C.02 of the National MUTCD is revised to read:

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

Standard:

01 **Unless otherwise defined in this Section, or in other Parts of this Manual, words or phrases shall have the meaning(s) as defined in the "Uniform Vehicle Code," "AASHTO Transportation Glossary (Highway Definitions)," or other appropriate publications.**

02 **Where a term that is defined in this Section or elsewhere in this Manual has a different definition in another resource or in common use, the definition herein shall govern for purposes of the applicability of the provisions of this Manual.**

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

1. **Accessible Pedestrian Signal—a device that communicates information about pedestrian signal timing in non-visual format such as audible tones, speech messages, and/or vibrating surfaces.**
2. **Accessible Pedestrian Signal Detector—a device designated to assist the pedestrian who has visual or physical disabilities in activating the pedestrian phase.**
3. **Active Grade Crossing—a grade crossing equipped with automatic traffic control devices, such as flashing-light signals, gates, and/or traffic control signals, that are activated upon the detection of approaching rail traffic.**
4. **Actuated—a type of traffic control signal operation in which some or all signal phases are operated on the basis of actuation.**
5. **Actuation—initiation of, a change in, or an extension of a traffic signal phase or a sign legend through the operation of any type of detector.**
6. **Advance Preemption—the notification of approaching rail traffic that is forwarded to the highway traffic signal controller unit or assembly by the railroad or light rail transit equipment in advance of the activation of the railroad or light rail transit warning devices.**
7. **Advance Preemption Time—the period of time that is the difference between the required maximum highway traffic signal preemption time and the activation of the railroad or light rail transit warning devices.**
8. **Advisory Speed—a recommended speed for all vehicles operating on a section of highway and based on the highway design, operating characteristics, and conditions.**
9. **Agency—an organization with the responsibility for providing, maintaining, and/or operating a public or private road system.**
10. **Alley—a street or highway intended to provide access to the rear or side of lots or buildings in urban areas and not intended for the purpose of through vehicular traffic.**

11. **Annual Average Daily Traffic (AADT)—the total volume of traffic passing a point or segment of a highway facility in both directions for one year divided by the number of days in the year. Normally, periodic daily traffic volumes are adjusted for hours of the day counted, days of the week, and seasons of the year to arrive at annual average daily traffic.**
12. **Application—in regard to a traffic control device, the act of deciding to use a device, generally or at a particular location for a particular condition.**
13. **Approach—all lanes of traffic moving toward an intersection or a midblock location from one direction, including any adjacent parking lane(s).**
14. **Arterial Highway (Street)—a general term denoting a highway primarily used by through traffic, usually on a continuous route or a highway designated as part of an arterial system.**
15. **Automated Vehicle—~~see Driving Automation System.~~ a motor vehicle that is equipped with an automated driving system (ARS §28-101).**
16. **Automatic Lane—see Exact Change Lane within the definition of Toll Collection.**
17. **Average Daily Traffic (ADT)—the average 24 hour volume, being the total volume during a stated period divided by the number of days in that period. Normally, this would be periodic daily traffic volumes over several days, not adjusted for days of the week or seasons of the year.**
18. **Average Day—a day representing traffic volumes normally and repeatedly found at a location, typically a weekday when volumes are influenced by employment or a weekend day when volumes are influenced by entertainment or recreation.**
19. **Backplate—see Signal Backplate.**
20. **Barrier-Separated Lane—a preferential lane or other special purpose lane that is separated from the adjacent general-purpose lane(s) by a physical barrier.**
21. **Beacon—a highway traffic signal with one or more signal sections that operates in a flashing mode. Types of beacons include:**
    - **(a) Emergency-Vehicle Hybrid Beacon—a special type of beacon (see Hybrid Beacon).**
    - **(b) Intersection Control Beacon—a beacon used only at an intersection to control two or more directions of travel.**
    - **(c) Pedestrian Hybrid Beacon—a special type of beacon (see Hybrid Beacon).**
    - **(d) Rectangular Rapid-Flashing Beacon (RRFB)—a pedestrian-activated and/or bicycle-activated device comprising two horizontally arranged, rapidly flashed, rectangular-shaped yellow indications that is used to provide supplemental emphasis for a pedestrian, school, or trail crossing warning sign at a marked crosswalk across an uncontrolled approach.**
    - **(e) Speed Limit Sign Beacon—a beacon used only to supplement a SPEED LIMIT sign.**
    - **(f) Stop Beacon—a beacon used only to supplement a STOP sign, a DO NOT ENTER sign, or a WRONG WAY sign.**
    - **(g) Warning Beacon—a beacon used only to supplement an appropriate warning or regulatory sign or marker.**

22. **Bicycle— ~~a pedal-powered vehicle upon which the human operator sits.~~ A device, including a racing wheelchair, that is propelled by human power and on which a person may ride and that has either: (a) Two tandem wheels, either of which is more than sixteen inches in diameter. (b) Three wheels in contact with the ground, any of which is more than sixteen inches in diameter (ARS §28-101).**
23. **Bicycle Box—a designated area on the approach to a signalized intersection, between an advance motorist stop line and the crosswalk or intersection, intended to provide bicyclists a visible place to wait in front of stopped motorists during the red signal phase.**
24. **Bicycle Facilities—a general term denoting improvements and provisions that accommodate or encourage bicycling, including parking and storage facilities, and shared roadways not specifically defined for bicycle use.**
25. **Bicycle Lane—a portion of a roadway that has been designated for preferential or exclusive use by bicyclists. A typical bicycle lane is delineated from the adjacent general-purpose lane(s) by longitudinal ~~by~~ pavement markings and bicycle lane symbol or word markings and, if used, signs. Other types of bicycle lanes include:**
    (a) **Buffer-Separated Bicycle Lane—a bicycle lane that is separated from the adjacent general purpose lane(s) by a pattern of standard longitudinal pavement markings that is wider than a normal or wide lane line marking.**
    (b) **Counter-Flow Bicycle Lane—a one-directional bicycle lane that provides a lawful path of travel for bicycles in the opposite direction from general traffic on a roadway that allows general traffic to travel in only one direction. Counter-flow bicycle lanes are designated by the traffic control devices used for other bicycle lanes.**
    (c) **Separated Bicycle Lane—an exclusive facility for bicyclists that is located within or directly adjacent to the roadway and that is physically separated from motor vehicle traffic with a vertical element. Separated bicycle lanes are differentiated from other bicycle lanes by a vertical element.**
26. **Bicycle Signal Face—a signal face that displays only bicycle symbol signal indications, that exclusively controls a bicycle movement from a designated bicycle lane or from a separate facility such as a shared-use path, and that displays signal indications that are applicable only to the bicycle movement.**
27. **Bicycle Symbol Signal Indication—a red, yellow, or green signal indication that displays a bicycle symbol rather than a circular or arrow indication.**
28. **Bikeway—a generic term for any road, street, path, or way that in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.**
29. **Blank-Out Sign—a sign that displays a single predetermined message only when activated. When not activated, the sign legend is not visible.**
30. **Buffer-Separated Lane—a preferential lane or other special purpose lane that is separated from the adjacent general-purpose lane(s) by a pattern of standard longitudinal pavement markings that is wider than a normal or wide lane line marking. The buffer area might include rumble strips,**

textured pavement, or channelizing devices such as tubular markers or traversable curbs, but does not include a physical barrier.

31. **Business Identification Sign Panel—a panel containing a word legend or logo used to identify a business on a Specific Service sign.**
32. **Busway—a traveled way that is used exclusively by buses.**
33. **Cantilevered Signal Structure—a structure, also referred to as a mast arm, that is rigidly attached to a vertical pole and is used to provide overhead support of highway traffic signal faces or grade crossing signal units.**
34. **Center Line Markings—the yellow pavement marking line(s) that delineates the separation of traffic lanes that have opposite directions of travel on a roadway. These markings need not be at the geometrical center of the pavement.**
35. **Changeable Message Sign—a sign that is capable of displaying more than one message (one of which might be a "blank" display), changeable manually, by remote control, or by automatic control. Electronic-display changeable message signs are referred to as Dynamic Message Signs in the National Intelligent Transportation Systems (ITS) Architecture and are referred to as Variable Message Signs in the National Electrical Manufacturers Association (NEMA) standards publication.**
36. **Channelizing Line—a solid wide or double white line marking used to form islands where traffic in the same direction of travel is permitted on both sides of the island.**
37. **Circular Intersection—an intersection that has an island, generally circular in design, located in the center of the intersection where traffic passes to the right of the island. Circular intersections include roundabouts, rotaries, and traffic circles.**
38. **Circulatory Roadway—the roadway within a circular intersection on which traffic travels in a counterclockwise direction around an island in the center of the circular intersection.**
39. **Clear Storage Distance—when used in Part 8, the distance available for vehicle storage measured between 6 feet from the rail nearest the intersection to the intersection stop line or the normal stopping point on the highway. At skewed grade crossings and intersections, the 6-foot distance shall be measured perpendicular to the nearest rail either along the center line or edge line of the highway, as appropriate, to obtain the shorter distance. Where exit gates are used, the distance available for vehicle storage is measured from the point where the rear of the vehicle would be clear of the exit gate arm. In cases where the exit gate arm is parallel to the track(s) and is not perpendicular to the highway, the distance is measured either along the center line or edge line of the highway, as appropriate, to obtain the shorter distance.**
40. **Clear Zone—the total roadside border area, starting at the edge of the traveled way, that is available for an errant driver to stop or regain control of a vehicle. This area might consist of a shoulder, a recoverable slope, and/or a non-recoverable, traversable slope with a clear run-out area at its toe.**
41. **Collector Highway—a term denoting a highway that in rural areas connects small towns and local highways to arterial highways, and in urban areas**

provides land access and traffic circulation within residential, commercial, and business areas and connects local highways to the arterial highways.

42. **Conflict Monitor—a device used to detect and respond to improper or conflicting signal indications and improper operating voltages in a traffic controller assembly.**
43. **Constant Warning Time Detection—a means of detecting rail traffic that provides relatively uniform warning time for the approach of through rail traffic that is not accelerating or decelerating after being detected.**
44. **Contiguous Lane—a lane, preferential or otherwise, that is separated from the adjacent lane(s) only by a normal or wide lane line marking.**
45. **Controller Assembly—a complete electrical device mounted in a cabinet for controlling the operation of a highway traffic signal.**
46. **Controller Unit—that part of a controller assembly that is devoted to the selection and timing of the display of signal indications.**
47. **Conventional Road—a street or highway other than an expressway or freeway.**
48. **Counter-Flow Lane—a lane operating in a direction opposite to the normal flow of traffic designated for peak direction of travel during at least a portion of the day. Counter-flow lanes are usually separated from the off-peak direction lanes by tubular markers or other flexible channelizing devices, temporary lane separators, or movable or permanent barrier.**
49. **Crashworthy—the ability of a roadside safety hardware device or appurtenance to minimize risks to vehicle occupants by allowing a vehicle impacting the appurtenance to be slowed before stopping, redirected, or to continue without significant resistance. Section 1D.11 contains additional information about crashworthiness.**
50. **Crosswalk—(a) ~~that part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or in the absence of curbs, from the edges of the traversable roadway, and in the absence of a sidewalk on one side of the roadway, the part of a roadway included within the extension of the lateral lines of the sidewalk at right angles to the center line; (b) any portion of a roadway at an intersection or elsewhere distinctly indicated as a pedestrian crossing by pavement marking lines on the surface, which might be supplemented by contrasting pavement texture, style, or color.~~ That part of a roadway at an intersection included within the prolongations or connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or, in absence of curbs, from the edges of the traversable roadway. (b) Any portion of a roadway at an intersection or elsewhere that is distinctly indicated for pedestrian crossing by lines or other markings on the surface (ARS §28-601).**
51. **Crosswalk Lines—white (or yellow at school crossings in accordance with §ARS 28-797) pavement marking lines that identify a crosswalk.**
52. **Cycle Length—the time required for one complete sequence of signal indications.**
53. **Dark Mode—the lack of all signal indications at a signalized location. The dark mode is most commonly associated with power failures, ramp meters, hybrid beacons, beacons, and some movable bridge signals.**

54. **Dedicated Lane—A lane on a freeway or expressway that provides access to: (a) either an exit lane or the mainline, but not both, at a freeway or expressway exit, or (b) only one roadway at a freeway or expressway split.**
55. **Delineator—a retroreflective device mounted at the side of the roadway in a series to indicate the alignment of the roadway, especially at night or in adverse weather.**
56. **Design Vehicle—the longest vehicle permitted by statute of the road authority (State or other) on that roadway.**
57. **Designated Bicycle Route—a system of bikeways designated by the jurisdiction having authority with appropriate directional and informational route signs, with or without specific bicycle route numbers.**
58. **Detectable—having a continuous edge within 6 inches of the surface so that pedestrians with vision disabilities can sense its presence and receive usable guidance information.**
59. **Detector—a device used for determining the presence or passage of motor vehicles, bicycles, or pedestrians.**
60. **Detection Plate—a smooth continuous plate used on pedestrian channelizing devices to facilitate the use of low-vision canes for pedestrians with vision disabilities. The bottom edge of the detection plate shall be no more than 2 inches above the walkway and the top edge of the detection plate shall be at least 8 inches above the walkway. The detection plate shall share the same vertical plane as the hand trailing edge of the pedestrian channelizing device.**
61. **Diagnostic Team—a group of knowledgeable representatives of the parties of interest in a grade crossing or group of grade crossings (see 23 CFR Part 646.204).**
62. **Downstream—a term that refers to a location that is encountered by traffic subsequent to an upstream location as it flows in an "upstream to downstream" direction. For example, "the downstream end of a lane line separating the turn lane from a through lane on the approach to an intersection" is the end of the lane line that is closest to the intersection.**
63. **Driveway—an access from a roadway to a building, site, or abutting property.**
64. **Driving Aisle—circulation area for motor vehicles within a parking area, typically between rows of parking spaces. Driving aisles provide one-way or two-way travel. Driving aisles are exempted from compliance with MUTCD provisions.**
65. **Driving Automation System—~~technology that automates some or all aspects of the driving task to assist or replace the human vehicle operator.~~ The hardware and software that are collectively capable of performing the entire dynamic driving task on a sustained basis, regardless of whether it is limited to a specific operational design domain (ARS §28-101). Section 5A.03 contains descriptions of the automation levels.**
66. **Dropped Lane—see Lane Drop.**
67. **Dual-Arrow Signal Section—a type of signal section designed to include both a yellow arrow and a green arrow.**
68. **Dynamic Envelope—the clearance required for light rail transit traffic or a train and its cargo overhang due to any combination of loading, lateral motion, or suspension failure (see Figure 8C-3).**

69. **Dynamic Exit Gate Operating Mode—a mode of operation where the exit gate operation is based on the presence of vehicles within the minimum track clearance distance.**
70. **Dynamic Message Sign—see Changeable Message Sign.**
71. **Edge Line Markings—white or yellow pavement marking lines that delineate the right or left edge(s) of a traveled way.**
72. **Electronic Toll Collection (ETC) Account Only Lane—a non-attended toll lane that is restricted to use only by vehicles with a registered toll payment account.**
73. **Emergency-Vehicle Hybrid Beacon—see Hybrid Beacon.**
74. **Emergency-Vehicle Traffic Control Signal—see Highway Traffic Signal.**
75. **Engineer—see Professional Engineer.**
76. **Engineering Judgment—the evaluation of available pertinent information including, but not limited to, the safety and operational efficiency of all road users, and the application of appropriate principles, provisions, and practices as contained in this Manual and other sources, for the purpose of deciding upon the design (see Section 1D.03), use, installation, or operation of a traffic control device. Engineering judgment shall be exercised by a professional engineer (see definition in this Section) with appropriate traffic engineering expertise, or by an individual working under the supervision of such an engineer, through the application of procedures and criteria established by the engineer. Documentation of engineering judgment is not required.**
77. **Engineering Study—the analysis and evaluation of available pertinent information including, but not limited to, the safety and operational efficiency of all road users, and the application of appropriate principles, provisions, and practices as contained in this Manual and other sources, for the purpose of deciding upon the design (see Section 1D.03), use, installation, or operation of a traffic control device. An engineering study shall be performed by a professional engineer (see definition in this Section) with appropriate traffic engineering expertise, or by an individual working under the supervision of such an engineer, through the application of procedures and criteria established by the engineer. An engineering study shall be documented in writing.**
78. **Entrance Gate—an automatic gate that can be lowered across the lanes approaching a grade crossing to block road users from entering the grade crossing.**
79. **Exclusive Alignment—a light rail transit track(s) or a bus rapid transit busway that is grade-separated or protected by a fence or traffic barrier. No grade crossings exist along the track(s) or busway. Motor vehicles, bicycles, and pedestrians are prohibited within the right-of-way. Subways and elevated structures are included within this definition.**
80. **Exit Gate—an automatic gate that can be lowered across the lanes departing a grade crossing to block road users from entering the grade crossing by driving in the opposing traffic lanes.**
81. **Exit Gate Clearance Time—for Four-Quadrant Gate systems at grade crossings, the amount of time provided to delay the descent of the exit gate arm(s) after entrance gate arm(s) begin to descend.**

82. **Exit Gate Operating Mode—for Four-Quadrant Gate systems at grade crossings, the mode of control used to govern the operation of the exit gate arms.**
83. **Expressway—a divided highway with partial control of access.**
84. **Fail-Safe—when used in Part 8, a railroad signal design philosophy applied to a system or device such that the result of a hardware failure or the effect of a software error shall either prohibit the system or device from assuming or maintaining an unsafe state or shall cause the system or device to assume a state that is known to be safe.**
85. **Flagger—a person who actively controls the flow of vehicular traffic into and/or through a temporary traffic control zone using hand-signaling devices or an Automated Flagger Assistance Device (AFAD).**
86. **Flasher—a device used to turn highway traffic signal indications on and off at a repetitive rate of approximately once per second.**
87. **Flashing—an operation in which a light source, such as a traffic signal indication or LEDs in a sign, is turned on and off repetitively.**
88. **Flashing-Light Signals—a warning device consisting of two red signal indications arranged horizontally that are activated to flash alternately when rail traffic is approaching or present at a grade crossing.**
89. **Flashing Mode—a mode of operation in which at least one traffic signal indication in each vehicular signal face of a highway traffic signal is turned on and off repetitively.**
90. **Four-Quadrant Gate System—an exit gate system that includes entrance and exit gates that control and block road users on all lanes entering and exiting the grade crossing.**
91. **Freeway—a divided highway with full control of access.**
92. **Full-Actuated—a type of traffic control signal operation in which all signal phases function on the basis of actuation.**
93. **Gate—an automatically-operated or manually-operated traffic control device that is used to physically obstruct road users such that they are discouraged from proceeding past a particular point on a roadway or pathway, or such that they are discouraged from entering a particular grade crossing, ramp, lane, roadway, or facility.**
94. **General-Purpose Lane—a highway lane or set of lanes, other than a Managed Lane (see definition in this Section) or a Preferential Lane (see definition in this Section), that all or most of the traffic that is allowed on that highway is also allowed to use. Certain classes of vehicles, such as commercial vehicles or vehicles exceeding a certain weight or size, might be prohibited from using one or more of the general-purpose lanes. A general-purpose lane might also be restricted to certain uses, such as passing or turning or as an auxiliary lane.**
95. **Gore Area—see Physical Gore and Theoretical Gore**
96. **Grade Crossing—the general area where a highway and a railroad and/or light rail transit route cross at the same level, within which are included the tracks, highway, and traffic control devices for traffic traversing that area.**
97. **Grade Crossing Warning System—the flashing-light signals, with or without automatic gates, together with the necessary control equipment used to**

inform road users of the approach or presence of rail traffic at a grade crossing.

98. **Guide Sign—a sign that shows route designations, highway names, destinations, directions, distances, services, points of interest, or other geographical, recreational, or cultural information.**
99. **High-Occupancy Vehicle (HOV)—a motor vehicle carrying at least two (or more than two if the signs for a specific roadway indicate a higher minimum occupancy requirement) persons, including carpools, vanpools, and buses.**
100. **Highway—~~a general term for denoting a public way for purposes of travel by vehicles and vulnerable road users, including the entire area within the right-of-way.~~ "Highway" or "Street" is the entire width between the boundary lines of every way if a part of the way is open to the use of the public for purposes of vehicular travel (ARS §28-101).**
101. **Highway-Light Rail Transit Grade Crossing—the general area where a highway and a light rail transit route cross at the same level, within which are included the light rail transit tracks, highway, and traffic control devices for traffic traversing that area.**
102. **Highway-Rail Grade Crossing—the general area where a highway and a railroad cross at the same level, within which are included the railroad tracks, highway, and traffic control devices for highway traffic traversing that area.**
103. **Highway Traffic Signal—a power-operated traffic control device by which traffic is warned or directed to take some specific action. These devices do not include power-operated signs (except as provided in Chapters 4S and 4T), steadily illuminated raised pavement markers, gates, flashing-light signals (see Section 8D.02), warning lights (see Section 6L.07), or steady-burning electric lamps. Highway traffic signals include:**
    (a) Flashing Beacon—see Beacon.
    (b) In-Roadway Warning Lights—a special type of highway traffic signal installed in the roadway surface to warn road users that they are approaching a condition on or adjacent to the roadway that might not be readily apparent and might require the road users to reduce speed and/or come to a stop.
    (c) Lane-Use Control Signal—a signal face or comparable display on a full-matrix Changeable Message Sign (see Chapters 2L and 4T) displaying indications to permit or prohibit the use of specific lanes of a roadway or a shoulder where driving is sometimes permitted, or to indicate the impending prohibition of such use.
    (d) Traffic Control Signal (Traffic Signal)—a highway traffic signal placed at intersections, movable bridges, fire stations, midblock crosswalks, alternating one-way sections of a single lane road, private driveways, or other locations that require conflicting traffic to be directed to stop and permitted to proceed in an orderly manner. These devices do not include pedestrian hybrid beacons (see Chapter 4J) or emergency-vehicle hybrid beacons (see Chapter 4N). Traffic control signals include vehicular signal indications, pedestrian signal indications, and bicycle symbol signal indications. Special traffic control signals include:

(1) Emergency-Vehicle Traffic Control Signal—a traffic control signal that directs all conflicting traffic to stop in order to permit the driver of an authorized emergency vehicle to proceed into the roadway or intersection.
(2) Movable Bridge Traffic Control Signal—a traffic control signal installed at a movable bridge to notify traffic to stop during periods when the roadway is closed to allow the bridge to open.
(3) Portable Traffic Control Signal—a temporary component of a traffic control signal on a mobile support with one or more signal faces that is designed so that it can be easily transported, deployed, or relocated as part of a temporary traffic control signal, or during construction and maintenance as a temporary part of a permanent traffic control signal installation.
(4) Pre-Signal—traffic control signal faces that are located upstream from a signalized intersection and are operated in conjunction with the traffic control signal faces at the downstream signalized intersection in a manner that is designed to keep the area between the stop line for the upstream traffic control signal faces and the stop line for the downstream signalized intersection clear of queued vehicles. When used in conjunction with a grade crossing, the pre-signal is operated for the purpose of preventing vehicles from queuing within the minimum track clearance distance. Supplemental near-side traffic control signal faces for the downstream signalized intersection are not considered to be pre-signals.
(5) Queue Cutter Signal—an independently-controlled traffic control signal (not operated in conjunction with the traffic control signal faces at a downstream signalized intersection) located at a grade crossing that controls traffic in one direction only on the roadway for the purpose of keeping the minimum track clearance distance clear of vehicles. The display of red signal indications is activated from a downstream queue detection system, by time of day, by approaching rail traffic, by an approaching bus on a busway, or by a combination of any of these methods.
(6) Ramp Control Signal—a traffic control signal installed to control the merging flow of traffic onto a freeway at an entrance ramp or at a freeway-to-freeway ramp connection.
(7) Temporary Traffic Control Signal—a traffic control signal that is installed for a limited time period using fixed or portable traffic control signal units.

104. HOV Lane—any preferential lane designated for exclusive use by high-occupancy vehicles for all or part of a day—including a designated lane on a freeway, other highway, street, or independent roadway on a separate right-of-way.

105. Hybrid Beacon—a special type of beacon that is intentionally placed in a dark mode (no indications displayed) between periods of operation and, when operated, displays both steady and flashing traffic control signal indications. Hybrid beacons include:

(a) Emergency-Vehicle Hybrid Beacon—used to warn and control traffic at an unsignalized location to assist authorized emergency vehicles in entering or crossing a street or highway.

(b) Pedestrian Hybrid Beacon—used to warn and control traffic at an unsignalized location to assist pedestrians in crossing a street or highway at a marked crosswalk.

106. Identification Marker—a shape, color, and/or pictograph that is used as a visual identifier for a destination guide signing system of a community wayfinding system or a shared-use path system for an area.

107. Inherently Low Emission Vehicle (ILEV)—any kind of vehicle that, because of inherent properties of the fuel system design, will not have significant evaporative emissions, even if its evaporative emission control system has failed.

108. In-Roadway Warning Lights—see Highway Traffic Signal.

109. Interchange—a system of interconnecting roadways providing for traffic movement between two or more highways that do not intersect at grade.

110. Interchange Lane Drop—see Lane Drop.

111. Preemption Interconnection—the electrical connection between the railroad or light rail transit active warning system and the highway traffic signal controller assembly for the purpose of preemption.

112. Intermediate Interchange—an interchange with an urban or rural route that is not a major or minor interchange as defined in this Section.

113. Intersection—~~intersection is defined as follows:~~ The area embraced within the prolongation or connection of the lateral curb lines, or if none, the lateral boundary lines of the roadways of two highways that join one another at, or approximately at, right angles, or the area within which vehicles traveling on different highways joining at any other angle may come in conflict. If a highway includes two roadways thirty or more feet apart, each crossing of each roadway of the divided highway by an intersecting highway is a separate intersection. If the intersecting highway also includes two roadways thirty or more feet apart, each crossing of two roadways of the highways is a separate intersection (ARS §28-601).

~~(a) The area embraced within the prolongation or connection of the lateral curb lines, or if none, the lateral boundary lines of the roadways of two highways that join one another at, or approximately at, right angles, or the area within which vehicles traveling on different highways that join at any other angle might come into conflict.~~

~~(b) The junction of an alley, driveway, or site roadway with a public roadway or highway shall not constitute an intersection, unless the public roadway or highway at said junction is controlled by a traffic control device.~~

~~(c) If a highway includes two roadways separated by a median, then every crossing of each roadway of such divided highway by an intersecting highway shall be a separate intersection if the opposing left-turn paths cross and there is sufficient interior storage for the design vehicle (see Figure 2A-5).~~

~~(d) At a location controlled by a traffic control signal, regardless of the distance between the separate intersections as defined in (c) above:~~

~~(1) If a stop line, yield line, or crosswalk has not been designated on the roadway (within the median) between the separate intersections, the two intersections and the roadway (median) between them shall be considered as one intersection;~~

~~(2) Where a stop line, yield line, or crosswalk is designated on the roadway on the intersection approach, the area within the crosswalk and/or beyond the designated stop 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.~~

114. Intersection Control Beacon—see Beacon.

115. Interval—the part of a signal cycle during which signal indications do not change.

116. Island—a defined area between traffic lanes for control of vehicular movements, for toll collection, or for pedestrian or bicyclist 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.

117. 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.

118. Lane Drop—a through lane that becomes a mandatory turn lane on a conventional roadway, or a through lane that becomes a mandatory exit lane on a freeway or expressway. The end of an acceleration lane and reductions in the number of through lanes that do not involve a mandatory turn or exit are not considered lane drops.

119. Lane Line Markings—white pavement marking lines that delineate the separation of traffic lanes that have the same direction of travel on a roadway.

120. Lane Reduction—elimination of a through lane by a gradual narrowing of the travel pavement (taper) through physical construction or pavement markings at which traffic in the lane being eliminated must merge into the adjacent through lane and continue in the same direction of travel. A lane reduction can occur outside the influence of an intersection or interchange, or within an interchange a short distance downstream of the gore of an exit ramp. Through lanes that become a mandatory turn or exit are considered lane drops rather than lane reductions.

121. Lane-Use Control Signal—see Highway Traffic Signal.

122. Legend—see Sign Legend.

123. Lens—see Signal Lens.

124. 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 at streetcars and trolleys) and assemblies of multiple light rail transit cars coupled together.

125. Loading Zone—a specially marked, signed or designated area for the loading or unloading of vehicles (passenger or freight).

126. 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.
127. Logo—a distinctive emblem or trademark that identifies a commercial or non-commercial business, program, or organization.
128. 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.
129. Louver—see Signal Louver.
130. 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.
131. 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.
132. Major Street—the street normally carrying the higher volume of vehicular traffic.
133. Malfunction Management Unit—same as Conflict Monitor.
134. 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-separated 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.
135. Manual Lane—see Attended Lane within the definition of Toll Collection.
136. 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.
137. Median— the portion of a highway separating opposing directions of the traveled way or the area between two roadways of a divided highway measured from edge of traveled way to edge of traveled way. The median excludes turn lanes. The median width might be different between intersections, interchanges, and at opposite approaches of the same intersection.
138. Minimum Track Clearance Distance—the length along a highway over the track(s) where a vehicle could be struck by rail traffic. The minimum track clearance distance is measured from a point upstream from the track(s) on the approach to the grade crossing to a point downstream from the track(s) on the departure from the grade crossing. The length along the highway between the two points is the minimum track clearance distance.
139. Minor Interchange—an interchange where traffic is local and very light, such as interchanges with land service access roads. Where the sum of the

exit volumes is estimated to be lower than 100 vehicles per day in the design year, the interchange is classified as local.

140. **Minor Street—the street normally carrying the lower volume of vehicular traffic.**
141. **Mixed-Use Alignment—a light rail transit track(s), a busway, or a bus only lane(s) where the light rail transit (LRT) or bus rapid transit (BRT) vehicles operate 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 or the bus rapid transit traffic does not have the right-of-way over other road users at grade crossings and intersections. If the LRT traffic or buses are 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 or buses.**
142. **Movable Bridge Resistance Gate—a type of traffic gate, which is located downstream of the movable bridge warning gate, that provides a physical deterrent to vehicle and/or pedestrian traffic when placed in the appropriate position.**
143. **Movable Bridge Signal—see Highway Traffic Signal.**
144. **Movable Bridge Warning Gate—a type of traffic gate designed to warn, but not primarily to block, vehicle and/or pedestrian traffic when placed in the appropriate position.**
145. **Multi-Lane—more than one lane moving in the same direction. A multi-lane street, highway, or roadway has a basic cross-section comprised of two or more through lanes in one or both directions. A multi-lane approach has two or more lanes moving toward the intersection, including turning lanes.**
146. **Neutral Area—the paved area between the channelizing lines separating an entrance or exit ramp or a channelized turn lane or channelized entering lane from the adjacent through lane(s).**
147. **Object Marker—a device used to mark obstructions within or adjacent to the roadway.**
148. **Occupancy Requirement—any restriction that regulates the use of a facility or one or more lanes of a facility for any period of the day based on a specified number of persons in a vehicle.**
149. **Occupant—a person driving or riding in a car, truck, bus, or other vehicle.**
150. **On-Street Parking—parking within or along, and accessed directly from, a public roadway or a site roadway open to public travel.**
151. **Open-Road ETC Lane—a non-attended lane that is designed to allow toll payments to be electronically collected from vehicles traveling at normal highway speeds. Open-Road ETC lanes are typically physically separated from the toll plaza, often following the alignment of the mainline lanes, with toll plaza lanes for cash toll payments being on a different alignment after diverging from the mainline lanes or a subset thereof.**
152. **Open-Road Tolling Point—the location along an Open-Road ETC lane at which roadside or overhead detection and receiving equipment are placed and vehicles are electronically assessed a toll.**
153. **Opposing Traffic—vehicles that are traveling in the opposite direction. At an intersection, vehicles entering from an approach that is approximately**

straight ahead would be considered to be opposing traffic, but vehicles entering from approaches on the left or right would be considered to be conflicting traffic rather than opposing traffic.

154. **Option Lane—A lane on a freeway, expressway, or conventional road multi-lane exit or multilane split that widens on the approach to allow access, without changing lanes, to:**
    (a) Both an exit lane and the mainline at a freeway or expressway exit; or
    (b) Both diverging roadways at a freeway, expressway, or conventional road split.
155. **Overhead Sign—a sign that is placed such that a portion or the entirety of the sign or its support is directly above the roadway or shoulder such that vehicles travel below it. Typical installations include signs placed on cantilever arms that extend over the roadway or shoulder, signs placed on sign support structures that span the entire width of the pavement, signs placed on mast arms or span wires either independently or that also support traffic control signals, and signs placed on highway bridges that cross over the roadway.**
156. **Parking Area—a parking lot or parking garage that is separated from a roadway. Parallel, perpendicular, or angle parking spaces along a roadway are not considered a parking area.**
157. **Parking Space—an area marked or designated for storage of a vehicle while the driver is not present.**
158. **Preemption Clearance Interval—the part of a traffic signal sequence displayed as a result of a preemption request when vehicles are provided the opportunity to clear the railroad or light rail transit tracks, or a movable bridge, prior to the arrival of the train or boat for which the traffic signal is being preempted.**
159. **Preemption Time Variability—the result that occurs when the traffic signal controller enters the Preemption Clearance Interval with less than the maximum design Right-of-Way Transfer Time or the speed of a train approaching the grade crossing varies.**
160. **Passive Grade Crossing—a grade crossing where none of the automatic traffic control devices associated with an Active Grade Crossing Warning System are present and at which the traffic control devices consist entirely of signs and/or markings.**
161. **Pathway—a general term denoting a public way for purposes of travel by authorized users outside the traveled way and physically separated from the roadway by an open space or barrier and either within the highway right-of-way or within an independent alignment. Pathways include shared-use paths, but do not include sidewalks.**
162. **Pathway Grade Crossing—the general area where a pathway and railroad and/or light rail transit tracks cross at the same level, within which are included the tracks, pathway, and traffic control devices for pathway traffic traversing that area.**
163. **Paved—having a roadway surface that has both a structural (weight bearing) and a sealing purpose for the roadway, such as a bituminous surface treatment, mixed bituminous concrete, or Portland cement concrete.**

164. **Pedestrian—~~a person on foot, in a wheelchair, on other devices determined by local law to be equivalent, which might include skates or a skateboard.~~ Any person afoot. A person who uses an electric personal assistive mobility device or a manual or motorized wheelchair is considered a pedestrian unless the manual wheelchair qualifies as a bicycle. For the purposes of this definition, "motorized wheelchair" means a self-propelled wheelchair that is used by a person for mobility (ARS §28-101).**
165. **Pedestrian Change Interval—an interval during which the flashing UPRAISED HAND (symbolizing DONT WALK) signal indication is displayed.**
166. **Pedestrian Clearance Time—the time provided for a pedestrian crossing in a crosswalk, after leaving the curb or edge of pavement, to travel to the far side of the traveled way or to a median.**
167. **Pedestrian Facility—a general term denoting a location where improvements and provisions have been made to accommodate or encourage pedestrian activity.**
168. **Pedestrian Hybrid Beacon—see Hybrid Beacon.**
169. **Pedestrian Signal Head—a signal head, which contains the symbols WALKING PERSON (symbolizing WALK) and UPRAISED HAND (symbolizing DONT WALK), that is installed to direct pedestrians at a traffic control signal.**
170. **Permissive Mode—a mode of traffic control signal operation in which left or right turns are permitted to be made after yielding to pedestrians, if any, and/or opposing traffic, if any. When a CIRCULAR GREEN signal indication is displayed, both left and right turns are permitted unless otherwise prohibited by another traffic control device. When a flashing YELLOW ARROW or flashing RED ARROW signal indication is displayed, the turn indicated by the arrow is permitted.**
171. **Physical Gore—a longitudinal point where a physical barrier or the lack of a paved surface inhibits road users from crossing from a ramp or channelized turn lane or channelized entering lane to the adjacent through lane(s) or vice versa.**
172. **Pictograph—a pictorial representation used to identify a governmental jurisdiction, an area of jurisdiction, a governmental or other public transportation agency or provider, a military base or branch of service, a governmental-approved university or college, a governmental-approved institution, or a toll payment system.**
173. **Plaque—a traffic control device intended to communicate specific information to road users through a word, symbol, or arrow legend that is placed immediately adjacent to a sign to supplement the message on the sign. The difference between a plaque and a sign is that a plaque cannot be used alone. The designation for a plaque includes a "P" suffix.**
174. **Platoon—a group of vehicles or pedestrians traveling together as a group, either voluntarily or involuntarily, because of traffic signal controls, geometrics, or other factors.**
175. **Portable Traffic Control Signal—see Highway Traffic Signal.**
176. **Post-Exit Ramp Lane Reduction—see Lane Reduction**

177. **Post-Mounted Sign—a sign that is placed to the side of the roadway such that no portion of the sign or its support is directly above the roadway or shoulder.**
178. **Posted Speed Limit—a speed limit determined by law or regulation and displayed on Speed Limit signs.**
179. **Preemption—the transfer of normal operation of a traffic control signal or a hybrid beacon to a special control mode of operation.**
180. **Preferential Lane—a highway lane or set of lanes, or a highway facility, reserved for the exclusive use of one or more specific types of vehicles or vehicles with a specific minimum number of occupants.**
181. **Pre-Signal—see Highway Traffic Signal.**
182. **Pretimed Operation—a type of traffic control signal operation in which none of the signal phases function on the basis of actuation.**
183. **Primary Signal Face—one of the required or recommended minimum number of signal faces for a given approach or separate turning movement, but not including near-side signal faces required as a result of the far-side signal faces exceeding the maximum distance from the stop line.**
184. **Principal Legend—place names, street names, and route numbers displayed on guide signs.**
185. **Priority Control—a means by which the assignment of right-of-way is obtained or modified.**
186. **Private Road—~~see Site Roadways Open to Public Travel.~~ a way or place that is in private ownership and that is used for vehicular travel by the owner and those persons who have express or implied permission from the owner but not by other persons (ARS §28-601).**
187. **Professional Engineer (P.E.)—An individual who has fulfilled education and experience requirements and passed examinations that, under State licensure laws, permit the individual to offer engineering services within areas of expertise directly to the public.**
188. **Protected Mode—a mode of traffic control signal operation in which left or right turns are permitted to be made only when a left or right GREEN ARROW signal indication is displayed.**
189. **Public Road—any road, street, or similar facility under the jurisdiction of and maintained by a public agency and open to public travel.**
190. **Pushbutton—a button to activate a device or signal timing for pedestrians, bicyclists, or other road users.**
191. **Pushbutton Information Message—a recorded message that can be actuated by pressing a push button when the walk interval is not timing and that provides the name of the street that the crosswalk associated with that particular push button crosses and can also provide other information about the intersection signalization or geometry.**
192. **Pushbutton Locator Tone—a repeating sound that informs approaching pedestrians that a pushbutton exists to actuate pedestrian timing or receive additional information and that enables pedestrians with vision disabilities to locate the push button.**
193. **Queue Clearance Time—when used in Part 8, the time required for the design vehicle of maximum length stopped just inside the minimum track**

clearance distance to start up and move through and clear the entire minimum track clearance distance.

194. **Queue Cutter Signal—see Highway Traffic Signal.**
195. **Quiet Zone—a segment of a rail line, within which is situated one or a number of consecutive public highway-rail grade crossings at which locomotive horns are not routinely sounded per 49 CFR Part 222.**
196. **Rail Traffic—every device in, upon, or by which any person or property can be transported on rails or tracks and to which all other traffic must yield the right-of-way by law at grade crossings, including trains, one or more locomotives coupled (with or without cars), other railroad equipment, and light rail transit operating in exclusive or semi-exclusive alignments. Light rail transit operating in a mixed-use alignment, to which other traffic is not required to yield the right-of-way by law, is a vehicle and is not considered to be rail traffic.**
197. **Raised Pavement Marker—a device mounted on or in a road surface that has a height generally not exceeding approximately 1 inch above the road surface for a permanent marker, or not exceeding approximately 2 inches above the road surface for a temporary flexible marker, and that is intended to be used as a positioning guide and/or to supplement or substitute for pavement markings. Raised pavement markers might also be recessed into or flush with the pavement surface.**
198. **Ramp Control Signal—see Highway Traffic Signal.**
199. **Red Clearance Interval—an interval that follows a yellow change interval and precedes the next conflicting green interval.**
200. **Regulatory Sign—a sign that gives notice to road users of traffic laws or regulations.**
201. **Retroreflectivity—a property of a surface that allows a large portion of the light coming from a point source to be returned directly back to a point near its origin.**

201a. Right-of-way— when used within the context of the regulation of the movement of traffic on a highway means the privilege of the immediate use of the highway. Right-of-way when used within the context of the real property on which transportation facilities and appurtenances to the facilities are constructed or maintained means the lands or interest in lands within the right-of-way boundaries (ARS §28-101).

202. **Road—see Roadway.**
203. **Road User—a vehicle operator, bicyclist, or pedestrian, including persons with disabilities, within the highway or on a site roadway open to public travel.**
204. **Roadway—~~that portion of a highway improved, designed, or ordinarily used for vehicular travel and parking lanes, but exclusive of the sidewalk, berm, or shoulder even though such sidewalk, berm, or shoulder is used by persons riding bicycles or other human-powered vehicles. In the event a highway includes two or more separate roadways, the term roadway as used in this Manual shall refer to any such roadway separately, but not to all such roadways collectively~~. That portion of a highway that is improved, designed or ordinarily used for vehicular travel, exclusive of the berm or shoulder. If a highway includes two or more separate roadways, roadway refers to any**

such roadway separately but not to all such roadways collectively (ARS §28-601).

205. **Roadway Network—a geographical arrangement of intersecting roadways.**
206. **Roundabout—a circular intersection with yield control at entry, which permits a vehicle on the circulatory roadway to proceed, and with deflection of the approaching vehicle counter-clockwise around a central island.**
207. **Rumble Strip—a series of intermittent, narrow, transverse areas of rough-textured, slightly raised, or depressed road surface that extend across the travel lane to alert vehicle operators to unusual traffic conditions or are located along the shoulder, along the roadway center line, or within islands formed by pavement markings to alert road users that they are leaving the travel lanes.**
208. **Rural Highway—a type of roadway normally characterized by lower volumes, higher speeds, fewer turning conflicts, and less conflict with pedestrians.**
209. **Scanning Graphic—a graphic designed for scanning by machine, and includes bar codes, quick-response (QR) codes or other matrix bar code formats, or similar graphics.**
210. **School—a public or private educational institution recognized by the state education authority for one or more grades K through 12 or as otherwise defined by the State.**
211. **School Zone—a designated roadway segment approaching, adjacent to, and beyond school buildings or grounds, or along which school related activities occur.**
212. **Semi-Actuated—a type of traffic control signal operation in which at least one, but not all, signal phases function on the basis of actuation.**
213. **Semi-Exclusive Alignment—a light rail transit track(s) or a bus rapid transit busway that is in a separate right-of-way or that is along a street or railroad right-of-way where motor vehicles, bicycles, and pedestrians have limited access and cross only at designated locations, 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.**
214. **Separate Turn Signal Face—a signal face that exclusively controls a turn movement and that displays signal indications that are applicable only to the turn movement.**
215. **Separation Time—the component of maximum highway traffic signal preemption time during which the minimum track clearance distance is clear of vehicular traffic prior to the arrival of rail traffic.**
216. **Serviceable—a condition in which a traffic control device appears (day and night) and operates as intended, beyond which it requires replacement due to damage or wear. Whether a device is serviceable will depend on the type of device under consideration. In general, if the device is capable of being serviced with minimal effort or replacement parts so that it continues to appear and operate as intended, and the device is otherwise substantially intact, then it can be considered to be in serviceable condition. If the device is damaged or not operational beyond reasonable repair, then it is likely no longer serviceable.**

217. **Shared Roadway—a roadway that is officially designated and marked as a bicycle route, but which is open to motor vehicle travel and upon which no bicycle lane is designated.**
218. **Shared Turn Signal Face—a signal face, for controlling both a turn movement and the adjacent through movement, that always displays the same color of circular signal indication that the adjacent through signal face or faces display.**
219. **Shared-Use Path—a bikeway outside the traveled way and physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent alignment. Shared-use paths are also used by pedestrians (including skaters, users of manual and motorized wheelchairs, and joggers) and other authorized motorized and non-motorized users.**
220. **Shoulder—a longitudinal area contiguous with the traveled way that is used for accommodation of stopped vehicles for emergency use and for lateral support of base and surface courses, and that is graded for emergency stopping. A shoulder might be paved or unpaved. A paved shoulder might be opened to part-time travel by some or all vehicles and might also be available for use by pedestrians and/or bicycles in the absence of other pedestrian or bicycle facilities.**
221. **Sidewalk—~~that portion of a street between the curb line, or the lateral line of a roadway, and the adjacent property line or on easements of private property that is paved or improved and intended for use by pedestrians.~~ That portion of a street that is between the curb lines or the lateral lines of a roadway and the adjacent property lines and that is intended for the use of pedestrians (ARS §28-601).**
222. **Sidewalk Extension—a pedestrian facility at an intersection or midblock crosswalk which extends the sidewalk by physically and visually narrowing the roadway.**
223. **Sidewalk Grade Crossing—the portion of a highway-rail grade crossing or of a highway-light rail transit grade crossing where a sidewalk and railroad tracks or a sidewalk and light rail transit tracks cross at the same level, within which are included the tracks, sidewalk, and traffic control devices for sidewalk users traversing that area.**
224. **Sign—with regard to controlling traffic, any traffic control device that is intended to communicate specific information to road users through a word, symbol, and/or arrow legend. Signs do not include highway traffic signals, pavement markings, delineators, or channelization devices. Signs whose purpose is unrelated to traffic control are addressed in Section 1A.02.**
225. **Sign Assembly—a group of signs, located on the same support(s), that supplement one another in conveying information to road users.**
226. **Sign Illumination—either internal or external lighting that shows similar color by day or night. Street or highway lighting shall not be considered as meeting this definition.**
227. **Sign Legend—all word messages, logos, pictographs, and symbol and arrow designs that are intended to convey specific meanings. The border, if any, on a sign is not considered to be a part of the legend.**

228. Sign Panel—a separate panel or piece of material containing a word, logo, pictograph, symbol, and/or arrow legend that is affixed to the face of a sign.
229. Signal—See Highway Traffic Signal.
230. Signal Backplate—a thin strip of material that extends outward from and parallel to a signal face on all sides of a signal housing to provide a background for improved visibility of the signal indications.
231. Signal Coordination—the establishment of timed relationships between adjacent traffic control signals.
232. Signal Dimming—a reduction of the light output from a signal indication, hybrid beacon, or rectangular rapid-flashing beacon indication, typically for nighttime conditions, to a value that is below the minimum specified intensity for daytime conditions. If a variety of intensity levels are used during daytime conditions and all of the various levels (including the lowest of the intensities) are above the minimum specified intensity for daytime conditions, this would not be considered to be signal dimming.
233. Signal Face—an assembly of one or more signal sections that is provided for controlling one or more traffic movements on a single approach.
234. Signal Head—an assembly of one or more signal faces that is provided for controlling traffic movements on one or more approaches.
235. Signal Housing—that part of a signal section that protects the light source and other required components.
236. Signal Indication—the illumination of a signal lens or equivalent device.
237. Signal Lens—that part of the signal section that redirects the light coming directly from the light source and its reflector, if any.
238. Signal Louver—a device that can be mounted inside a signal visor to restrict visibility of a signal indication from the side or to limit the visibility of the signal indication to a certain lane or lanes, or to a certain distance from the stop line.
239. Signal Phase—the right-of-way, yellow change, and red clearance intervals in a cycle that are assigned to an independent traffic movement or combination of movements.
240. Signal Section—the assembly of a signal housing, signal lens, if any, and light source with necessary components to be used for displaying one signal indication.
241. Signal Sequence (Sequence of Indications)—the order of appearance of signal indications during successive intervals of a signal cycle.
242. Signal System—two or more traffic control signals operating in signal coordination.
243. Signal Timing—the amount of time allocated for the display of a signal indication.
244. Signal Visor—that part of a signal section that directs the signal indication specifically to approaching traffic and reduces the effect of direct external light entering the signal lens.
245. Signing—individual signs or a group of signs, not necessarily on the same support(s), that supplement one another in conveying information to road users.

246. Simultaneous Preemption—notification of approaching rail traffic is forwarded to the highway traffic signal controller unit or assembly and railroad or light rail transit active warning devices at the same time.

247. Site Roadways Open to Public Travel—Roadways and bikeways on sites of shopping centers, office parks, airports, schools, universities, sports arenas, recreational parks, and other similar business, governmental, and/or recreation facilities that are publicly or privately owned but where the public is allowed to travel without full-time access restrictions. Two types of roadways are not included in this definition: (1) roadways where access is restricted at all times by gates and/or guards to residents, employees, or other specifically-authorized persons; and (2) private highway-rail grade crossings. Site roadways open to public travel do not include parking areas (see definition in this Section), including the driving aisles (see definition in this Section) within those parking areas.

248. Special Purpose Road—a low-volume, low-speed road that serves recreational areas or resource development activities.

249. Speed—speed is defined based on the following classifications:

- **(a) Average Speed—the summation of the instantaneous or spot-measured speeds at a specific location of vehicles divided by the number of vehicles observed.**
- **(b) Design Speed—a selected speed used to determine the various geometric design features of a roadway.**
- **(c) 85th-Percentile Speed—the speed at or below which 85 percent of the motor vehicles travel.**
- **(d) Operating Speed—a speed at which a typical vehicle or the overall traffic operates. Operating speed might be defined with speed values such as the average, pace, or 85th-percentile speeds.**
- **(e) Pace—the 10 mph speed range representing the speeds of the largest percentage of vehicles in the traffic stream.**

250. Speed Limit—the maximum (or minimum) speed applicable to a section of highway as established by law or regulation.

251. Speed Zone—a section of highway with a speed limit that is established by law or regulation, but which might be different from a legislatively-specified statutory speed limit.

252. Splitter Island—a median island used to separate opposing directions of traffic entering and exiting a roundabout.

253. Station Crossing—a pathway grade crossing that is associated with a station platform.

254. Statutory Speed Limit—a speed limit established by legislative action (such as Federal or State law) that typically is applicable for a particular class of highways with specified design, functional, jurisdictional and/or location characteristics and that is not necessarily displayed on Speed Limit signs.

255. Steady (Steady Mode)—the continuous display of a signal indication for the duration of an interval, signal phase, or consecutive signal phases.

256. Stop Line—a solid white pavement marking line extending across approach lanes to indicate the point at which a stop is intended or required to be made.

257. Street—see Highway.

258. Supplemental Signal Face—a signal face that is not a primary signal face but which is provided for a given approach or separate turning movement to enhance visibility or conspicuity.

259. Swing Gate—a self-closing fence-type gate designated to swing open away from the track area and return to the closed position upon release.

260. Symbol—the approved design of a pictorial or graphical representation of a specific traffic control message for signs, pavement markings, traffic control signals, or other traffic control devices, as shown in the MUTCD.

261. Temporary Traffic Control Signal—see Highway Traffic Signal.

262. Temporary Traffic Control Zone—an area of a highway, pedestrian or bicycle facility where road user conditions are changed because of a work zone or incident by the use of temporary traffic control devices, flaggers, uniformed law enforcement officers, or other authorized personnel.

263. Theoretical Gore—a longitudinal point at the upstream end of a neutral area at an exit ramp or channelized turn lane where the channelizing lines that separate the ramp or channelized turn lane from the adjacent through lane(s) begin to diverge, or a longitudinal point at the downstream end of a neutral area at an entrance ramp or channelized entering lane where the channelizing lines that separate the ramp or channelized entering lane from the adjacent through lane(s) intersect each other.

264. Through Train—a train movement that continues without stopping or reversing direction throughout the entire length of the rail traffic detection circuit length approaching a highway-rail grade crossing.

265. Timed Exit Gate Operating Mode—a mode of operation where the exit gate descent at a grade crossing is based on a predetermined time interval.

266. Toll Booth—a shelter where a toll attendant is stationed to collect tolls or issue toll tickets. A toll booth is located adjacent to a toll lane and is typically set on a toll island.

267. Toll Collection—manual or electronic methods and elements used to collect a fee for use of a toll facility. Toll collection methods include:

- **(a) Electronic Toll Collection (ETC)—a cashless system for automated collection of tolls from moving or stopped vehicles through wireless technologies such as radio-frequency communication or optical scanning. ETC systems are classified as one of the following:**
  - **(1) Systems that require users to have registered toll accounts, with the use of equipment inside or on the exterior of vehicles, such as a transponder or barcode decal, that communicates with or is detected by roadside or overhead receiving equipment, or with the use of license plate optical scanning, to automatically deduct the toll from the registered user account,**
  - **(2) Systems that do not require users to have registered toll accounts because vehicle license plates are optically scanned and invoices for the toll amount are typically sent through postal mail to the address of the vehicle owner, or**
  - **(3) Systems that allow electronic toll collection for both registered and non-registered toll accounts.**
- **(b) Open-Road Tolling (ORT)—a system designed to allow electronic toll collection (ETC) from vehicles traveling at posted speeds. Open-road**

tolling might be used on toll roads or toll facilities in conjunction with toll plazas. Open-road tolling is also typically used on managed lanes and on toll facilities that only accept payment by ETC.

(c) Manual Toll Collection—a system of toll collection from stopped vehicles through acceptance of cash, toll tickets, tokens, or credit cards, and may involve issuance of receipts. Toll collection may be by a machine or toll booth attendant.

(1) Toll-Ticket System—a toll system in which the user of a toll road must stop to receive a ticket from a machine or toll booth attendant upon entering the toll facility. The ticket denotes the user's point of entry and, upon exiting the toll system, the user surrenders the ticket and is charged a toll based on the distance traveled between the points of entry and exit.

(2) Attended Lane (Manual Lane)—a toll lane adjacent to a toll booth occupied by a human toll collector who makes change, issues receipts, and performs other toll-related functions. Attended lanes at toll plazas typically require vehicles to stop to pay the toll.

(3) Exact Change Lane (Automatic Lane)—a non-attended toll lane that has a receptacle into which road users deposit coins totaling the exact amount of the toll. Exact Change lanes at toll plazas typically require vehicles to stop to pay the toll.

268. Toll Island—a raised island on which a toll booth or other toll collection and related equipment are located.

269. Toll Lane—an individual lane located within a toll plaza in which a toll payment is collected or, for toll-ticket systems, a toll ticket is issued.

270. Toll Plaza—the location at which tolls are collected consisting of a grouping of toll booths, toll islands, toll lanes, and, typically, a canopy. Toll plazas might be located on highway mainlines or on interchange ramps. A mainline toll plaza is sometimes referred to as a barrier toll plaza because it interrupts the traffic flow.

271. Toll Road (Facility)—a road or facility that is open to traffic only by payment of a user toll or fee.

272. Traffic—~~pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other conveyances either singularly or together while using for purposes of travel any highway or site roadway open to public travel.~~ Pedestrians, ridden or herded animals, vehicles and other conveyances either singly or together while using a highway for purposes of travel (ARS §28-601).

273. Traffic Control Device—all signs, signals, markings, channelization devices, or other devices that use colors, shapes, symbols, words, sounds, and/or tactile information for the primary purpose of communicating a regulatory, warning, or guidance message to road users on a street, highway, pedestrian facility, bikeway, pathway, or site roadway open to public travel. Section 1A.02 contains information regarding items that are not traffic control devices.

274. Traffic Control Signal (Traffic Signal)—see Highway Traffic Signal.

275. **Train—one or more locomotives coupled, with or without cars, that operates on rails or tracks and to which all other traffic must yield the right-of-way by law at highway-rail grade crossings.**
276. **Transverse Markings—pavement markings that are generally placed perpendicular and across the flow of traffic such as shoulder markings; word, symbol, and arrow markings; stop lines; crosswalk lines; parking space markings; and others.**
277. **Traveled Way—the portion of the roadway for the movement of vehicles, exclusive of the shoulders, berms, sidewalks, and parking lanes.**
278. **Turn Bay—a lane for the exclusive use of turning vehicles that is formed on the approach to the location where the turn is to be made. In most cases where turn bays are provided, drivers who desire to turn must move out of a through lane into the newly-formed turn bay in order to turn. A through lane that becomes a turn lane is considered to be a lane drop rather than a turn bay.**
279. **Two-Stage Bicycle Turn Box—a designated area at an intersection intended to provide bicyclists a place to wait for traffic to clear before proceeding in a different direction of travel.**
280. **Uncontrolled Approach—an approach on which vehicles are not controlled by a traffic control signal, hybrid beacon, STOP sign, or YIELD sign.**
281. **Upstream—a term that refers to a location that is encountered by traffic prior to a downstream location as it flows in an "upstream to downstream" direction. For example, "the upstream end of a lane line separating the turn lane from a through lane on the approach to an intersection" is the end of the line that is furthest from the intersection.**
282. **Urban Street—a type of street normally characterized by relatively low speeds, wide ranges of traffic volumes, narrower lanes, frequent intersections and driveways, significant pedestrian traffic, and more businesses and houses.**
283. **Variable Message Sign—see Changeable Message Sign.**
284. **Vehicle— ~~every device in, upon, or by which any person or property can be transported or drawn upon a highway, except trains and light rail transit operating in exclusive or semi-exclusive alignments. Light rail transit equipment operating in a mixed-use alignment, to which other traffic is not required to yield the right-of-way by law, is a vehicle.~~ A device in, on or by which a person or property is or may be transported or drawn on a public highway. Excludes electric bicycles, electric miniature scooters, electric standup scooters and devices moved by human power; devices used exclusively on stationary rails or tracks; personal delivery devices; scrap vehicles; and personal mobile cargo carrying devices (ARS §28-101).**
285. **Vibrotactile Pedestrian Device—an accessible pedestrian signal feature that communicates, by touch, information about pedestrian timing using a vibrating surface.**
286. **Visibility-Limited Signal Face or Visibility-Limited Signal Section—a type of signal face or signal section designed (or shielded, hooded, or louvered) to restrict the visibility of a signal indication from the side, to a certain lane or lanes, or to a certain distance from the stop line.**

287. Walk Interval—an interval during which the WALKING PERSON (symbolizing WALK) signal indication is displayed.

288. Warning Light—a portable, powered, yellow, lens-directed, enclosed light that is used in a temporary traffic control zone in either a steady burn or a flashing mode.

289. Warning Sign—a sign that gives notice to road users of a situation that might not be readily apparent.

290. Warrant—a warrant describes a threshold condition based upon average or normal conditions that, if found to be satisfied as part of an engineering study, shall result in analysis of other traffic conditions or factors to determine whether a traffic control device or other improvement is justified. Warrants are not a substitute for engineering judgment. The fact that a warrant for a particular traffic control device is met is not conclusive justification for the installation of the device.

291. Wayside Horn System—a stationary horn (or series of horns) located at a grade crossing that is used in conjunction with train-activated or light rail transit-activated warning systems to provide audible warning of approaching rail traffic to road users on the highway or pathway approaches to a grade crossing, either as a supplement or alternative to the sounding of a locomotive horn.

292. Worker—a person on foot whose duties place him or her within the right-of-way of a street, highway, or pathway, such as: construction and maintenance forces; survey crews; utility crews; responders to incidents within the right-of-way; and law enforcement personnel when directing traffic, investigating crashes, and handling lane closures, obstructed roadways, and disasters within the right-of-way.

293. Wrong-Way Arrow—a slender, elongated, white pavement marking arrow placed upstream from the ramp terminus to indicate the correct direction of traffic flow. Wrong-way arrows are intended primarily to warn wrong-way road users that they are going in the wrong direction.

294. Yellow Change Interval—the first interval following the green or flashing arrow interval during which the steady yellow signal indication is displayed.

295. Yield Line—a row of solid white isosceles triangles pointing toward approaching vehicles extending across approach lanes to indicate the point at which the yield is intended or required to be made.

PART 2 - SIGNS
CHAPTER 2A - GENERAL

Section 2A.07 of the National MUTCD is revised to read:

Section 2A.07 Dimensions

Support:

01 The "Standard Highway Signs" publication (see Section 1A.05) prescribes design details for different sizes of each sign or plaque depending on the type of traffic facility, including bikeways. Smaller sizes are designed to be used on bikeways and some other off-road applications. Larger sizes are designed for use on freeways and expressways, and can also be used in oversized applications to enhance road user safety and convenience on other facilities, especially on multi-lane divided highways and on undivided highways having five or more lanes of traffic and/or high speeds. The intermediate sizes are designed to be used on other highway types. Minimum sizes of signs and plaques for specific applications are prescribed in the various sign size tables in each Chapter of this Manual.

Standard:

02 **The sign dimensions prescribed in the sign size tables in the various Parts and Chapters in this Manual and in the "Standard Highway Signs" publication (see Section 1A.05) shall be used unless engineering judgment determines that other sizes are appropriate in accordance with the following. Except as provided in Paragraph 3 of this Section, where engineering judgment determines that sizes smaller than the prescribed dimensions are appropriate for use, the sign dimensions shall not be less than the minimum dimensions specified in this Manual. The sizes shown in the Minimum columns that are smaller than the sizes shown in the Conventional Road columns in the various sign size tables in this Manual shall only be used on low-speed roadways, alleys, site roadways open to public travel, and on low-volume rural roads with operating speeds of 30 mph or less; and only where the reduced legend size would be adequate for the regulation or warning or where physical conditions preclude the use of larger sizes.**

Option:

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

Guidance:

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

05 *The sizes shown in the Oversized columns in the various sign size tables in this Manual should be used for those special applications where speed, volume, or other*

factors result in conditions where increased emphasis, improved recognition, or increased legibility is needed, as determined by engineering judgment or study.

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

Standard:

07 **Where a maximum allowable sign size is prescribed, increases in sign size above the maximum size shall not be allowed.**

08 **Where engineering judgment determines that sizes that are different from the minimum prescribed dimensions are appropriate for use, standard shapes and colors shall be used. Standard proportions shall be retained as much as practical.**

Guidance:

09 *Except where specifically prohibited in this Manual, when supplemental plaques are installed with larger-sized signs, a corresponding increase in the size of the plaque and its legend should also be made. The resulting plaque size should be approximately in the same relative proportion to the larger-sized sign as the conventional-sized plaque is to the conventional-sized sign.*

Support:

10 Engineering judgment as defined in Section 1D.03 is applied in adjusting sign sizes where the sign size specified in the various Parts and Chapters in this Manual are not feasible or appropriate.

Section 2A.15 of the National MUTCD is revised to read:

Section 2A.15 Mounting Height

Standard:

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

Support:

02 It might be necessary to use larger minimum mounting heights than those prescribed in this Manual to ensure appropriate crash performance of sign installations that are required to be crashworthy (see Section 1D.11).

03 In addition to the provisions of this Section, information affecting the minimum mounting height of signs as a function of crash performance can be found in the "Roadside Design Guide," 4th Edition, 2011, AASHTO.

Standard:

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

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

Option:

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

Standard:

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

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

Support:

09 Section 9A.02 contains provisions for the minimum mounting height of signs on shared-use paths.

Option:

10 Signs that are placed 30 feet or more from the edge of the traveled way may be installed with a minimum height of 5 feet, measured vertically from the bottom of the sign to the elevation of the near edge of the pavement.

Standard:

11 **Directional signs on freeways and expressways shall be installed with a minimum height of 7 feet, measured vertically from the bottom of the sign to the**

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

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

Option:

13 A route sign assembly (see Section 2D.29) consisting of a route sign and auxiliary signs may be treated as a single sign for the purposes of this Section.

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

Standard:

15 **Signs that are post-mounted on a median barrier that overhang any portion of the traveled way shall be mounted with a vertical clearance that complies with that of overhead signs.**

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

Option:

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

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

Guidance:

19 While a maximum mounting height for signs is generally not prescribed in this Manual, agencies should ensure that signs are not mounted at such a height as to be out of the road user's normal field of vision (see Paragraph 3 of Section 1D.09), especially in urban settings where signs are mounted on traffic signal or light poles.

Support:

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

21 Overhead signs mounted on a bridge or overpass structure are generally mounted level with the bottom of the structure unless the vertical clearance of the structure is less than 16 feet.

CHAPTER 2B - REGULATORY SIGNS, BARRICADES, AND GATES

Section 2B.18 of the National MUTCD is revised to read:

Section 2B.18 STOP Sign or YIELD Sign Placement

Standard:

01 **The STOP or YIELD sign shall be installed on the near side of the intersection on the right-hand side of the approach to which it applies. When the STOP or YIELD sign is installed at this required location and the sign visibility is restricted, a Stop Ahead sign (see Section 2C.35) shall be installed in advance of the STOP sign or a Yield Ahead sign (see Section 2C.35) shall be installed in advance of the YIELD sign.**

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

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

Support:

04 Section 2A.05 contains information about mounting signs back-to-back with a STOP or YIELD sign.

Guidance:

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

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

Option:

07 Where drivers proceeding straight ahead must yield to traffic approaching from the opposite direction, such as at a one-lane bridge, a TO ONCOMING TRAFFIC (R1-2aP) plaque (see Figure 2B-1) may be mounted below the YIELD sign.

08 Where drivers must yield to traffic in a multi-lane roundabout, a TO TRAFFIC IN CIRCLE (R1-2bP) or TO ALL LANES (R1-2cP) plaque (see Figure 2B-1) may be mounted below the YIELD sign.

Support:

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

10 Section 2A.13 contains additional information about separate and combined mounting of other signs with STOP or YIELD signs.

Guidance:

11 *Stop lines that are used to supplement a STOP sign should be located as described in Section 3B.19. Yield lines that are used to supplement a YIELD sign should be located as described in Section 3B.19.*

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

13 *Except at roundabouts and channelized right-turn lanes, where there is a marked crosswalk at the intersection, the YIELD sign should be installed in advance of the edge of the crosswalk that is nearest to the approaching traffic.*

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

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

Option:

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

17 At wide-throat intersections or where two or more approach lanes of traffic exist on the signed approach, an additional STOP or YIELD sign may be installed on the left-hand side of the road and/or a stop or yield line may be used to improve observance of the right-of-way control. At channelized intersections or at divided roadways separated by a median or divisional island, the additional STOP or YIELD sign may be placed on a channelizing island, or in the median or on the divisional island. An additional STOP or YIELD sign may also be placed overhead facing the approach at the intersection to improve observance of the right-of-way control.

Standard:

18 **More than one STOP sign or more than one YIELD sign shall not be placed on the same support facing in the same direction.**

Option:

19 For a yield-controlled channelized right-turn movement onto a roadway without an acceleration lane and for an entrance ramp onto a freeway or expressway without an acceleration lane, a NO MERGE AREA (W4-5aP) supplemental plaque (see Section 2C.45) may be mounted below a Yield Ahead (W3-2) sign and/or below a YIELD (R1-2) sign when engineering judgment indicates that road users would expect an acceleration lane to be present.

Support:

20 The provisions in this Section do not prohibit the use of a STOP or YIELD sign on the same post as long as the signs are facing traffic approaching in different directions and meet the minimum mounting requirements.

21 The placement of the STOP sign will generally be in the vicinity of the point of where the drivers make their first stop and/or where the sign is most visible to approaching traffic. A driver must stop at the location as defined in ARS §28-855.

Section 2B.20 of the National MUTCD is revised to read:

Section 2B.20 In-Street and Overhead Pedestrian and Trail Crossing Signs (R1-6 and R1-9 Series)

Option:

01 The In-Street Pedestrian Crossing (R1-6 or R1-6a) sign (see Figure 2B-2), In-Street Trail Crossing (R1-6d or R1-6e) sign (see Figure 2B-2), the Overhead Pedestrian Crossing (R1-9 or R1-9a) sign (see Figures 2B-2), or the Overhead Trail Crossing (R1-9d or R1-9e) sign (see Figure 2B-2) may be used to remind road users of laws regarding right-of-way at an unsignalized pedestrian crosswalk. The legend STATE LAW may be displayed at the top of the R1-6 series and R1-9 series signs if applicable. On the R1-6 series signs, the legends STOP or YIELD may be used instead of the appropriate STOP sign or YIELD sign symbol.

02 Highway agencies may develop and apply criteria for determining the applicability of In-Street Pedestrian Crossing signs.

Standard:

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

04 **If used, the In-Street Pedestrian or Trail Crossing signs shall only be placed in the roadway at the crosswalk location on the center line, on a median island, on a lane line, or on an edge line.**

05 **The In-Street Pedestrian or Trail Crossing sign shall not be post-mounted on the left-hand or right-hand side of the roadway.**

Support:

06 06 Section 3I.02 contains information about the use of tubular markers to provide additional emphasis for a pedestrian crossing.

Standard:

07 **If used, the Overhead Pedestrian or Trail Crossing sign shall be placed over the roadway at the crosswalk location.**

08 **When used at an uncontrolled crossing, the In-Street or Overhead Pedestrian Crossing sign shall be used only as a supplement to a Pedestrian Crossing (W11-2) warning sign with a diagonal downward-pointing arrow (W16-7P) plaque at the crosswalk location.**

09 **When used at an uncontrolled crossing, the In-Street or Overhead Trail Crossing sign shall be used only as a supplement to a Trail Crossing (W11-15) warning sign with a diagonal downward-pointing arrow (W16-7P) plaque at the crosswalk location.**

10 **An In-Street or Overhead Pedestrian or Trail Crossing sign shall not be placed in advance of the crosswalk to educate road users about the State law prior to reaching the crosswalk, nor shall it be installed as an educational display that is not near any crosswalk.**

Guidance:

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

Option:

12 In-Street Pedestrian or Trail Crossing signs may be mounted back-to-back in the median or on the center line of an undivided roadway.

Standard:

13 **The In-Street Pedestrian or Trail Crossing sign and the Overhead Pedestrian Crossing or Trail sign shall not be used at crosswalks on approaches controlled by a traffic control signal, pedestrian hybrid beacon, or an emergency-vehicle hybrid beacon**

14 **Except where the In-Street Pedestrian Crossing sign is placed on a physical island, the sign support shall be designed to bend over and then bounce back to its normal vertical position when struck by a vehicle.**

Option:

15 The In-Street and Overhead Pedestrian and Trail Crossing sign may be used at intersections or midblock pedestrian crossings with flashing beacons.

Support:

16 The provisions of Section 2A.15 concerning mounting height are not applicable for the In-Street Pedestrian Crossing sign. Section 2A.18 contains information about sign mounting methods.

Standard:

17 **The top of an In-Street Pedestrian or Trail Crossing sign shall be a maximum of 4 feet above the pavement surface. The top of an In-Street Pedestrian or Trail Crossing sign placed in an island shall be a maximum of 4 feet above the island surface.**

Option:

18 The In-Street Pedestrian Crossing or Trail signs may be used seasonally to prevent damage in winter because of plowing operations, and may be removed ~~at night~~ if the pedestrian activity at ~~night~~ specific times is minimal.

19 Both sign mounting types, In-Street Crossing (R1-6 series) signs and Overhead Crossing (R1-9 series) signs, may be used together at the same crosswalk.

Section 2B.25 of the National MUTCD is revised to read:

Section 2B.25 Higher Fines Signs and Plaque (R2-6P, R2-10, and R2-11)

Standard:

01 **Except as provided in Paragraph 3 of this Section, if increased fines are imposed for traffic violations within a designated zone of a roadway a BEGIN HIGHER FINES ZONE (R2-10) sign (see Figure 2B-3) or a FINES HIGHER (R2-6P) plaque (see Figure 2B-3) shall be used to provide notice to road users.**

02 **If an R2-10 sign or an R2-6P plaque is posted to provide notice of increased fines for traffic violations, an END HIGHER FINES ZONE (R2-11) sign (see Figure 2B-3) shall be installed at the downstream end of the zone to provide notice to road users of the termination of the increased fines zone.**

Option:

03 The BEGIN HIGHER FINES ZONE (R2-10) sign or FINES HIGHER (R2-6P) plaque may be omitted where the higher fines zone is established by statute.

Guidance:

04 *The BEGIN HIGHER FINES ZONE sign or FINES HIGHER plaque should be located at the beginning of the temporary traffic control zone, school zone, or other applicable designated zone and just beyond any interchanges, major intersections, or other major traffic generators.*

05 *Agencies should limit the use of the Higher Fines signs and plaque to locations where work is actually underway, or to locations where the roadway, shoulder, or other conditions, including the presence of a school zone and/or a reduced school speed limit zone, require a speed reduction or extra caution on the part of the road user.*

Standard:

06 **The Higher Fines signs and plaque shall have a black legend and border on a white rectangular background. All supplemental plaques mounted below the Higher Fines signs and plaque shall have a black legend and border on a white rectangular background.**

07 **The FINES HIGHER plaque shall be mounted below an applicable regulatory or warning sign in a temporary traffic control zone (see Section 6G.08), a school zone (see Section 7B.06), or other applicable designated zone.**

Option:

08 Alternate legends such as BEGIN (or END) DOUBLE FINES ZONE may also be used for the R2-10 and R2-11 signs.

09 The legend FINES HIGHER on the R2-6P plaque may be replaced by FINES DOUBLE (R2-6aP), $XX FINE (R2-6bP), or another legend appropriate to the specific regulation (see Figure 2B-3).

10 The following may be mounted below an R2-10 sign or R2-6P plaque:

A. A supplemental plaque specifying the times that the higher fines are in effect (similar to the S4-1P plaque shown in Figure 7B-1), or
B. A supplemental plaque WHEN CHILDREN (WORKERS) ARE PRESENT, or

C. A supplemental plaque WHEN FLASHING (similar to the S4-4P plaque shown in Figure 7B-1) if used in conjunction with a Speed Limit Sign Beacon (see Section 4S.04).

Support:

11 State highway work zones are defined in ARS §28-652. School crossing zones are defined in ARS §28-797. Double fine signing examples are provided in the ADOT Temporary Traffic Control Design Guidelines.

Section 2B.69 of the National MUTCD is revised to read:

Section 2B.69 Photo Enforced Signs and Plaques (R10-18, R10-18a, R10-19P, R10-19aP)

Option:

01 A Traffic Laws Photo Enforced (R10-18) sign (see Figure 2B-32) may be installed at a jurisdictional boundary to advise road users that some of the traffic regulations within that jurisdiction are being enforced by photographic equipment.

02 A Traffic Signal Photo Enforced (R10-18a) sign (see Figure 2B-32) may be installed in advance of or at a traffic signal to advise road users that compliance with the signal is enforced by photographic equipment. A Signal Ahead (W3-3) sign and a Traffic Signal Photo Enforced (R10-18a) sign may be used on the same approach provided that they are on separate supports.

03 A Photo Enforced (R10-19P) plaque or a PHOTO ENFORCED (R10-19aP) word message plaque (see Figure 2B-32) may be mounted below a regulatory sign to advise road users that the regulation is being enforced by photographic equipment.

Standard:

04 **The Traffic Signal Photo Enforced (R10-18a) sign shall not be installed on approaches to signalized locations where red-light cameras are not present on any of the approaches to the signalized location.**

05 **A Traffic Signal Photo Enforced (R10-18a) sign shall not be installed on the same support in combination with a Signal Ahead (W3-3) sign.**

06 **If used below a regulatory sign, the Photo Enforced (R10-19P or R10-19aP) plaque shall be a rectangle with a black legend and border on a white background.**

07 **Except as provided in Paragraph 10 of this Section, every local authority or agency within Arizona using a photo enforcement system shall adopt standards and specifications that indicate to a person operating a motor vehicle that a photo enforcement system is present and operational per ARS §28-1204. The standards and specifications shall include all of the following:**

- **A. At least two signs shall be placed in a location before a photo enforcement system. One sign shall be in a location that is approximately three hundred feet before the photo enforcement system. Placement of additional signs shall be more than three hundred feet before a photo enforcement system to provide reasonable notice to a person that a photo enforcement system is present and operational.**
- **B. A sign that clearly states the posted speed limit shall be placed between the two signs prescribed by the above subsection (A).**
- **C. Signs indicating a photo enforcement system shall be removed or covered when the photo enforcement system is no longer present or not operating.**

08 **Signs erected by a local authority or agency of this state as prescribed in this section shall contain a yellow warning notice and correlate with and as far as possible conform to the MUTCD.**

09 **During the time a vehicle containing photo enforcement equipment is being used to identify violators of articles 3 and 6 of Title 28, Chapter 3 of the Arizona Revised Statutes, the rear of the vehicle shall be clearly marked to indicate that the vehicle is functioning as a photo enforcement vehicle. This paragraph does not apply to a vehicle that does not contain a photo enforcement system and that is used by a law enforcement officer.**

10 **Paragraph 7 of this Section does not apply to a mobile photo enforcement vehicle during the time a mobile photo enforcement vehicle is deployed on streets with a posted speed limit of forty miles per hour or less.**

CHAPTER 2C - WARNING SIGNS AND OBJECT MARKERS

Section 2C.40 of the National MUTCD is revised to read:

Section 2C.40 Reduced Speed Limit Ahead and Speed Zone Signs (W3-5, W3-5a, W3-5b, and W3-5c)

Guidance:

01 *A Reduced Speed Limit Ahead (W3-5 or W3-5a) or Truck Speed Zone Ahead (W3-5c) sign (see Figure 2C-9) should be used to inform road users of a reduced speed zone where the speed limit is being reduced by more than 10 mph, or where engineering judgment indicates the need for advance notice to comply with the posted speed limit ahead.*

02 *A VARIABLE SPEED ZONE AHEAD (W3-5b) sign (see Figure 2C-9) should be used to inform road users of a zone where the speed limit is varied by time of day or as conditions change.*

Standard:

03 **If used, Reduced Speed Limit Ahead, Variable Speed Zone, or Truck Speed Zone Ahead signs shall be followed by a Speed Limit (R2-1) sign (see Figure 2B-3), with the Trucks (R2-2P) plaque (see Figure 2B-3) if applicable, installed at the beginning of the zone where the speed limit applies.**

04 **The speed limit displayed on the W3-5, W3-5a, and W3-5c signs shall be identical to the speed limit displayed on the subsequent Speed Limit sign.**

Option:

05 The Arizona SPEED REDUCED AHEAD (W3-5aAZ) sign may be used in advance of speed reductions based on engineering judgment as defined in Section 1D.03.

PART 3 - MARKINGS

CHAPTER 3B - PAVEMENT AND CURB MARKINGS

Section 3B.05 of the National MUTCD is revised to read:

Section 3B.05 Pavement Markings for Two-Way Left-Turn Lanes

Standard:

01 **If a two-way left-turn lane that is never operated as a reversible lane is used, the lane line pavement markings on each side of the two-way left-turn lane shall consist of a normal width broken yellow line and a normal width solid yellow line to delineate the edges of a lane that can be used by traffic in either direction as part of a left-turn maneuver. These markings shall be placed with the broken line toward the two-way left-turn lane and the solid line toward the adjacent traffic lane as shown in Figure 3B-7.**

Guidance:

02 *White two-way left-turn lane-use arrows should be used at or just downstream from the beginning of a two-way left-turn lane.*

Option:

03 Additional two-way left-turn lane-use arrow markings may be used at other locations along a two-way left-turn lane where engineering judgment determines that such additional markings are needed to emphasize the proper use of the lane.

Standard:

04 **A single-direction lane-use arrow shall not be used in a lane bordered on both sides by yellow two-way left-turn lane longitudinal markings.**

Guidance:

05 *Signs should be used in conjunction with the two-way left-turn markings (see Section 2B.32).*

06 *Two-way left-turn lane markings should not extend to intersections (see definition in Section 1C.02).*

Option:

07 Two-way left-turn lanes may be transitioned to mandatory left-turn lanes as shown in Figure 3B-7 or painted median islands where they approach an intersection.

Support:

08 Section 8A.06 contains guidance information for discontinuing a two-way left-turn lane in the immediate vicinity of a highway-rail or highway-LRT grade crossing.

Support:

09 Paragraph 6 of this Section does not apply to the junction of an alley, driveway, or site roadway with a public roadway or highway, unless the main roadway at such a junction is controlled by a traffic control device (for example, a traffic signal or ALL-WAY Stop). Two-way left turn lane markings typically extend through/to such junctions. Engineering judgment as defined in Section 1D.03 applies when installing

two-way left-turn markings in an area with limited space or where discontinuing the two-way left-turn lane markings are expected to create operational issues.

Section 3B.06 of the National MUTCD is revised to read:

Section 3B.06 White Lane Line Pavement Markings

Standard:

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

02 **Lane line markings shall be used on all freeways and Interstate highways.**

Guidance:

03 *Lane line markings should be used:*

A. On all roadways that are intended to operate with two or more adjacent traffic lanes in the same direction of travel, except as otherwise required for reversible lanes.

B. At congested locations where the roadway will accommodate more traffic lanes with lane line markings than without the markings.

Support:

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

Standard:

05 **Except as provided in Paragraph 1 of Section 3B.07, where crossing the lane line markings with care is not discouraged or prohibited, the lane line markings shall consist of a normal width broken white line.**

06 **Where crossing the lane line markings is discouraged, the lane line markings shall consist of a normal width solid white line.**

Guidance:

07 *A solid white lane line marking should be used on approaches to:*

A. Intersections to separate a through lane from a mandatory turn lane.

B. Intersections to separate contiguous mandatory turn lanes from each other.

C. Toll collection points to separate toll lanes, payment methods, channelized movements, or obstructions.

Option:

08 Solid white lane line markings may be used:

A. On approaches to intersections to separate contiguous through lanes.

B. To separate through traffic lanes from auxiliary lanes, such as an added uphill truck lane.

C. On approaches to crosswalks across multi-lane roadways.

D. On roadways with physically restricted shoulders, such as on bridges and in tunnels.

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

10 A curved transition may be used where an edge line, channelizing line, or dotted extension line changes direction.

Support:

11 Examples of locations where a curved transition can have value include freeway exit and entrance ramps, and turn lanes.

Standard:

12 **Where crossing the lane line markings is prohibited, the lane line markings shall consist of a double solid white line (see Figure 3B-8).**

PART 4
HIGHWAY TRAFFIC SIGNALS

CHAPTER 4B -
TRAFFIC CONTROL SIGNALS - GENERAL

Section 4B.02 of the National MUTCD is revised to read:

Section 4B.02 Advantages and Disadvantages of Traffic Control Signals

Support:

01 When properly used and adhered to by all road users, traffic control signals and applicable beacons are valuable devices for safety and the control of vehicular and vulnerable road user traffic. ~~They control the various traffic movements by alternating between directing them to stop and permitting them to proceed and thereby profoundly influence traffic flow.~~ Traffic signals provide the opportunity to assign right-of-way to various traffic movements by alternating between these movements, indicating when road users should stop, go, proceed with caution, or take other appropriate actions in compliance with the displayed indications. This accomplishes the need to safely separate road users in time in order to prevent crashes.

02 Traffic control signals that are properly designed, located, operated, and maintained will have one or more of the following advantages:

A. They reduce the frequency and severity of certain types of crashes, especially right-angle collisions and those involving vulnerable road users.
B. They provide for the orderly movement of traffic.
C. They increase the traffic-handling capacity of the intersection if:
    1. Proper physical layouts and control measures are used, and
    2. The signal operational parameters are reviewed and updated (if needed) on a regular basis (as engineering judgment determines that significant traffic flow and/or land use changes have occurred) to maximize the ability of the traffic control signal to satisfy current traffic demands.
D. They are coordinated to provide for continuous or nearly-continuous movement of traffic at a definite speed along a given route under favorable conditions.
E. They are used to interrupt heavy traffic at intervals to permit other traffic, vehicular or pedestrian, to cross.

03 Traffic control signals are often considered a panacea for all traffic problems at intersections. This belief has led to traffic control signals being installed at many locations where they are not needed, adversely affecting the safety and efficiency of motor vehicular, bicycle, and pedestrian traffic.

04 Traffic control signals, even when justified by traffic and roadway conditions, can be ill-designed, ineffectively placed, improperly operated, or poorly maintained.

Improper or unjustified traffic control signals can result in one or more of the following disadvantages:

A. Excessive delay,
B. Excessive disobedience of the signal indications,
C. Increased use of less adequate routes as road users attempt to avoid the traffic control signals, and
D. Significant increases in the frequency of collisions (especially rear-end collisions).

05 Traffic control devices, including signals, offer potential advantages and disadvantages. Engineering judgment as defined in Section 1D.03 is needed to weigh the advantages and disadvantages, and compare to existing conditions to determine if changes are appropriate.

CHAPTER 4J. PEDESTRIAN HYBRID BEACONS

Section 4J.01 of the National MUTCD is revised to read:

Section 4J.01 Application of Pedestrian Hybrid Beacons

Support:

01 A pedestrian hybrid beacon is a special type of hybrid beacon used to warn and control traffic at an unsignalized location to assist pedestrians in crossing a street or highway at a marked crosswalk.

Option:

02 A pedestrian hybrid beacon may be considered for installation to facilitate pedestrian crossings at a location that does not meet traffic signal warrants (see Chapter 4C), or at a location that meets traffic signal warrants under Sections 4C.05 and/or 4C.06 but a decision is made to not install a traffic control signal.

Standard:

03 **If used, pedestrian hybrid beacons shall be used in conjunction with signs and pavement markings (see Section 4J.02) to warn and control traffic at locations where pedestrians enter or cross a street or highway. A pedestrian hybrid beacon shall only be installed at a marked crosswalk.**

Guidance:

04 *If one of the signal warrants of Chapter 4C is met and a traffic control signal is justified by an engineering study, and if a decision is made to install a traffic control signal, it should be installed based upon the provisions of Chapters 4D through 4I and 4K.*

05 *If a traffic control signal is not justified under the signal warrants of Chapter 4C and if gaps in traffic are not adequate to permit pedestrians to cross, or if the speed for vehicles approaching on the major street is too high to permit pedestrians to cross, or if pedestrian delay is excessive, the need for a pedestrian hybrid beacon should be considered on the basis of an engineering study that considers major-street volumes, speeds, widths, and gaps in conjunction with pedestrian volumes, walking speeds, and delay.*

06 *For a major street where the posted or statutory speed limit or the 85th-percentile speed is 35 mph or less, the need for a pedestrian hybrid beacon should be considered if the engineering study finds that the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding total of all pedestrians crossing the major street for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4J-1 for the length of the crosswalk.*

07 *For a major street where the posted or statutory speed limit or the 85th-percentile speed exceeds 35 mph, the need for a pedestrian hybrid beacon should be considered if the engineering study finds that the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding total of all pedestrians crossing the major street for 1 hour (any four consecutive 15-minute*

periods) of an average day falls above the applicable curve in Figure 4J-2 for the length of the crosswalk.

08 *For crosswalks that have lengths other than the four that are specifically shown in Figures 4J-1 and 4J-2, the values should be interpolated between the curves.*

Option:

09 The criteria for the pedestrian volume crossing the major street shown in Figures 4J-1 and 4J-2 may be reduced as much as 50 percent if the 15th-percentile crossing speed of pedestrians is less than 3.5 feet per second.

10 Where there is a divided street having a median of sufficient width for pedestrians to wait, the criteria for the major-street traffic volume shown in Figures 4J-1 and 4J-2 may be applied separately to each direction of vehicular traffic.

Support:

11 Local agencies typically establish specific warrants or guidelines for the installation of pedestrian hybrid beacons for roadways under their jurisdiction, based on one or more of the engineering study considerations specified in Paragraph 5 of this Section.

Section 4J.02 of the National MUTCD is revised to read:

Section 4J.02 Design of Pedestrian Hybrid Beacons

Standard:

01 **Except as otherwise provided in this Section, a pedestrian hybrid beacon shall meet the provisions of Chapters 4D through 4G, 4I, and 4J.**

02 **A pedestrian hybrid beacon face shall consist of three signal sections, with a CIRCULAR YELLOW signal indication centered below two horizontally-aligned CIRCULAR RED signal indications (see Figure 4J-3).**

03 **When an engineering study finds that installation of a pedestrian hybrid beacon is justified, then:**

- **A. At least two pedestrian hybrid beacon faces shall be installed for each approach of the major street,**
- **B. A stop line shall be installed for each approach to the crosswalk,**
- **C. A pedestrian signal head complying with the provisions set forth in Chapter 4I shall be installed at each end of the marked crosswalk,**
- **D. The pedestrian hybrid beacon shall be pedestrian actuated; and**
- **E. If the pedestrian hybrid beacon is installed at or immediately adjacent to an intersection with a minor street, a STOP sign shall be installed for each minor-street approach.**

Guidance:

04 *When an engineering study finds that installation of a pedestrian hybrid beacon is justified, then:*

- *A. Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk, or site accommodations should be made through curb extensions or other techniques to provide adequate sight distance; and*
- *B. If installed within a signal system, the pedestrian hybrid beacon should be coordinated.*

05 *On approaches having posted or statutory speed limits or 85th-percentile speeds in excess of 35 mph and on approaches having traffic or operating conditions that would tend to obscure visibility of roadside hybrid beacon face locations, both of the minimum of two pedestrian hybrid beacon faces should be installed over the roadway.*

06 *On multi-lane approaches having a posted or statutory speed limits or 85th-percentile speeds of 35 mph or less, either a pedestrian hybrid beacon face should be installed on each side of the approach (if a median of sufficient width exists) or at least one of the pedestrian hybrid beacon faces should be installed over the roadway.*

07 *A pedestrian hybrid beacon should comply with the signal face location provisions described in Sections 4D.05 through 4D.10.*

Option:

08 A CROSSWALK—STOP ON RED (symbolic circular red) (R10-23) or a STOP ON STEADY RED—YIELD ON FLASHING RED AFTER STOP (R10-23a) sign (see Section 2B.59) may be installed facing each major street approach.

09 A W11-2 (Pedestrian), S1-1 (School), or W11-15 (Trail) crossing warning sign with an AHEAD (W16-9P) supplemental plaque may be placed in advance of a pedestrian hybrid beacon. A Warning Beacon may be installed to supplement the W11-2, S1-1, or W11-15 sign. The Bicycle (W11-1), Bicycle/Pedestrian (W11-15), or Trail Crossing (W11-15a) warning signs may be used when appropriate.

10 Backplates (see Section 4D.06) may be used with pedestrian hybrid beacons.

Support:

11 Accessible pedestrian signals (see Chapter 4K) where a pedestrian hybrid beacon is used provide information in non-visual formats (such as audible tones and/or speech messages, and vibrating surfaces) so that a pedestrian with vision disabilities can know when to cross the street.

Guidance:

12 *If a Warning Beacon supplements a W11-1, W11-2, W11-15, or W11-15a warning sign in advance of a pedestrian hybrid beacon, it should be programmed to flash only when the pedestrian hybrid beacon is not in the dark mode.*

Standard:

13 **If a Warning Beacon is installed to supplement the W11-2 sign, the design and location of the Warning Beacon shall comply with the provisions of Sections 4S.01 and 4S.03.**

14 **Bicycle signal faces (see Chapter 4H) shall not be used at a pedestrian hybrid beacon.**

Support:

15 Coordination of a pedestrian hybrid beacon within a traffic signal system, as specified in Paragraph 4 of this Section, is based factors, such as: on the location of the pedestrian hybrid beacon, anticipated vehicle and pedestrian volumes, traffic speeds, expected frequency of activation, potential interaction with adjacent intersections, and other geometric and roadway network factors.

Section 4J.03 of the National MUTCD is revised to read:

Section 4J.03 Operation of Pedestrian Hybrid Beacons

Standard:

01 **Pedestrian hybrid beacon indications shall be dark (not illuminated) during periods between actuations.**

02 **Following an actuation by a pedestrian, a pedestrian hybrid beacon face shall display a flashing CIRCULAR yellow signal indication, followed by a steady CIRCULAR yellow signal indication, followed by both steady CIRCULAR RED signal indications during the pedestrian walk interval, followed by alternating flashing CIRCULAR RED signal indications during the pedestrian change interval (see Figure 4J-3). Upon termination of the pedestrian change interval, the pedestrian hybrid beacon faces shall revert to a dark (not illuminated) condition.**

03 **Except as provided in Paragraph 4 of this Section, the pedestrian signal heads shall continue to display a steady UPRAISED HAND (symbolizing DONT WALK) signal indication when the pedestrian hybrid beacon faces are either dark or displaying flashing or steady CIRCULAR yellow signal indications. The pedestrian signal heads shall display a WALKING PERSON (symbolizing WALK) signal indication when the pedestrian hybrid beacon faces are displaying steady CIRCULAR RED signal indications. The pedestrian signal heads shall display a flashing UPRAISED HAND (symbolizing DONT WALK) signal indication when the pedestrian hybrid beacon faces are displaying alternating flashing CIRCULAR RED signal indications. Upon termination of the pedestrian clearance interval, the pedestrian signal heads shall revert to a steady UPRAISED HAND (symbolizing DONT WALK) signal indication.**

Option:

04 Where the pedestrian hybrid beacon is installed adjacent to a roundabout to facilitate crossings by pedestrians with visual disabilities and an engineering study determines that pedestrians without visual disabilities can be allowed to cross the roadway without actuating the pedestrian hybrid beacon, the pedestrian signal heads may be dark (not illuminated) when the pedestrian hybrid beacon faces are dark.

Guidance:

05 *The duration of the flashing yellow interval should be determined by engineering judgment.*

06 *The duration of the flashing yellow interval should not vary on a cycle-by-cycle basis.*

07 *If the pedestrian hybrid beacon is coordinated as a part of a signal system, it should remain in the dark condition after a pedestrian actuation has been received until the point in the background cycle when the predetermined duration of the flashing yellow interval needs to be initiated in order to achieve the appropriate coordinated offset.*

Option:

08 If a minimum dark time between activations of the pedestrian hybrid beacon has been set on the controller, the pedestrian hybrid beacon may remain in the dark condition after a pedestrian actuation has been received until the minimum dark time has been provided.

Support:

09 The minimum dark time is a preprogrammed time set in the controller that provides time between the pedestrian actuation and beginning of the flashing yellow interval. At locations in coordinated signal systems, the dark time can be variable based on when the pedestrian actuation occurs in the coordinated signal timing sequence.

Standard:

10 **The duration of the steady yellow change interval shall be determined using engineering practices in accordance with the provisions in Section 4F.17.**

Guidance:

11 *The steady yellow change interval should have a minimum duration of 3 seconds and a maximum duration of 6 seconds (see Section 4F.17). The longer intervals should be reserved for use on approaches with higher speeds.*

Option:

12 A steady red clearance interval may be used after the steady yellow change interval.

13 The alternating flashing CIRCULAR RED signal indications may continue to flash for a short period after the pedestrian change interval has terminated to provide a buffer interval for pedestrians.

Guidance:

14 *A pedestrian hybrid beacon that is located 200 feet or less from an active grade crossing should be preempted in accordance with the applicable provisions in Sections 4F.19 and 8D.09.*

Standard:

15 **If a pedestrian hybrid beacon is placed into a flashing mode by a conflict monitor (malfunction management unit) or by a manual switch, the pedestrian hybrid beacon faces shall display flashing CIRCULAR YELLOW signal indications to each approach of the major street and the pedestrian signal heads shall revert to a dark (not illuminated) condition.**

Guidance:

16 *If used with a pedestrian signal head that does not have a concurrent vehicular phase, the pedestrian change interval (flashing UPRAISED HAND) should be set to be approximately 4 seconds less than the required pedestrian clearance time (see Section 4I.06) and an additional clearance interval (during which a steady UPRAISED HAND is displayed) should be provided prior to the start of the conflicting vehicular phase.*

PART 6
TEMPORARY TRAFFIC CONTROL

CHAPTER 6A - GENERAL

Section 6A.02 of the National MUTCD is revised to read:

Section 6A.02 Fundamental Principles of Temporary Traffic Control

Guidance:

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

02 *The following are the seven fundamental principles of TTC:*

A. General plans or guidelines should be developed to provide safety for motorists, bicyclists, pedestrians, workers, enforcement/emergency officials, and equipment, with the following factors being considered:

1. The basic safety principles governing the design of permanent roadways and roadsides should also govern the design of TTC zones. The goal should be to route road users through such zones using roadway geometrics, roadside features, and TTC devices as nearly as possible comparable to those for normal highway situations.

2. A TTC plan, in detail appropriate to the complexity of the work project or incident, should be prepared and understood by all responsible parties before the site is occupied. Any changes in the TTC plan should be approved by an official who is knowledgeable (for example, trained and/or certified) in proper TTC practices.

B. Road user movement should be inhibited as little as practical, based on the following considerations:

1. TTC at work and incident sites should be designed on the assumption that drivers will only reduce their speeds if they clearly perceive a need to do so (see Section 6B.01).

2. Frequent and abrupt changes in geometrics such as lane narrowing, dropped lanes, or main roadway transitions that require rapid maneuvers, should be avoided.

3. Work should be scheduled in a manner that minimizes the need for lane closures or alternate routes, while still getting the work completed quickly and the lanes or roadway open to traffic as soon as possible.

4. Attempts should be made to reduce the volume of traffic using the roadway or freeway to match the restricted capacity conditions. Road users should be

encouraged to use alternative routes. When the roadway capacity is reduced because of lane closures, the demand could exceed the available capacity, which might result in either a lengthy stopped or slow moving queue of vehicles that might extend past the normal location of the signs shown in the typical advance warning area. An assessment of the expected queue length, which should be a part of the TTC plan design process, might result in adjustments to the sign spacing and number of signs as well as the use of more conspicuous devices to increase the distance and conspicuity of the advance warning area. For high-volume roadways and freeways, the closure of selected entrance ramps or other access points and the use of signed diversion routes should be evaluated.

5. *Bicyclists and pedestrians, including those with disabilities, should be provided with access and passage through the TTC zone.*
6. *If work operations permit, lane closures on high-volume streets and highways should be scheduled during off-peak hours. Night work should be considered if the work can be accomplished with a series of short-term operations.*
7. *Early coordination with officials having jurisdiction over the affected cross streets and providing emergency services should occur if significant impacts to roadway operations are anticipated.*

C. *Motorists, bicyclists, and pedestrians should be guided in a clear and positive manner while approaching and traversing TTC zones and incident sites. The following principles should be applied:*

1. *Adequate warning, delineation, and channelization should be provided to assist in guiding road users in advance of and through the TTC zone or incident site by using proper pavement marking, signing, or other devices that are effective under varying conditions. Information should be provided in usable formats for pedestrians with vision disabilities.*
2. *TTC devices inconsistent with intended travel paths through TTC zones should be removed or covered. However, in intermediate-term stationary, short-term, and mobile operations, where visible permanent devices are inconsistent with intended travel paths, devices that highlight or emphasize the appropriate path should be used. Traffic control devices should provide information in usable formats for pedestrians with vision disabilities.*
3. *Flagging procedures, when used, should provide positive guidance to road users traversing the TTC zone.*

D. *To provide acceptable levels of operations, routine day and night inspections of TTC elements should be performed as follows:*

1. *Individuals who are knowledgeable (for example, trained and/or certified) in the principles of proper TTC should be assigned responsibility for safety in TTC zones. The most important duty of these individuals is to check that TTC devices on the project are consistent with the TTC plan and are effective for motorists, bicyclists, pedestrians, and workers.*
2. *As the work progresses, temporary traffic controls and/or working conditions should be modified, as needed, to facilitate road user movement and provide worker safety. The individual responsible for TTC should have the authority to halt work until applicable or remedial safety measures are taken.*

3. *TTC zones should be carefully monitored under varying conditions of road user volumes, light, and weather to check that applicable TTC devices are effective, clearly visible, clean, and in compliance with the TTC plan.*
4. *When warranted, an engineering study should be made (in cooperation with law enforcement officials) of reported crashes occurring within the TTC zone. Crash records in TTC zones should be monitored to identify the need for changes in the TTC zone.*

E. *Attention should be given to the maintenance of roadside safety during the life of the TTC zone by applying the following principles:*
1. *To accommodate run-off-the-road incidents, disabled vehicles, or emergency situations, unencumbered roadside recovery areas or clear zones should be provided where practical.*
2. *Channelization of road users should be accomplished by the use of pavement markings, signing, and crashworthy, detectable channelizing devices.*
3. *Work equipment, workers' private vehicles, materials, and debris should be stored in such a manner to reduce the probability of being impacted by run-off-the-road vehicles.*

F. *Each person whose actions affect TTC zone safety, from the upper-level management through the field workers, should receive training appropriate to the job decisions each individual is required to make. Only those individuals who are trained in proper TTC practices and have a basic understanding of the principles (established by applicable standards and guidelines, including those of this Manual) should supervise the selection, placement, and maintenance of TTC devices used for TTC zones and for incident management.*

G. *Good public relations should be maintained by applying the following principles:*
1. *The needs of all road users should be assessed such that appropriate advance notice is given and clearly defined alternative paths are provided.*
2. *The cooperation of the various news media should be sought in publicizing the existence of and reasons for TTC zones because news releases can assist in keeping the road users well informed.*
3. *The needs of abutting property owners, residents, and businesses should be assessed and appropriate accommodations made.*
4. *The needs of emergency service providers (law enforcement, fire, and medical) should be assessed and appropriate coordination and accommodations made.*
5. *The needs of railroads and transit should be assessed and appropriate coordination and accommodations made.*
6. *The needs of operators of commercial vehicles such as buses and large trucks should be assessed and appropriate accommodations made.*
7. *Early coordination should occur with school officials to discuss potential impacts on picking up and dropping off schoolchildren, on school bus routing, and on safe routes to school patterns.*

Support:

03 The State of Arizona and local jurisdictions maintain policy and/or procedure manuals that describe optional methods of controlling traffic within work zones, which are used in conjunction with Part 6 of the MUTCD.

04 Examples of differences in traffic control application in work zones in urban areas with lower speeds include:

1. Shadow vehicles are typically not necessary, and can aggravate congestion.
2. Vehicle mounted crash attenuators are typically not necessary, and can be counter-productive by lengthening the exposure of large vehicles at intersections.
3. Traffic control devices and lighting on breakaway and frangible supports in areas with pedestrian activity can create hazards due to debris and exposed electrical wires if struck by errant vehicles.
4. Crash cushions and temporary barriers are not typically appropriate.
5. Adding additional signs above those specified in the MUTCD is typically not appropriate nor needed, and can distract from more-critical warning or guidance.

CHAPTER 6G -
TTC ZONE REGULATORY SIGNS

Section 6G.08 of the National MUTCD is revised to read:

Section 6G.08 Work Zone and Higher Fines Signs and Plaques

Option:

01 A WORK ZONE (G20-5aP) plaque (see Figure 6G-1) may be mounted above a Speed Limit sign to emphasize that a reduced speed limit is in effect within a TTC zone. An END WORK ZONE SPEED LIMIT (R2-12) sign (see Figure 6G-1) may be installed at the downstream end of the reduced speed limit zone.

Guidance:

02 *A BEGIN HIGHER FINES ZONE (R2-10) sign (see Figure 6G-1) should be installed at or near the beginning of a TTC zone where increased fines are imposed for traffic violations, and an END HIGHER FINES ZONE (R2-11) sign (see Figure 6G-1) should be installed at the downstream end of the TTC zone.*

Option:

03 Alternate legends such as BEGIN (or END) DOUBLE FINES ZONE may also be used for the R2-10 and R2-11 signs.

04 A FINES HIGHER, FINES DOUBLE, or $XX FINE plaque (see Section 2B.25 and Figure 6G-1) may be mounted below the Speed Limit sign if increased fines are imposed for traffic violations within the TTC zone.

05 Individual signs and plaques for work zone speed limits and higher fines may be combined into a single sign or may be displayed as an assembly of signs and plaques.

Support:

06 Double fine signs in state highway work zones as defined in ARS §28-652 and §28-710 are placed only when workers are present in the double fine area and are removed when workers are not present in the double fine area. Existing speed limit signs in the double fine area are covered when these signs are visible.

Guidance:

07 *If used, Double Fine signing in state highway work zones should conform to figures provided in the ADOT Temporary Traffic Control Design Guidelines.*

Option:

08 The speed limit in the double fine area may be the same as the speed limit of the adjacent work zone or roadway.

CHAPTER 6P – TYPICAL APPLICATIONS

Notes for Figure 6P-44AZ –Typical Application 44AZ Work in the Vicinity of an Entrance Ramp

Guidance:

1. *An acceleration lane of sufficient length should be provided whenever possible as shown on the diagram on the left.*

Standard:

2. **For the information shown on the diagram on the right-hand side of the typical application, where inadequate acceleration distance exists for the temporary entrance, the YIELD sign shall be replaced with STOP signs (one on each side of the approach).**

Guidance:

3. *When used, the YIELD or STOP sign should be located so that ramp vehicular traffic has adequate sight distance of oncoming mainline vehicular traffic to select an acceptable gap in the mainline vehicular traffic flow, but should not be located so far forward that motorists will be encouraged to stop in the path of the mainline traffic. Also, a longer acceleration lane should be provided beyond the sign to reduce the gap size needed. If sufficient gaps are not available, consideration should be given to closing the ramp.*
4. *Where a STOP sign is used, a temporary stop line should be placed across the ramp at the desired stop location.*
5. *The mainline merging taper with the arrow board at its starting point should be located sufficiently in advance so that the arrow board is not confusing to drivers on the entrance ramp, and so that the mainline merging vehicular traffic from the lane closure has the opportunity to stabilize before encountering the vehicular traffic merging from the ramp.*
6. *If the ramp curves sharply to the right, warning signs with advisory speeds located in advance of the entrance terminal should be placed in pairs (one on each side of the ramp).*

Option:

7. Positive protection devices may be used per Section 6M.02.
8. A Stop Beacon (see Section 4S.05) or a Type B high-intensity warning flasher with a red lens may be placed above the STOP sign.
9. Where the acceleration distance is significantly reduced, a supplemental plaque may be placed below the Yield Ahead sign reading NO MERGE AREA.

Standard:

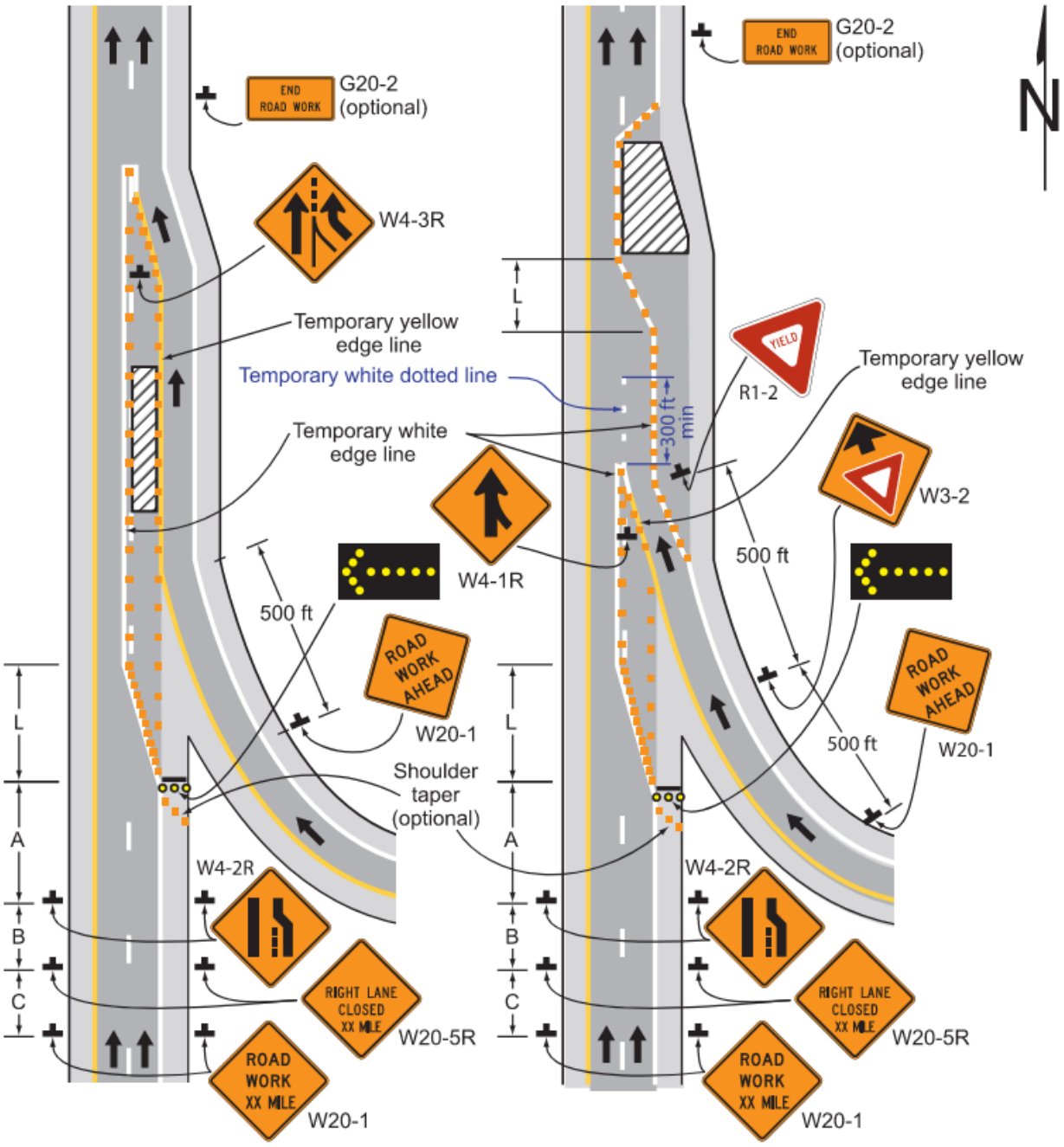
10. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

Guidance:

11. *A parallel acceleration lane of at least 300 feet should be provided for adequate gap acceptance.*

Figure 6P-44AZ is replacing Figure 6P-44 of the National MUTCD:

Figure 6P-44AZ. Work in the Vicinity of an Entrance Ramp (TA-44) (Arizona)



Typical Application 44AZ

PART 7
TRAFFIC CONTROL FOR SCHOOL AREAS

CHAPTER 7 - GENERAL

Section 7A.01 of the National MUTCD is revised to read:

Section 7A.01 Introduction

Support:

01 Part 7 sets forth basic principles and prescribes standards for the design, application, installation, and maintenance of all traffic control devices (including signs, signals, and markings) and other controls (including adult crossing guards) for the special pedestrian conditions in school areas.

02 The ADOT Traffic Safety for School Areas Guidelines define school area traffic control for kindergarten through 8th grade.

Section 7A.02 of the National MUTCD is revised to read:

Section 7A.02 School Route Plans and School Crossings

Guidance:

01 *A school route plan for each school serving elementary to high school students should be prepared in order to develop uniformity in the use of school area traffic controls and to serve as the basis for a school traffic control plan for each school.*

02 *The school route plan, developed in a systematic manner by the school, law enforcement, and traffic officials responsible for school pedestrian safety, should consist of a map (see Figure 7A-1) showing streets, the school, existing traffic controls, established school walk routes, and established school crossings.*

03 *Bicycle use as a mode of transportation, as applicable, should also be considered if students biking to and from school are not allowed to use the sidewalks along the pedestrian route.*

04 *The type(s) of school area traffic control devices used, either warning or regulatory, should be related to the volume and speed of vehicular traffic, street width, and the number and age of the students using the crossing.*

05 *School area traffic control devices should be included in a school traffic control plan*

Support:

06 To establish a safer route to and from school for schoolchildren, the application of planning criterion for school walk routes might make it necessary for children to walk an indirect route to an established school crossing located where there is existing traffic control and to avoid the use of a direct crossing where there is no existing traffic control.

07 The frequency of gaps in the traffic stream that are sufficient for student crossing is different at each crossing location. When the delay between the occurrences of adequate gaps becomes excessive, students might become impatient and endanger themselves by attempting to cross the street during an inadequate gap. In these instances, the creation of sufficient gaps needs to be considered to accommodate the crossing demand.

Guidance:

08 *School walk routes should be planned to take advantage of existing traffic controls.*

09 *The following factors should be considered when determining the feasibility of requiring children to walk a longer distance to a crossing with existing traffic control:*

- *A. The availability of adequate sidewalks or other pedestrian walkways to and from the location with existing control,*
- *B. The number of students using the crossing,*
- *C. The age levels of the students using the crossing, and*
- *D. The total extra walking distance.*

Support:

10 A School Crossing signal warrant is provided in Section 4C.06.

11 The ADOT Traffic Safety for School Areas Guidelines define school area traffic control for kindergarten through 8th grade.

CHAPTER 7B. SIGNS

Section 7B.01 of the National MUTCD is revised to read:

Section 7B.01 Design of School Signs

Standard:

01 **Except as provided in Section 2A.07, and where not addressed by ARS §28-797 for 15 mph School Crossings, the sizes of signs and plaques to be used on conventional roadways in school areas shall be as shown in Tables 7B-1 and 7B-1AZ.**

02 **The sizes in the Oversized column Table 7B-1 shall be used on expressways in school areas.**

Guidance:

03 *The sizes in the Oversized column should be used on roadways that have four or more lanes with posted speed limits of 40 mph or higher.*

Option:

04 Signs and plaques larger than those shown in Tables 7B-1 and 7B-1AZ may be used (see Section 2A.07).

Standard:

05 **School warning signs, including the "SCHOOL" portion of the School Speed Limit (S5-1) sign and including any supplemental plaques used in association with these warning signs, shall have a fluorescent yellow-green background with a black legend and border unless otherwise provided in this Manual for a specific sign.**

06 **The signs used for school area traffic control shall be retroreflective or illuminated.**

Support:

07 Sections 2A.13 and 2A.14 and the ADOT Traffic Safety for School Areas Guidelines contain provisions regarding the installation, placement, and location of signs.

08 Section 2A.15 contains provisions regarding the mounting heights of signs. Mounting heights for portable signs used at school crossings, such as the STOP WHEN CHILDREN IN CROSSWALK sign (S2-101) and NO PASSING 15 MPH FINES DOUBLE SCHOOL IN SESSION (S4-101) sign, are found in the ADOT Traffic Safety for School Areas Guidelines.

09 Section 2A.16 contains provisions regarding the lateral offsets of signs.

10 The "Standard Highway Signs" publication (see Section 1A.05) contains information regarding sign lettering.

Option:

11 In-roadway signs for school traffic control areas may be used consistent with the requirements of Sections 2B.20 and 7B.03 and the ADOT Traffic Safety for School Areas Guidelines.

Support:

Table 7B-1AZ is appended to Table 7B-1 of the National MUTCD:

Table 7B-1AZ. School Area Sign and Plaque Sizes (Arizona)

Sign	Sign Designation	Section	Conventional Road	Minimum	Oversized
Stop When Children in Crosswalk	S2-101	7B.03	24 x 30	20 x 30	—
No Passing 15 MPH Fines Double School in Session	S4-101	7B.03	24 x 30	20 x 30	—

Note: 1. Larger sizes may be used when appropriate
2. Dimensions are shown in inches and are shown as width x height
3. Minimum sign sizes for multi-lane conventional roads shall be as shown in the Conventional Road column

Section 7B.02 of the National MUTCD is revised to read:

Section 7B.02 School Area Signs and Plaques

Support:

01 Many state and local jurisdictions find it beneficial to advise road users that they are approaching a school that is adjacent to a highway, where additional care is needed, even though no school crossing is involved and the speed limit remains unchanged. Additionally, some jurisdictions designate school zones that have a unique legal standing in that fines for speeding or other traffic violations within designated school zones are increased or special enforcement techniques such as photo radar systems are used. It is important and sometimes legally necessary to mark the beginning and end points of these designated school zones so that the road user is given proper notice.

02 The School (S1-1) sign (see Figure 7B-1) has the following four applications:

A. School Area – the S1-1 sign can be used to warn road users that they are approaching a school area that might include school buildings or grounds, a school crossing, or school related activity adjacent to the highway.

B. School Zone – the S1-1 sign can be used to identify the location of the beginning of a designated school zone.

C. School Advance Crossing – if combined with an AHEAD (W16-9P) plaque or an XX FEET (W16-2P or W16-2aP) plaque to comprise the School Advance Crossing assembly (see Figure 7B-1), the S1-1 sign can be used to warn road users that they are approaching a crossing where schoolchildren cross the roadway (see Section 7B.03).

D. School Crossing – if combined with a diagonal downward-pointing arrow (W16-7P) plaque to comprise the School Crossing assembly (see Figure 7B-1), the S1-1 sign can be used to warn approaching road users of the location of a crossing where schoolchildren cross the roadway (see Section 7B.03).

Option:

03 If a school area or school zone is located on a cross street in close proximity to the intersection, a School (S1-1) sign with a supplemental arrow (W16-5P or W16-6P) plaque (see Figure 7B-1) may be installed on each approach of the street or highway to warn road users making a turn onto the cross street that they will encounter a school area soon after making the turn.

Standard:

04 **If a school zone has been designated under State or local statute, a School (S1-1) sign (see Figure 7B-1) shall be installed to identify the beginning point(s) of the designated school zone (see Figure 7B-2).**

Option:

05 A School Zone (S1-1) sign may be supplemented with a SCHOOL (S4-3P) plaque (see Figure 7B-1).

06 A School Zone (S1-1) sign may be supplemented with an ALL YEAR (S4-7P) plaque (see Figure 7B-1) if the school operates on a 12-month schedule.

07 The downstream end of a designated school zone may be identified with an END SCHOOL ZONE (S5-2) sign (see Figures 7B-1 and 7B-2).

08 A School Zone (S1-1) sign may be used in other locations in accordance with the ADOT Traffic Safety for School Areas Guidelines.

Support:

09 It is not desirable to post END SCHOOL ZONE (S5-2) signs at locations where a school crossing as defined in ARS §28-797 exists, as the 15 MPH speed zone established by ARS §28-701, when portable school signs are in place, ends at the crosswalk.

10 It is not desirable to post an END SCHOOL ZONE (S5-2) sign or a Speed Limit (R2-1) sign immediately downstream from the school crosswalk, as it may encourage drivers to accelerate sooner.

Support:

11 A school crossing is defined in ARS §28-797 in accordance with Paragraph 4 of this Section. ADOT Traffic Safety for School Areas Guidelines provide details on the placement of a School (S1-1) sign in advance of the school crossing.

Section 7B.03 of the National MUTCD is revised to read:

Section 7B.03 School Crossing Signs

Standard:

01 **The School Advance Crossing assembly (see Figure 7B-1) shall consist of a School (S1-1) sign supplemented with an AHEAD (W16-9P) plaque or an XX FEET (W16-2P or W16-2aP) plaque.**

02 **Except as provided in Paragraph 3 of this Section, a School Advance Crossing assembly shall be used in advance (see Table 2C-3 for advance placement guidelines) of the first School Crossing assembly that is encountered in each direction as traffic approaches a school crosswalk (see Figure 7B-3).**

Option:

03 The School Advance Crossing assembly may be omitted (see Figure 7B-2) where a School Zone (S1-1) sign (see Section 7B.02) is installed to identify the beginning of a school zone in advance of the School Crossing assembly, or at locations where a school crossing as defined in ARS §28-797 exists.

04 If a school crosswalk is located on a cross street in close proximity to an intersection, a School Advance Crossing assembly with a supplemental arrow (W16-5P or W16-6P) plaque may be installed on each approach of the street or highway to warn road users making a turn onto the cross street that they will encounter a school crosswalk soon after making the turn (see Figure 7B-3).

05 A 12-inch reduced size in-street School (S1-1) sign (see Figure 7B-1), installed in compliance with the mounting height and special mounting support requirements for an In-Street Pedestrian Crossing (R1-6 or R1-6a) sign (see Section 2B.20), may be used in advance of a school crossing to supplement the post-mounted school warning signs. A 12 x 6-inch reduced size AHEAD (W16-9P) plaque (see Figure 7B-1) may be mounted below the reduced size in-street School (S1-1) sign.

Standard:

06 **If used, the School Crossing assembly (see Figure 7B-1) shall be installed at the school crossing (see Figures 7B-2 and 7B-3), or as close to it as possible, and shall consist of a School (S1-1) sign supplemented with a diagonal downward-pointing arrow (W16-7P) plaque (see Section 2C.63) to show the location of the crossing.**

07 **The School Crossing assembly shall not be used at crossings other than those adjacent to schools and those on established school pedestrian routes.**

08 **The School Crossing assembly shall not be installed on an approach controlled by a STOP or YIELD sign except as provided in Paragraphs 9 and 10 of this Section.**

Option:

09 The School Crossing assembly may be installed on an approach to a circular intersection controlled by a YIELD sign where the crosswalk is at least 20 feet in advance of the yield point at the entrance to a circulatory roadway.

10 At a signalized or stop-controlled intersection the School Crossing assembly may be installed on an approach to a channelized right turn lane controlled by a YIELD sign where the crosswalk is at least 20 feet in advance of the yield point.

11 A Yield Here To (Stop Here For) School Crossing (R1-5a or R1-5c) sign (see Figure 7B-4) may be used, in accordance with the provisions of Section 2B.19, in advance of a marked crosswalk that crosses an uncontrolled multi-lane approach within school zones.

12 The In-Street Pedestrian Crossing (R1-6 or R1-6a) sign (see Section 2B.20 and Figure 7B-1) or the In-Street School Crossing (R1-6b or R1-6c) sign (see Figure 7B-1) may be used at school crossings on approaches that are not controlled by a traffic control signal, a pedestrian hybrid beacon, or emergency-vehicle hybrid beacon. If used at a school crossing, a 12 x 4-inch SCHOOL (S4-3P) plaque (see Figure 7B-1) may be mounted above the sign. The STATE LAW legend on the R1-6 series signs may be omitted.

13 The In-Street Pedestrian Crossing (R1-6 or R1-6a) sign or In-Street School Crossing (R1-6b or R1-6c) sign may be used at intersections or midblock crossings with flashing beacons.

14 The Overhead School Crossing (R1-9b or R1-9c) sign (see Figure 7B-1) may be used at school crossings on approaches that are not controlled by a traffic control signal, pedestrian hybrid beacon, or an emergency-vehicle hybrid beacon. The STATE LAW legend on the R1-9 series signs may be omitted.

Standard:

15 **When used at an uncontrolled crossing, the In-Street or Overhead Pedestrian Crossing sign shall be used only as a supplement to a School Crossing assembly with a diagonal downward-pointing arrow (W16-7P) plaque at the crosswalk location.**

Option:

16 A 12-inch reduced size in-street School (S1-1) sign (see Figure 7B-1) may be used instead of the In-Street Pedestrian Crossing (R1-6 or R1-6a) or the In-Street School Crossing (R1-6b or R1-6c) sign at a school crossing on approaches that are not controlled by a traffic control signal, pedestrian hybrid beacon, or an emergency-vehicle hybrid beacon. A 12 x 6-inch reduced size diagonal downward-pointing arrow (W16-7P) plaque (see Figure 7B-1) may be mounted below the reduced size in-street School (S1-1) sign.

Standard:

17 **If an In-Street Pedestrian Crossing sign, an In-Street School Crossing sign, or a reduced size in-street School (S1-1) sign is placed in the roadway, the sign support shall comply with the mounting height and special mounting support requirements for In-Street Pedestrian Crossing (R1-6 or R1-6a) sign (see Section 2B.20).**

18 **The In-Street Pedestrian Crossing sign, the In-Street School Crossing sign, the Overhead Pedestrian Crossing sign, and the reduced size in-street School (S1-1) sign shall not be used on approaches that are controlled by a traffic control signal, pedestrian hybrid beacon, or an emergency-vehicle hybrid beacon.**

19 **Paragraphs 1-18 of this Section only apply to crossings that are not school crossings as defined in ARS §28-797.**

20 **At locations where a school crossing as defined in ARS §28-797 exists, signs shall conform to the ADOT Traffic Safety for School Areas Guidelines, including the use of S4-101 and S2-101 signs.**

Option:

21 School Crossing assemblies may be omitted at locations where a school crossing as defined in ARS §28-797 exists.

Section 7B.05 of the National MUTCD is revised to read:

Section 7B.05 School Speed Limit Signs and Plaques

Standard:

01 **A School Speed Limit assembly (see Figure 7B-1) or a School Speed Limit When Flashing (S5-1) sign (see Figure 7B-1) shall be used to indicate the speed limit where a reduced school speed limit zone has been established based upon an engineering study or where a reduced school speed limit is specified for such areas by statute. The School Speed Limit assembly or School Speed Limit When Flashing sign shall be placed at or as near as practical to the point where the reduced school speed limit zone begins (see Figures 7B-2 and 7B-4).**

02 **If a reduced school speed limit zone has been established, a School (S1-1) sign shall be installed in advance (see Table 2C-3 for advance placement guidelines) of the first School Speed Limit sign assembly or S5-1 sign that is encountered in each direction as traffic approaches the reduced school speed limit zone (see Figures 7B-2 and 7B-4).**

03 **Except as provided in Paragraph 4 of this Section, the downstream end of an authorized and posted reduced school speed limit zone shall be identified with an END SCHOOL SPEED LIMIT (S5-3) sign (see Figures 7B-1, 7B-2, and 7B-4).**

Option:

04 If a reduced school speed limit zone ends at the same point as a designated school zone (see Section 7B.02), an END SCHOOL ZONE (S5-2) sign may be used instead of an END SCHOOL SPEED LIMIT (S5-3) sign. A standard Speed Limit sign showing the speed limit for the section of highway that is downstream from the authorized and posted reduced school speed limit zone may be mounted on the same post above the END SCHOOL SPEED LIMIT (S5-3) sign or the END SCHOOL ZONE (S5-2) sign.

Guidance:

05 *The beginning point of a reduced school speed limit zone should be at least 200 feet in advance of the school grounds or a school crossing; however, this 200-foot distance should be increased if the reduced school speed limit is 30 mph or higher. The maximum beginning point of a reduced school speed limit zone should not be greater than 500 feet in advance of the school grounds or a school crossing.*

Standard:

06 **The School Speed Limit assembly shall be either a static sign assembly, a blank-out sign, or a changeable message sign (see Chapter 2L).**

07 **The static School Speed Limit assembly shall consist of a top plaque (S4-3P) with the legend SCHOOL, a Speed Limit (R2-1) sign, and a bottom plaque (S4-1P, S4-2P, S4-4P, or S4-6P) indicating the specific periods of the day and/or days of the week that the special school speed limit is in effect (see Figure 7B-1).**

08 **When a School Speed Limit When Flashing (S5-1) sign or a Speed Limit (R2-1) sign with a supplemental WHEN FLASHING (S4-4P) plaque is used, a Speed Limit Sign Beacon (see Section 4S.04) shall be used to identify the periods that the school speed limit is in effect.**

09 **Fluorescent yellow-green pixels shall be used when the "SCHOOL" message is displayed on a changeable message sign for a school speed limit.**

Option:

10 Changeable message signs may use blank-out messages or other methods in order to display the school speed limit only during the periods it applies.

11 A Vehicle Speed Feedback (W13-20aP) plaque that displays the speed of approaching drivers (see Sections 2B.21 and 2C.13), that is part of a School Speed Limit assembly or a School Speed Limit When Flashing (S5-1) sign, may be used in a school speed limit zone.

Guidance:

12 *If used, the Vehicle Speed Feedback (W13-20aP) plaque should only be used during the time period when the school speed limit is in effect.*

13 *A Reduced School Speed Limit Ahead (S4-5 or S4-5a) sign (see Figure 7B-1) should be used to inform road users of a reduced speed zone where the speed limit is being reduced by more than 10 mph, or where engineering judgment indicates that advance notice would be appropriate.*

Standard:

14 **If used, the Reduced School Speed Limit Ahead sign shall be followed by a School Speed Limit sign or a School Speed Limit assembly.**

15 **The speed limit displayed on the Reduced School Speed Limit Ahead sign shall be identical to the speed limit displayed on the subsequent School Speed Limit sign or School Speed Limit assembly**

16 **Paragraphs 1-15 of this Section only apply to crossings that are not school crossings as defined in ARS §28-797.**

17 **At locations where a school crossing as defined in ARS §28-797 exists, signs shall conform to the ADOT Traffic Safety for School Areas Guidelines.**

Section 7B.06 of the National MUTCD is revised to read:

Section 7B.06 Higher Fines Zone Signs and Plaques in School Areas

Support:

01 The signs and plaques used to inform road users of higher fines zones and their locations depend on whether the fines apply to all traffic violations or only to speeding violations. Their locations also depend on whether the higher fines zone begins and/or ends at the same point as the school zone or school speed limit zone. Figures 7B-4 and 7B-5 show examples of higher fines zones signing.

Standard:

02 **Where increased fines are imposed for traffic violations within a designated school zone:**

A. A BEGIN HIGHER FINES ZONE (R2-10) sign (see Figure 7B-1) or a FINES HIGHER (R2-6P), FINES DOUBLE (R2-6aP), or $XX FINE (R2-6bP) plaque (see Figure 7B-1) shall be installed as a supplement to the School Zone (S1-1) sign to identify the beginning point of the higher fines zone (see Figures 7B-4 and 7B-5); and

B. An END HIGHER FINES ZONE (R2-11) sign (see Figure 7B-1) or an END SCHOOL ZONE (S5-2) sign (see Figure 7B-1) shall be installed at the downstream end of the zone to notify road users of the termination of the increased fines zone (see Figure 7B-5).

03 **If exceeding the speed limit is the only traffic violation that is subject to higher fines, a FINES HIGHER (R2-6P), FINES DOUBLE (R2-6aP), or $XX FINE (R2-6bP) plaque shall be posted with the School Speed Limit (S5-1) sign and shall not be posted beneath the School Zone (S1-1) sign (see Section 7B.05).**

04 **If the portion of the roadway that is subject to higher fines does not begin at the location of the School Zone (S1-1) sign, a BEGIN HIGHER FINES ZONE (R2-10) sign shall be placed at the point where the higher fines begin (see Sheet 2 of Figure 7B-5).**

Option:

05 If a BEGIN HIGHER FINES ZONE (R2-10) sign is used downstream of the School Zone (S1-1) sign, a FINES HIGHER (R2-6P), FINES DOUBLE (R2-6aP), or $XX FINE (R2-6bP) plaque may also be placed beneath the School Zone (S1-1) sign.

06 Where appropriate, one of the following plaques may be mounted below the sign that identifies the beginning point of the higher fines zone:

A. A S4-1P plaque (see Figure 7B-1) specifying the times that the higher fines are in effect,

B. A WHEN CHILDREN ARE PRESENT (S4-2P) plaque (see Figure 7B-1), or

C. A WHEN FLASHING (S4-4P) plaque (see Figure 7B-1) if used in conjunction with a yellow flashing beacon.

Guidance:

07 *If other traffic violations in addition to exceeding the speed limit are subject to higher fines, then the duplicate FINES HIGHER (R2-6P), FINES DOUBLE (R2-6aP), or $XX FINE (R2-6bP) plaque should be omitted from the School Speed Limit When Flashing (S5-1) sign (see Section 7B.05).*

Option:

08 If a higher fines zone ends at the same point as a reduced school speed limit zone, an END SCHOOL ZONE (S5-2) sign may be used instead of a combination of an END HIGHER FINES ZONE (R2-11) sign and an END SCHOOL SPEED LIMIT (S5-3) sign (see Figure 7B-5).

09 Where the higher fines zone is established by statute, the BEGIN HIGHER FINES ZONE (R2-10) sign, FINES HIGHER (R2-6P), FINES DOUBLE (R2-6aP), and $XX FINE (R2-6bP) plaques may be omitted.

Standard:

10 **Paragraphs 1-9 of this Section only apply to crossings that are not school crossings as defined in ARS §28-797.**

11 **At locations where a school crossing as defined in ARS §28-797 exists, signs shall conform to the ADOT Traffic Safety for School Areas Guidelines.**

12 **Where increased fines are imposed for traffic violations within a designated school crossing in accordance with ARS §28-797, the NO PASSING 15 MPH FINES DOUBLE SCHOOL IN SESSION (S4-101) sign shall be the beginning point of the higher fine zone, and the STOP WHEN CHILDREN IN CROSSWALK (S2-101) sign shall be the end point of the higher fine zone, and no other signs shall be required.**

CHAPTER 7C - MARKINGS

Section 7C.01 of the National MUTCD is revised to read:

Section 7C.01 Crosswalk Markings

Guidance:

01 *Crosswalks should be marked at all intersections on established routes to a school where there is substantial conflict between motorists, bicyclists, and student movements; where students are encouraged to cross between intersections; where students would not otherwise recognize the proper place to cross; or where motorists or bicyclists might not expect students to cross (see Figure 7A-1).*

02 *An engineering study considering the factors described in Section 3C.02 should be performed before a marked crosswalk is installed at a location away from a traffic control signal or an approach controlled by a STOP or YIELD sign.*

03 *Because non-intersection school crossings are generally unexpected by the road user, warning signs (see Section 7B.03) should be installed for all marked school crosswalks at non-intersection locations. Adequate visibility of students by approaching motorists and of approaching motorists by students should be provided by parking prohibitions or other appropriate measures.*

Support:

04 Section 3C.03 contains provisions regarding the placement and design of crosswalks, and Section 3B.19 contains provisions regarding the placement and design of the stop lines and yield lines that are associated with them. Provisions regarding the curb markings that can be used to establish parking regulations on the approaches to crosswalks are contained in Section 3B.18.

Standard:

05 **School crosswalk markings installed at school crossings established in accordance with ARS §28-797 shall be yellow. Yellow crosswalk lines shall be not less than 10 inches in width.**

Option:

06 Lane lines in advance of school crosswalks may be made solid to discourage passing and to provide additional notice that a crosswalk may exist ahead. On two-lane streets, a solid centerline may be added.

PART 8
TRAFFIC CONTROL FOR RAILROAD AND LIGHT RAIL TRANSIT GRADE CROSSINGS

CHAPTER 8B - SIGNS

Section 8B.04 of the National MUTCD is revised to read:

Section 8B.04 Crossbuck Assemblies with YIELD or STOP Signs at Passive Grade Crossings

Standard:

01 **A Crossbuck Assembly shall consist of a Crossbuck (R15-1) sign, and a Number of Tracks (R15-2P) plaque if two or more tracks are present, that complies with the provisions of Section 8B.03, and either a YIELD (R1-2) or STOP (R1-1) sign installed on the same support, except as provided in Paragraph 10 of this Section. YIELD or STOP signs used at passive grade crossings shall be installed in compliance with the provisions of Section 2B.18, and Figures 8B-2 and 8B-3.**

02 **At all public highway-rail grade crossings that are not equipped with the active traffic control systems that are described in Chapter 8D, except crossings where road users are directed by an authorized person on the ground to not enter the crossing at all times that an approaching train is about to occupy the crossing, a Crossbuck Assembly shall be installed on the right-hand side of the highway on each approach to the highway-rail grade crossing.**

03 **If a Crossbuck sign is used on a highway approach to a public highway-LRT grade crossing that is not equipped with the active traffic control systems that are described in Chapter 8D, a Crossbuck Assembly shall be installed on the right-hand side of the highway on each approach to the highway-LRT grade crossing.**

04 **Where restricted sight distance or unfavorable highway geometry exists on an approach to a grade crossing that has a Crossbuck Assembly, or where there is a one-way multi-lane approach, an additional Crossbuck Assembly shall be installed on the left-hand side of the highway.**

05 **A YIELD sign shall be the default traffic control device for Crossbuck Assemblies on all highway approaches to passive grade crossings unless an engineering study performed by the regulatory agency or highway authority having jurisdiction over the roadway approach determines that a STOP sign is appropriate in accordance with ARS §28-852.**

Guidance:

06 *The use of STOP signs at passive grade crossings should be limited to unusual conditions where requiring all motor vehicles to make a full stop is determined to be*

necessary by a Diagnostic Team. Among the factors that should be considered by the Diagnostic Team are the line of sight to approaching rail traffic (giving due consideration to seasonal crops or vegetation beyond both the highway and railroad or LRT rights-of-ways), the number of tracks, the speeds of trains or LRT equipment and motor vehicles, and the crash history at the grade crossing.

07 *Where a passive grade crossing is located on a stop-controlled approach and the clear storage distance is less than the length of the design vehicle, and where adequate sight distance to oncoming traffic on the parallel roadway is available to road users stopped on the approach to the grade crossing, consideration should be given to installing a STOP sign at the Crossbuck Assembly instead of at the highway-highway intersection. If the STOP sign is installed at the Crossbuck Assembly instead of at the highway-highway intersection, the Diagnostic Team should consider installing some other intersection traffic control device at the highway-highway intersection.*

Standard:

08 **If a Crossbuck Assembly is installed on the approach to a passive grade crossing located at a highway-highway intersection controlled by a traffic control signal that is not interconnected with the grade crossing and not preempted by the approach of rail traffic, a Diagnostic Team shall be convened to determine the appropriate traffic control devices. A STOP sign shall not be installed on a Crossbuck Assembly in this situation.**

Support:

09 Sections 8A.01 and 8A.05 contain information regarding the responsibilities of the Diagnostic Team, highway agency, regulatory agency with statutory authority (if applicable), and the railroad company or transit agency regarding the selection, design, and operation of traffic control devices placed at grade crossings.

Option:

10 If a YIELD or STOP sign is installed for a Crossbuck Assembly at a grade crossing, it may be installed on the same support as the Crossbuck sign or it may be installed on a separate support at a point where the motor vehicle is to stop, or as near to that point as practical, but in either case, the YIELD or STOP sign is considered to be a part of the Crossbuck Assembly.

Standard:

11 **If a YIELD or STOP sign is installed on an existing Crossbuck sign support, the mounting height, measured vertically from the bottom of the YIELD or STOP sign to the top of the curb, or in the absence of curb, measured vertically from the bottom of the YIELD or STOP sign to the elevation of the near edge of the traveled way, shall be at least 4 feet (see Figure 8B-2).**

12 **If a Crossbuck Assembly is installed on a new sign support (see Figure 8B-2) or if the YIELD or STOP sign is installed on a separate support (see Figure 8B-3), the mounting height, measured vertically from the bottom of the YIELD or STOP sign to the top of the curb, or in the absence of curb, measured vertically from the bottom of the YIELD or STOP sign to the elevation of the near edge of the traveled way, shall be at least 5 feet in rural areas and shall be at least 7 feet in areas where parking or pedestrian movements are likely to occur.**

Guidance:

13 *If a YIELD or STOP sign is installed for a Crossbuck Assembly at a grade crossing on a separate support than the Crossbuck sign (see Figure 8B-3), the YIELD or STOP sign should be placed in the same plane as the Crossbuck sign and closer to the traveled way than the Crossbuck sign. The minimum separation between the nearest point of the YIELD or STOP sign and the nearest point of the Crossbuck sign should be 2 inches as shown in Figure 8B-3.*

Support:

14 The meaning of a Crossbuck Assembly that includes a YIELD sign is that a road user approaching the grade crossing needs to be prepared to decelerate, and when necessary, yield the right-of-way to any rail traffic that might be occupying the crossing or might be approaching and in such close proximity to the crossing that it would be unsafe for the road user to cross.

15 Certain commercial motor vehicles and school buses are required to stop at all grade crossings in accordance with 49 CFR 392.10 even if a YIELD sign (or just a Crossbuck sign) is posted.

16 The meaning of a Crossbuck Assembly that includes a STOP sign is that a road user approaching the grade crossing must come to a full stop not less than 15 feet short of the nearest rail, and remain stopped while the road user determines if there is rail traffic either occupying the crossing or approaching and in such close proximity to the crossing that the road user must yield the right-of-way to rail traffic. The road user is permitted to proceed when it is safe to cross.

Standard:

17 **A vertical strip of retroreflective white material, not less than 2 inches in width, shall be used on each Crossbuck support at passive grade crossings for the full length of the back of the support from the Crossbuck sign or Number of Tracks plaque to within 2 feet above the near edge of the roadway, except as provided in Paragraph 18 of this Section. A white retroreflective strip wrapped around a round support for the full length of the support from the Crossbuck Sign or Number of Tracks plaque to within 2 feet above the near edge of the roadway shall satisfy this requirement as long as the round support has an outside diameter of at least 2 inches.**

Option:

18 The vertical strip of retroreflective material may be omitted from the back sides of Crossbuck sign supports installed on one-way streets and at pathway or sidewalk grade crossings (see Section 8E.05).

19 If a YIELD or STOP sign is installed on the same support as the Crossbuck sign, a vertical strip of red (see Section 2A.11) or white retroreflective material that is at least 2 inches wide may be used on the front of the support from the YIELD or STOP sign to within 2 feet above the near edge of the roadway.

Standard:

20 **If a Crossbuck sign support at a passive grade crossing does not include a YIELD or STOP sign (either because the YIELD or STOP sign is placed on a separate support or because a YIELD or STOP sign is not present on the approach), a vertical strip of retroreflective white material, not less than 2 inches in width, shall be used for the full length of the front of the support from the**

Crossbuck sign or Number of Tracks plaque to within 2 feet above the near edge of the roadway. A white retroreflective strip wrapped around a round support for the full length of the support from the Crossbuck Sign or Number of Tracks plaque to within 2 feet above the near edge of the roadway shall satisfy this requirement as long as the round support has an outside diameter of at least 2 inches.

21 **At all grade crossings where YIELD or STOP signs are installed, Yield Ahead (W3-2) or Stop Ahead (W3-1) signs shall also be installed if the criteria for their installation in Section 2C.35 is met.**

Support:

22 Section 8C.03 contains provisions regarding the use of stop lines or yield lines at grade crossings.