

CHAPTER 2C. WARNING SIGNS

Section 2C.01 Function of Warning Signs

Support:

Warning signs call attention to unexpected conditions on or adjacent to a highway or street and to situations that might not be readily apparent to road users. Warning signs alert road users to conditions that might call for a reduction of speed or an action in the interest of safety and efficient traffic operations.

Section 2C.02 Application of Warning Signs

Standard:

The use of warning signs shall be based on an engineering study or on engineering judgment.

Guidance:

The use of warning signs should be kept to a minimum as the unnecessary use of warning signs tends to breed disrespect for all signs. In situations where the condition or activity is seasonal or temporary, the warning sign should be removed or covered when the condition or activity does not exist.

Support:

The application of warning signs can be classified into the categories shown in Table 2C-1. Warning signs specified herein cover most of the conditions that are likely to be encountered. Special warning signs for low-volume roads (as defined in Section 5A.01), temporary traffic control zones, school areas, highway-rail grade crossings, bicycle facilities, and highway-light rail transit grade crossings are discussed in Parts 5 through 10, respectively.

Option:

Word message warning signs other than those specified in this Manual may be developed and installed by State and local highway agencies.

Section 2C.03 Design of Warning Signs

Standard:

All warning signs shall be diamond-shaped (square with one diagonal vertical) with a black legend and border on a yellow background unless specifically designated otherwise. Warning signs shall be designed in accordance with the sizes, shapes, colors, and legends contained in the "Standard Highway Signs" book.

Table 2C-1. Application of Warning Signs

Category	Group	Section	Signs	MUTCD Codes
Roadway Related	Changes in Horizontal Alignment	2C.06	Turn, Curve, Reverse Turn, Reverse Curve, Winding Road	W1-1 through W1-5
		2C.07	Combination Horizontal Alignment/Advisory Speed	W1-9
		2C.08	Combination Horizontal Alignment/Intersection	W1-10
		2C.09	Large Arrow (one direction)	W1-6
		2C.10	Chevron	W1-8
	Vertical Alignment	2C.11	Hill	W7-1, W7-1a
		2C.12	Truck Escape Ramp	W7-4, W7-4a
		2C.13	Road Narrows	W5-1
	Cross Section	2C.14-15	Narrow Bridge, One Lane Bridge	W5-2, W5-2a, W5-3
		2C.16-18	Divided Road, Divided Road Ends, Double Arrow	W6-1, W6-2, W12-1
		2C.19	Dead End, No Outlet	W14-1, W14-2
		2C.20	Low Clearance	W12-2, W12-2P
	Roadway Surface Condition	2C.21-22	Bump, Dip, Speed Hump	W8-1, W8-2, W17-1
		2C.23	Pavement Ends	W8-3
		2C.24	Shoulder	W8-4, W8-9, W8-11
2C.25		Slippery When Wet	W8-5	
2C.26		Stop Ahead, Yield Ahead, Signal Ahead	W3-1a, W3-2a, W3-3	
Traffic Related	Traffic Flow	2C.28-32	Merge, Lane Reduction, Added Lane, Right Lane Ends, Lane Ends Merge Left, Two-Way Traffic, No Passing Zone	W4-1, W4-2, W4-3, W6-3, W9-1, W9-2, W14-3
		2C.27	Cross Traffic Does Not Stop	W4-4P
	Change in Speed	2C.33	Advisory Exit Speed	W13-2, W13-3, W13-5
		2C.34	Cross Road, Side Roads, T, Y, and Circular Intersection	W2-1 through W2-6
	Intersections	2C.35	Large Arrow (two directions)	W1-7
		2C.36	Trucks Crossing, Truck (symbol), Emergency Vehicle, Tractor	W8-6, W11-5, W11-8, W11-10
Nonvehicular	Crossings	2C.37-38	Bicycle, Pedestrian, Deer, Cattle, Horse, Wheelchair, Playground, Diagonal Arrow	W11-1, W11-2, W11-3, W11-4, W11-7, W11-9, W15-1, W16-7P
Supplemental Plaques	Distance	2C.41	XX Feet, XX Miles, Next XX FT, Next XX MI	W16-2, W16-3, W16-4, W7-3a
	Speed	2C.42	Advisory Speed	W13-1
	Arrow	2C.43	Advance Arrow, Directional Arrow	W16-5P, W16-6P
	Hill-Related	2C.44	X% Grade, Trucks Use Low Gear	W7-2, W7-3
	Street Name Plaque	2C.45	Advance Street Name	W16-8
	Dead End/No Outlet	2C.46	Dead End, No Outlet	W14-1P, W14-2P
	Share the Road	2C.47	Share the Road	W16-1

Option:

Warning signs regarding conditions associated with pedestrians, bicyclists, school buses, and schools may have a black legend and border on a yellow background or a black legend and border on a fluorescent yellow-green background.

Section 2C.04 Size of Warning Signs

Support:

Table 2C-2 is a listing of the sizes for warning signs.

Guidance:

The Conventional Road size should be used on conventional roads.

The Expressway and Freeway sizes should be used for higher-speed applications for increased recognition.

Option:

The minimum size may be used on low-speed roadways where the reduced legend size would be adequate.

Oversized signs and larger sizes may be used where speed, volume, or other factors result in conditions where greater visibility or emphasis would be desirable.

Standard:

The minimum size for supplemental warning plaques shall be as shown in Table 2C-3.

Section 2C.05 Placement of Warning Signs

Standard:

Warning signs shall be installed in accordance with the general requirements for sign placement as described in Sections 2A.16 to 2A.21.

Support:

The total time needed to perceive and complete a reaction to a sign is the sum of the times necessary for Perception, Identification (understanding), Emotion (decision making), and Volition (execution of decision), and is called the PIEV time. The PIEV time can vary from several seconds for general warning signs to 6 seconds or more for warning signs requiring high road user judgment.

Table 2C-2. Warning Sign Sizes

Description		Conventional Roads	Express-ways	Freeways	Minimum	Oversized
Shape	Sign Series					
Diamond	W1, W2, W7, W8, W9, W11, W14, W15-1, W17-1	750 x 750 (30 x 30)	900 x 900 (36 x 36)	900 x 900 (36 x 36)	600 x 600 (24 x 24)	1200 x 1200 (48 x 48)
	W3, W4, W5, W6, W8-3, W10, W12	900 x 900 (36 x 36)	1200 x 1200 (48 x 48)	1200 x 1200 (48 x 48)	750 x 750 (30 x 30)	_____
Rectangular	W1 - Arrows	1200 x 600 (48 x 24)	_____	_____	900 x 450 (36 x 18)	1500 x 750 (60 x 30)
	W1 - Chevron	450 x 600 (18 x 24)	750 x 900 (30 x 36)	900 x 1200 (36 x 48)	300 x 450 (12 x 18)	_____
	W7-4	1950 x 1200 (78 x 48)	_____	_____	_____	_____
	W7-4a	1950 x 1500 (78 x 60)	_____	_____	_____	_____
	W12-2P	2100 x 600 (84 x 24)	_____	_____	_____	_____
	W13	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	600 x 750 (24 x 30)	1200 x 1500 (48 x 60)
Pennant	W14-3	900 x 1200 x 1200 (36 x 48 x 48)	_____	_____	750 x 1000 x 1000 (30 x 40 x 40)	1200 x 1600 x 1600 (48 x 64 x 64)
Circular	W10-1	450 (18) Dia.	_____	_____	375 (15) Dia.	600 (24) Dia.

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

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

Size of Warning Sign	Size of Supplemental Plaque			
	Rectangular			Square
	1 Line	2 Lines	Arrow	
600 x 600 (24 x 24) 750 x 750 (30 x 30)	600 x 300 (24 x 12)	600 x 450 (24 x 18)	600 x 300 (24 x 12)	450 x 450 (18 x 18)
900 x 900 (36 x 36) 1200 x 1200 (48 x 48)	750 x 450 (30 x 18)	750 x 600 (30 x 24)	750 x 450 (30 x 18)	600 x 600 (24 x 24)

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

Table 2C-4 lists suggested sign placement distances for three conditions. This table is provided as an aid for determining warning sign location.

Guidance:

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

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

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

Option:

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

**Table 2C-4. Guidelines for Advance Placement of Warning Signs
(Metric Units)**

Posted or 85th- Percentile Speed (km/h)	Advance Placement Distance ¹									
	Condition A: High judgment required ²	Condition B: Stop condition ³	Condition C: Deceleration to the listed advisory speed (km/h) for the condition ⁴							
			10	20	30	40	50	60	70	80
30	50 m	N/A ⁵	N/A ⁵	N/A ⁵	—	—	—	—	—	—
40	70 m	N/A ⁵	25m	N/A ⁵	N/A ⁵	—	—	—	—	—
50	100 m	30 m	50 m	40 m	35 m	N/A ⁵	—	—	—	—
60	130 m	60 m	80 m	70 m	60 m	50 m	40 m	—	—	—
70	160 m	80 m	100 m	100 m	90 m	80 m	70 m	35 m	—	—
80	180 m	110 m	130 m	120 m	120 m	110 m	100 m	70 m	50 m	—
90	210 m	140 m	160 m	150 m	150 m	140 m	130 m	100 m	80 m	60 m
100	240 m	180 m	190 m	180 m	180 m	170 m	160 m	130 m	110 m	90 m
110	270 m	220 m	220 m	210 m	210 m	200 m	190 m	160 m	150 m	130 m
120	300 m	260 m	240 m	240 m	230 m	230 m	220 m	190 m	180 m	160 m
130	320 m	300 m	270 m	270 m	270 m	260 m	250 m	220 m	210 m	190 m

Notes:

¹ The distances are adjusted for a sign legibility distance of 50 m (175 ft) which is the appropriate legibility distance for a 125 mm (5 in) Series D word legend. The distances may be adjusted by deducting another 30 m (100 ft) if symbol signs are used. Adjustments may be made for grades if appropriate.

² Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge, Right Lane Ends, etc. The distances are determined by providing the driver a PIEV time of 6.7 to 10.0 seconds plus 4.5 seconds for vehicle maneuvers minus the legibility distance of 50 m (175 ft) for the appropriate sign.

³ Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, or Signal Ahead. The distances are based on the 1990 AASHTO Policy for stopping sight distance (page 120) providing a PIEV time of 2.5 seconds, friction factor of 0.30 to 0.40, minus the sign legibility distance of 50 m (175 ft).

⁴ Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, or Cross Road. The distance is determined by providing a 1.6 second PIEV time (1990 AASHTO, page 119), a vehicle deceleration rate of 3 m/second² (10 ft/second²), minus the sign legibility distance of 50 m (175 ft).

⁵ No suggested minimum distances are provided for these speeds, as placement location is dependent on site conditions and other signing to provide an adequate advance warning for the driver.

**Table 2C-4. Guidelines for Advance Placement of Warning Signs
(English Units)**

Posted or 85th- Percentile Speed	Advance Placement Distance ¹						
	Condition A: High judgment required ²	Condition B: Stop condition ³	Condition C: Deceleration to the listed advisory speed (mph) for the condition ⁴				
			10	20	30	40	50
20 mph	175 ft	N/A ⁵	N/A ⁵	—	—	—	—
25 mph	250 ft	N/A ⁵	100 ft	N/A ⁵	—	—	—
30 mph	325 ft	100 ft	150 ft	100 ft	—	—	—
35 mph	400 ft	150 ft	200 ft	175 ft	N/A ⁵	—	—
40 mph	475 ft	225 ft	275 ft	250 ft	175 ft	—	—
45 mph	550 ft	300 ft	350 ft	300 ft	250 ft	N/A ⁵	—
50 mph	625 ft	375 ft	425 ft	400 ft	325 ft	225 ft	—
55 mph	700 ft	450 ft	500 ft	475 ft	400 ft	300 ft	N/A ⁵
60 mph	775 ft	550 ft	575 ft	550 ft	500 ft	400 ft	300 ft
65 mph	850 ft	650 ft	650 ft	625 ft	575 ft	500 ft	375 ft

Notes:

- ¹ The distances are adjusted for a sign legibility distance of 50 m (175 ft) which is the appropriate legibility distance for a 125 mm (5 in) Series D word legend. The distances may be adjusted by deducting another 30 m (100 ft) if symbol signs are used. Adjustments may be made for grades if appropriate.
- ² Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge, Right Lane Ends, etc. The distances are determined by providing the driver a PIEV time of 6.7 to 10.0 seconds plus 4.5 seconds for vehicle maneuvers minus the legibility distance of 50 m (175 ft) for the appropriate sign.
- ³ Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, or Signal Ahead. The distances are based on the 1990 AASHTO Policy for stopping sight distance (page 120) providing a PIEV time of 2.5 seconds, friction factor of 0.30 to 0.40, minus the sign legibility distance of 50 m (175 ft).
- ⁴ Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, or Cross Road. The distance is determined by providing a 1.6 second PIEV time (1990 AASHTO, page 119), a vehicle deceleration rate of 3 m/second² (10 ft/second²), minus the sign legibility distance of 50 m (175 ft).
- ⁵ No suggested minimum distances are provided for these speeds, as placement location is dependent on site conditions and other signing to provide an adequate advance warning for the driver.

Sections 2C.06 Horizontal Alignment Signs (W1-1 through W1-5)**Option:**

The horizontal alignment Turn (W1-1), Curve (W1-2), Reverse Turn (W1-3), Reverse Curve (W1-4), or Winding Road (W1-5) signs may be used in advance of situations where the horizontal roadway alignment changes. A Large Arrow (W1-6) sign (see Section 2C.09) may be used on the outside of the turn or curve.

Guidance:

The application of these signs should conform to Table 2C-5.

Option:

An Advisory Speed plaque (see Section 2C.42) may be used to indicate the speed for the change in horizontal alignment. The supplemental distance plaque NEXT XX KM (NEXT XX MILES) may be installed below the Winding Road sign where continuous roadway curves exist (see Section 2C.41). The combination Horizontal Alignment/Advisory Speed sign (see Section 2C.07) or combination Horizontal Alignment/Intersection sign (see Section 2C.08) may also be used.

Standard:

When engineering judgment determines the need for a horizontal alignment sign, one of the W1-1 through W1-5 signs shall be used.

Section 2C.07 Combination Horizontal Alignment/Advisory Speed Sign (W1-9)**Option:**

The Turn (W1-1) sign or the Curve (W1-2) sign may be combined with the Advisory Speed (W13-1) plaque to create a combination Horizontal Alignment/Advisory Speed (W1-9) sign.

Standard:

When used, the combination Horizontal Alignment/Advisory Speed sign shall supplement other advance warning signs and shall be installed at the beginning of the turn or curve. The minimum size of the W1-9 sign shall be 1200 x 1200 mm (48 x 48 in) for high-speed facilities, and 900 x 900 mm (36 x 36 in) for low-speed facilities.



W1-1



W1-2



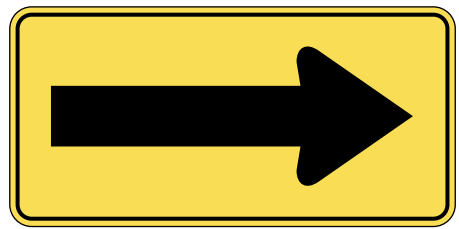
W1-3



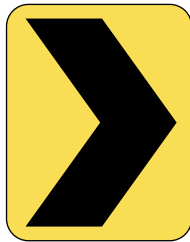
W1-4



W1-5



W1-6



W1-8



W1-9



W1-10

Table 2C-5. Horizontal Alignment Sign Usage

Number of Alignment Changes	Advisory Speed	
	≤ 30 MPH	> 30 MPH
1	Turn (W1-1) ¹	Curve (W1-2) ¹
2 ²	Reverse Turn ³ (W1-3)	Reverse Turn ³ (W1-4)
3 or more ²	Winding Road ³ (W1-5)	

Notes:

¹ Engineering judgment should be used to determine whether the Turn or Curve sign should be used.

² Alignment changes are in opposite directions and are separated by a tangent distance of 180 m (600 ft) or less.

³ A Right Reverse Turn (W1-3R), Right Reverse Curve (W1-4R), or Right Winding Road (W1-5R) sign is used if the first change in alignment is to the right; a Left Reverse Turn (W1-3L), Left Reverse Curve (W1-4L), or Left Winding Road (W1-5L) sign is used if the first change in alignment is to the left.

Section 2C.08 Combination Horizontal Alignment/Intersection Sign (W1-10)

Option:

The Turn (W1-1) sign or the Curve (W1-2) sign may be combined with the Cross Road (W2-1) sign or the Side Road (W2-2 or W2-3) sign to create a combination Horizontal Alignment/Intersection (W1-10) sign that depicts the condition where an intersection occurs within a turn or curve.

Guidance:

Elements of the combination Horizontal Alignment/Intersection sign related to horizontal alignment should conform to Section 2C.06, and elements related to intersection configuration should conform to Section 2C.34. No more than one Cross Road or two Side Road symbols should be shown on any one combination Horizontal Alignment/Intersection sign.

Section 2C.09 One-Direction Large Arrow Sign (W1-6)

Option:

A One-Direction Large Arrow (W1-6) sign may be used to delineate a change in horizontal alignment.

Standard:

The One-Direction Large Arrow sign shall be a horizontal rectangle with an

arrow pointing to the left or right.

If used, the One-Direction Large Arrow sign shall be installed on the outside of a turn or curve in line with and at approximately a right angle to approaching traffic.

The One-Direction Large Arrow sign shall not be used where there is no alignment change in the direction of travel, such as at the beginnings and ends of medians or at center piers.

Guidance:

The One-Direction Large Arrow sign should be visible for a sufficient distance to provide the road user with adequate time to react to the change in alignment.

Section 2C.10 Chevron Alignment Sign (W1-8)

Option:

The Chevron Alignment (W1-8) sign may be used to provide additional emphasis and guidance for a change in horizontal alignment. A Chevron Alignment sign may be used as an alternate or supplement to standard delineators on curves or to the Large Arrow (W1-6) sign.

Standard:

The Chevron Alignment sign shall be a vertical rectangle.

If used, Chevron Alignment signs shall be installed on the outside of a turn or curve, in line with and at approximately a right angle to approaching traffic.

Option:

A Chevron Alignment sign may be used on the far side of an intersection to inform drivers of a change of horizontal alignment through the intersection.

Guidance:

Spacing of Chevron Alignment signs should be such that the road user always has at least two in view, until the change in alignment eliminates the need for the signs.

Chevron Alignment signs should be visible for a sufficient distance to provide the road user with adequate time to react to the change in alignment.

Section 2C.11 Hill Signs (W7-1, W7-1a, W7-1b)**Guidance:**

The Hill (W7-1) sign should be used in advance of a downgrade where the length, percent of grade, horizontal curvature, and/or other physical features require special precautions on the part of road users.

The Hill sign and supplemental grade (W7-3) plaque (see Section 2C.45) used in combination, or the W7-1b sign used alone, should be installed in advance of downgrades for the following conditions:

- A. 5% grade that is more than 900 m (3,000 ft) in length;
- B. 6% grade that is more than 600 m (2,000 ft) in length;
- C. 7% grade that is more than 300 m (1,000 ft) in length;
- D. 8% grade that is more than 225 m (750 ft) in length; or
- E. 9% grade that is more than 150 m (500 ft) in length.

These signs should also be installed for steeper grades or where crash experience and field observations indicate a need.

Supplemental plaques (see Section 2C.44) and larger signs should be used for emphasis or where special hill characteristics exist. On longer grades, the use of the distance (W7-3a) plaque or the combination distance/grade (W7-3b) plaque at periodic intervals of approximately 1.6 km (1 mi) spacing should be considered.

Standard:

When the percent grade is shown, the message X% plaque shall be placed below the inclined ramp/truck symbol (W7-1) or the word message HILL (W7-1a) sign.

Option:

The word message HILL (W7-1a) sign may be used as an alternate to the symbol (W7-1) sign. The percent grade message may be included within these signs.

Section 2C.12 Truck Escape Ramp Signs (W7-4 Series)**Guidance:**

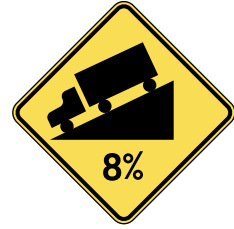
Where applicable, truck escape (or runaway truck) ramp advance warning signs



W7-1



W7-1a



W7-1b



W7-4



W7-4b



W7-4c

should be located approximately 1.6 km (1 mi), and 0.8 km (0.5 mi) in advance of the grade, and of the ramp. A sign also should be placed at the gore. A regulatory sign with the legend RUNAWAY VEHICLES ONLY should be installed near the ramp entrance to discourage other road users from entering. No Parking (R8-3) signs should be placed near the ramp entrance.

Standard:

When truck escape ramps are installed, one of the W7-4 series signs shall be used.

Option:

A supplemental plaque may be used with the words SAND, GRAVEL, or PAVED to describe the ramp surface. State and local highway agencies may develop appropriate word message signs for the specific situation.

Section 2C.13 ROAD NARROWS Sign (W5-1)

Guidance:

A ROAD NARROWS (W5-1) sign should be used in advance of a transition on two-lane roads where the pavement width is reduced abruptly to a width such that vehicles might not be able to pass without reducing speed.

Option:

Additional emphasis may be provided by the use of object markers and delineators (see Chapters 3C and 3D). The Advisory Speed (W13-1) plaque (see Section 2C.42) may be used to indicate the recommended speed.

Section 2C.14 NARROW BRIDGE Sign (W5-2)

Guidance:

A NARROW BRIDGE (W5-2) sign should be used in advance of any bridge or culvert having a two-way roadway clearance width of 4.9 to 5.5 m (16 to 18 ft), or any bridge or culvert having a roadway clearance less than the width of the approach travel lanes.

Additional emphasis should be provided by the use of object markers, delineators, and/or pavement markings.



W5-1



W5-2



W5-2a



W5-3



W6-1



W6-1a



W6-1b



W6-2



W6-2a



W12-1



W12-2

OR



W14-1



W14-2



OR



W12-2P

Option:

A NARROW BRIDGE sign may be used in advance of a bridge or culvert on which the approach shoulders are narrowed or eliminated.

The Narrow Bridge (W5-2a) symbol sign may be used as an alternate to the word message NARROW BRIDGE sign.

Section 2C.15 ONE LANE BRIDGE Sign (W5-3)

Guidance:

A ONE LANE BRIDGE (W5-3) sign should be used on two-way roadways in advance of any bridge or culvert:

- A. Having a clear roadway width of less than 4.9 m (16 ft), or
- B. Having a clear roadway width of less than 5.5 m (18 ft) when commercial vehicles constitute a high proportion of the traffic, or
- C. Having a clear roadway width of 5.5 m (18 ft) or less, where the sight distance is limited on the approach to the structure.

Additional emphasis should be provided by the use of object markers, delineators, and/or pavement markings.

Section 2C.16 Divided Highway (Road) Sign (W6-1)

Guidance:

A Divided Highway (W6-1) symbol sign should be used on the approaches to a section of highway (not an intersection or junction) where the opposing flows of traffic are separated by a median or other physical barrier.

Option:

The word message DIVIDED HIGHWAY (W6-1a) or DIVIDED ROAD (W6-1b) sign may be used as an alternate to the symbol sign.

Section 2C.17 Divided Highway (Road) Ends Sign (W6-2)**Guidance:**

A Divided Highway Ends (W6-2) symbol sign should be used at the end of a section of physically divided highway (not an intersection or junction) as a warning of two-way traffic ahead.

Option:

The TWO-WAY TRAFFIC (W6-3) sign (see Section 2C.31) may be used to give warning and notice of the transition to a two-lane, two-way section.

The word message DIVIDED HIGHWAY ENDS (W6-2a) or DIVIDED ROAD ENDS (W6-2b) sign may be used as an alternate to the symbol sign.

Section 2C.18 Double Arrow Sign (W12-1)**Option:**

The Double Arrow (W12-1) sign may be used to advise road users that traffic is permitted to pass on either side of an island, obstruction, or gore in the roadway. Traffic separated by this sign may either rejoin or change directions.

Guidance:

If used on an island, the Double Arrow sign should be mounted near the approach end.

If used in front of a pier or obstruction, the Double Arrow sign should be mounted on the face of, or just in front of, the obstruction. Where stripe markings are used on the obstruction, they should be discontinued to leave a 75 mm (3 in) space around the outside of the sign.

Section 2C.19 DEAD END/NO OUTLET Signs (W14-1, W14-2)**Option:**

The DEAD END (W14-1) sign may be used at the entrance of a single road or street that terminates in a dead end or cul-de-sac. The NO OUTLET (W14-2) sign may be used at the entrance to a road or road network from which there is no other exit.

The DEAD END or NO OUTLET plaques (see Section 2C.46) may be used in combination with the Street Name (D3) sign (see Section 2D.38) at intersections instead of or in addition to the W14-1 or W14-2 signs.

Standard:

When the W14-1 or W14-2 sign is used, the sign shall be posted at the entry point or at a sufficient advance distance to permit the road user to avoid the dead end or no outlet condition by turning off, if possible, at the nearest intersecting street.

Section 2C.20 Low Clearance Signs (W12-2 and W12-2P)**Standard:**

The Low Clearance (W12-2) sign shall be used to warn road users of clearances less than 300 mm (12 in) above the statutory maximum vehicle height or minimum structure height.

Guidance:

The actual clearance should be shown on the Low Clearance sign to the nearest 25 mm (1 in) not exceeding the actual clearance. However, in areas that experience changes in temperature causing frost action, a reduction, not exceeding 75 mm (3 in), should be used for this condition.

Where the clearance is less than the legal limit, a sign to that effect should be placed at the nearest intersecting road or wide point in the road at which a vehicle can detour or turn around.

In the case of an arch or other structure under which the clearance varies greatly, two or more signs should be used as necessary on the structure itself to give information as to the clearances over the entire roadway.

Clearances should be evaluated periodically, particularly when resurfacing operations have occurred.

Option:

The Low Clearance sign may be installed on or in advance of the structure. If a sign is placed on the structure, it may be a rectangular shape (W12-2P) with the appropriate legend.



W8-1



W8-2



W8-3



W8-4



W8-5



W8-9



W8-9a



W8-11



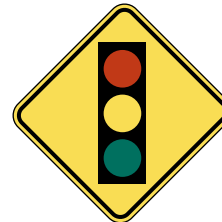
W17-1



W3-1a



W3-2a



W3-3

Section 2C.21 BUMP and DIP Signs (W8-1, W8-2)**Guidance:**

BUMP (W8-1) and DIP (W8-2) signs should be used to give warning of a sharp rise or depression in the profile of the road.

Option:

These signs may be supplemented with an Advisory Speed plaque (see Section 2C.42).

Standard:

The DIP sign shall not be used at a short stretch of depressed alignment that may momentarily hide a vehicle.

Guidance:

A short stretch of depressed alignment that may momentarily hide a vehicle should be treated as a no-passing zone (see Section 3B.02).

Section 2C.22 SPEED HUMP Sign (W17-1)**Guidance:**

The SPEED HUMP (W17-1) sign should be used to give warning of a vertical deflection in the roadway that is designed to limit the speed of traffic.

If used, the SPEED HUMP sign should be supplemented by an Advisory Speed plaque (see Section 2C.42).

Option:

If a series of speed humps exists in close proximity, an Advisory Speed plaque may be eliminated on all but the first SPEED HUMP sign in the series.

Section 2C.23 PAVEMENT ENDS Sign (W8-3)**Guidance:**

A PAVEMENT ENDS (W8-3) word message sign should be used where a paved surface changes to either a gravel treated surface or an earth road surface.

Option:

An Advisory Speed plaque (see Section 2C.42) may be used when the change in roadway condition requires a reduced speed.

Section 2C.24 Shoulder Signs (W8-4, W8-9, W8-9a, and W8-11)**Support:**

The signs discussed in this Section are appropriate for use in temporary traffic control zones (see Part 6).

Standard:

When used in temporary traffic control zones, the sign legend and border shall be black on an orange background.

Option:

The SOFT SHOULDER (W8-4) word message sign may be used to warn of a soft shoulder condition.

The LOW SHOULDER (W8-9) word message sign may be used to warn of a shoulder condition where there is an elevation difference of less than 75 mm (3 in) between the shoulder and the travel lane.

Guidance:

The SHOULDER DROP-OFF (W8-9a) sign should be used during construction and maintenance when a shoulder drop-off exceeds 75 mm (3 in) in height.

The UNEVEN LANES (W8-11) word message sign should be used during construction and maintenance operations that create a substantial difference in elevation between adjacent lanes.

Additional shoulder signs should be placed at appropriate intervals along the road where the condition continually exists.

Standard:

When used, shoulder signs shall be placed in advance of the condition (see Table 2C-4).

Section 2C.25 Slippery When Wet Sign (W8-5)**Option:**

The Slippery When Wet (W8-5) sign may be used to warn that a slippery condition may exist.

Guidance:

When used, a Slippery When Wet sign should be placed in advance of the beginning of the affected section (see Table 2C-4), and additional signs should be placed at appropriate intervals along the road where the condition exists.

Section 2C.26 Advance Traffic Control Signs (W3-1, W3-2, W3-3, W3-4)**Standard:**

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

Support:

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

Guidance:

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

Option:

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

Word messages (W3-1, W3-2, W3-3a) may be used as alternates to the Advance Traffic Control symbol signs.

A supplemental street name plaque (see Section 2C.45) may be installed above or below an Advance Traffic Control sign.

A warning beacon may be used with a Signal Ahead (W3-3) sign.

A BE PREPARED TO STOP (W3-4) sign may be used to warn of stopped traffic caused by traffic control signals or in areas that regularly experience traffic congestion.

Standard:

When a BE PREPARED TO STOP sign is used in advance of traffic signals, it shall be used in addition to a Signal Ahead sign.

Option:

The BE PREPARED TO STOP sign may be supplemented with beacons.

Guidance:

When the beacon is interconnected with a traffic control signal or queue detection system, the BE PREPARED TO STOP sign should be supplemented with a WHEN FLASHING plaque.

Section 2C.27 CROSS TRAFFIC DOES NOT STOP Plaque (W4-4P)

Option:

The CROSS TRAFFIC DOES NOT STOP (W4-4P) plaque may be used in advance of a STOP sign on approaches to two-way stop-controlled intersections to warn road users who might misinterpret the intersection as a four-way (or all-way) stop intersection. The W4-4P plaque may also be used in advance of a STOP sign on a one-way stop-controlled T-intersection.

In situations where this plaque is used to regulate traffic, the W4-4P plaque may be installed on the same post with the STOP sign.

Guidance:

If the W4-4P plaque is installed on the same post as the STOP sign, then the color of the plaque should be a black legend and border on a white background.

Option:

The arrow on the W4-4P plaque may point to the left, to the right, or in both directions.

Standard:

If the arrow points in a single direction, the arrow shall point in the direction from which the nonstopping traffic is approaching, and not in the direction that the nonstopping traffic is moving.



W4-1



W4-3



W6-3



W9-1



W9-2



W14-3



W4-4P

Section 2C.28 Merge Sign (W4-1)

Option:

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

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

Guidance:

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

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

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

The Merge sign should not be used in place of a Lane Ends (W4-2) sign where lanes of traffic moving on a single roadway must merge because of a reduction in the actual or usable pavement width (see Section 2C.30).

Section 2C.29 Added Lane Sign (W4-3)

Guidance:

The Added Lane (W4-3) sign should be installed in advance of a point where two roadways converge and merging movements are not required. When possible, the Added Lane sign should be placed such that it is visible from both roadways; if this is not possible, an Added Lane sign should be placed on the side of each roadway.

Section 2C.30 Lane Ends Signs (W9-1, W9-2)

Guidance:

The LANE ENDS MERGE LEFT (RIGHT) sign (W9-2) should be used to warn of the reduction in the number of traffic lanes in the direction of travel on a multilane highway.

Option:

The RIGHT (LEFT) LANE ENDS (W9-1) sign may be used in advance of the LANE ENDS (W4-2) sign or the LANE ENDS MERGE LEFT (RIGHT) (W9-2) sign as additional warning or to emphasize that the traffic lane is ending and that a merging maneuver will be required.

On one-way streets or on divided highways where the width of the median will permit, two Lane Ends signs may be placed facing approaching traffic, one on the right side and the other on the left side or median.

The reduction in traffic lanes may also be delineated with roadway edge lines (see Section 3B.09) and/or roadway delineation (see Chapter 3D).

Guidance:

Where an extra lane has been provided for slower moving traffic (see Section 2B.27), a Lane Ends sign should be installed in advance of the end of the extra lane.

Lane Ends signs should not be installed in advance of the end of an acceleration lane.

Section 2C.31 Two-Way Traffic Sign (W6-3)**Guidance:**

A Two-Way Traffic (W6-3) sign should be used to warn road users of a transition from a multilane divided section of roadway to a two-lane, two-way section of roadway.

Option:

The Two-Way Traffic sign may be used at intervals along a two-way roadway and may be used to supplement the Divided Highway (Road) Ends (W6-2) sign discussed in Section 2C.17.

Section 2C.32 NO PASSING ZONE Sign (W14-3)**Standard:**

The NO PASSING ZONE (W14-3) sign shall be a pennant-shaped isosceles triangle with its longer axis horizontal and pointing to the right. When used, the NO PASSING ZONE sign shall be installed on the left side of the roadway at the beginning of no-passing zones identified by either pavement markings or DO NOT PASS signs or both (see Sections 2B.24 and 3B.02).

Section 2C.33 Advisory Exit, Ramp, and Curve Speed Signs (W13-2, W13-3, W13-5)**Standard:**

Advisory Exit, Ramp, and Curve Speed signs shall be vertical rectangles.

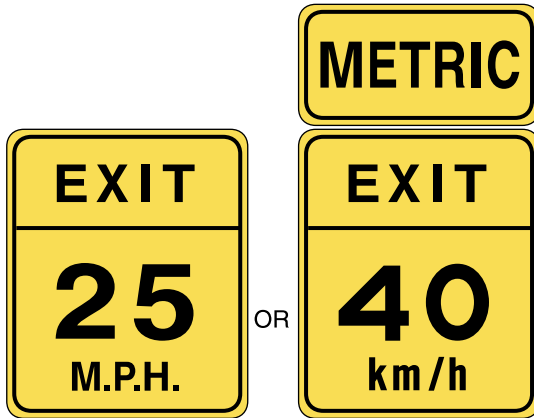
The Exit Speed (W13-2), Ramp Speed (W13-3), or Curve Speed (W13-5) signs shall be used where engineering judgment indicates the need to advise road users of the recommended speed on an exit, a ramp, or a curve.

Guidance:

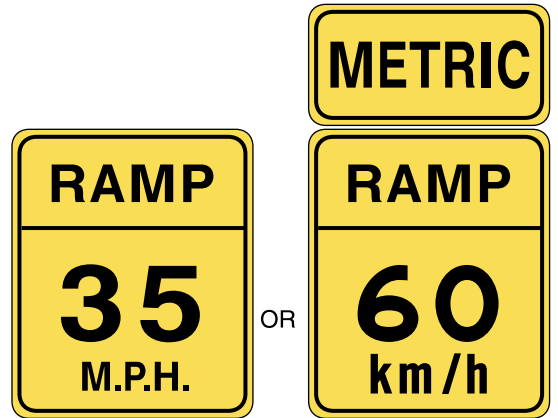
The Exit Speed sign should be used along the deceleration lane and the Ramp Speed sign should be used along the actual ramp since in some cases the ramp speed may be different from the deceleration exit speed.

The Exit Speed sign should be visible in time for the road user to make a safe slowing and exiting maneuver.

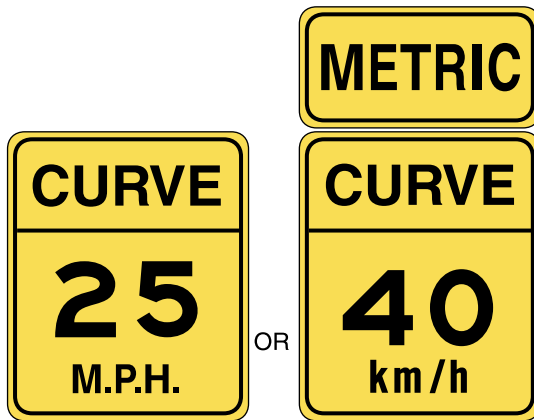
The Ramp Speed sign should be visible in time for the road user to reduce to the recommended speed.



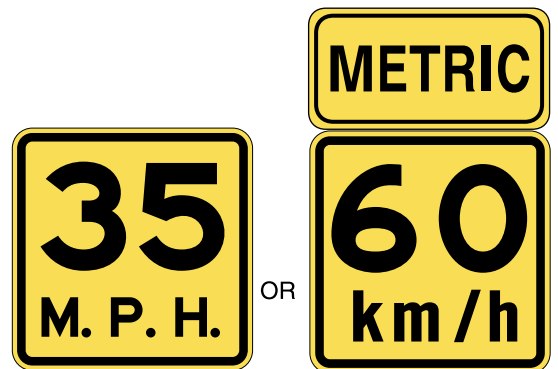
W13-2



W13-3



W13-5



W13-1

Option:

Additional Ramp Speed signs may be used beyond the gore and along the ramp where the recommended speed changes because of a change in curvature or when there is a need to remind road users of the recommended speed. Based on engineering judgment, the Ramp Speed sign may be installed on the inside or outside of the curve to enhance its visibility.

A Curve Speed sign may be used beyond the beginning of a curve following a Horizontal Alignment and Advisory Speed sign combination where the recommended speed changes because of a change in curvature or when there is a need to remind road users of the recommended speed.

Section 2C.34 Intersection Warning Signs (W2-1 through W2-6)**Option:**

A Cross Road (W2-1), Side Road (W2-2 or W2-3), T-Symbol (W2-4), or Y-Symbol (W2-5) sign may be used on a roadway, street, or shared-use path in advance of an intersection to indicate the presence of an intersection and the possibility of turning or entering traffic. The Circular Intersection (W2-6) sign accompanied by an educational word message plaque may be installed in advance of a circular intersection.

The relative importance of the intersecting roadways may be shown by different widths of lines in the symbol.

An advance street name plaque (see Section 2C.45) may be installed below an Intersection sign.

Guidance:

The Intersection sign should illustrate and depict the general configuration of the intersecting roadway, such as cross road, side road, T-intersection, Y-intersection, or curvilinear alignment.

Intersection signs should not be used on approaches controlled by STOP signs, YIELD signs, signals, or where Junction signing (see Sections 2D.13 and 2D.28) or advance route turn assembly signs (see Section 2D.29) are present.

Where the side roads are not opposite of each other, the symbol for the intersection should indicate a slight offset.



W2-1



W2-2



W2-3



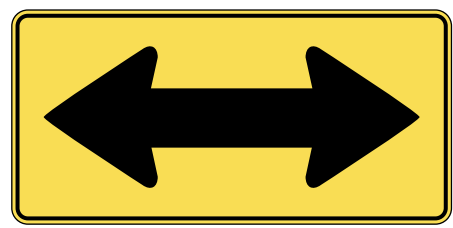
W2-4



W2-5



W2-6



W1-7

Section 2C.35 Two-Direction Large Arrow Sign (W1-7)

Standard:

The Two-Direction Large Arrow (W1-7) sign shall be a horizontal rectangle.

If used, it shall be installed on the far side of a T-intersection in line with, and at approximately a right angle to, approaching traffic.

The Two-Direction Large Arrow sign shall not be used where there is no change in the direction of travel such as at the beginnings and ends of medians or at center piers.

Guidance:

The Two-Direction Large Arrow sign should be visible for a sufficient distance to provide the road user with adequate time to react to the intersection configuration.

Section 2C.36 Motorized Traffic Signs (W8-6, W11-5, W11-8, W11-10)**Option:**

Motorized Traffic (W8-6, W11-5, W11-8, or W11-10) signs may be used to alert road users to locations where unexpected entries into the roadway by trucks, farm vehicles, emergency vehicles, or other vehicles might occur.

Support:

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

Guidance:

Motorized Traffic signs should be used only at locations where the road user's sight distance is restricted, or the condition, activity, or entering traffic would be unexpected.

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

Option:

Supplemental plaques (see Section 2C.39) with the legend AHEAD, XX METERS (XX FEET), or NEXT XX KILOMETERS (NEXT XX MILES) may be mounted below Motorized Traffic signs to provide advance notice to road users of unexpected entries.

Standard:

The Emergency Vehicle (W11-8) sign with the EMERGENCY SIGNAL AHEAD (W11-12P) supplemental plaque shall be placed in advance of all emergency-vehicle traffic control signals (see Chapter 4F).

Option:

The Emergency Vehicle (W11-8) sign, or a word message sign indicating the type of emergency vehicle (such as rescue squad), may be used in advance of the emergency vehicle station when no emergency-vehicle traffic control signal is present.

Section 2C.37 Crossing Signs (W11-1, W11-2, W11-3, W11-4, W16-7P)**Option:**

Crossing (W11-1 through W11-4) signs may be used to alert road users to locations where unexpected entries into the roadway by pedestrians, bicyclists, animals, and other crossing activities might occur.



W8-6



W11-5



W11-8



W11-10



W11-12P



W11-1



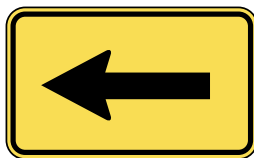
W11-2



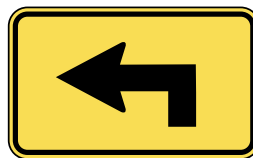
W11-3



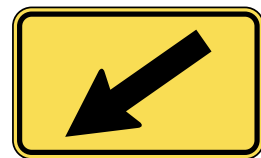
W11-4



W16-5P



W16-6P



W16-7P

Support:

These conflicts might be relatively confined, or might occur randomly over a segment of roadway.

Option:

Crossing signs may be supplemented with supplemental plaques (see Section 2C.39) with the legend AHEAD, XX METERS (XX FEET), or NEXT XX KILOMETERS (NEXT XX MILES) to provide advance notice to road users of crossing activity.

Standard:

Crossing signs shall be used adjacent to the crossing location. If the crossing location is not delineated by crosswalk pavement markings, the Crossing sign shall be supplemented with a diagonal downward pointing arrow plaque (W16-7P) showing the location of the crossing. If the crossing location is delineated by crosswalk pavement markings, the diagonal downward pointing arrow plaque shall not be required.

Option:

The crossing location may be defined with pavement markings (see Section 3B.17).

Pedestrian, Bicycle, School Advance Crossing, and School Crossing signs may have a fluorescent yellow-green background with a black legend and border.

Guidance:

When a fluorescent yellow-green background is used, a systematic approach featuring one background color within a zone or area should be used. The mixing of standard yellow and fluorescent yellow-green backgrounds within a selected site area should be avoided.

Crossing signs should be used only at locations where the crossing activity is unexpected or at locations not readily apparent.

Section 2C.38 Playground Sign (W15-1)**Option:**

The Playground (W15-1) sign may be used to give advance warning of a designated children's playground that is located adjacent to the road. The Playground sign may have a fluorescent yellow-green background with a black legend and border.



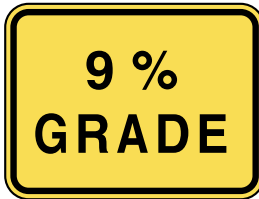
W16-1



W7-2



W7-2b



W7-3



W7-3b



W15-1



W16-8



W7-3a



W16-2



W16-2a



W16-3



W16-3a



W16-4



W14--1P



W14-2P

Guidance:

If the access to the playground area requires a roadway crossing, the application of crosswalk pavement markings (see Section 3B.17) and Crossing signs (see Section 2C.37) should be considered.

Section 2C.39 Use of Supplemental Plaques**Option:**

A supplemental plaque may be displayed with a warning sign when engineering judgment indicates that road users require additional information beyond that contained in the main message of the warning sign.

Standard:

Supplemental plaques shall be used only in combination with warning or regulatory signs. They shall not be mounted alone or displayed alone. If used, a supplemental plaque shall be installed on the same post(s) as the warning sign.

Section 2C.40 Design of Supplemental Plaques**Standard:**

A supplemental plaque shall have the same color legend, border, and background as the warning sign with which it is displayed. Supplemental plaques shall be square or rectangular.

Section 2C.41 Distance Plaques (W16-2, W16-3, W16-4, W7-3a)**Option:**

The Distance Ahead (W16-2 and W16-3) plaques may be used to inform the road user of the distance to the condition indicated by the warning sign.

The Next Distance (W16-4 and W7-3a) plaques may be used to inform road users of the length of roadway over which the condition indicated by the warning sign exists.

Section 2C.42 Advisory Speed Plaque (W13-1)**Option:**

The Advisory Speed (W13-1) plaque may be used to indicate the recommended speed for a condition.

Standard:

The Advisory Speed plaque shall carry the message XX km/h (XX M.P.H). The speed shown shall be a multiple of 10 km/h (5 mph).

Except in emergencies or when the condition is temporary, an Advisory Speed plaque shall not be installed until the recommended speed has been determined by an engineering study.

Guidance:

Because changes in conditions, such as roadway geometrics, surface characteristics, or sight distance, might affect the recommended speed, each location should be periodically evaluated and the Advisory Speed plaque changed if necessary.

Section 2C.43 Supplemental Arrow Plaques (W16-5P, W16-6P)**Guidance:**

If the condition indicated by a warning sign is located on an intersecting road and the distance between the intersection and condition is not sufficient to provide adequate advance placement of the warning sign, a Supplemental Arrow plaque (W16-5P, W16-6P) should be used below the warning sign.

Standard:

Supplemental Arrow plaques shall have the same legend design as the Advance Turn and Direction Arrow markers (see Sections 2D.25 and 2D.26) except that they shall have a black legend and border on a yellow or fluorescent yellow-green background, as appropriate.

Section 2C.44 Hill-Related Plaques (W7-2 and W7-3)**Guidance:**

Hill-Related (W7-2 series, W7-3 series) plaques (or other appropriate legends) and larger signs should be used for emphasis or where special hill characteristics exist.

On longer grades, the use of the distance plaque (W7-3a or W7-3b) at periodic intervals of approximately 1.6 km (1 mi) spacing should be considered.

Section 2C.45 Advance Street Name Plaque (W16-8)

Option:

An Advance Street Name (W16-8) plaque may be used with any Intersection sign (W2 series) or Advance Traffic Control (W3 series) sign to identify the name of the intersecting street.

Section 2C.46 DEAD END/NO OUTLET Plaques (W14-1P, W14-2P)

Option:

DEAD END (W14-1P) or NO OUTLET (W14-2P) plaques may be used in combination with Street Name (D3) signs (see Section 2D.38) at intersections instead of or in addition to the W14-1 or W14-2 signs.

Standard:

The DEAD END or the NO OUTLET plaque, as appropriate, shall be used where traffic can proceed straight through the intersection to the dead end or no outlet street.

Section 2C.47 SHARE THE ROAD Plaque (W16-1)

Option:

In situations where there is a need to warn drivers to watch for other slower forms of transportation traveling along the highway, such as bicycles, golf carts, or farm machinery, a SHARE THE ROAD (W16-1) plaque may be used.