

PART 3

MARKINGS

CHAPTER 3A. GENERAL

Section 3A.01 Standardization of Application

Support:

- 01 Markings are used to supplement other traffic control devices such as signs, signals, and other markings. In other instances, markings are used alone to effectively convey regulations, warnings, or guidance in ways not obtainable by the use of other devices.
- 02 Markings can take many forms, including road surface markings, curb markings, delineators, colored pavements, and channelizing devices.

Standard:

- 03 Each standard marking shall be used only to convey the meaning prescribed for that marking in this Manual, including when used for applications not described in this Manual.
- 04 Except as provided in Chapter 3H, markings that must be visible at night shall be retroreflective unless the markings are adequately visible under street or highway lighting. All markings on Interstate highways shall be retroreflective.
- 05 Markings that are no longer applicable for roadway conditions or restrictions and that might cause confusion for the road user shall be removed or obliterated to be unidentifiable as a marking as soon as practicable.

Guidance:

- 05a Local authorities may apply lines, arrows, or other symbols to street or highway surfaces to guide visitors and tourists to local points of interest, provided Caltrans approves such markings (CVC § 21374).

Option:

- 06 Until they can be removed or obliterated, markings that are no longer applicable for roadway conditions or restrictions may be temporarily masked with non-reflective, preformed tape that is approximately the same color as the pavement surface.

Support:

- 07 Obliteration of obsolete markings, using one of the known permanent removal methods, such as Ultra-High-Water blasting, shot blasting, or grinding, is the preferred action rather than temporary masking, particularly on faded asphalt concrete pavement. This results in the most visually distinct pavement markings and reduces the risk of driver confusion due to sun glare, especially on eastbound and westbound approaches.

- 08 Use of black tape for temporary "masking" is effective for new Asphalt Concrete pavement. However, for faded Asphalt Concrete pavement or Portland Cement Concrete pavements, black "masking" pavement markings could appear as a stripe in low light conditions and result in confusion to road users.

Section 3A.02 Materials

Guidance:

- 01 The materials used for markings should provide the specified color throughout their useful life.
- 02 Consideration should be given to selecting pavement marking materials that will minimize tripping or loss of traction for road users, including pedestrians, bicyclists, and motorcyclists.

Option:

- 03 Marking systems that consist of clumps or droplets of material with visible open spaces of bare pavement between the material droplets, which can function in a manner that is similar to the marking systems that completely cover the pavement surface, may be used as pavement markings if they meet the other pavement marking requirements of the highway agency.

Section 3A.03 Colors

Standard:

- 01 Markings shall be yellow, white, red, blue, green, or purple. The colors for markings shall conform to the

standard highway colors.

01a **The color of curb markings shall conform to CVC § 21458.**
01b **Lines, arrows, or other symbols on the street or highway surface to guide visitors and tourists shall be distinct in color from official traffic control devices (CVC § 21374).**

Option:

02 Black markings may be used in combination with the colors mentioned in Paragraph 1 of this Section to enhance the contrast with a light-colored pavement.
02a **If the material used for centerline marking is paint, a 3-inch-wide black line may be placed between the 4-inch-wide yellow lines on streets and highways under local jurisdiction.**

Standard:

02b **If the material used for centerline marking is paint, a 3-inch-wide black line shall be placed between the 4-inch-wide yellow lines on State highways.**

03 When used, yellow markings for longitudinal lines shall delineate:
A. The separation of traffic traveling in opposite directions,
B. The left-hand edge of the roadways of divided highways and one-way streets or ramps, or
C. The separation of two-way left-turn lanes and reversible lanes from other lanes.
04 When used, white markings for longitudinal lines shall delineate:
A. The separation of traffic flows in the same direction,
B. The right-hand edge of the roadway, or
C. Both the right-hand edge and left-hand edge of a reversible roadway.
05 When used, red raised pavement markers or delineators shall delineate:
A. Truck escape ramps, or
B. One-way roadways, ramps, or travel lanes that shall not be entered or used in the direction from which the markers are visible.
06 When used, blue markings shall supplement white markings for parking spaces for persons with disabilities.
07 When used, purple markings shall be in accordance with the provisions of Chapter 3F to identify toll plaza approach lanes restricted to use only by vehicles with registered electronic toll collection accounts.
08 When pavement markings that simulate route signs are used (see Section 3B.22), the colors shall be the same as those that are used for the route signs (see Section 2D.11).
Support:
09 Provisions regarding colored pavements are contained in Chapter 3H.

Section 3A.04 Functions, Widths, and Patterns of Longitudinal Pavement Markings

Standard:

01 The general functions of longitudinal lines shall be as follows:
A. A double line indicates maximum or special restrictions.
B. A solid line discourages or prohibits crossing (depending on the specific application).
C. A broken line indicates a permissive condition.
D. A dotted lane line provides warning of a downstream change in lane function.
E. A dotted line used as a lane line or edge line extension guides vehicles through an intersection, a taper area, or an interchange ramp area.
02 The widths and patterns of longitudinal lines shall be as follows:
A. Normal line—4 to 6 inches wide.
B. Wide line—at least twice the width of a normal line.
C. Double line—two parallel lines separated by a discernible space. The pavement surface shall be visible between the lines in the same way that it is visible outside the lines, except where contrast markings are used in combination with the double line (see Section 3A.03).
D. Broken line—normal width line segments separated by gaps.
E. Dotted line—noticeably shorter line segments separated by shorter gaps than used for a broken line. The width of a dotted line extension shall be at least the same as the width of the line it extends.
02a **All longitudinal traffic lines for lane lines, edge lines, and centerlines on state highways shall be 6 inches wide.**
02b **All longitudinal traffic lines on local agency roadways shall be a minimum of 4 inches wide.**

Option:

02c Longitudinal traffic lines on local agency roadways may be 6 inches wide.

Guidance:

03 *To be recognized as a double line rather than two separate, disassociated single lines, the discernible space separating the parallel lines of a double line should not exceed two times the line width of a single line.*

Support:

04 The width of the line indicates the degree of emphasis.

05 Increasing edge line width from 4 inches to 6 inches has been shown to be a beneficial countermeasure to enhance safety at locations with a history of run-off-the-road crashes (see Section 3B.09). Wider normal lines with a 6-inch width instead of the minimum 4-inch width can be beneficial to both human drivers and driving automation systems (see Section 5B.02).

Guidance:

06 *Broken lines should consist of 10 foot line segments and 30 foot gaps, or dimensions in a similar ratio of line segments to gaps as appropriate for traffic speeds and the need for delineation.*

07 *A dotted line used as a lane line (see Section 3B.07) should consist of 3 foot line segments and 9 foot gaps. A dotted line for line extensions within an intersection, taper area, or interchange ramp area (see Section 3B.11) should consist of 2 foot line segments and 2 foot to 6 foot gaps.*

Standard:

07a **The widths and patterns of longitudinal lines shall conform to the details shown in Figures 3A-101(CA) through 3A-114(CA).**

Support:

08 Section 5B.02 contains information on pavement marking considerations for driving automation systems.

Section 3A.05 Maintaining Minimum Pavement Marking Retroreflectivity

Standard:

01 Except as provided in Paragraph 5 of this Section, a method designed to maintain retroreflectivity at or above 50 mcd/m²/lx under dry conditions shall be used for longitudinal markings on roadways with speed limits of 35 mph or greater.

Guidance:

02 Except as provided in Paragraph 5 of this Section, a method designed to maintain retroreflectivity at or above 100 mcd/m²/lx under dry conditions should be used for longitudinal markings on roadways with speed limits of 70 mph or greater.

03 The method used to maintain retroreflectivity should be one or more of those described in "Methods for Maintaining Pavement Marking Retroreflectivity" (FHWA-SA-22-028), 2022 Edition, FHWA or developed from an engineering study based on the values in Paragraphs 1 and 2 of this Section.

Support:

04 Retroreflectivity levels for pavement markings are measured with an entrance angle of 88.76 degrees and an observation angle of 1.05 degrees. This geometry is also referred to as 30-meter geometry. The units of pavement marking retroreflectivity are reported in mcd/m²/lx, which means millicandela per square meter per lux.

Option:

05 The following markings may be excluded from the provisions established in Paragraphs 1 and 2 of this Section:

- A. Markings where ambient illumination assures that the markings are adequately visible;
- B. Markings on streets or highways that have an ADT of less than 6,000 vehicles per day; **markings to alert possible wrong-way drivers, as shown in Figure 3A-102(CA) and Figure 3A-105(CA), Details 9A, 12A, and 25A;**
- C. Dotted extension lines that extend a longitudinal line through an intersection, major driveway, or interchange area (see Section 3B.11);
- D. Curb markings;
- E. Parking space markings; and
- F. Shared-use path markings.

Support:

06 The provisions of this Section do not apply to non-longitudinal pavement markings including, but not limited to, the following:

- A. Transverse markings;
- B. Word, symbol, and arrow markings;
- C. Crosswalk markings; and
- D. Chevron, diagonal, and crosshatch markings.

07 Special circumstances will periodically cause pavement marking retroreflectivity to be below the minimum levels.

These circumstances include, but are not limited to, the following:

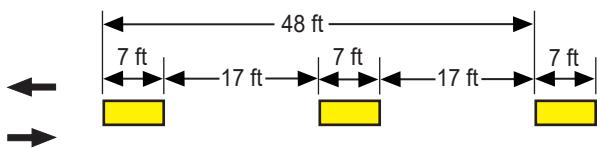
- A. Isolated locations of abnormal degradation;
- B. Periods preceding imminent resurfacing or reconstruction;
- C. Unanticipated events such as equipment breakdowns, material shortages, and contracting problems; and
- D. Loss of retroreflectivity resulting from snow maintenance operations.

08 When such circumstances occur, compliance with Paragraphs 1 and 2 of this Section is still considered to be achieved if a reasonable course of action is taken to resume maintenance of minimum retroreflectivity in a timely manner according to the maintaining agency's method(s), policies, and procedures.

Figure 3A-101(CA). Centerlines - 2 Lane Highways

FOR SPEEDS 40 mph OR LESS

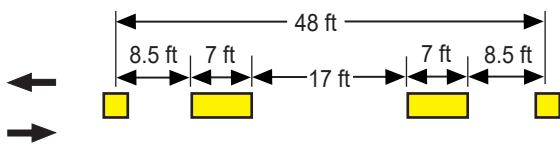
DETAIL 1



POLICY

Centerline pattern for use on two-lane streets and highways (normally used on local streets and highways).

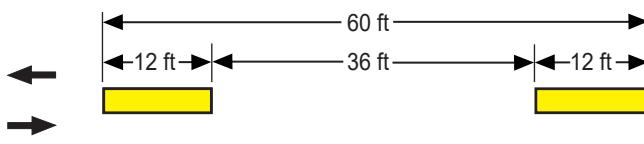
DETAIL 2



Centerline pattern with pavement markers for use on two-lane streets and highways.

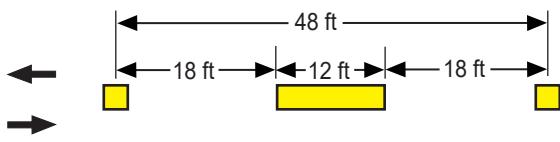
FOR SPEEDS 45 mph OR MORE

DETAIL 5



Centerline pattern for use on two-lane streets and highways (normally used on local streets and highways).

DETAIL 6



Centerline pattern with pavement markers for use on two-lane streets and highways.

CONTRAST STRIPING

OPTION 1



OPTION 2



NOT TO SCALE

LEGEND

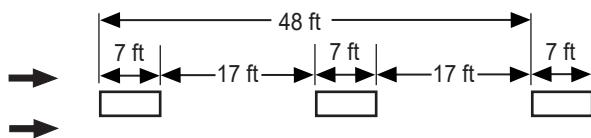
- 4 to 6 in. Yellow (for local agencies)
6 in. Yellow (on State Highway System)
- White or Yellow Normal Line
- Black Contrast Striping

- Two-Way Yellow Retroreflective Markers
- Two-Way Retroreflective Markers
- Direction of Travel

**Figure 3A-102(CA). Lane Lines - Multilane Highways
(Sheet 1 of 2)**

FOR SPEEDS 40 mph OR LESS

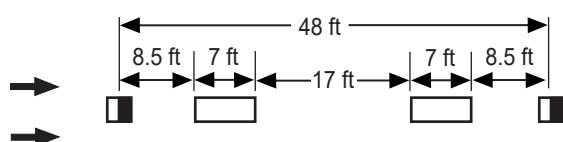
DETAIL 8



POLICY

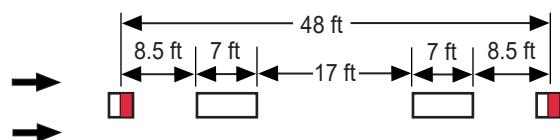
Lane Line pattern for use on multilane streets and highways (normally used on local streets and highways).

DETAIL 9



Lane Line pattern with pavement markers for use on multilane streets, and highways.

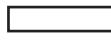
DETAIL 9A



Lane line pattern with pavement markers for use on multilane streets, highways and freeway ramps.

NOT TO SCALE

LEGEND



4 to 6 in. White (for local agencies)
6 in. White (on State Highway System)

→ Direction of Travel

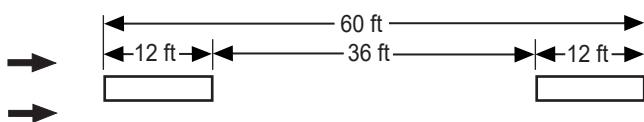
■ One-Way Clear Retroreflective Markers

■ Red-Clear Retroreflective Markers

**Figure 3A-102(CA). Lane Lines - Multilane Highways
(Sheet 2 of 2)**

FOR SPEEDS 45 mph OR MORE

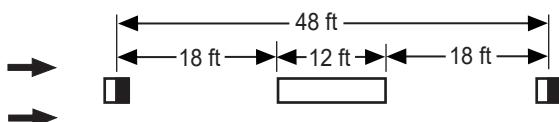
DETAIL 11



POLICY

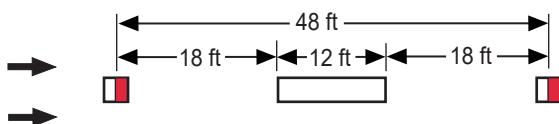
Lane Line pattern for use on multilane streets and highways (normally used on local streets and highways).

DETAIL 12



Lane Line pattern with pavement markers for use on multilane conventional streets and highways, expressways and collector roads.

DETAIL 12A



Lane Line pattern with pavement markers for use on multilane conventional streets and highways, freeways, expressways, freeway ramps, and freeway to freeway connectors.

NOT TO SCALE

LEGEND



4 to 6 in. White (for local agencies)
6 in. White (on State Highway System)

→ Direction of Travel

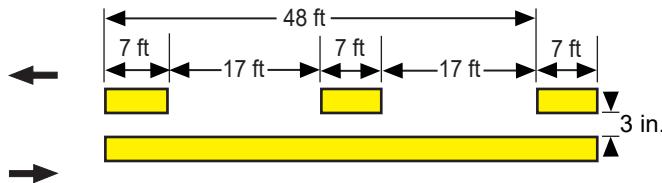
■ One-Way Clear Retroreflective Markers

■ Red-Clear Retroreflective Markers

Figure 3A-103(CA). No Passing Zones - One Direction

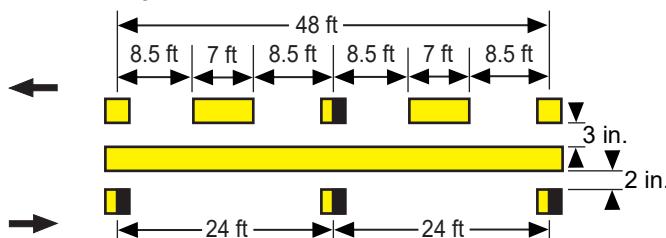
FOR SPEEDS 40 mph OR LESS

DETAIL 15



POLICY

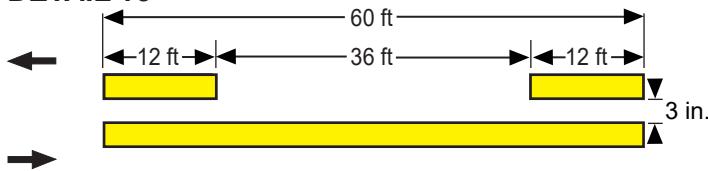
DETAIL 16



One direction no-passing pattern for use on two-lane streets and highways (normally used on local streets and highways). See Note 2.

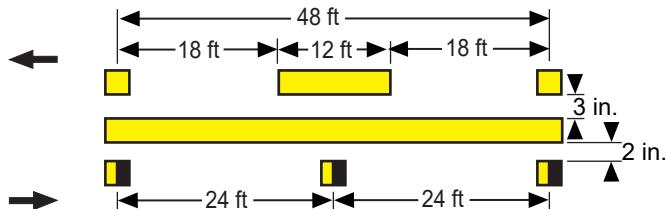
FOR SPEEDS 45 mph OR MORE

DETAIL 18



One direction no-passing pattern for use on two-lane streets and highways (normally used on local streets and highways). See Note 2.

DETAIL 19



One direction no-passing pattern with pavement markers for use on two-lane streets and highways. See Notes 1 and 2.

NOT TO SCALE

LEGEND



4 to 6 in. Yellow (for local agencies)
6 in. Yellow (on State Highway System)



Direction of Travel



Two-Way Yellow Retroreflective Markers



One-Way Yellow Retroreflective Markers

Notes:

1. Pavement markers shown off the solid line in Details 16 and 19 may be placed on the line.
2. If the material used for centerline marking is paint, a 3 in. black line shall be placed between the yellow lines on State highways and may be placed on streets and highways under local jurisdiction.

Figure 3A-104(CA). No Passing Zones - Two Direction

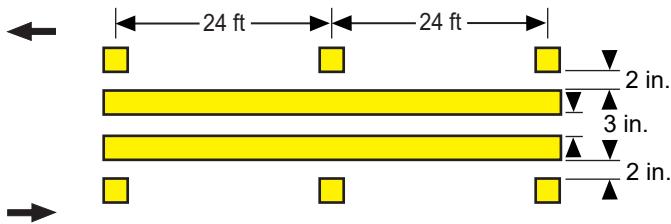
DETAIL 21



POLICY

Two-direction no-passing pattern for use on two-lane streets and highways (normally used on local streets and highways). See Note 2.

DETAIL 22



Two-direction no-passing pattern with pavement markers for use on two-lane streets and highways. See Notes 1 and 2.

CONTRAST STRIPING

TYPICAL DOUBLE STRIPE CONTRAST DETAIL OPTION



NOT TO SCALE

LEGEND

 4 to 6 in. Yellow (for local agencies)
 6 in. Yellow (on State Highway System)

→ Direction of Travel

 Two-Way Yellow Retroreflective Markers

 White or Yellow Normal Line

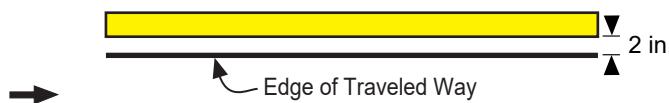
 Black Contrast Striping

Notes:

1. Pavement markers shown off the solid line in Detail 22 may be placed on the line.
2. If the material used for centerline marking is paint, a 3 in. black line shall be placed between the yellow lines on State highways and may be placed on streets and highways under local jurisdiction.

Figure 3A-105(CA). Left Edge Lines for Divided Highways

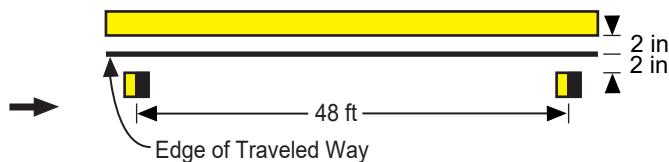
DETAIL 24



POLICY

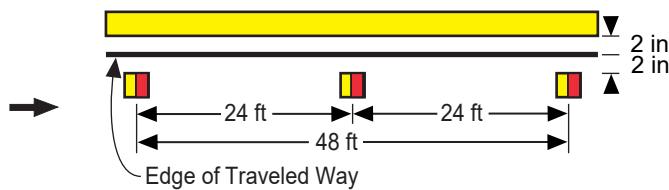
Left Edge Line pattern for use on streets and highways (normally used on local streets and highways).

DETAIL 25



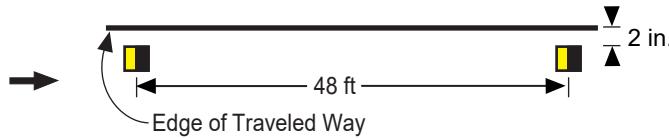
Left Edge Line for use on State highways.

DETAIL 25A



Left Edge Line for use on highways, freeway ramps and connectors.

DETAIL 26



Alternate to Details 24 and 25 when there is adequate contrast between traveled way and shoulder.

DETAIL 27



Alternate to Detail 25. A double solid yellow line may be used for more emphasis when motorists tend to use the shoulder for a through lane, or where encroachments onto the shoulder occasionally occur. See Note 1.

NOT TO SCALE

LEGEND

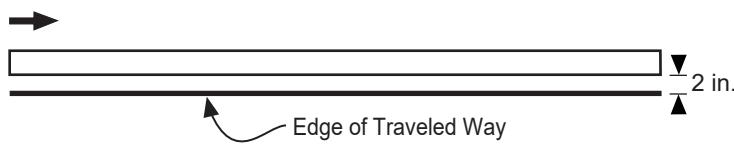
- 4 to 6 in. Yellow (for local agencies)
6 in. Yellow (on State Highway System)
- Direction of Travel

- One-Way Yellow Retroreflective Markers
- Red-Yellow Retroreflective Markers

Note: If the material used for centerline marking is paint, a 3 in black line shall be placed between the yellow lines on State highways and may be placed on streets and highways under local jurisdiction.

Figure 3A-106(CA). Right Edge Line and Right Edge Line Extension Through Intersections

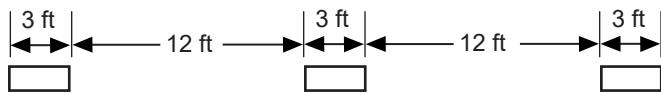
DETAIL 27B - Right Edge Line



POLICY

Right Edge Line pattern for use on all State highways may be used on local streets and highways. It is generally dropped at the beginning of the intersection flares on conventional highways. See also Detail 27C. On freeways, it may be flared in advance of the exit ramp as shown in Figure 3B-8(CA).

DETAIL 27C - Right Edge Line Extension Through Intersections



Right Edge Line Extension Through Intersections pattern for use to extend the right edgeline through an intersection where climatic conditions, such as areas of heavy fog, may require additional guidance.

CONTRAST STRIPING

TYPICAL LANE LINE, EDGE LINE, OR CHANNELIZING LINE CONTRAST DETAIL OPTION



NOT TO SCALE

LEGEND

4 to 6 in. White (for local agencies)
6 in. White (on State Highway System)

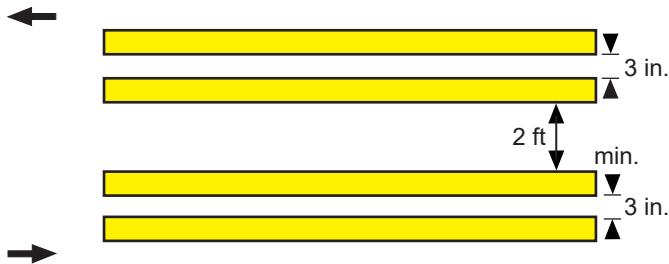
Black Contrast Striping

White or Yellow Normal or Wide line

Direction of Travel

Figure 3A-107(CA). Median Islands

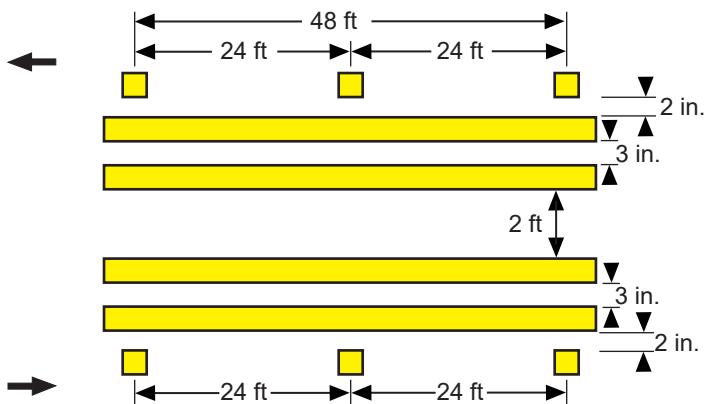
DETAIL 28



POLICY

Double Left Edge Line pattern for use on all-paved sections of streets and highways (normally used on local streets and highways). See Note 2.

DETAIL 29



Double Left Edge Line pattern with pavement markers for use on all-paved sections of streets and highways. See Notes 1 and 2.

NOT TO SCALE

LEGEND

 4 to 6 in. Yellow (for local agencies)
6 in. Yellow (on State Highway System)

 Two-Way Yellow Retroreflective Markers

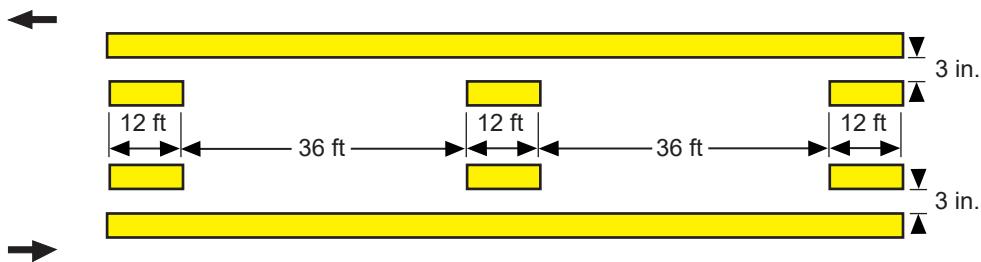
  Direction of Travel

Notes:

1. Pavement markers shown off the solid line in Detail 29 may be placed on the line.
2. If the material used for centerline marking is paint, a 3 in black line shall be placed between the yellow lines on State highways and may be placed on streets and highways under local jurisdiction.

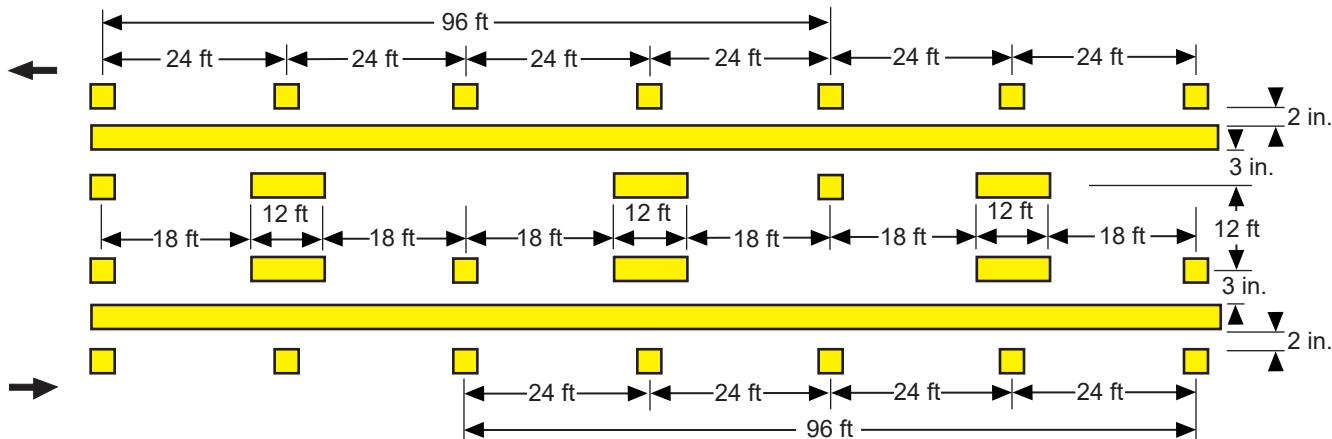
Figure 3A-108(CA). Two-Way Left-Turn Lanes

DETAIL 31



POLICY Two-way left-turn lane pattern for use on streets and highways (normally used on local streets and highways). See Note 2.

DETAIL 32



POLICY Two-way left-turn lane pattern for use on streets and highways. See Note 2.

NOT TO SCALE

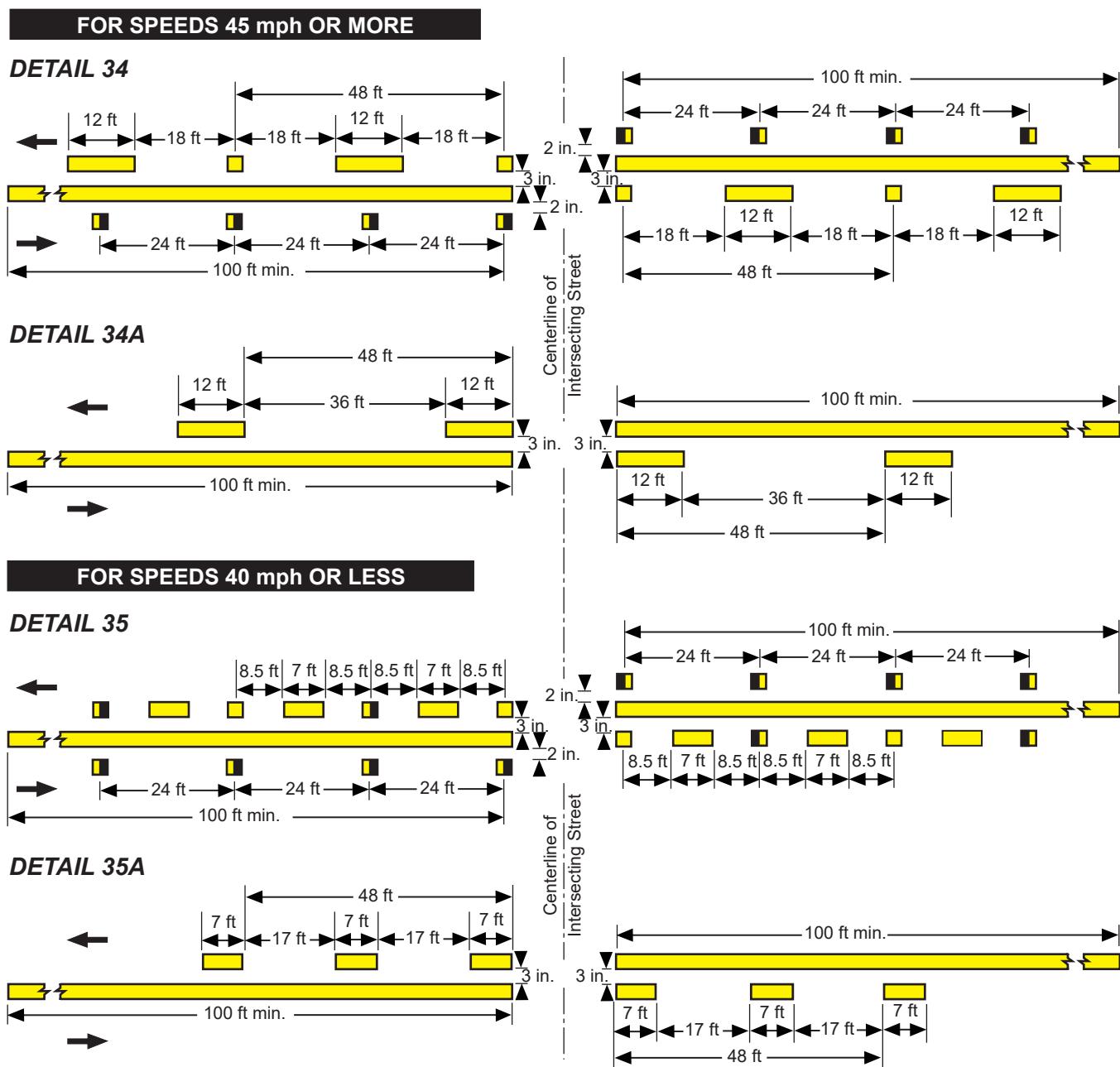
LEGEND

4 to 6 in. Yellow (for local agencies)	Two-Way Yellow Retroreflective Markers
6 in. Yellow (on State Highway System)	
Direction of Travel	

Notes:

1. Pavement markers shown off the solid line in Detail 32 may be placed on the line.
2. If the material used for centerline marking is paint, a 3 in. black line shall be placed between the yellow lines on State highways and may be placed on streets and highways under local jurisdiction.

Figure 3A-109(CA). Intersection Markings



LEGEND

	4 to 6 in. Yellow (for local agencies)		Two-Way Yellow Retroreflective Markers
	6 in. Yellow (on State Highway System)		One-Way Yellow Retroreflective Markers

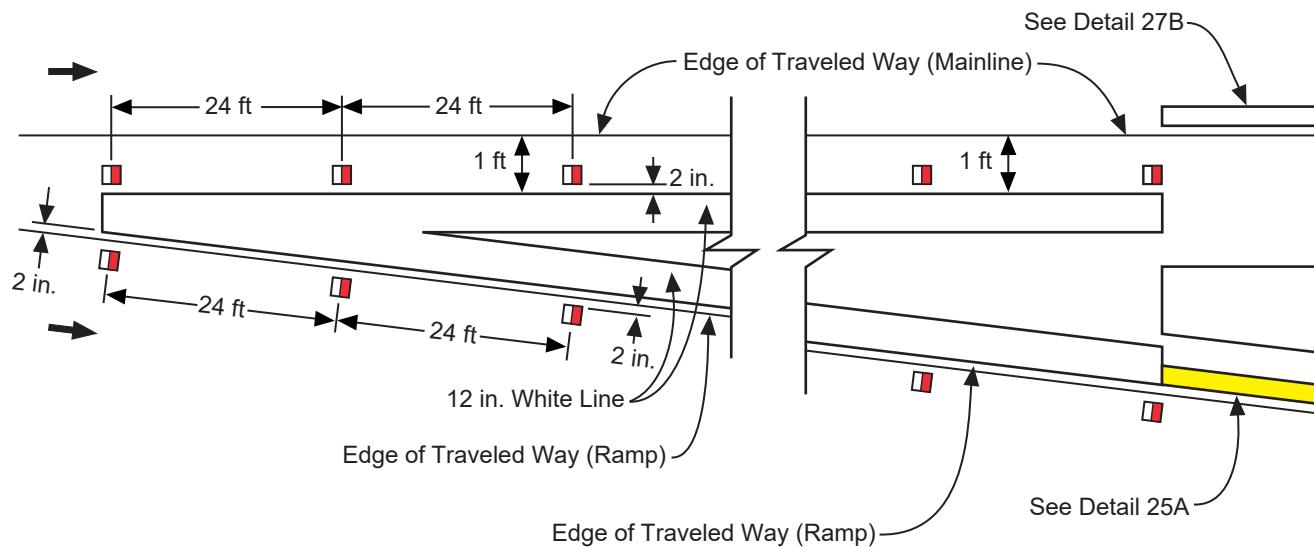
Direction of Travel

Notes:

1. Raised Pavement Markers are optional on non-state highways.
2. Raised Pavement Markers shown off the solid line may be placed on the line.
3. If the material used for centerline marking is paint, a 3 in. black line shall be placed between the yellow lines on State highways and may be placed on streets and highways under local jurisdiction.

**Figure 3A-110(CA). Freeway Exit and Entrance Ramp Channelizing Line
(Sheet 1 of 2)**

DETAIL 36 - Exit Ramp Neutral Area (Gore) Channelizing Lines



NOT TO SCALE

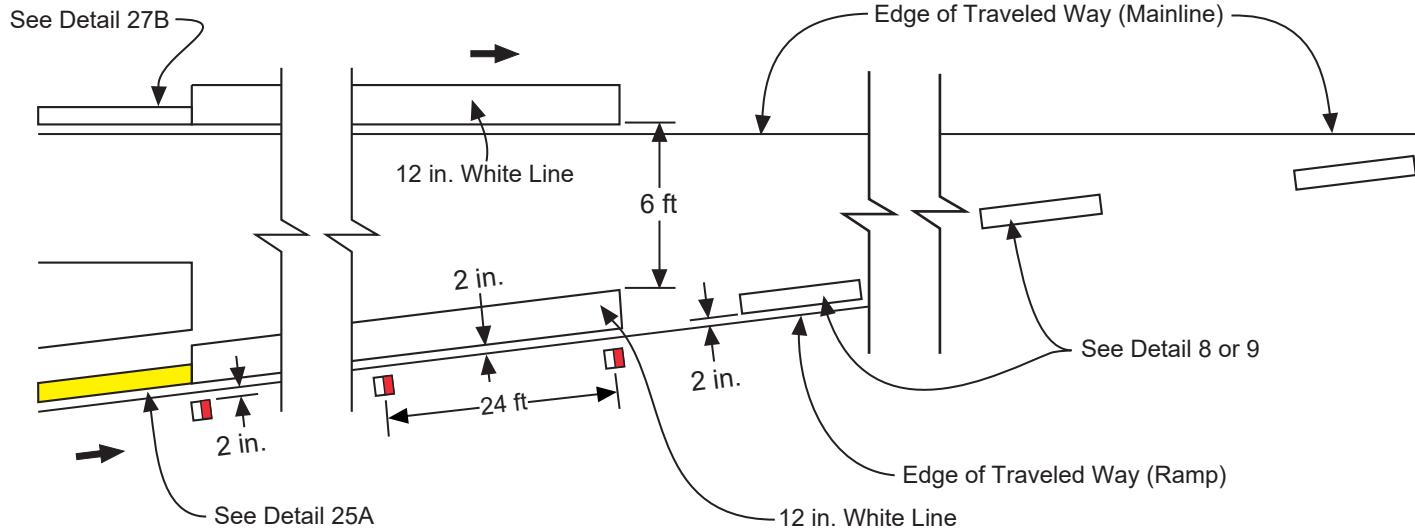
LEGEND

	4 to 6 in. White (for local agencies) 6 in. White (on State Highway System)		Red-Clear Retroreflective Markers
	4 to 6 in. Yellow (for local agencies) 6 in. Yellow (on State Highway System)		Direction of Travel

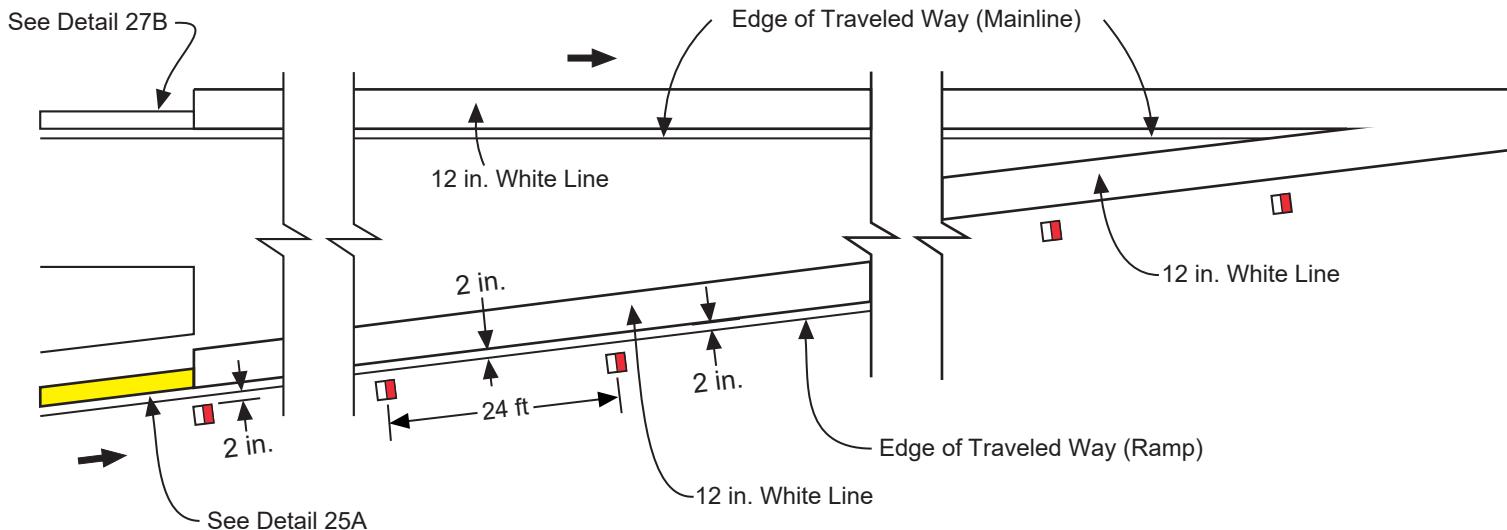
Note: See Figure 3B-9(CA).

**Figure 3A-110(CA). Freeway Exit and Entrance Ramp Channelizing Lines
(Sheet 2 of 2)**

DETAIL 36A - Entrance Ramp Neutral Area (Merge) Channelizing Lines



DETAIL 36B - Entrance Ramp Neutral Area (Acceleration Lane) Channelizing Lines



NOT TO SCALE

LEGEND

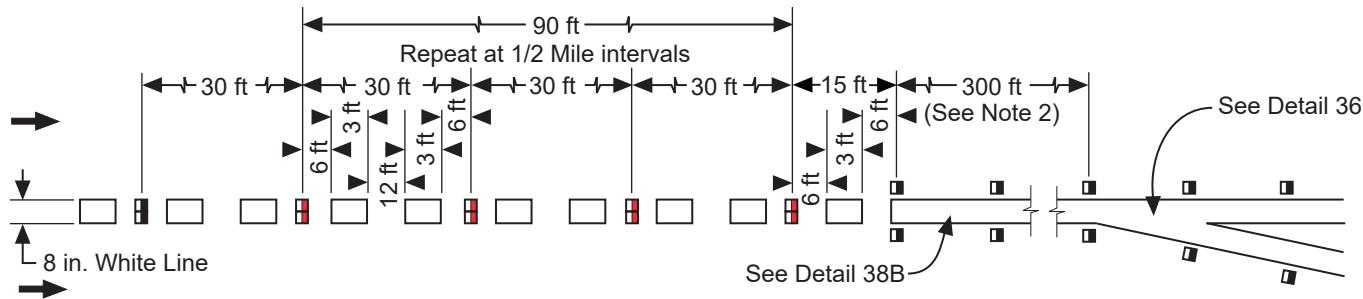
	4 to 6 in. White (for local agencies) 6 in. White (on State Highway System)		Red-Clear Retroreflective Markers
	4 to 6 in. Yellow (for local agencies) 6 in. Yellow (on State Highway System)		Direction of Travel

Notes:

1. For Detail 36A, see Figure 3B-10(CA) Sheet 1 of 2.
2. For Detail 36B, see Figure 3B-11(CA) Sheet 1 of 2.

Figure 3A-111(CA). Lane Drop Markings

DETAIL 37 - Lane Drop Markings at Exit Ramps



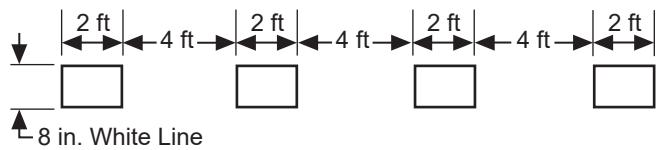
POLICY Marking pattern for use on mandatory lane drops at freeway exit ramps and freeway to freeway connectors.

DETAIL 37B - Lane Drop Markings at Conventional Highway Intersections



POLICY Marking pattern for use on mandatory turn lanes at intersections. Pavement markers shown are optional on local streets and highways.

DETAIL 37D - Lane Drop Line For Two-Lane Roundabouts



POLICY For use on mandatory exiting lanes from two-lane roundabouts.

NOT TO SCALE

LEGEND

→ Direction of Travel

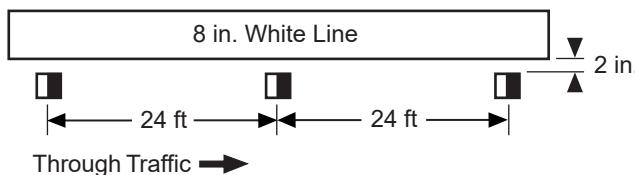
- █ One-Way Clear Retroreflective Markers
- █ Red-Clear Retroreflective Markers

Notes:

1. Pavement markers shown off the solid line in Detail 37 may be placed on the line.
2. The Solid Channelizing Line shown in Detail 37 may be omitted on short auxiliary lanes where weaving length is critical.

Figure 3A-112(CA). Channelizing Line and Lane Line/Centerline Extensions

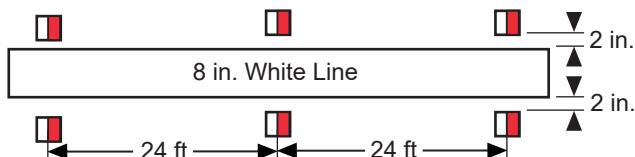
DETAIL 38 - Channelizing Line



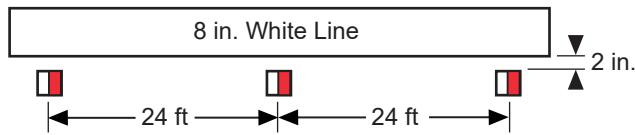
DETAIL 38A - Channelizing Line



DETAIL 38B - Channelizing Line at Exit Ramps



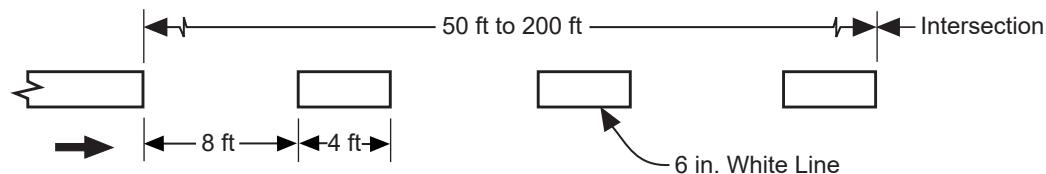
DETAIL 38D - Channelizing Line at Exit Ramps



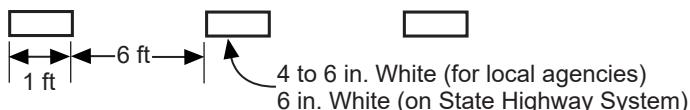
DETAIL 39 - Bike Lane Line



DETAIL 39A - Bike Lane Intersection Line



DETAIL 40 - Lane Line Extension Through Intersections



Typical channelizing line for use on Exit Ramps. Pavement Markers, as shown, may also be placed on the line.

DETAIL 41 - Centerline Extension Through Intersections



The Lane Line Extension Through Intersections line is used to extend the lane line through an intersection that might otherwise be confusing to the motorist.

The Centerline Extension Through Intersections line is used to extend the centerline through an intersection that might otherwise be confusing to the motorist.

NOT TO SCALE

LEGEND

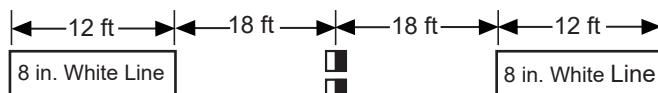
→ Direction of Travel



■ One-Way Clear Retroreflective Markers
■ Red-Clear Retroreflective Markers

Figure 3A-113(CA). Examples of Preferential Lane Lines

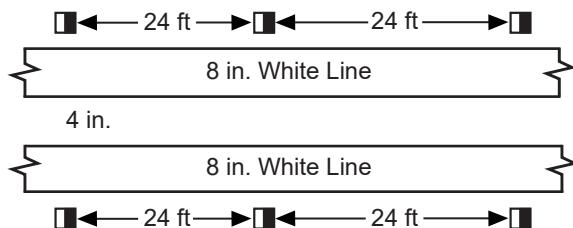
DETAIL 42 - Contiguous, Continuous Access



POLICY

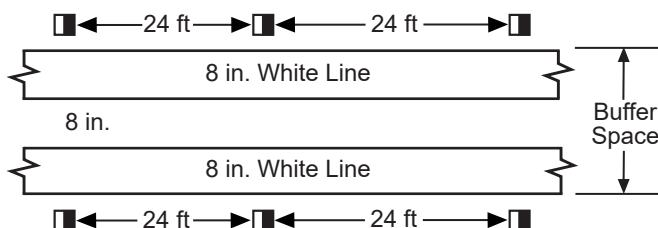
Refer to Figure 3E-3.C

DETAIL 44A - Contiguous, Access Prohibited



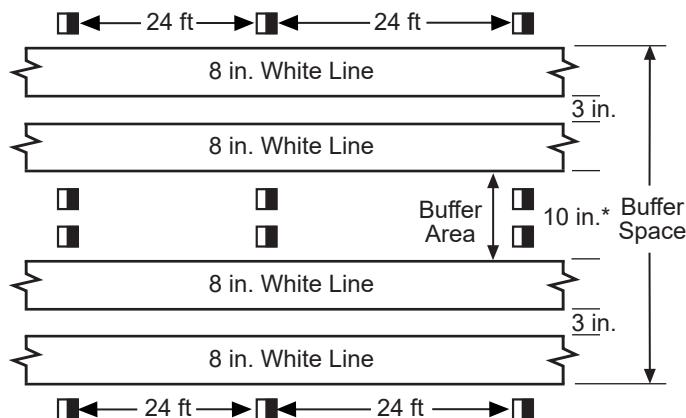
Refer to Figure 3E-3.A

DETAIL 44B - Buffer-Separated, Access Prohibited



Refer to Figure 3E-2.A

DETAIL 45 - Buffer-Separated, Access Prohibited



Refer to Figure 3E-2.A

* If buffer area is wider than 4 feet, then chevron markings are required (Refer to Figure 3E-2.A and Section 3B-25).

NOT TO SCALE

LEGEND



White Line



One-Way Clear Retroreflective Markers

Figure 3A-114(CA). Exit Ramp with Enhanced Pavement Markers for Wrong Way Details

