



TRAFFIC AND SAFETY MANUAL

Chapter 2 – Signing 2A - General

Sign Placement

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Signs should be located on the right side of the roadway where they are easily recognized and understood by road users. Signs in other locations should be considered only as supplementary to signs in the normal locations, except as otherwise indicated in the Traffic and Safety Manual or the Manual on Uniform Traffic Control Devices (MUTCD). Supplementary warning signs are used on the left of the roadway on multilane divided roads since traffic in the right lane might obstruct the view to the right.

Signs should be individually installed on separate posts or mountings except where one sign supplements another or where route or directional signs must be grouped. Where space is limited, certain signs may be mounted together or omitted. The State Traffic Engineer will provide assistance for individual cases at the request of the District Office.

Longitudinal Placement

The locations of some signs are fixed such as points where speed limits change, no passing zones begin, corporate limits cross a primary road and at intersections. A reasonable amount of flexibility is afforded in the location of many other warning and guide signs. When selecting locations, surrounding features and terrain should be carefully examined.

First, the roadway cross section should be considered. Select a location where the sign can be offset the desired distance without encountering a severe fill section requiring long posts or a cut section where the sign cannot be offset at the proper mounting height. If available, a relatively level section is preferred. Locations behind existing guardrails or barriers should be considered to take advantage of protected areas.

Next, check to see if there are physical features that may obstruct visibility of the sign. Examples are trees, mailboxes, vertical or horizontal curves, utility or luminaire poles, bridge piers and abutments and other essential signs. Locations must be adjusted to points where these features are not obstructions. In some cases, it may be necessary to clear obstructions.

Care should be taken to see that the shape or outline of a sign is not obscured when mounting signs back to back. Do Not Enter and Wrong Way signs at interchange ramps may be mounted on the back of Stop and Destination signs respectively if this does not obscure the outline of the signs. For most other back-to-back locations, signs should be located on separate posts at a minimum of 50-foot spacing.

Normally, the minimum longitudinal spacing of signs is 300 feet on two-lane and four-lane undivided roadways and 800 feet for four-lane divided roadways. At intersections and in urban areas where room is limited, it may be necessary to reduce spacing. In sections with reduced speed limits, spacing of five times the posted speed limit is desirable, but conditions may limit spacing to as little as three times the posted speed limit. Uniform spacing enhances the effectiveness of a series of signs. Where practical, the typical spacing for Interstate and Freeway Routes should be 1000 feet or more. Spacing is important to allow signs to be viewed without obstructing one another and to allow the motorist time to read and understand the message conveyed before encountering another sign.

Since warning signs are primarily for the benefit of the driver who is unacquainted with the road, it is very important that care be given to the placement of such signs. Warning signs should provide adequate time for the driver to perceive, identify, decide, and perform any necessary maneuver. This total time 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 a decision, and is here referred to as the PIEV time. The PIEV time can vary from about 3 seconds for general warning signs to 10 seconds for high driver judgment condition warning signs. Table 1 lists suggested minimum sign placement distances that may be used for three conditions.

Condition A is a high driver judgment condition which requires the driver to use extra time in making and executing a decision because of a complex driving situation such as lane changing, passing or merging. Typical signs are Merge, Lane Reduction, Added Lane, Right Lane Ends, and Divided Road Ends. **Condition B** is a condition in which the driver will likely be required to stop. Typical signs are Stop Ahead, Signal Ahead and Low Clearance. **Condition C** is a condition in which the driver will likely be required to decelerate to a specific speed. Typical signs are Turn, Curve, Bump, Dip and Cross Road. Table 1 is provided as an aid for determining warning sign locations. The values contained in the table are for guidance purposes and should be applied with engineering judgment.

Table 1

Guidelines for Advance Placement of Warning Signs

Posted or 85th percentile speed MPH (use higher speed)	Suggested Minimum Placement Distance (Feet) (1) (2)							
	Condition A high judgment needed (10 Secs. PIEV)	Condition B STOP condition	General Warning Signs					
			Condition C Deceleration conditions to listed advisory speed or desired speed at condition (MPH)					
			10	20	30	40	50	
20	175	-(3)	-(3)					
25	250	-(3)	100	-(3)				
30	325	100	150	100				
35	400	150	200	175	-(3)			
40	475	225	275	250	175			
45	550	300	350	300	250	-(3)		
50	625	375	425	400	325	225		
55	700	450	500	475	400	300	-(3)	
60	775	550	575	550	500	400	300	
65	850	650	650	625	575	500	375	

Notes:

- (1) To determine the advance placement distance, enter the table at the left using the approach speed, select the condition which applies, (A, B, or C) and read the distance in the column below.
- (2) Distance provides for a 3-second PIEV, 175 feet Sign Legibility Distance, Braking Distance for Condition B and Comfortable Braking Distance for Condition C.
- (3) No suggested minimum distance provided. At these speeds, sign location depends on physical conditions at the site.

Other miscellaneous warning signs that advise of potential hazards not related to a specific location may be installed in the most appropriate locations since they are not covered in Table 1. These include Deer Crossing and Soft Shoulder signs for example.

Lateral Placement

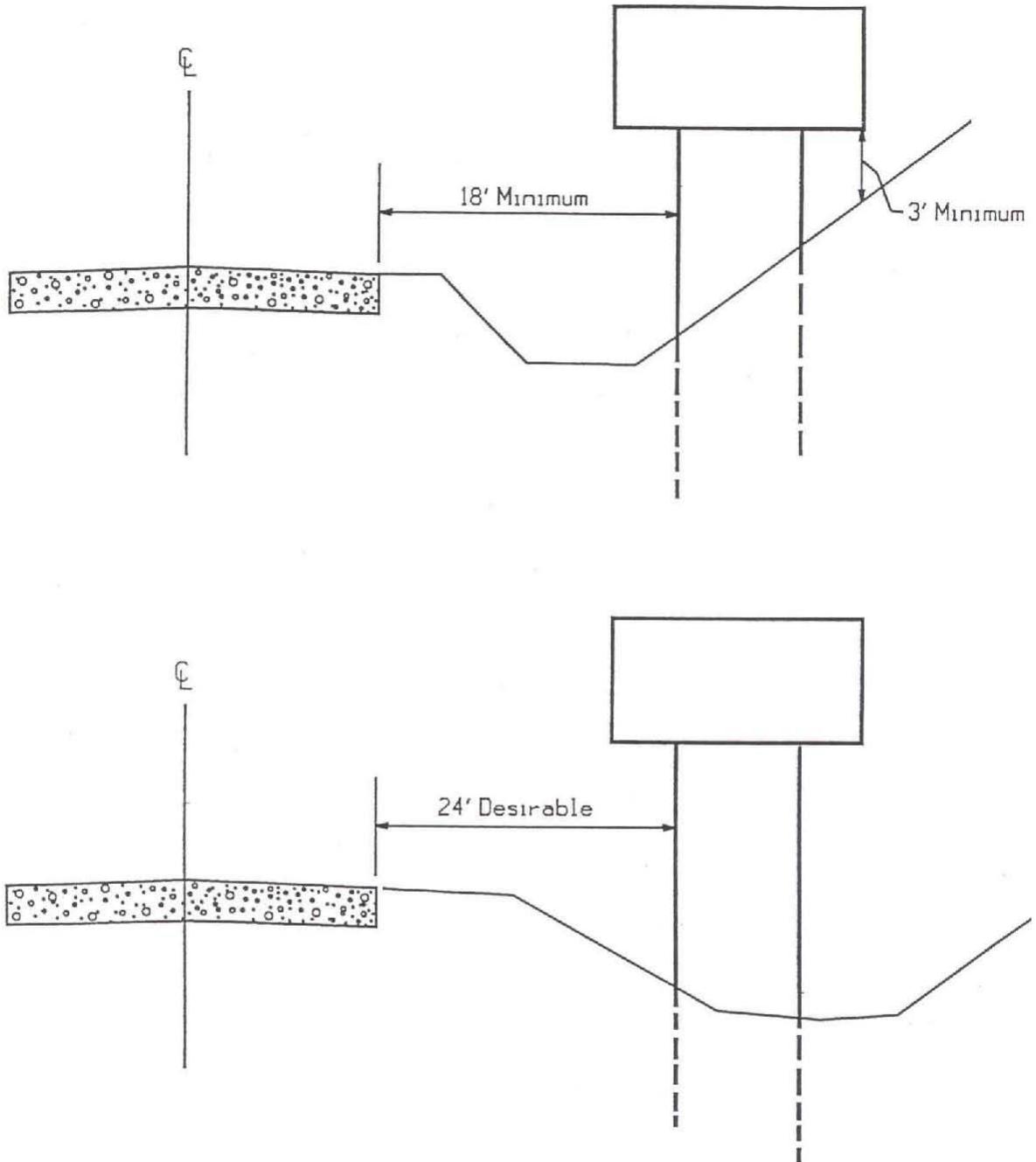
Signs on all newly constructed highways are to be offset from the traveled way if practical. This concept is to be extended to all signs that are replaced or are otherwise in need of attention by maintenance personnel.

The shape of the cross section, available right of way, maximum length of posts available and condition of the soil to resist wind load, control the permissible offset. Good signing practice requires that signs be at least 6 feet from the edge of the shoulder and at least 12 feet from the edge of the traveled way. Taking into consideration all of the above factors, offsets prescribed below should be used for all signs in rural areas except those in special categories covered later in this section.

<u>Type of Offset</u>	<u>Distance from Edge of Pavement to Near Post</u>
Minimum	18 feet
Desirable	24 feet

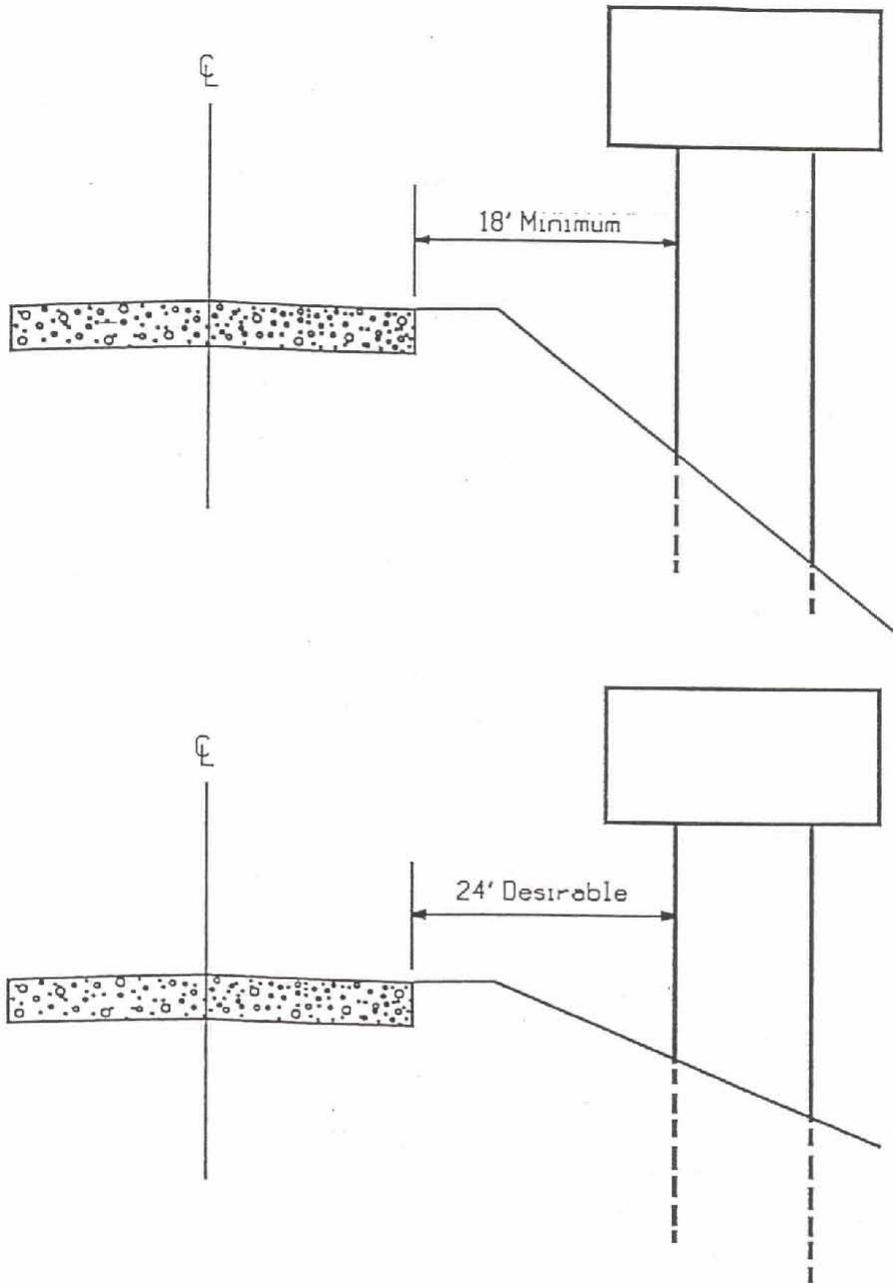
Offsets should be measured from the edge of the pavement in all cases, regardless of the shoulder width. The offset distances are to the post for a single support assembly or the near post for a multiple support assembly. Although the near edge of the sign projects closer to the roadway, offset distances will provide more than the minimum distances prescribed in the Manual on Uniform Traffic Control Devices.

Depending on shoulder width these offsets will result in approximately 12 feet of clearance from the edge of the shoulder to the near edge of the sign. A distance of approximately 14 feet is provided from the shoulder edge to the signpost to provide a recovery area for errant vehicles, to allow for mowing and snow plowing, and to keep the signs cleaner. Figures 1 and 2 show typical minimum and desirable sign offsets for cut and fill sections in rural areas.



SIGN OFFSETS IN CUT AREAS

Figure 1



SIGN OFFSETS IN FILL AREAS

Figure 2

The desirable 24-foot offset (from the pavement) should be used in most normal cases. Where site conditions do not permit this offset, the 18-foot minimum may be used. It is recognized that there may be unusual circumstances where these distances cannot be attained. For special cases, the near edge of the sign should be installed not less than 6 feet from the edge of the shoulder.

In urban areas, signs may be installed on existing utility and light poles when space for installing posts is otherwise not available. Permission should be obtained from the owner before installing signs. A minimum offset of 2 feet from the face of the curb to the near edge of the sign should be maintained if practical.

On Interstate, Freeway, and Expressway routes, large guide signs are normally installed between 30 and 60 feet measured from the edge of pavement to the near edge of the sign. In most cases, large guide signs are mounted on permanent steel breakaway supports because the sign area is too large for wood supports.

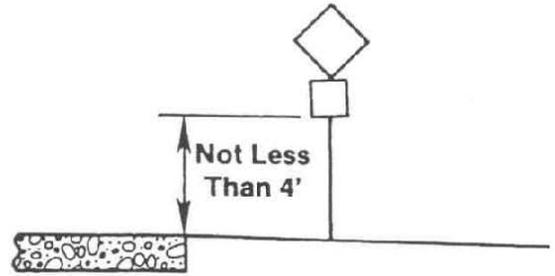
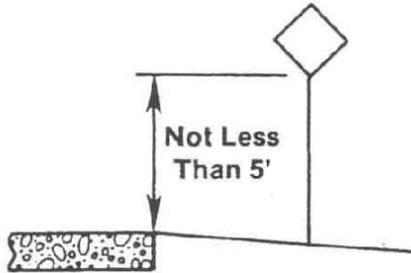
MOUNTING HEIGHT

On two-lane routes in rural areas, the Manual on Uniform Traffic Control Devices specifies that signs be mounted at a height of at least 5 feet measured from the bottom of the sign to the near edge of the pavement. In areas where parking or pedestrian movements are likely to occur or where there are other obstructions to view, the clearance from the bottom of the sign to the curb or ground at the base of the sign shall be at least 7 feet. When a secondary sign is mounted below another sign, the mounting heights prescribed above may be reduced to 4 feet and 6 feet respectively. The above mounting heights are illustrated in Figure 3. For the purpose of this section, a route sign assembly is treated as a single sign.

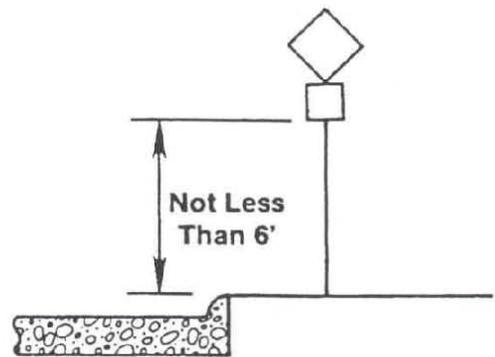
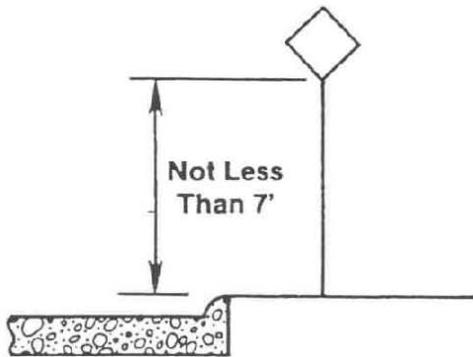
The sign mounting height requirements for ground installations on Interstate, Freeway and Expressway routes vary somewhat from those on conventional highways and streets. Directional signs should be mounted at a height of at least 7 feet measured from the level of the near edge of the pavement to the bottom of the sign. If a secondary sign is mounted below another sign, the major sign shall be at least 8 feet and the secondary sign at least 5 feet above the level of the pavement edge. All route signs, warning signs and regulatory signs shall be at least 7 feet above the near edge of the pavement. Where larger guide signs are placed 30 feet or more from the edge of the nearest traffic lane, the height from the bottom of the sign to the near edge of pavement may be 5 feet. The above requirements for signs installed on Interstate, Freeway and Expressway Routes including crossovers, intersections, and interchanges, are illustrated in Figure 4.

It is recognized that signs cannot be installed precisely at the above stated heights, therefore a mounting tolerance of 6 inches is allowed. The above mounting heights are considered minimums. As an example, the permissible range in mounting height for a rural area would be from 5 feet, 0 inches to 5 feet, 6 inches.

RURAL AREAS

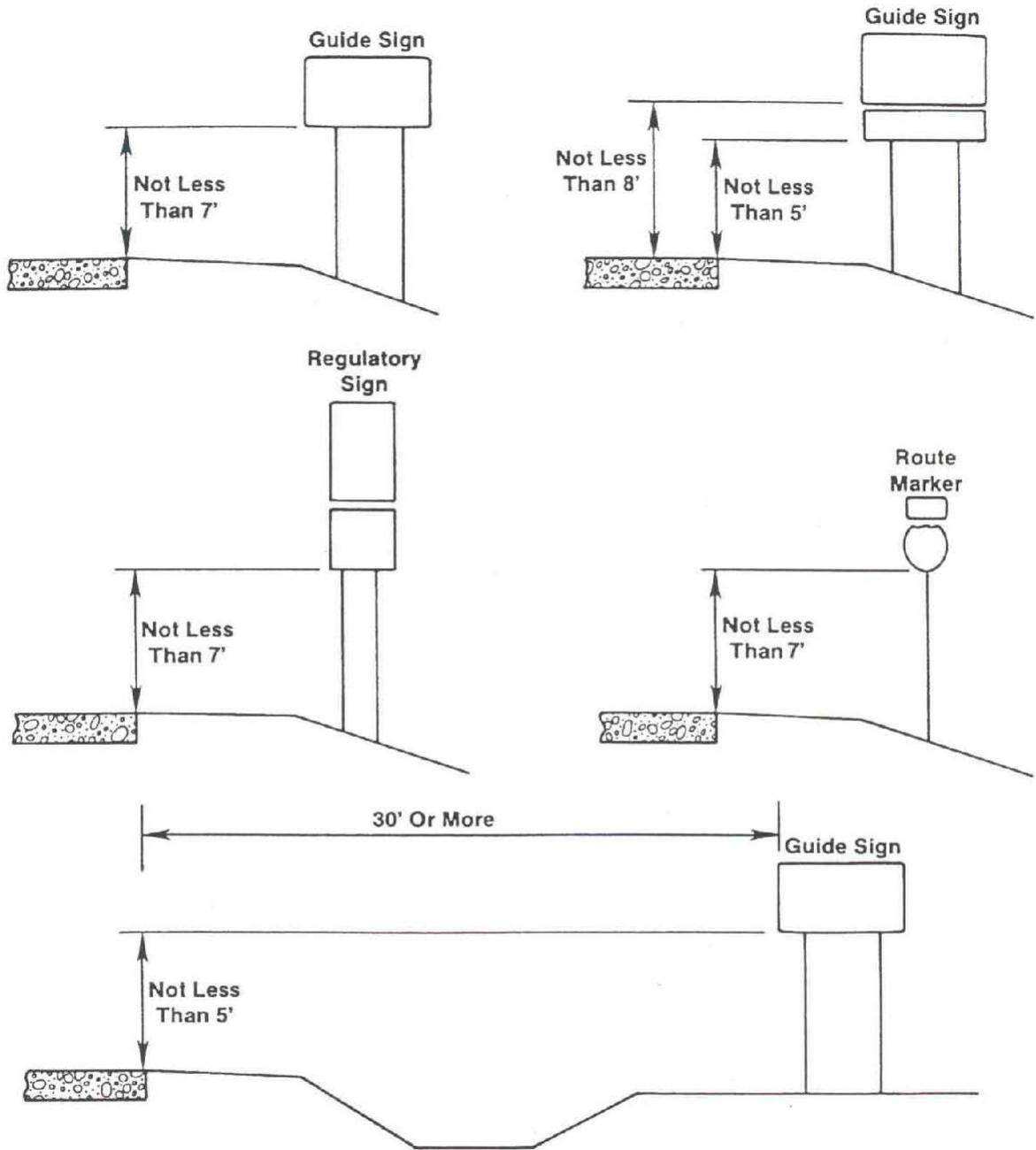


URBAN AREAS



Sign Mounting Heights
(Except for Freeways & Expressways)

Figure 3



Sign Mounting Heights
Freeways & Expressways

Figure 4

Stop Sign Placement

The location of stop signs is important; therefore this section of the guidelines is to provide specific directions on their placement.

Stop signs shall be located as close as practical to the intersection it regulates while optimizing its visibility to the road user it is intended to regulate. Stop signs do not necessarily need to be placed immediately adjacent to the painted stop bar. The MUTCD suggests that stop signs be located a maximum of 50 feet from the edge of the intersected street or highway. In areas where there are no curbs, the lateral clearance should be no closer than 6 feet from the edge of a usable shoulder. If a usable shoulder is nonexistent, the lateral clearance should be no closer than 12 feet from the edge of the traveled way. These offset distances are illustrated in Figure 5, Figure 6, Figure 7, and Figure 8 illustrate stop sign locations where there is a shoulder (Case A), where there is no shoulder (Case B) and where there is an island (Case C), respectively. Stop signs should be confined to the shaded areas, but as close to the approach roadway as possible to provide the motorist with the best visual impact. If the stop sign located as described above is considered marginal or unsatisfactory, consideration should be given to adding a stop sign barrel or island, provided ample space is available within the intersection. The barrel or island should be offset a minimum of 2 feet from the edge of the approach roadway and full shoulder width plus 2 feet from the through roadway. Also, the width of the turning roadway should be ample to accommodate the classes of vehicles using the intersection. A barrel may be used on a temporary basis.

In urban areas, stop signs should be placed a minimum of 6 feet from the near edge of the intersected street or a minimum of 4 feet in advance of the near edge of a marked crosswalk. Lateral clearance may be reduced to a minimum of 2 feet from the face of a curb. This minimum offset would also apply where stop signs are placed in medians or channelizing islands.

Where only one stop sign is used, it shall be located on the right side of the approach traffic lane. Where the approach roadway consists of two lanes of traffic, a second stop sign should be placed where it is visible to traffic in the inner lane if a suitable location exists. At channelized intersections, the additional stop sign may be placed on a channelizing island or median.

Yield Sign Placement

Yield signs are used as described in [Section 2B-2](#) of the Traffic and Safety Manual. When used at interchanges they should be placed as described below and shown in Figure 9.

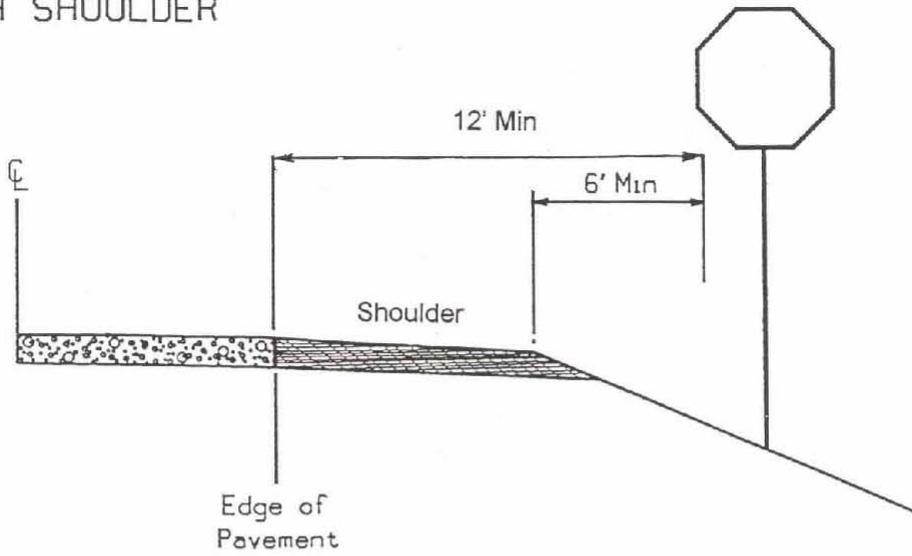
Yield signs should be placed on parallel acceleration lanes less than 1,300 feet in length, measured from the point of compound curvature (PCC) on the ramp where the driver can begin to accelerate, to the beginning of the lane drop taper.

Yield signs should be placed on tapered acceleration lanes less than 300 feet in length, measured from the point of tangency (PT) of the ramp entrance curve to the point at which the taper pavement is 12 feet wide.

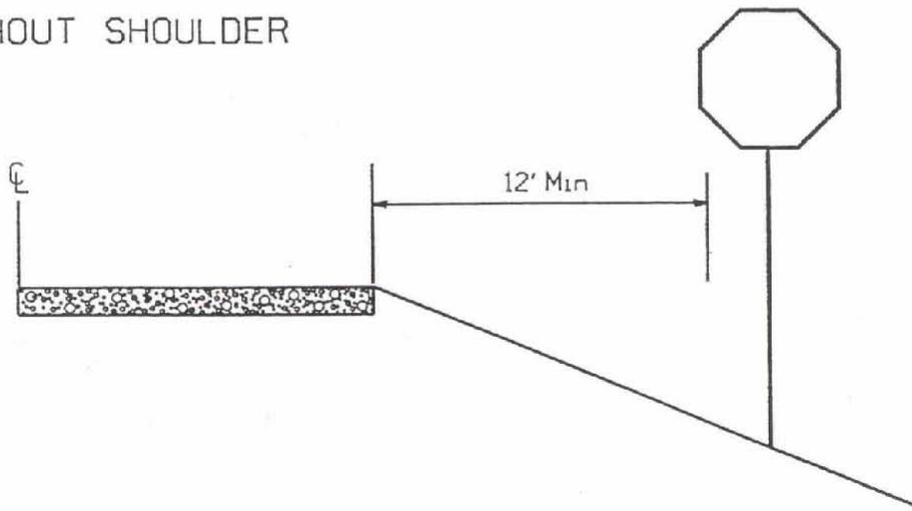
When used on an entrance ramp with a tapered acceleration lane, the Yield sign should be placed at the point where the taper pavement is twelve feet wide. When used on an entrance ramp with a parallel acceleration lane, the Yield sign should be placed at the beginning of the lane drop taper.

At locations where a parallel acceleration lane does not extend beyond a nearby exit ramp the sign should be placed on the entrance ramp near the parallel acceleration lane.

WITH SHOULDER



WITHOUT SHOULDER



LATERAL PLACEMENT OF STOP SIGNS

Figure 5

**CASE "A"
WITH SHOULDER**

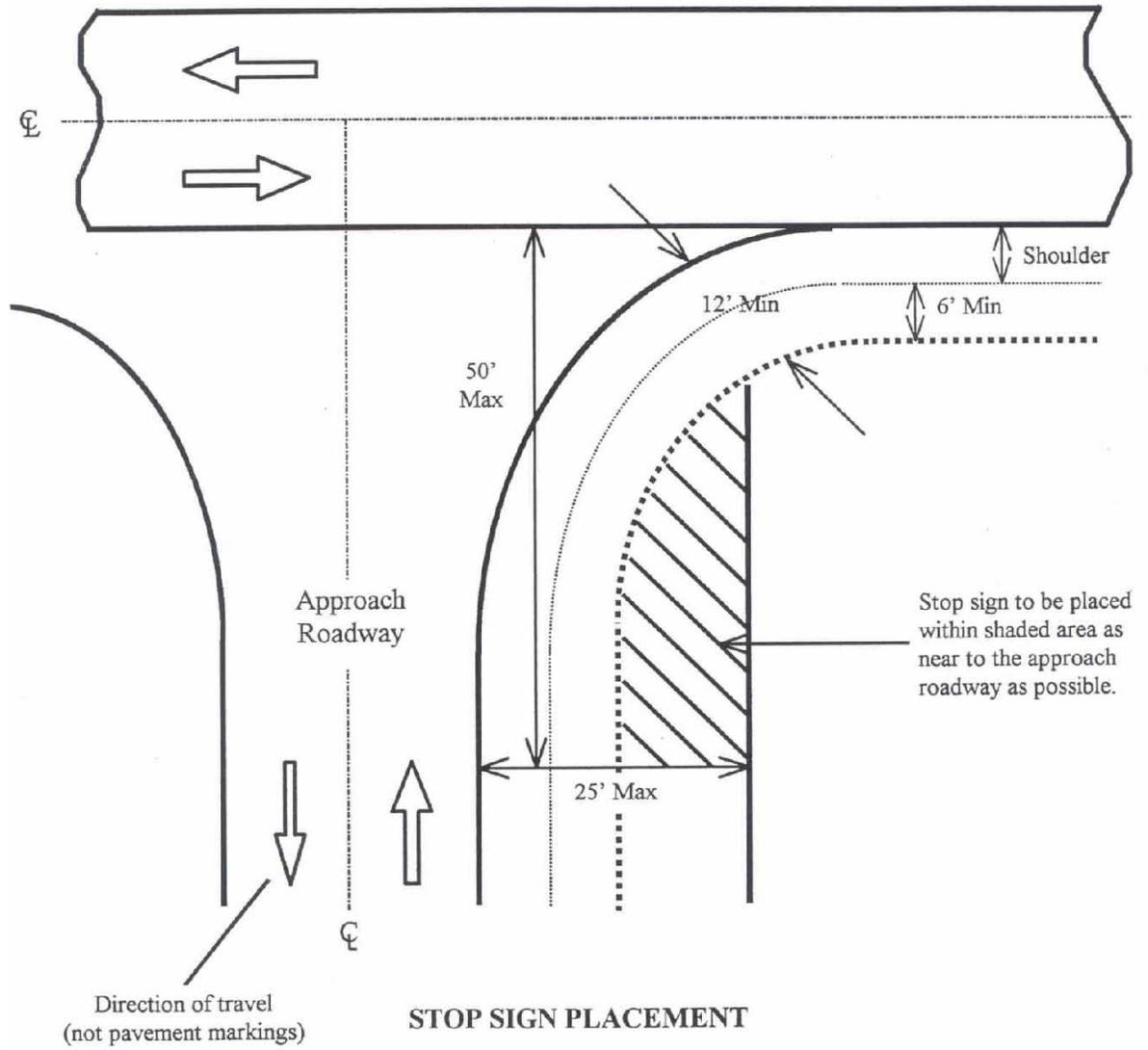


Figure 6

**CASE "B"
WITHOUT SHOULDER**

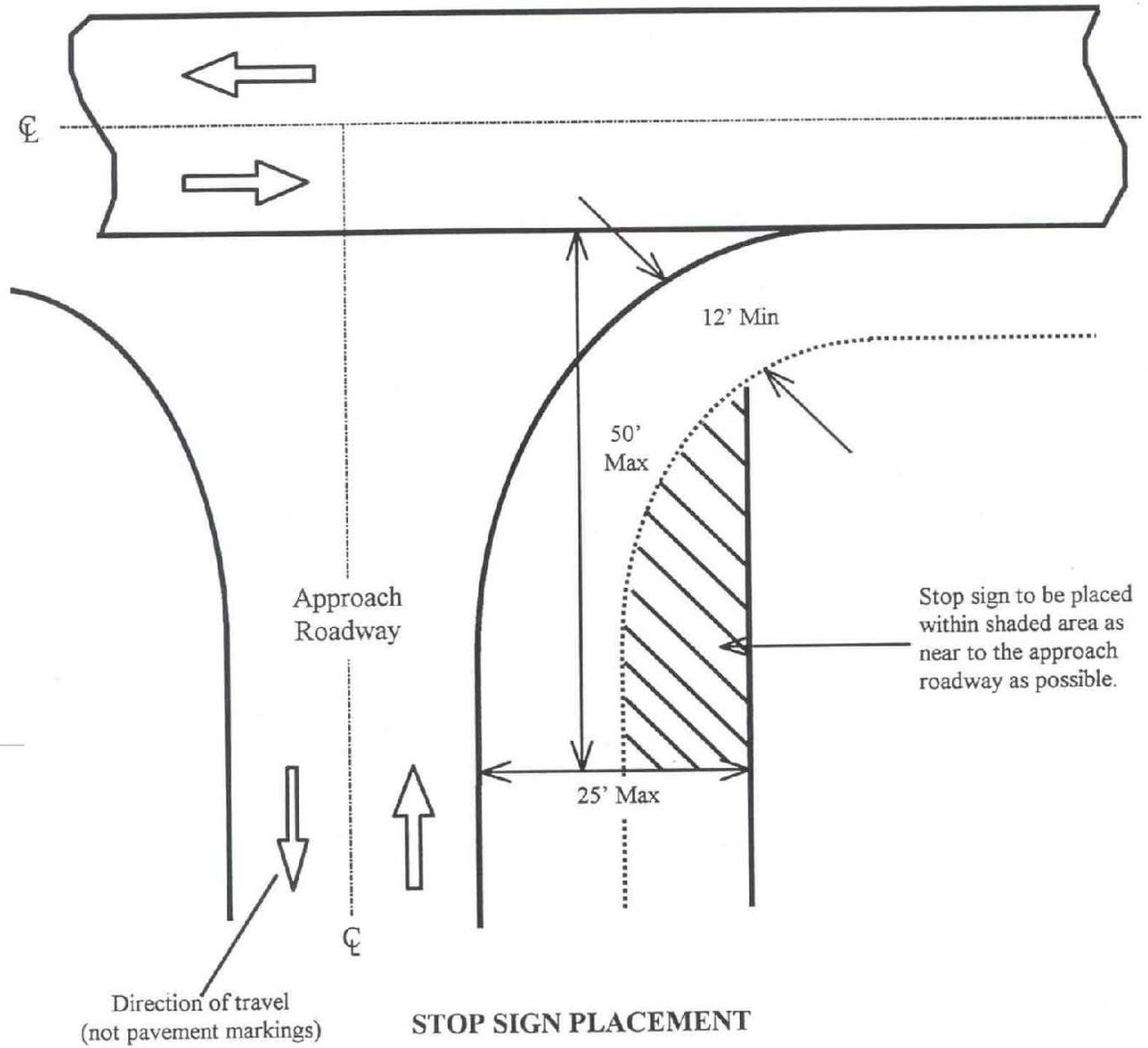


Figure 7

**CASE "C"
WITH ISLAND**

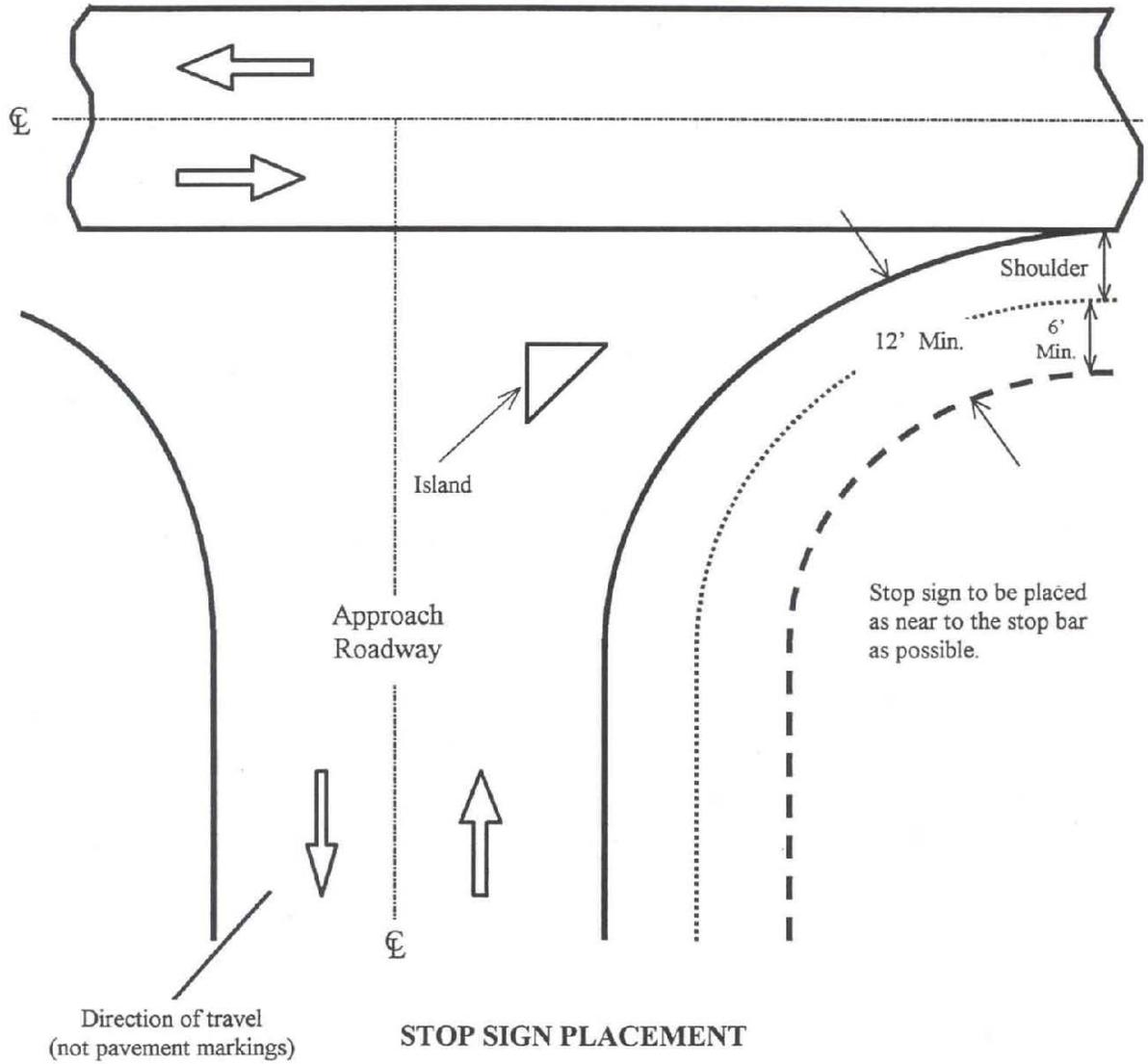
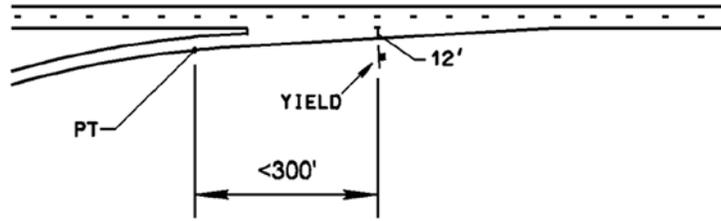
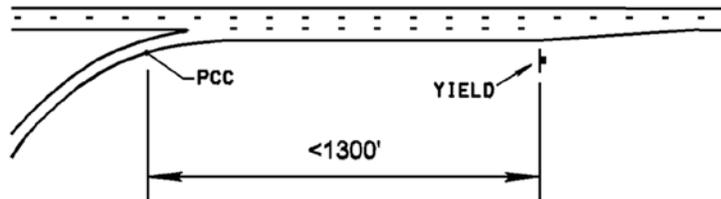


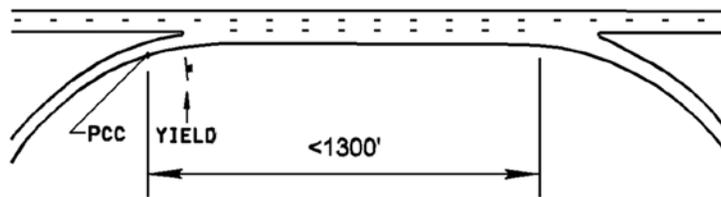
Figure 8



On Tapered Acceleration Lane



On Parallel Acceleration Lane With Lane Drop Taper



At Parallel Acceleration Lane Ending at Exit Ramp

Typical Yield Sign Placement at Interchanges
Figure 9

Speed Reduction Sign Placement

A Speed Reduction sign is to be used when a reduction is made from a speed zone of 55 mph or higher. For a speed limit of 55 mph, it is placed at the distance in advance of the lower speed zone shown in Table 2. For a speed reduction from a speed zone of less than 55 mph, a Speed Reduction sign may be used as authorized by the Office of Traffic and Safety. For a reduction from a speed greater than 55 mph, the Speed Reduction sign is to be placed 800 feet in advance of the lower limit.

Table 2

**Distance From Speed Reduction Sign In 55 mph Zone
To Speed Limit Sign**

Posted Speed Limit mph	Distance To Speed Reduction Sign (feet)
25	1200
30	1000
35	800
40	600
45	450
50	300

Speed Limit Sign Placement

Speed Limit signs should be placed at the following locations:

1. As nearly as practical to the location of a change in the speed limit as described in the Commission Order or Staff Action.
2. Just beyond major street intersections and at intervals of about three blocks in cities.
3. At the corporate limits line for traffic leaving the city, except for Freeways.
4. On primary highways for traffic exiting a higher speed highway at an interchange.
5. Beyond interchanges at the standard location of 1500 feet beyond entrance ramp tapers.
6. On rural highways with speed limits less than 55 mph, just beyond each intersection with a paved side road and at intervals not to exceed two miles.
7. On highways with speed limits of 65 mph, just beyond each intersection with a paved side road.
8. On multilane divided highways with speed limits of 55 mph, just beyond each paved side road and at intervals not to exceed two miles.

In rural areas with closely spaced intersections with paved side roads it is not necessary to have speed limit signs at each of them as long as the minimum spacing is approximately one mile.

Route Sign Assemblies

A route sign assembly consists of a route sign and auxiliary signs that further identify the route and indicate the direction. Route sign assemblies are used at the beginning of routes, end of routes, at route turns, at junctions and at intervals between signed intersections. If engineering

judgment indicates that groups of assemblies that include overlapping routes or multiple turns might be confusing, route signs or auxiliary signs may be omitted or combined, provided that clear directions are given to road users.

The beginning of a route shall be marked by an assembly that includes a Cardinal Direction auxiliary sign above a route sign. The end of a route shall be marked by an assembly that includes an End auxiliary sign above a route sign.

Placement of route sign assemblies is shown Figures 1, 2, 3, 4, 5, 6 and 7 of [Section 2A-10](#) of the Traffic and Safety Manual.

Junction Assembly

A Junction assembly consists of a Junction auxiliary sign and a route sign. The route sign shall carry the number of the intersected or joined route. The Junction assembly shall be installed in advance of an intersection where a numbered route is intersected or joined by another numbered route.

Advance Route Turn Assembly

An Advance Route Turn assembly consists of a route sign and an Advance Turn Arrow or word message auxiliary sign. It shall be placed in advance of an intersection where a turn must be made to remain on the indicated route. It is also placed between the junction assembly and the directional assembly to supplement the junction assembly in advance of intersecting routes. Where a multi-lane highway approaches an interchange or intersection with a numbered route, the word message auxiliary sign, Left Lane or Right Lane, should be used to pre-position turning vehicles in the correct lane from which to make their turn.

Directional Assembly

A Directional assembly consists of a route sign and a Directional Arrow auxiliary sign. It shall be used to mark turn movements previously indicated by an Advance Route Turn assembly or a Junction assembly.

Confirming Assembly

A Confirming assembly consists of a Cardinal Direction auxiliary sign and a route sign. It shall be erected just beyond primary-to-primary intersections of numbered routes to inform motorists of the route they have turned onto.

Reassurance Assembly

A Reassurance assembly consists of a Cardinal Direction auxiliary sign and a route sign. Reassurance assemblies should be spaced at such intervals as necessary to keep drivers informed of their route. In urban areas Reassurance assemblies should be erected just beyond major intersections and at intervals of about three city blocks.

For the benefit of traffic entering from paved secondary routes, Reassurance assemblies for the primary route shall be placed for both directions of traffic. They should also be placed at unpaved intersections on alternating sides of the primary highway. However, in areas with closely spaced intersections it is not necessary to have reassurance assemblies at each of them as long as the minimum spacing is approximately one mile. Reassurance assemblies are also used in the series of signs at corporate limits as shown in Figure 6 of [Section 2A-10](#) of the Traffic and Safety Manual.

Signing for Climbing Lane

Signing for climbing lanes consists of a Slower Traffic Keep Right sign placed 600 feet in advance of the climbing lane taper and at certain locations along the climbing lane, a No Passing

Zone warning sign at the taper point and typical Lane Ends warning signing. Required signing for climbing lanes is shown in Figure 7 of [Section 3B-2](#) of the Traffic and Safety Manual.

Signing for Passing Lane

Signing for passing lanes constructed at strategic locations along a normal two-lane highway consists of a regulatory Passing Lane 2 Miles Ahead sign, a No Passing Zone warning sign at the taper point, a Slower Traffic Keep Right sign placed at the end of the of the climbing lane taper and typical Lane Ends warning signing. The signing for passing lanes is shown in Figure 6 of [Section 3B-2](#) of the Traffic and Safety Manual. Signing for Passing Lanes is not required where passing lanes have been provided at intersections.

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