RE: 2007 NPA Text (Clean Version)

P. 230, Lines 29-30 SECTION 3B.04 White Lane Line Pavement Markings and Warrants
P. 232, Lines 6-16 SECTION 3B.05 Other White Longitudinal Pavement Markings

FIGURE 3B-9 (B)

COMMENTS: This recommendation will modify past action of the MTC and the NCUTCD. Add an OPTION Statement and MODIFY another OPTION Statement to allow agencies to continue to mark tapered acceleration lanes for safe merge operations. The NCHRP Pavement Marking Synthesis 356 actually shows the NPA language to be the minority report.

Modify the OPTION Statement on P. 230, Lines 29-30 to read as follows:
For entrance ramps with a tapered acceleration lane, a dotted white line extension may be installed from the downstream end of the through lane channelizing line to the downstream end of the acceleration taper.

Add an OPTION Statement beginning on P. 232, Line 13 to read as follows:
For entrance ramps with a tapered acceleration lane, the channelizing lines may be terminated upstream of the theoretical gore, but no more than one-half the distance from the theoretical gore to the physical gore.

Modify Figure 3B-9 (B) in conformance to the above-proposed OPTIONS.

REASON: The 2008 NPA language, a change from the 2003 MUTCD, is also contrary to the results of the NCHRP Synthesis 356, “Pavement Markings-Design and Typical Layout Details.” I marked up Figure 3B-9 to show where states are marking the end of these channelization lines (Note blue arrowheads). The drawing is titled “Marking Synthesis Representation of End of Channelizing Line for a Tapered Acceleration Lane.” 76% of responding agencies terminate the channelizing lines upstream of the theoretical gore point. This would be prohibitive based on the NPA language. Only 6 of 25 terminate the lines where they join, at the theoretical gore. Why is an OPTION not allowed? Are the majority of states experiencing operational problems with their current marking methods? Safe merges from tapered acceleration lanes are a function of gap acceptance length, initial ramp speed, speed differentials, ramp geometrics, through lane/taper ratio, etc. The ability of the engineer to lengthen or shorten this opening to the through lane is removed with the NPA language. The proposed change is needed to allow agencies the flexibility to adjust the limits of the markings to promote safe merge operations for each location.
Standard:

For entrance ramps with a parallel acceleration lane, a **lane line should be extended from the end of the channelizing line for a distance of one half the length of the full-width acceleration lane** dotted white line shall be installed from the theoretical gore or from the downstream end of a solid white lane line, if used, that extends downstream from the theoretical gore, to a point at least one-half the distance from the theoretical gore to the downstream end of the acceleration taper, as shown in Drawing A of Figure 3B-9.

Option:

For entrance ramps with a parallel acceleration lane, a dotted white line extension may be installed from the downstream end of the dotted white lane line to the downstream end of the acceleration taper.

For entrance ramps with a tapered acceleration lane, lane line markings may be placed to extend the channelizing line, but not beyond a point where the tapered lane meets the near side of the through traffic lane. A dotted white line extension may be installed from the downstream end of the through lane channelizing line to the downstream end of the acceleration taper.

Standard:

A wide dotted white line (see Drawings A and B of Figure 3B-10) shall be used as a lane drop marking as shown in Figure 3B-10 may be used in advance of lane drops at exit ramps to distinguish a lane drop from a normal exit ramp or from an auxiliary lane.

A wide dotted white line (see Drawing C of Figure 3B-8) shall be used to separate a through lane that continues beyond an interchange from an adjacent auxiliary lane between an entrance ramp and an exit ramp.

A normal or wide dotted white line (see Drawing C of Figure 3B-10) shall be used as a lane drop marking in advance of lane drops at intersections to distinguish a lane drop from an intersection through lane.

A normal or wide dotted white line (see Drawing D of Figure 3B-10) shall be used to separate a through lane that continues beyond an intersection from an adjacent auxiliary lane between two or more intersections.

Guidance:

A normal dotted white line should be used as a lane drop marking for lane reduction transitions (see Section 3B.09 and Figure 3B-13).

If used, lane drop markings used in advance of lane drops at freeway and expressway exit ramps should begin at least added to be consistent with Figure 3B-10, which shows a solid line of variable length after 0.5 miles of lane drop markings 800 m (0.5 mi) in advance of the theoretical gore point.

On the approach to a multi-lane exit ramp having an optional exit lane that also carries through traffic, lane line markings should be used as illustrated in drawing B of Figure 3B-10. In this case, if the right-most exit lane is an added lane such as a parallel deceleration lane, the lane drop marking should begin at the upstream end of the full-width deceleration lane.

Lane drop markings used in advance of lane drops at intersections should begin a distance in advance of the intersection that is determined by engineering judgment as suitable to enable drivers who do not
markings at exit ramp and entrance ramps for enhanced nighttime visibility, to reflect recommendations from the Older Driver handbook.

**Standard:**

A channelizing line shall be a wide or double solid white line.

**Option:**

Channelizing lines may be used to form channelizing islands where traffic traveling in the same direction is permitted on both sides of the island.

**Standard:**

Other pavement markings in the channelizing island area shall be white.

**Support:**

Examples of channelizing line applications are shown in Figures 3B-8, 3B-9, 3B-10, and 3B-11.

Channelizing lines at exit ramps as shown in Figure 3B-8 define the neutral area, direct exiting traffic at the proper angle for smooth divergence from the main lanes into the ramp, and reduce the probability of colliding with objects adjacent to the roadway.

Channelizing lines at entrance ramps as shown in Figure 3B-9 promote reasonably safe orderly and efficient merging with the through traffic.

**Standard:**

For exit and entrance ramps, channelizing lines shall be placed along the on both sides of the neutral area adjacent to the through traffic lane and the ramp lane.

For exit ramps, the channelizing lines for the ramp and through lanes shall begin at the theoretical gore and extend downstream on each side of the neutral area to the physical gore.

For entrance ramps, the channelizing lines for the ramp and through lanes shall begin at the physical gore and extend downstream on each side of the neutral area to the theoretical gore.

**Option:**

For entrance ramps with a tapered acceleration lane the channelizing lines may be terminated upstream of the theoretical gore up to one-half the distance from the theoretical gore to the physical gore.

White chevron markings may be placed in the neutral area of exit ramp and entrance ramp gores for special emphasis as shown in Figure 3B-8. The channelizing lines and the optional chevron markings at exit ramp and entrance ramp gores may be supplemented with white retroreflective or internally illuminated raised pavement markers (see Sections 3B.11 and 3B.13) for enhanced nighttime visibility.

**Guidance:**

For entrance ramps, a channelizing line should be placed along the side of the neutral area adjacent to the ramp lane.

### Section 3B.06  Edge Line Pavement Markings

**Standard:**

If used, edge line pavement markings shall delineate the right or left edges of a roadway.

Except for dotted edge line extensions (see Section 3B.08), edge line markings shall not be continued through intersections or major driveways.

If used on the roadways of divided highways or one-way streets, or on any ramp in the direction of travel, left edge line pavement markings shall consist of a normal solid yellow line to delineate the left-hand edge of a roadway or to indicate driving or passing restrictions left of these markings.
NOTE: Blue arrowheads are a representation of the approximate location of the end of the channelizing lines for the through and acceleration lanes used by the State Agencies. The submitter is totally responsible for arrowhead placement and believes this to be an accurate representation based upon the Synthesis Report.

**Figure 3B-9. Examples of Dotted Line and Channelizing Line Applications for Entrance Ramp Markings**

- **A - Parallel acceleration lane**
  - Optional dotted lane line or dotted extension of right-hand edge line downstream beyond the '0.5 A MIN.' point
  - Dotted lane line markings for at least half the length of the full-width acceleration lane plus taper
  - Solid white lane line (optional, variable length) or dotted white lane line
  - Channelizing lines
  - Theoretical gore point

- **B - Tapered acceleration lane**
  - Optional dotted extension of right-hand edge line
  - Full lane width
  - Channelizing lines
  - Edge of through lane

Legend:
- Direction of travel
- A = Length of acceleration lane plus taper

- IN, OK, PA, VT, WI, PR at theoretical gore (NPA Standard)
- UT - 3ft Separation
- IA - 4ft.
- AZ, NH – 5ft.
- CA, CO, GA, HI, IL, MN, MT, NY, OH, TN, WA – 6ft
- ND - 195ft downstream of physical gore
- WY - width of mainline shoulder (6-10 ft. ?)
- WV - midpt of paved gore
- NC
B = Limit of Channelization lines

0.5 B min.