



National Committee on Uniform Traffic Control Devices

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ATTACHMENT NO.1

Item No.: 15B-RW-01

NCUTCD Proposal for Changes to the Manual on Uniform Traffic Control Devices

TECHNICAL COMMITTEE: Regulatory & Warning Signs, GM & I, Markings
ITEM NUMBER: 15B-RW-01
TOPIC: Climbing, Truck and Passing Lanes
ORIGIN OF REQUEST: RWSTC Task force: Tom Heydel (RWSTC chair), Tom Honich (GMI), Lee Roadifer (RWSTC), Jeffrey Wolfe (RWSTC), Richard Meredith (RWSTC), Scott Kuznicki (RWSTC), Harry Campbell (Markings), James Kratz (Markings)
AFFECTED SECTIONS OF MUTCD: Sections 2A.16a, 2B.30, 2B.31, 2C.42, 2D.51, 3B.04, 3B.09

DEVELOPMENT HISTORY:

- Approved by Technical Committees: 06/18/2015
- Approved by Technical Committees following sponsor comments: (RWSTC, Markings, and GM&I): 01/07/2016
- Approved by NCUTCD Council: 01/08/2016

This is a proposal for recommended changes to the MUTCD that has been approved by the NCUTCD Council. This proposal does not represent a revision of the MUTCD and does not constitute official MUTCD standards, guidance, or options. It will be submitted to FHWA for consideration for inclusion in a future MUTCD revision. The MUTCD can be revised only through the federal rulemaking process.

SUMMARY:

The MUTCD contains references to truck climbing and passing lane signing in various sections of the manual as noted in affected portions of the MUTCD above. This sometimes leads to confusion in terms of how to apply these signs correctly, where to place the signs and how the signs are used for various posted speeds. In 2002 a proposal was sent to sponsors but did not make it beyond the sponsor comment stage. Also, Texas Transportation Institute did some research in 2002 related to this topic. Accordingly, a joint task force is needed to provide for a consistent application. A detail depicting the use of signing and marking for climbing and passing lanes is needed to illustrate how and when signs and markings are used.

Research: Texas Transportation Institute 2001, Design Guidelines for Passing lanes

34 **DISCUSSION:**

35 The research focused on three critical elements of the design of passing lanes: passing lane
36 length and spacing, lane and shoulder width requirements, and signing and marking strategies.
37 Researchers reviewed the literature and conducted site visits and field studies in Kansas,
38 Minnesota, and Texas. In addition, a computer-based survey was conducted to examine driver
39 understanding and acceptance of signs, markings, and highway design characteristics of passing
40 lanes.

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42 Given this background, this became the starting point for developing a proposal to provide cross
43 references between the guide, regulatory, warning and marking sections of the MUTCD. By
44 providing a detail in Part 2A with references to other sections of the MUTCD it provides a
45 consistency with the way other details are handled such as Figure 2A-4 which has all the
46 elements of regulatory, warning, guide signs plus markings.
47 The detail, along with modifications to existing text will provide the practioner needed guidance
48 on the use of these signs.

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50 **RECOMMENDED MUTCD CHANGES**
51 The following present the proposed changes to the current MUTCD within the context of the
52 current MUTCD language. Proposed additions to the MUTCD are shown in blue underline and
53 proposed deletions from the MUTCD are shown in ~~red strikethrough~~. Changes previously
54 approved by NCUTCD Council (but not yet adopted by FHWA) are shown in green double
55 underline for additions and ~~green double strikethrough~~ for deletions. In some cases, background
56 comments may be provided with the MUTCD text. These comments are indicated by
57 highlighted light blue in brackets.

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59 **PART 2. SIGNS**

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61 **CHAPTER 2A. GENERAL**

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63 Section 2A.16a is to be after Section 2A.16

64 **Section 2A.16a Passing, Climbing and Truck Lane Signs**

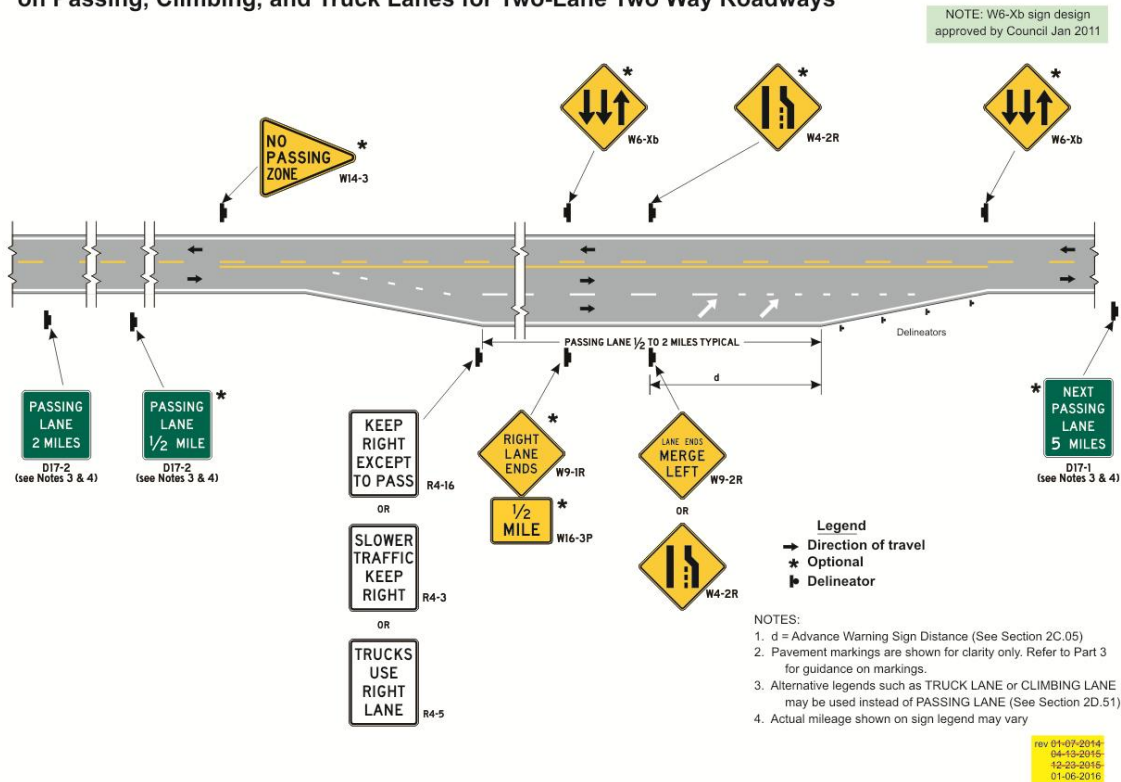
65 Support:

66 01 Passing, Climbing and/or Truck lanes can facilitate passing of slower vehicles without
67 crossing the centerline. Where passing, climbing and/or truck lanes are provided, operations and
68 safety can be improved by giving road users advance information about the location of passing
69 lanes (see Section 2D.51).

70 02 Sections 2B.30, 2B.31, 2C.42, 2C.42a, and 2D.51 contain information on regulatory,
71 warning, guide signs, and Sections 3B.04 and 3B.09 contain information on pavement markings
72 typically used for passing, climbing and truck lanes. Figure 2A-5 provides an example of the
73 relative locations of the regulatory, warning and guide signs and pavement markings for passing,
74 climbing and truck lanes. For further details on pavement markings see Chapter 3B.

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Figure 2A-5 - Relative Locations of Regulatory, Warning, and Guide Signs on Passing, Climbing, and Truck Lanes for Two-Lane Two Way Roadways



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[Figure 2A-5 – Relative Location of Regulatory, Warning, and Guide Signs on Passing, Climbing, and Truck Lanes for Two Lane Two Way Roadways](#)

PART 2 SIGNS

CHAPTER 2B. REGULATORY SIGNS, BARRICADES, AND GATES

Section 2B.30 KEEP RIGHT EXCEPT TO PASS Sign (R4-16) and SLOWER TRAFFIC KEEP RIGHT Sign (R4-3)

Option:

01 The KEEP RIGHT EXCEPT TO PASS (R4-16) sign (see Figure 2B-10) may be used on multi-lane roadways to direct drivers to stay in the right-hand lane except when they are passing another vehicle.

Guidance:

02 If used, the KEEP RIGHT EXCEPT TO PASS sign should be installed *just beyond* at the beginning of a multi-lane roadway and at selected locations along multi-lane roadways for additional emphasis.

Option:

03 The SLOWER TRAFFIC KEEP RIGHT (R4-3) sign (see Figure 2B-10) may be used on multi-lane roadways to reduce unnecessary lane changing *and improve capacity*.

99 *Guidance:*

100 ⁰⁴ *If used, the SLOWER TRAFFIC KEEP RIGHT sign should be installed ~~just beyond~~ at the*
101 *beginning of a multi-lane roadway pavement, and at selected locations where there is a tendency*
102 *on the part of some road users to drive in the left-hand lane (or lanes) below the normal speed of*
103 *traffic. This sign should not be used on the approach to an interchange or through an*
104 *interchange area.*

105 ⁰⁵ A KEEP RIGHT EXCEPT TO PASS (R4-16) or SLOWER TRAFFIC KEEP RIGHT (R4-3)
106 sign should be installed at the beginning of a passing, climbing or truck lane as shown in Figure
107 2A-5.

108 *Support:*

109 ⁰⁶ Section 2A.16a contains provisions regarding regulatory, warning and guide signs used for
110 passing, climbing and truck lanes, and Figure 2A-5 illustrates an example of the relative
111 locations of signs and pavement markings used for passing, climbing and truck lanes.

113 **Section 2B.31 TRUCKS USE RIGHT LANE Sign (R4-5)**

114 *Guidance:*

115 ~~⁰¹ *If an extra lane has been provided for trucks and other slow-moving traffic, a SLOWER*~~
116 ~~*TRAFFIC KEEP RIGHT (R4-3) sign (see Figure 2B-10), TRUCKS USE RIGHT LANE (R4-5)*~~
117 ~~*sign (see Figure 2B-10), or other appropriate sign should be installed at the beginning of the*~~
118 ~~*lane.*~~

119 *Option:*

120 ~~⁰² *The SLOWER TRAFFIC KEEP RIGHT sign may be used as a supplement or as an*~~
121 ~~*alternative to the TRUCKS USE RIGHT LANE sign. Both signs may be used on multi-lane*~~
122 ~~*roadways to improve capacity and reduce lane changing.*~~

123 ⁰¹ If an extra lane has been provided for trucks and other slow moving traffic, the TRUCKS
124 USE RIGHT LANE (R4-5) sign (see Figure 2B-10) may be used as an alternative or supplement
125 to the KEEP RIGHT EXCEPT TO PASS (R4-16) and/or SLOWER TRAFFIC KEEP RIGHT
126 (R4-3) sign installed at the beginning of a passing, climbing or truck lane as shown in Figure 2A-
127 5 and at selected locations along multi-lane roadways for additional emphasis.

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129 ^{03 02} The TRUCKS USE RIGHT LANE (R4-5) sign may be used on multi-lane roadways to
130 reduce unnecessary lane changing.

131 *Guidance:*

132 ^{04 03} *If an extra lane has been provided for trucks and other slow-moving traffic, a Lane Ends*
133 *sign (see Section 2C.42) should be installed in advance of the point where the extra lane ends.*
134 *Appropriate pavement markings should be installed at both the upstream and downstream ends*
135 *of the extra lane (see Section 3B.09 and Figure 3B-13).*

136 *Support:*

137 ^{05 04} Section 2D.51 contains provisions ~~information~~ regarding advance information signs for
138 extra lanes ~~that have been provided~~ for trucks and other slow-moving traffic.

139 ⁰⁵ Section 2A.16a contains provisions regarding regulatory, warning and guide signs used for
140 passing, climbing and truck lanes, and Figure 2A-5 illustrates an example of the relative
141 locations of signs and pavement markings used for passing, climbing and truck lanes.

143 **PART 2. SIGNS**

145 **CHAPTER 2C. WARNING SIGNS AND OBJECT MARKERS**

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147 **Section 2C.42 Lane Ends Signs (W4-2, W9-1, W9-2)**

148 *Guidance:*

149 01 *The LANE ENDS MERGE LEFT (RIGHT) (W9-2) sign or the Lane Ends (W4-2) sign should*
150 *be used to warn of the reduction in the number of traffic lanes in the direction of travel on a*
151 *multi-lane highway (see Figure 2C-8).*

152 *Option:*

153 02 *The RIGHT (LEFT) LANE ENDS (W9-1) sign (see Figure 2C-8) may be used in advance*
154 *of the Lane Ends (W4-2) sign or the LANE ENDS MERGE LEFT (RIGHT) (W9-2) sign as*
155 *additional warning or to emphasize that the traffic lane is ending and that a merging maneuver*
156 *will be required.*

157 *Guidance:*

158 03 *If used, the RIGHT (LEFT) LANE ENDS (W9-1) sign should be installed in advance of the*
159 *Lane Ends (W4-2 or W9-2) sign. ~~adjacent to the Lane Reduction Arrow pavement markings.~~*

160 *Option:*

161 04 *On one-way streets or on divided highways where the width of the median will permit, two*
162 *Lane Ends signs may be placed facing approaching traffic, one on the right-hand side and the*
163 *other on the left-hand side or median.*

164 *Support:*

165 05 *Section 3B.09 contains information regarding the use of pavement markings in conjunction*
166 *with a lane reduction.*

167 *Guidance:*

168 06 *Where an extra lane has been provided for slower moving traffic (see Section 2B.31), a Lane*
169 *Ends word sign or a Lane Ends (W4-2) symbol sign should be installed in advance of the*
170 *downstream end of the extra lane.*

171 07 *Lane Ends signs should not be installed in advance of the downstream end of an*
172 *acceleration lane.*

173 *Support:*

174 08 *Section 2A.16a contains provisions regarding regulatory, warning and guide signs used for*
175 *passing, climbing and truck lanes, and Figure 2A-5 illustrates an example of the relative*
176 *locations of signs and pavement markings used for passing, climbing and truck lanes.*

177 **Standard:**

178 08-09 **In dropped lane situations, regulatory signs (see Section 2B.20) shall be used to inform**
179 **road users that a through lane is becoming a mandatory turn lane. The W4-2, W9-1, and**
180 **W9-2 signs shall not be used in dropped lane situations.**

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182 **The following section was previously approved by Council in January 2011:**

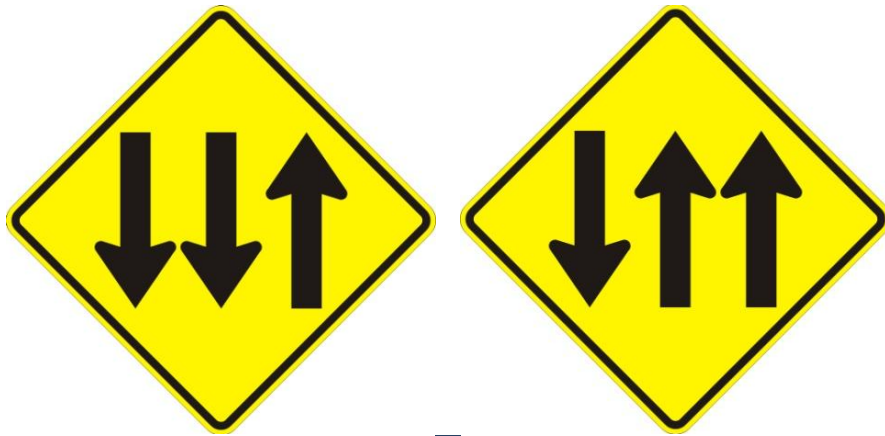
183 **Section 2C.42a Two-way Traffic on a Three Lane Roadway (W6-4) sign**

184 *Option:*

185 01 *The Two-way Traffic on a Three Lane Roadway (W6-4a and W6-4b) signs may be installed*
186 *along three lane roadways with two lanes in one direction and one in the opposing direction.*

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189 **Standard:**

190 02 *The W6-4 sign shall match the lane configuration of the roadway.*



W6-4a and W6-4b

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Support:

3 Section 2A.16a contains provisions regarding regulatory, warning and guide signs used for passing, climbing and truck lanes, and Figure 2A-5 illustrates an example of the relative locations of signs and pavement markings used for passing, climbing and truck lanes.

PART 2. SIGNS

CHAPTER 2D. GUIDE SIGNS—CONVENTIONAL ROADS

Section 2D.51 Passing, Climbing and Truck, ~~Passing, or Climbing~~ Lane Signs (D17-1 and D17-2)

Guidance:

~~*01—If an extra lane has been provided for trucks and other slow-moving traffic, a NEXT TRUCK LANE XX MILES (D17-1) sign and/or a TRUCK LANE XX MILES (D17-2) sign (see Figure 2D-21) should may be installed in advance of the lane.*~~

01 If a passing, climbing or truck lane has been provided to facilitate the passing of trucks and other slower-moving traffic on roadways with one lane of traffic in each direction, a PASSING, CLIMBING or TRUCK LANE XX MILES (D17-2) sign (see Figure 2D-21) should be installed in advance of the lane.

Option:

01a If a series of passing, climbing or truck lanes are provided along a highway, a NEXT PASSING, CLIMBING or TRUCK LANE XX MILES (D17-1) sign (see Figure 2D-21) may should be installed after each passing, climbing, or truck lane.

Figure 2D-21 Crossover, Passing, Climbing, Truck Lane, and Slow Vehicle Signs

Figure 2D-21. Crossover, Truck Lane, and Slow Vehicle Signs



* The words PASSING or CLIMBING may be substituted for the word TRUCK on the D17-1 and D17-2 signs.

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Change "TRUCK" to "PASSING" on the D17-1 and D17-2 signs above. Alternate messages "TRUCK" or "CLIMBING" may be used.



D17-1

D17-2

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Option:

02 Alternative legends such as TRUCK PASSING LANE or CLIMBING LANE may be used instead of ~~TRUCK~~-PASSING LANE on the (D17-1) and (D17-2) signs.

03 Section 2B.31 contains information regarding regulatory signs for these types of lanes.

Support:

04 Section 2A.16a contains provisions regarding regulatory, warning and guide signs used for passing, climbing and truck lanes, and Figure 2A-5 illustrates an example of the relative locations of signs and pavement markings used for passing, climbing and truck lanes.

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PART 3. MARKINGS

CHAPTER 3B. PAVEMENT AND CURB MARKINGS

Section 3B.04 White Lane Line Pavement Markings and Warrants

Standard:

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

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

Guidance:

03 *Lane line markings should be used on all roadways that are intended to operate with two or more adjacent traffic lanes in the same direction of travel, except as otherwise required for reversible lanes. Lane line markings should also be used at congested locations where the*

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254 roadway will accommodate more traffic lanes with lane line markings than without the
255 markings.

256 Support:

257 04 Examples of lane line markings are shown in Figures 3B-2, 3B-3, and 3B-7 through 3B-13.

258 **Standard:**

259 05 **Except as provided in Paragraph 6, where crossing the lane line markings with care is**
260 **permitted, the lane line markings shall consist of a normal broken white line.**

261 06 **A dotted white line marking shall be used as the lane line to separate a through lane**
262 **that continues beyond the interchange or intersection from an adjacent lane for any of the**
263 **following conditions:**

264 **A. A deceleration or acceleration lane,**

265 **B. A through lane that becomes a mandatory exit or turn lane,**

266 **C. An auxiliary lane 2 miles or less in length between an entrance ramp and an exit**
267 **ramp, or**

268 **D. An auxiliary lane 1 mile or less in length between two adjacent intersections.**

269 07 **For exit ramps with a parallel deceleration lane, a normal width dotted white lane line**
270 **shall be installed from the upstream end of the full-width deceleration lane to the**
271 **theoretical gore or to the upstream end of a solid white lane line, if used, that extends**
272 **upstream from the theoretical gore as shown in Drawings A and C of Figure 3B-8.**

273 Option:

274 08 For exit ramps with a parallel deceleration lane, a normal width dotted white line extension
275 may be installed in the taper area upstream from the full-width deceleration lane as shown in
276 Drawings A and C of Figure 3B-8.

277 09 For an exit ramp with a tapered deceleration lane, a normal width dotted white line
278 extension may be installed from the theoretical gore through the taper area such that it meets the
279 edge line at the upstream end of the taper as shown in Drawing B of [Figure 3B-8](#).

280 **Standard:**

281 10 **For entrance ramps with a parallel acceleration lane, a normal width dotted white lane**
282 **line shall be installed from the theoretical gore or from the downstream end of a solid white**
283 **lane line, if used, that extends downstream from the theoretical gore, to a point at least one-**
284 **half the distance from the theoretical gore to the downstream end of the acceleration taper,**
285 **as shown in Drawing A of Figure 3B-9.**

286 Option:

287 11 For entrance ramps with a parallel acceleration lane, a normal width dotted white line
288 extension may be installed from the downstream end of the dotted white lane line to the
289 downstream end of the acceleration taper, as shown in Drawing A of Figure 3B-9.

290 12 For entrance ramps with a tapered acceleration lane, a normal width dotted white line
291 extension may be installed from the downstream end of the channelizing line adjacent to the
292 through lane to the downstream end of the acceleration taper, as shown in Drawings B and C of
293 Figure 3B-9.

294 [12a For passing, climbing or truck lanes, a normal width dotted white line extension may be](#)
295 [installed as shown in “Figure 2A-5” to guide slower-moving traffic to the right lane.](#)

296 **Standard:**

297 13 **A wide dotted white lane line shall be used:**

298 **A. As a lane drop marking in advance of lane drops at exit ramps to distinguish a lane**
299 **drop from a normal exit ramp (see Drawings A, B, and C of Figure 3B-10),**

- 300 **B. In advance of freeway route splits with dedicated lanes (see Drawing D of Figure**
- 301 **3B-10),**
- 302 **C. To separate a through lane that continues beyond an interchange from an adjacent**
- 303 **auxiliary lane between an entrance ramp and an exit ramp (see Drawing E of**
- 304 **Figure 3B-10),**
- 305 **D. As a lane drop marking in advance of lane drops at intersections to distinguish a**
- 306 **lane drop from an intersection through lane (see Drawing A of Figure 3B-11), and**
- 307 **E. To separate a through lane that continues beyond an intersection from an adjacent**
- 308 **auxiliary lane between two intersections (see Drawing B of Figure 3B-11).**

309 *Guidance:*

310 ¹⁴ *Lane drop markings used in advance of lane drops at freeway and expressway exit ramps*

311 *should begin at least 1/2 mile in advance of the theoretical gore.*

312 ¹⁵ *On the approach to a multi-lane exit ramp having an optional exit lane that also carries*

313 *through traffic, lane line markings should be used as illustrated in Drawing B of Figure 3B-10.*

314 *In this case, if the right-most exit lane is an added lane such as a parallel deceleration lane, the*

315 *lane drop marking should begin at the upstream end of the full-width deceleration lane, as*

316 *shown in Drawing C of Figure 3B-8.*

317 ¹⁶ *Lane drop markings used in advance of lane drops at intersections should begin a distance*

318 *in advance of the intersection that is determined by engineering judgment as suitable to enable*

319 *drivers who do not desire to make the mandatory turn to move out of the lane being dropped*

320 *prior to reaching the queue of vehicles that are waiting to make the turn. The lane drop marking*

321 *should begin no closer to the intersection than the most upstream regulatory or warning sign*

322 *associated with the lane drop.*

323 ¹⁷ *The dotted white lane lines that are used for lane drop markings and that are used as a lane*

324 *line separating through lanes from auxiliary lanes should consist of line segments that are 3 feet*

325 *in length separated by 9-foot gaps.*

326 **Support:**

327 ¹⁸ Section 3B.20 contains information regarding other markings that are associated with lane

328 drops, such as lane-use arrow markings and ONLY word markings.

329 ¹⁹ Section 3B.09 contains information about the lane line markings that are to be used for

330 transition areas where the number of through lanes is reduced.

331 **Standard:**

332 ²⁰ **Where crossing the lane line markings is discouraged, the lane line markings shall**

333 **consist of a normal or wide solid white line.**

334 **Option:**

335 ²¹ Where it is intended to discourage lane changing on the approach to an exit ramp, a wide

336 solid white lane line may extend upstream from the theoretical gore or, for multi-lane exits, as

337 shown in Drawing B of Figure 3B-10, for a distance that is determined by engineering judgment.

338 ²² Where lane changes might cause conflicts, a wide or normal solid white lane line may

339 extend upstream from an intersection.

340 ²³ In the case of a lane drop at an exit ramp or intersection, such a solid white line may replace

341 a portion, but not all of the length of the wide dotted white lane line.

342 **Support:**

343 ²⁴ Section 3B.09 contains information about the lane line markings that are to be used for

344 transition areas where the number of through lanes is reduced.

345 *Guidance:*

346 25 *On approaches to intersections, a solid white lane line marking should be used to separate a*
347 *through lane from an added mandatory turn lane.*

348 Option:

349 26 On approaches to intersections, solid white lane line markings may be used to separate
350 adjacent through lanes or adjacent mandatory turn lanes from each other.

351 27 Where the median width allows the left-turn lanes to be separated from the through lanes to
352 give drivers on opposing approaches a less obstructed view of opposing through traffic, white
353 pavement markings may be used to form channelizing islands as shown in Figure 2B-17.

354 28 Solid white lane line markings may be used to separate through traffic lanes from auxiliary
355 lanes, such as an added uphill truck lane or a preferential lane (see Section 3D.02).

356 29 Wide solid lane line markings may be used for greater emphasis.

357 **Standard:**

358 30 **Where crossing the lane line markings is prohibited, the lane line markings shall**
359 **consist of a solid double white line (see Figure 3B-12).**

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361 **Section 3B.09 Lane-Reduction Transition Markings**

362 Support:

363 01 Lane-reduction transition markings are used where the number of through lanes is reduced
364 because of narrowing of the roadway or because of a section of on-street parking in what would
365 otherwise be a through lane. Lane-reduction transition markings are not used for lane drops.

366 **Standard:**

367 02 **Except as provided in Paragraph 3, where pavement markings are used, lane-**
368 **reduction transition markings shall be used to guide traffic through transition areas where**
369 **the number of through lanes is reduced, as shown in Figure 3B-14. On two-way roadways,**
370 **no-passing zone markings shall be used to prohibit passing in the direction of the**
371 **convergence, and shall continue through the transition area.**

372 Option:

373 03 On low-speed urban roadways where curbs clearly define the roadway edge in the lane-
374 reduction transition, or where a through lane becomes a parking lane, the edge line and/or
375 delineators shown in Figure 3B-14 may be omitted as determined by engineering judgment.

376 *Guidance:*

377 04 *For roadways having a posted or statutory speed limit of 45 mph or greater, the transition*
378 *taper length for a lane-reduction transition should be computed by the formula $L = WS$. For*
379 *roadways where the posted or statutory speed limit is less than 45 mph, the formula $L = WS^2/60$*
380 *should be used to compute the taper length.*

381 Support:

382 05 Under both formulas, L equals the taper length in feet, W equals the width of the offset
383 distance in feet, and S equals the 85th-percentile speed or the posted or statutory speed limit,
384 whichever is higher.

385 *Guidance:*

386 06 *Where observed speeds exceed posted or statutory speed limits, longer tapers should be*
387 *used.*

388 Option:

389 07 On new construction, where no posted or statutory speed limit has been established, the
390 design speed may be used in the transition taper length formula.

391 *Guidance:*

392 08 Lane line markings should be discontinued one-quarter of the distance between the Lane
393 Ends sign (see Section 2C.42) and the point where the transition taper begins.

394 09 Except as provided in Paragraph 3 for low-speed urban roadways, the edge line markings
395 shown in Figure 3B-14 should be installed from the location of the Lane Ends warning sign to
396 beyond the beginning of the narrower roadway.

397 Support:

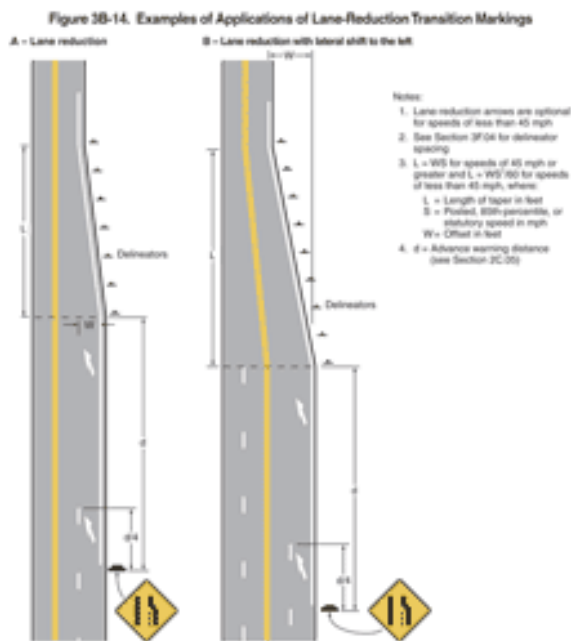
398 10 Pavement markings at lane-reduction transitions supplement the standard signs. See Section
399 3B.20 for provisions regarding use of lane-reduction arrows.

400 Support:

401 [11 Section 2A.16a contains provisions regarding regulatory, warning and guide signs used for](#)
402 [passing, climbing and truck lanes, and Figure 2A-5 illustrates an example of the relative](#)
403 [locations of signs and pavement markings used for passing, climbing and truck lanes.](#)

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405 **Figure 3B-14 Examples of Applications of Lane-Reduction Transition Markings**



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412 **Section 3F.04 Delineator Placement and Spacing**

413 *Guidance:*

414 01 Delineators should be mounted on suitable supports at a mounting height, measured
415 vertically from the bottom of the lowest retroreflective device to the elevation of the near edge of
416 the roadway, of approximately 4 feet.

417 *Option:*

418 02 When mounted on the face of or on top of guardrails or other longitudinal barriers,
419 delineators may be mounted at a lower elevation than the normal delineator height recommended
420 in Paragraph 1.

PART 3. MARKINGS

CHAPTER 3F. DELINEATORS

421 *Guidance:*
 422 03 *Delineators should be placed 2 to 8 feet outside the outer edge of the shoulder, or if*
 423 *appropriate, in line with the roadside barrier that is 8 feet or less outside the outer edge of the*
 424 *shoulder.*
 425 04 *Delineators should be placed at a constant distance from the edge of the roadway, except*
 426 *that where an obstruction intrudes into the space between the pavement edge and the extension*
 427 *of the line of the delineators, the delineators should be transitioned to be in line with or inside*
 428 *the innermost edge of the obstruction. If the obstruction is a guardrail or other longitudinal*
 429 *barrier, the delineators should be transitioned to be just behind, directly above (in line with), or*
 430 *on the innermost edge of the guardrail or longitudinal barrier.*
 431 05 *Delineators should be spaced 200 to 530 feet apart on mainline tangent sections.*
 432 *Delineators should be spaced 100 feet apart on ramp tangent sections.*
 433 05a *If used along a lane-reduction transition of a passing, climbing or truck lane taper,*
 434 *delineators should be spaced a maximum of 100 feet apart.*
 435 *Support:*
 436 06 *Examples of delineator installations are shown in Figure 3F-1.*
 437 *Option:*
 438 07 *When uniform spacing is interrupted by such features as driveways and intersections,*
 439 *delineators which would ordinarily be located within the features may be relocated in either*
 440 *direction for a distance not exceeding one quarter of the uniform spacing. Delineators still falling*
 441 *within such features may be eliminated.*
 442 08 *Delineators may be transitioned in advance of a lane transition or obstruction as a guide for*
 443 *oncoming traffic.*
 444 *Guidance:*
 445 09 *The spacing of delineators should be adjusted on approaches to and throughout horizontal*
 446 *curves so that several delineators are always simultaneously visible to the road user. The*
 447 *approximate spacing shown in Table 3F-1 should be used.*
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Table 3F-1. Approximate Spacing for Delineators on Horizontal Curves

| Radius (R) of Curve | Approximate Spacing (S) on Curve |
|----------------------------|---|
| 50 feet | 20 feet |
| 115 feet | 25 feet |
| 180 feet | 35 feet |
| 250 feet | 40 feet |
| 300 feet | 50 feet |
| 400 feet | 55 feet |
| 500 feet | 65 feet |
| 600 feet | 70 feet |
| 700 feet | 75 feet |
| 800 feet | 80 feet |
| 900 feet | 85 feet |
| 1,000 feet | 90 feet |

449 *Notes:*
 450 1. Spacing for specific radii may be interpolated from table.

- 451 2. The minimum spacing should be 20 feet.
452 3. The spacing on curves should not exceed 300 feet.
453 4. In advance of or beyond a curve, and proceeding away from the end of the curve, the
454 spacing of the first delineator is 2S, the second 3S, and the third 6S, but not to exceed 300
455 feet.
456 5. S refers to the delineator spacing for specific radii computed from the formula $S=3\sqrt{R-50}$.
457 6. The distances for S shown in the table above were rounded to the nearest 5 feet.

458 Option:

459 10 When needed for special conditions, delineators of the appropriate color may be mounted in
460 a closely-spaced manner on the face of or on top of guardrails or other longitudinal barriers to
461 form a continuous or nearly continuous "ribbon" of delineation.

462
463

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