



National Committee on Uniform Traffic Control Devices

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2 **National Committee on Uniform Traffic Control Devices (NCUTCD)**
3 **Recommended Changes to Proposed Text for 11th Edition of the MUTCD**
4 **Docket Number: FHWA-2020-0001**

5 **Federal Register Item Number:** 516

6 **NPA MUTCD Section Number:** Section 6P.01

7 **Legend:** Base text shown in proposal is the NPA “clean” proposed text.

- 8 • **NCUTCD recommendation for text to be added in final rule.**
- 9 • **NCUTCD recommendation for text to be deleted in final rule.**
- 10 • **NCUTCD recommendation for text to be moved/relocated in final rule.**
- 11 • **NPA text that was not previously approved by NCUTCD but is now approved.**
- 12 • Explanatory note: [Note that explains purpose of recommended change.]

13 The following pages present NCUTCD recommendations for changes to the MUTCD NPA
14 proposed text, tables, and figures for Chapter 6P. Below is a short summary of the NCUTCD
15 position for each section of this chapter. A more detailed summary is provided at the beginning
16 of each section.

- 17 • NPA #516, Section 6P.01: Changes recommended based on Council action in spring 2021

21 CHAPTER 6P. TYPICAL APPLICATIONS

22 **Chapter 6P Comments:** NCUTCD recommends reviewing all Figures in Chapter 6P and
23 revising as needed to show all signs and dimensions consistently.

24 **Section 6P.01 Comments:** NCUTCD generally agrees with 6P.01 as presented in the NPA, but
25 recommends revising the Support statement to correct the current number of TAs in this section.

26 **Section 6P.01 Typical Applications**

27 Support:

28 Chapter 6N contains discussions of typical TTC activities. Section 6A.02 contains
29 discussions on development of TTC plans for the various activities. This Chapter presents
30 typical applications for a variety of situations commonly encountered. While not every situation
31 is addressed, the information illustrated can generally be adapted to a broad range of conditions.
32 In many instances, an appropriate TTC plan is achieved by combining features from various
33 typical applications. For example, work at an intersection might present a near-side work zone
34 for one street and a far-side work zone for the other street. These treatments are found in two
35 different typical applications, while a third typical application shows how to handle pedestrian

41 crosswalk closures. For convenience in using the typical application diagrams, Tables 6B-1 and
42 6B-4 are reproduced in this Chapter as Tables 6P-5 and 6P-4, respectively.

43 In general, the procedures illustrated represent minimum solutions for the situations
44 depicted. Except for the notes (which are clearly classified using headings as being Standard,
45 Guidance, Option, or Support), the information presented in the typical applications can
46 generally be regarded as Guidance.

47 Option:

48 TTC plans may deviate from the typical applications described in this Chapter to allow for
49 conditions and requirements of a particular site or jurisdiction.

50 Other devices may be added to supplement the devices and device spacing may be adjusted
51 to provide additional reaction time or delineation. Fewer devices may be used based on field
52 conditions.

53 Support:

54 Figures and tables found throughout Part 6 provide information for the development of TTC
55 plans.

56 Table 6P-1 is an index of the 4654 typical applications. Typical applications are shown on
57 the right-hand page with notes on the facing page to the left. The legend for the symbols used in
58 the typical applications is provided in Table 6P-2. In many of the typical applications, sign
59 spacings and other dimensions are indicated by letters using the criteria provided in Table 6P-3.
60 The formulas for determining taper lengths are provided in Table 6P-4. Table 6P-4 is used for
61 the determination of sign spacing and other dimensions for various area and roadway types. [edit
62 for number of TAs]

63 Most of the typical applications show TTC devices for only one direction.

64
65 **Table 6P-1. Comments:** NCUTCD generally agrees with Table 6P-1 as presented in the NPA,
66 but recommends revising as follows:

- 67 • Edit the title of TA-5 to include 'or Expressway' in accordance with NCUTCD
68 recommendation 20B-TTC-03
- 69 • Delete TA-16 and combine with TA-15 in accordance with NCUTCD recommendation 20B-
70 TTC-02
- 71 • Delete 'High Speed' from the title of TA-32 in accordance with NCUTCD recommendation
72 20B-TTC-03
- 73 • Renumber TA-52, TA-53, and TA-54 to place between TA-27 and TA-28 since they are all
74 intersection related, and renumber other TAs for better grouping of similar material
- 75 • Add a new TA-27d Circulating Lane Closure in a Multi-Lane Roundabout (inserted at the
76 end of this Section) in between TA-27 and TA-28 in accordance with NCUTCD
77 recommendation 19B-TTC-01

Table 6P-1. Index to Typical Applications

Typical Application Description	Typical Application Number
Work Outside of the Shoulder (see Section 6N.05)	
Work Beyond the Shoulder	TA-1
Blasting Zone	TA-2
Work on the Shoulder (see Sections 6N.06 and 6N.07)	
Work on the Shoulders	TA-3
Short Duration or Mobile Operation on a Shoulder	TA-4
Shoulder Closure on a Freeway <u>or Expressway</u>	TA-5
Shoulder Work with Minor Encroachment	TA-6
Work Within the Traveled Way of a Two-Lane Highway (see Section 6N.09)	
Road Closed with a Diversion	TA-7
Roads Closed with an Off-Site Detour	TA-8
Overlapping Routes with a Detour	TA-9
Lane Closure on a Two-Lane Road Using Flaggers	TA-10
Lane Closure on a Two-Lane Road with Low Traffic Volumes	TA-11
Lane Closure on a Two-Lane Road Using Traffic Control Signals	TA-12
Temporary Road Closure	TA-13
Haul Road Crossing	TA-14
Work in the Center of a Road with Low Traffic Volumes	TA-15
Surveying Along the Center Line of a Road with Low Traffic Volumes	TA-16
Mobile Operations on a Two-Lane Road	TA-17
Work Within the Traveled Way of an Urban Street (see Section 6N.10)	
Lane Closure on a Minor Street	TA-18
Detour for One Travel Direction	TA-19
Detour for a Closed Street	TA-20
Work Within the Traveled Way at an Intersection and on Sidewalks (see Section 6N.12)	
Lane Closure on the Near Side of an Intersection	TA-21
Right-Hand Lane Closure on the Far Side of an Intersection	TA-22
Left-Hand Lane Closure on the Far Side of an Intersection	TA-23
Half Road Closure on the Far Side of an Intersection	TA-24
Multiple Lane Closures at an Intersection	TA-25
Closure in the Center of an Intersection	TA-26
Closure at the Side of an Intersection	TA-27
Sidewalk Detour or Diversion	TA-28
Crosswalk Closures and Pedestrian Detours	TA-29

Table 6P-1. Index to Typical Applications

Typical Application Description	Typical Application Number
Work Within the Traveled Way of a Multi-Lane, Non-Access Controlled Highway (see Section 6N.11)	
Interior Lane Closure on a Multi-Lane Street	TA-30
Lane Closure on a Street with Uneven Directional Volumes	TA-31
Half Road Closure on a Multi-Lane High Speed Highway	TA-32
Stationary Lane Closure on a Divided Highway	TA-33
Lane Closure with a Temporary Traffic Barrier	TA-34
Mobile Operation on a Multi-Lane Road	TA-35
Work Within the Traveled Way of a Freeway or Expressway (see Section 6N.13)	
Lane Shift on a Freeway	TA-36
Double Lane Closure on a Freeway	TA-37
Interior Lane Closure on a Freeway	TA-38
Median Crossover on a Freeway	TA-39
Median Crossover for an Entrance Ramp	TA-40
Median Crossover for an Exit Ramp	TA-41
Work in the Vicinity of an Exit Ramp	TA-42
Partial Exit Ramp Closure	TA-43
Work in the Vicinity of an Entrance Ramp	TA-44
Temporary Reversible Lane Using Movable Barriers	TA-45
Work in the Vicinity of a Grade Crossing (see Section 6N.17)	
Work in the Vicinity of a Grade Crossing	TA-46
Work in the Vicinity of Bicycle Lanes and Shared Use Paths (see Section 6N.04)	
Bicycle Lane Closure without Detour	TA-47
Bicycle Lane Closure with On-Road Detour	TA-48
Shared-Use Path Closure with a Diversion	TA-49
On-Road Detour for Shared-Use Path	TA-50
Paved Shoulder Closure with Bicycle Diversion onto Temporary Path	TA-51
Work in the Traveled Way of Roundabouts	
Short-Term or Short Duration Work in a Roundabout	TA- 52 27a
Flagging Operation on a Single-Lane Roundabout	TA- 53 27b
Inside Lane Closure on a Multi-Lane Roundabout	TA- 54 27c
Circulating Lane Closure in a Multi-Lane Roundabout	TA-27d

Relocate
between TA-27
and TA-28

85 **Table 6P-2 Comments:** NCUTCD recommends restoring existing Table 6P-2 from the 2009
86 MUTCD, which is not included in the NPA documents, but is referenced in this Section.
87 NCUTCD recommends deleting the “surveyor” symbol in accordance with NCUTCD
88 recommendation 20B-TTC-02.

89
90 **Table 6P-2. Meaning of Symbols on Typical Application Diagrams**
91

	Arrow board		Shadow vehicle
	Arrow board support or trailer (shown facing down)		Sign (shown facing left)
	Changeable message sign or support trailer		Surveyor
	Channelizing device		Temporary barrier
	Crash cushion		Temporary barrier with warning light
	Direction of temporary traffic detour		Traffic or pedestrian signal
	Direction of traffic		Truck-mounted attenuator
	Flagger		Type 3 barricade
	High-level warning device (Flag tree)		Warning light
	Longitudinal channelizing device		Work space
	Luminaire		Work vehicle
	Pavement markings that should be removed for a long-term project		

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94 **Table 6P-3. Comments:** NCUTCD agrees with Table 6P-3 as presented in the NPA.

**Table 6P-3. Meaning of Letter Codes on
Typical Application Diagrams**

Road Type	Distance Between Signs**		
	A	B	C
Urban (low speed)*	100 feet	100 feet	100 feet
Urban (high speed)*	350 feet	350 feet	350 feet
Rural	500 feet	500 feet	500 feet
Expressway / Freeway	1,000 feet	1,500 feet	2,640 feet

* Speed category to be determined by the highway agency

** The column headings A, B, and C are the dimensions shown in Figures 6P-1 through 6P-54. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The "first sign" is the sign in a three-sign series that is closest to the TTC zone. The "third sign" is the sign that is furthest upstream from the TTC zone.)

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96 **Table 6P-4. Comments:** NCUTCD agrees with Table 6P-4 as presented in the NPA.

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Table 6P-4. Formulas for Determining Taper Length

Speed (S)	Taper Length (L) in feet
40 mph or less	$L = \frac{WS^2}{60}$
45 mph or more	$L = WS$

Where: L = taper length in feet

W = width of offset in feet

S = posted speed limit, or off-peak 85th-percentile speed
prior to work starting, or the anticipated operating
speed in mph

98 **Table 6P-5. Comments:** NCUTCD recommends deleting Table 6P-5. The table is a repeat of
99 Table 6P-3 with a different title. Table 6P-3 is cross-referenced throughout Chapter 6P, but Table
100 6P-5 does not appear to be referenced.
101

**Table 6P-5. Recommended Advance Warning Sign
Minimum Spacing**

Road Type	Distance Between Signs**		
	A	B	C
Urban (low speed)*	100 feet	100 feet	100 feet
Urban (high speed)*	350 feet	350 feet	350 feet
Rural	500 feet	500 feet	500 feet
Expressway / Freeway	1,000 feet	1,500 feet	2,640 feet

* Speed category to be determined by the highway agency or owner of site roadways open to public travel.

** The column headings A, B, and C are the dimensions shown in Figures 6P-1 through 6P-54. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The "first sign" is the sign in a three-sign series that is closest to the TTC zone. The "third sign" is the sign that is furthest upstream from the TTC zone.)

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105 **Notes for Figure 6P-1 Comments:** NCUTCD generally agrees with Notes for Figure 6P-1 as
106 presented in the NPA, but recommends revisions in accordance with NCUTCD recommendation
107 20B-TTC-03 as follows:

- 108 • Note 1: change “directional roadway” to “highway in both directions” and editorial revisions
- 109 • Note 2: add other appropriate signs
- 110 • Note 4: editorial revisions

111

112 **Notes for Figure 6P-1 — Typical Application 1** 113 **Work Beyond the Shoulder**

114 *Guidance:*

- 115 1. *If the work space is in the median of a divided highway, ~~an~~ the advance warning sign
116 should also be placed on the left side of the ~~directional roadway~~ highway in both
117 directions. [revise per 20B-TTC-03]*

118 Option:

- 119 2. The ROAD WORK AHEAD sign may be replaced with other appropriate signs such as
120 the SHOULDER WORK, UTILITY WORK AHEAD, MOWING AHEAD, or SURVEY
121 CREW signs. ~~The SHOULDER WORK sign may be used for work adjacent to the~~
122 ~~shoulder~~. [revise per 20B-TTC-03]
- 123 3. The ROAD WORK AHEAD sign may be omitted where the work space is behind a
124 barrier, more than 24 inches behind the curb, or 15 feet or more from the edge of any
125 roadway.
- 126 4. For short-term, short duration or mobile operations, ~~all the signs and channelizing devices~~
127 may be eliminated if a vehicle with activated high-intensity rotating, flashing, oscillating,
128 or strobe lights is used. [revise per 20B-TTC-03]
- 129 5. Vehicle hazard warning signals may be used to supplement high-intensity rotating,
130 flashing, oscillating, or strobe lights.

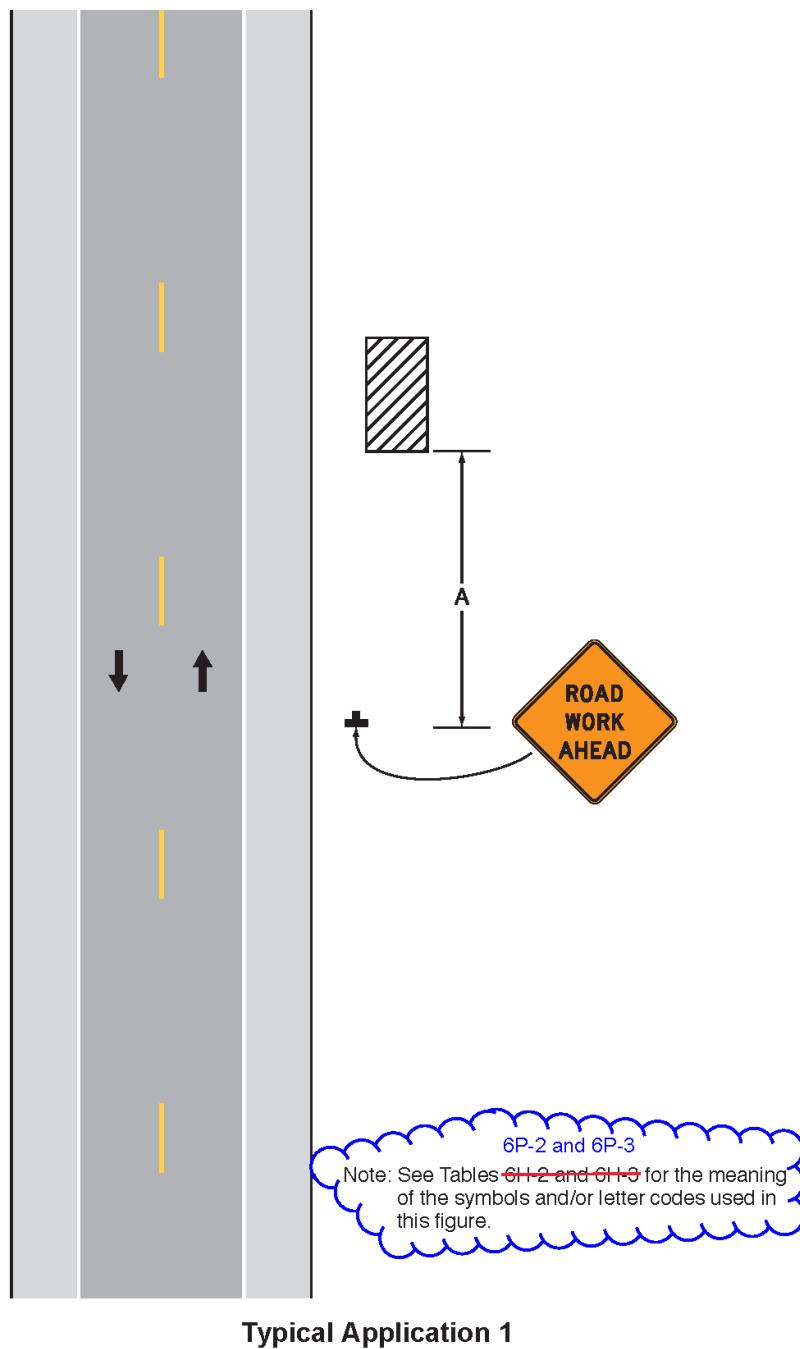
131 Standard:

- 132 6. **Vehicle hazard warning signals shall not be used instead of the vehicle’s high-**
133 **intensity rotating, flashing, oscillating, or strobe lights.**

135 **Figure 6P-1 Comments:** NCUTCD generally agrees with Figure 6P-1 as presented in the NPA,
136 but recommends revising the references to Tables in the Figure note to correspond with the NPA
137 table renumbering.

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Figure 6P-1. Work Beyond the Shoulder (TA-1)



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142 **Notes for Figure 6P-2 Comments:** NCUTCD agrees with Notes for Figure 6P-2 as presented
143 in the NPA.

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145 **Notes for Figure 6P-2—Typical Application 2**
146 **Blasting Zone**

147 **Standard:**

- 148 1. Whenever blasting caps are used within 1,000 feet of a roadway, the signing shown
149 shall be used.
- 150 2. The signs shall be covered or removed when there are no explosives in the area or
151 the area is otherwise secure.
- 152 3. Whenever a side road intersects the roadway between the BLASTING ZONE
153 AHEAD sign and the END BLASTING ZONE sign, or a side road is within 1,000
154 feet of any blasting cap, similar signing, as on the mainline, shall be installed on the
155 side road.
- 156 4. Prior to blasting, the blaster in charge shall determine whether road users in the
157 blasting zone will be endangered by the blasting operation. If there is danger, road
158 users shall not be permitted to pass through the blasting zone during blasting
159 operations.

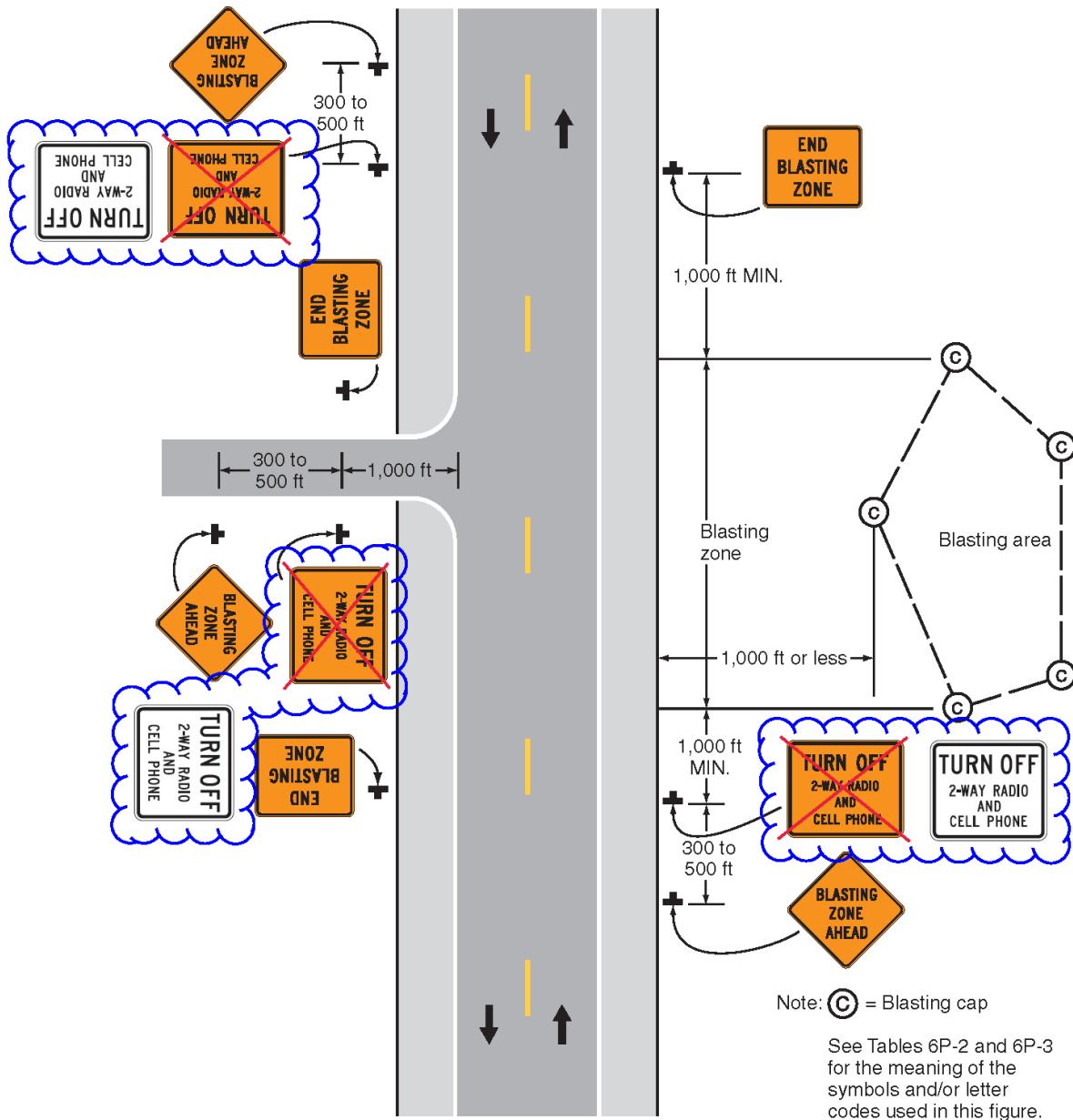
160 **Guidance:**

- 161 5. *On a divided highway, the signs should be mounted on both sides of the directional
162 roadways*

163 **Figure 6P-2 Comments:** NCUTCD generally agrees with Figure 6P-2 as presented in the NPA,
164 but recommends revising as follows:

- 165 • In the NPA the W22-2 TURN OFF 2-WAY RADIO AND CELL PHONE sign was
166 changed to regulatory R22-2 in Section 6G.11 and Figure 2G-1. For consistency with
167 Section 6G.11 and Figure 2G-1, the sign needs to be edited in Figure 6P-2.
- 168 • Revise the references to Tables in the figure note to correspond with the NPA table
169 renumbering.

170 **Figure 6P-2. Blasting Zone (TA-2)**



172

Typical Application 2

173 **Notes for Figure 6P-3 Comments:** NCUTCD generally agrees with Notes for Figure 6P-3 as
174 presented in the NPA, but recommends revisions in accordance with NCUTCD recommendation
175 20B-TTC-03 as follows:

176 Note 1: delete “the roadway for a divided or” and other editorial revisions

177 Note 3: change “instead of” to “in addition to”

178 Note 4: delete AHEAD from sign name

179 Delete Notes 5-8 and add a new Note 5, as work meeting this criteria is addressed in TA-4

181 **Notes for Figure 6P-3 — Typical Application 3** 182 **Work on Shoulders**

183 *Guidance:*

- 184 1. *A* The SHOULDER WORK sign should be placed on the left side of ~~the roadway for a~~
185 ~~divided or a one-way street~~ only if only the left shoulder is affected. [revise per 20B-
186 TTC-03]

187 Option:

- 188 2. Positive protection devices may be used per Section 6M.02.
- 189 3. The Workers symbol signs may be used instead of addition to SHOULDER WORK
190 signs. [revise per 20B-TTC-03]
- 191 4. The SHOULDER WORK AHEAD sign on an intersecting roadway may be omitted
192 where drivers emerging from that roadway will encounter another advance warning sign
193 prior to this activity area. [revise per 20B-TTC-03]
- 194 5. ~~For short duration operations of 60 minutes or less, all signs and channelizing devices~~
195 ~~may be eliminated if a vehicle with activated high intensity rotating, flashing, oscillating,~~
196 ~~or strobe lights is used.~~ [revise per 20B-TTC-03]
- 197 6. ~~Vehicle hazard warning signals may be used to supplement high intensity rotating,~~
198 ~~flashing, oscillating, or strobe lights.~~ [revise per 20B-TTC-03]

199 *Standard:*

- 200 7. ~~Vehicle hazard warning signals shall not be used instead of the vehicle's high-~~
201 ~~intensity rotating, flashing, oscillating, or strobe lights.~~ [revise per 20B-TTC-03]
- 202 8. ~~When paved shoulders having a width of 8 feet or more are closed, at least one~~
203 ~~advance warning sign shall be used. In addition, channelizing devices shall be used to~~
204 ~~close the shoulder in advance to delineate the beginning of the work space and direct~~
205 ~~vehicular traffic to remain within the traveled way.~~ [revise per 20B-TTC-03, identical

206 text is in Section 6G.07 P02]

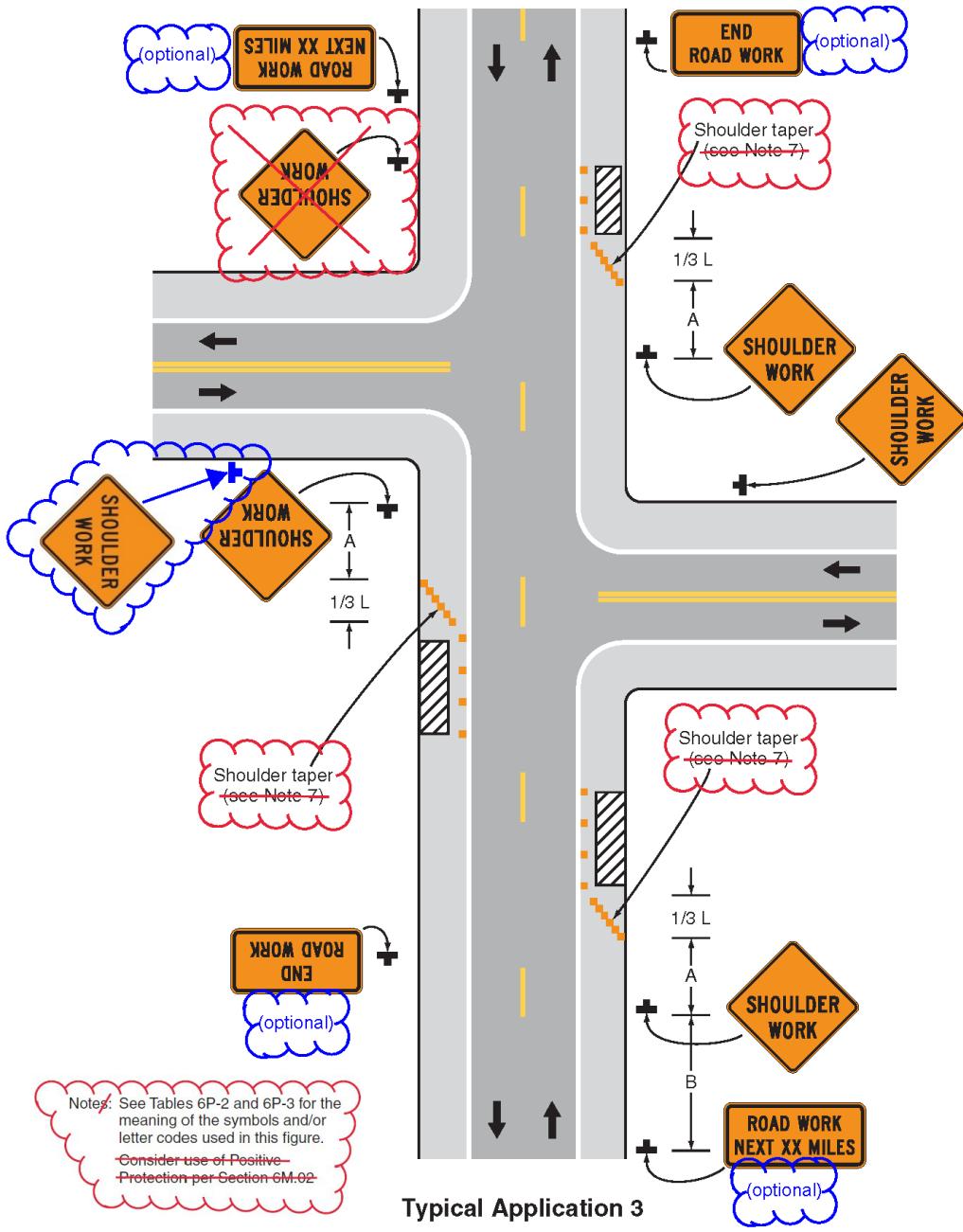
207 *Support:*

- 208 5. See Figure 6P-4 for short duration and mobile operations. [revise per 20B-TTC-03]

210 **Figure 6P-3 Comments:** NCUTCD generally agrees with Figure 6P-3 as presented in the NPA,
211 but recommends revising as follows:

- Delete and relocate SHOULDER WORK signs
- Add “optional” to signs as appropriate
- Delete references to items deleted from notes
- Delete the positive protection note since it is redundant with a note added to the notes page

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218 **Figure 6P-3. Work on the Shoulders (TA-3)**



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221 Notes for Figure 6P-4 Comments: NCUTCD recommends revising Notes for Figure 6P-4 in
222 accordance with NCUTCD recommendation 20B-TTC-03:

- 223 • Note 1: Add a new Standard requiring vehicle lights
- 224 • Note 3 (was Note 2): editorial revisions
- 225 • Note 5 (was Note 4): Add Option text omitting distance plaques if ROAD WORK NEXT
226 XX MILES sign is used
- 227 • Note 6 (was Note 5): delete references to lighting (covered in new Note 1)
- 228 • Note 8 (new): Add Option text referencing truck-mounted attenuators

230 **Notes for Figure 6P-4 — Typical Application 4**
231 **Short Duration or Mobile Operation on a Shoulder**

232 **Standard:**

- 233 1. **Shadow and work vehicles shall display high-intensity rotating, flashing,
234 oscillating, or strobe lights.** [revise per 20B-TTC-03]

235 **Guidance:**

- 236 1.2. *In those situations where multiple work locations within a limited distance make it
237 practical to place stationary signs, the distance between the advance warning sign and
238 the work should not exceed 5 miles.*
- 239 2.3. *In those situations where When the distance between the advance warning signs and
240 the work is 2 miles to 5 miles, a Supplemental Distance plaque should be used with the
241 ROAD WORK AHEAD sign. [revise per 20B-TTC-03]*

242 **Option:**

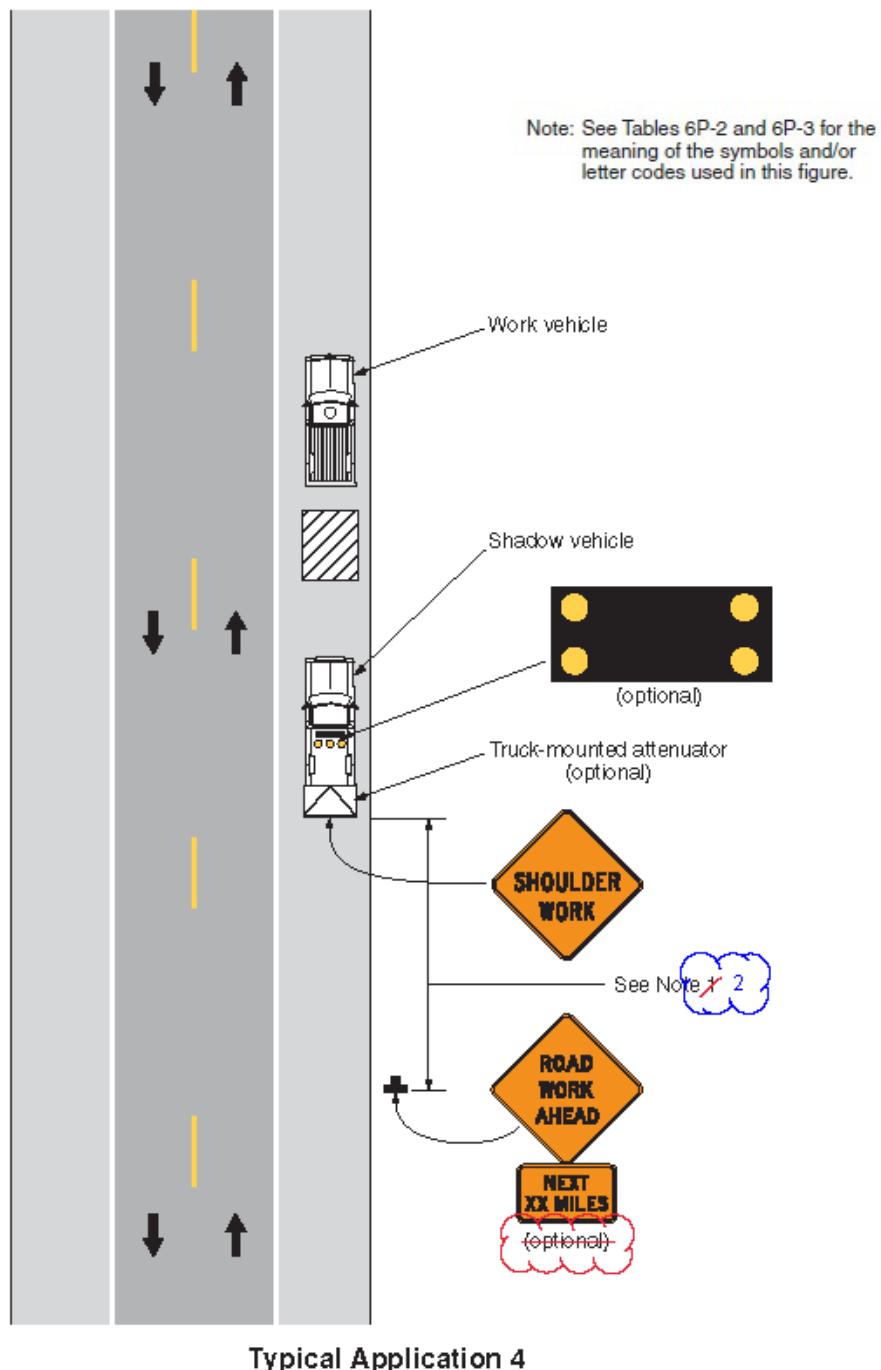
- 243 3.4. Additional positive protection devices may be used per Section 6M.02.
- 244 4.5. The ROAD WORK NEXT XX MILES sign may be used instead of before the ROAD
245 WORK AHEAD sign if the work locations occur over a distance of more than 2 miles.
246 If the ROAD WORK NEXT XX MILES sign is used, the Supplementary Distance
247 plaque may be omitted from the ROAD WORK AHEAD sign assembly. [revise per
248 20B-TTC-03]
- 249 5.6. Stationary warning signs may be omitted for short duration or mobile operations. if the
250 work vehicle displays high intensity rotating, flashing, oscillating, or strobe lights.
- 251 6.7. Vehicle hazard warning signals may be used to supplement high-intensity rotating,
252 flashing, oscillating, or strobe lights. [revise per 20B-TTC-03]
- 253 8. A truck-mounted attenuator may be used on the shadow vehicle or on the work vehicle.
254 [revise per 20B-TTC-03]

255 **Standard:**

- 256 7.9. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-
257 intensity rotating, flashing, oscillating, or strobe lights.**
- 258 8.10. **If an arrow board is used for an operation on the shoulder, the caution mode shall
259 be used.**
- 260 9.11. **Vehicle-mounted signs shall be mounted in a manner such that they are not
261 obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be
262 covered or turned from view when work is not in progress.**

266 **Figure 6P-4 Comments:** NCUTCD generally agrees with Figure 6P-4 as presented in the NPA,
267 but recommends minor revisions in accordance with NCUTCD recommendation 20B-TTC-03,
268 including deleting the hyphen between 'Short' and 'Duration'.
269

270 **Figure 6P-4. Short Duration Short Duration or Mobile Operation on a Shoulder (TA-4)**
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273 **Notes for Figure 6P-5 Comments:** NCUTCD generally agrees with Notes for Figure 6P-5 as
274 presented in the NPA, but recommends revisions in accordance with NCUTCD recommendation
275 20B-TTC-03 as follows:

276 Title: add “or Expressway”

277 Note 1: Add RIGHT (LEFT) to sign name

278 Note 2: add text stating a plaque should be used to convey shoulder closure length information

280 **Notes for Figure 6P-5 — Typical Application 5** 281 **Shoulder Closure on a Freeway or Expressway** [revise per 20B-TTC-03]

282 *Guidance:*

- 283 1. *RIGHT (LEFT) SHOULDER CLOSED signs should be used on limited-access highways*
284 *where there is no opportunity for disabled vehicles to pull off the roadway.* [revise per
285 20B-TTC-03]
- 286 2. *If drivers cannot see a pull-off area beyond the closed shoulder, information regarding a*
287 *plaque indicating the length of the shoulder closure should be provided below the*
288 *warning sign nearest the closure in feet or miles, as appropriate with the legend NEXT*
289 *XX FT or NEXT XX MILES.* [revise per 20B-TTC-03]
- 290 3. *The use of a temporary traffic barrier should be based on engineering judgment.*

291 **Standard:**

- 292 4. **Temporary traffic barriers, if used, shall comply with the provisions of Section**
6M.02.

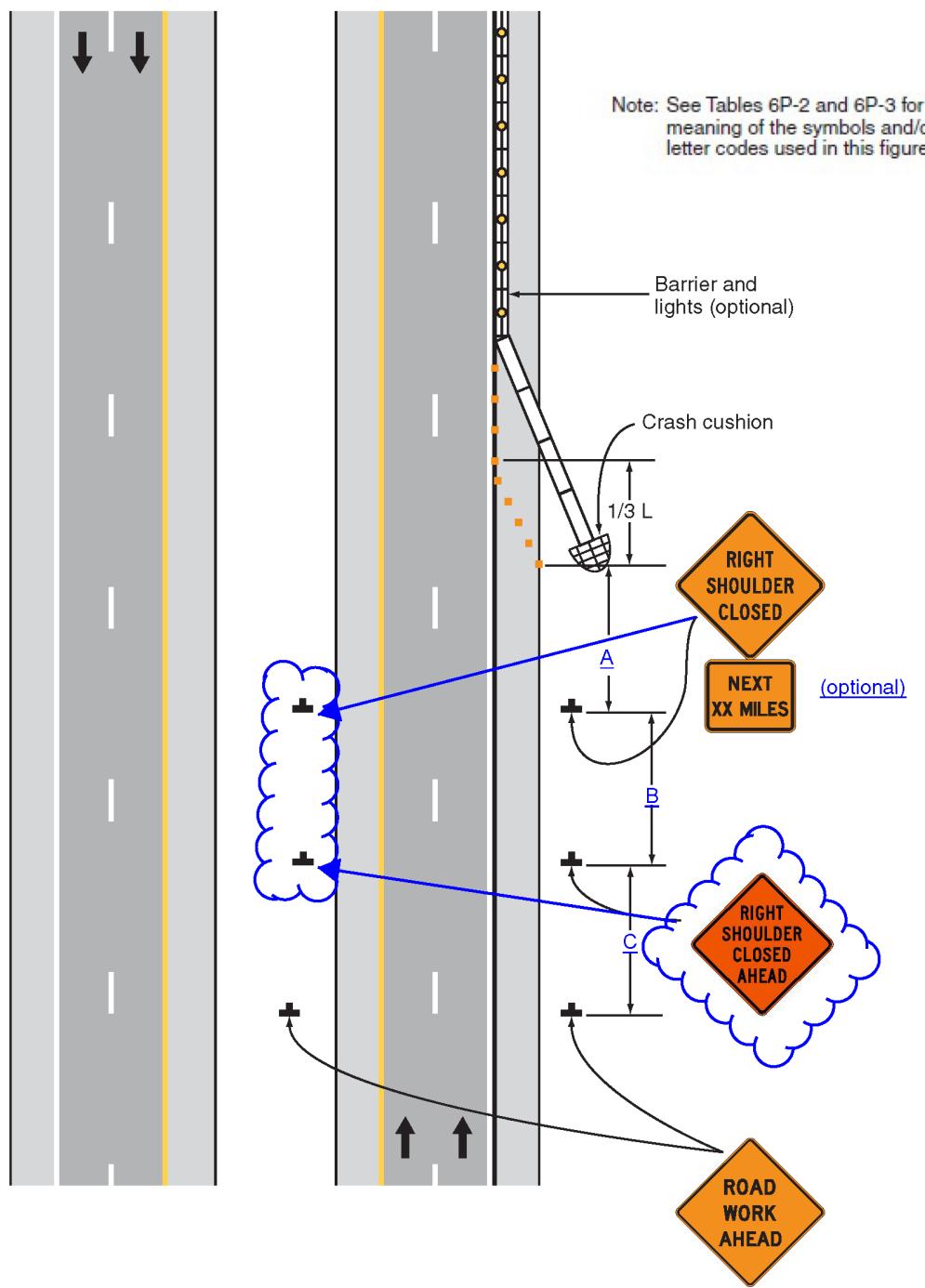
293 *Option:*

- 294 5. The barrier shown in this typical application is an example of one method that may be
295 used to close a shoulder of a long-term project.
- 296 6. The warning lights shown on the barrier may be used.

299 **Figure 6P-5 Comments:** NCUTCD generally agrees with Figure 6P-5 as presented in the NPA,
300 but recommends revisions in accordance with NCUTCD recommendation 20B-TTC-03,
301 including adding “or Expressway” to the title and placing signs on both the left and right sides of
302 the roadway.

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Figure 6P-5. Shoulder Closure on a Freeway or Expressway (TA-5)



Typical Application 5

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307 **Notes for Figure 6P-6 Comments:** NCUTCD generally agrees with Notes for Figure 6P-6 as
308 presented in the NPA, but recommends revisions in accordance with NCUTCD recommendation
309 20B-TTC-03 as follows:

- 310 • Relocate Notes 13 and 14 to the top as Notes 1 and 2 for emphasis
- 311 • Note 4 (was Note 2): editorial revisions
- 312 • Note 11 (was Note 9): revise to note a truck-mounted attenuator may be used on the work
313 vehicle
- 314 • Note 12 (was Note 10): Add the Shoulder Work sign to the list of devices for omission where
315 a shadow vehicle is used

318 **Notes for Figure 6P-6 — Typical Application 6** 319 **Shoulder Work with Minor Encroachment**

320 **Standard:**

- 321 **1. Shadow and work vehicles shall display high-intensity rotating, flashing,
322 oscillating, or strobe lights.** [Moved from note 12]
- 323 **2. Vehicle hazard warning signals shall not be used instead of the vehicle's high-
324 intensity rotating, flashing, oscillating, or strobe lights.** [Moved from note 13]

325 **Guidance:**

- 326 **1.3.** All lanes should be a minimum of 10 feet in width as measured to the near face of the
327 channelizing devices.
- 328 **2.4.** The treatment shown should be used on a minor road having low speeds. For higher
329 volume or higher speed traffic conditions, a lane closure should be used
330 as shown in Figure 6HP-10 or Figure 6HP-12. [revise per 20B-TTC-03]

331 **Option:**

- 332 **3.5.** Additional positive protection devices may be used per Section 6M.02.
- 333 **4.6.** For short-term use on low-volume, low-speed roadways with vehicular traffic that does
334 not include longer and wider heavy commercial vehicles, a minimum lane width of 9
335 feet may be used.
- 336 **5.7.** Where the opposite shoulder is suitable for carrying vehicular traffic and of adequate
337 width, lanes may be shifted by use of closely-spaced channelizing devices, provided
338 that the minimum lane width of 10 feet is maintained.
- 339 **6.8.** Additional advance warning may be appropriate, such as a ROAD NARROWS sign.
- 340 **7.9.** Temporary traffic barriers may be used along the work space.
- 341 **8.10.** The shadow vehicle may be omitted if a taper and channelizing devices are used.
- 342 **9.11.** A truck-mounted attenuator may be used on the shadow vehicle or on the work vehicle.
343 [revise per 20B-TTC-03]
- 344 **10.12.** For short-duration work, the SHOULDER WORK sign, taper and channelizing devices
345 may be omitted if a shadow vehicle with activated high-intensity rotating, flashing,
346 oscillating, or strobe lights is used. [revise per 20B-TTC-03]
- 347 **11.13.** Vehicle hazard warning signals may be used to supplement high-intensity rotating,
348 flashing, oscillating, or strobe lights.

349 **Standard:**

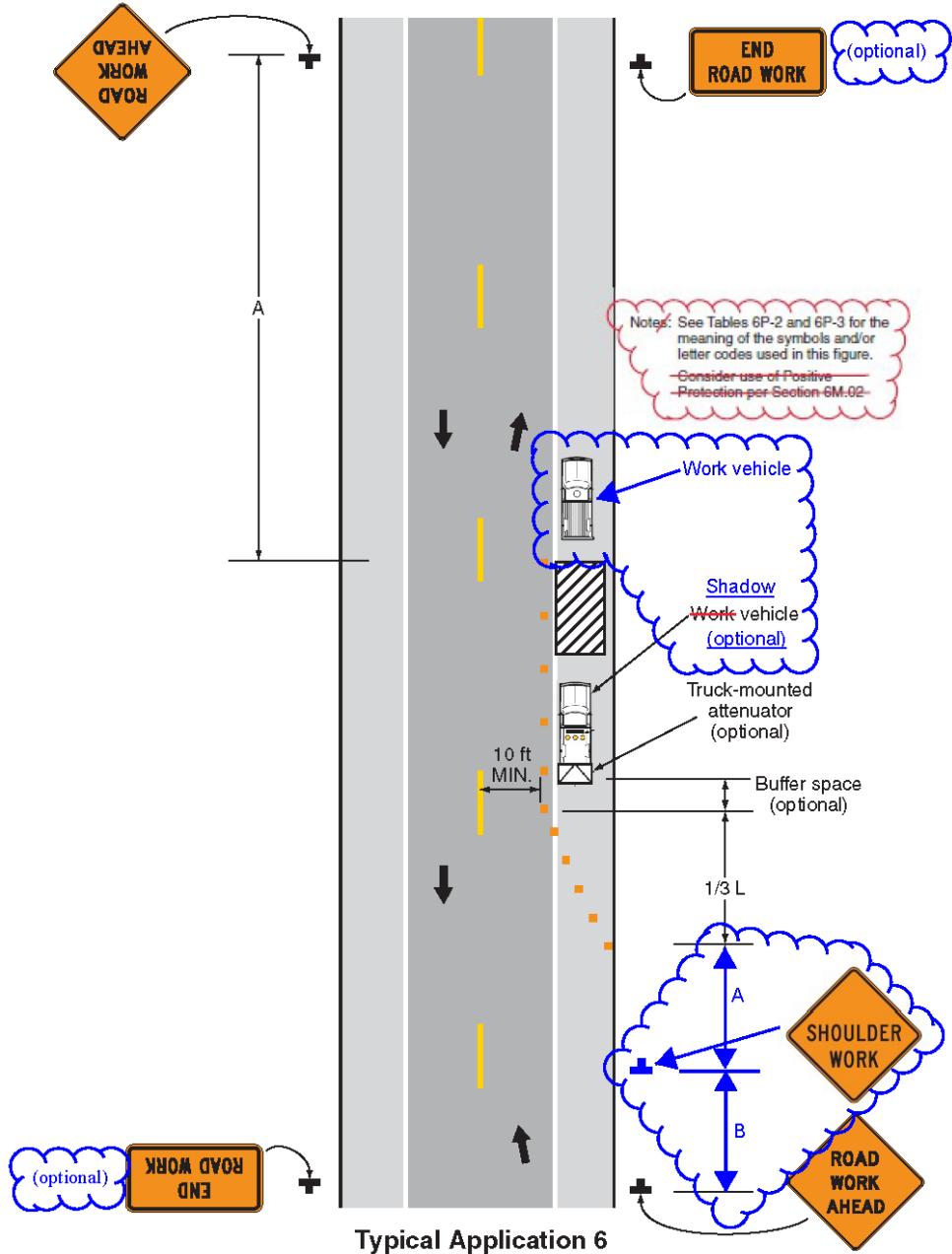
- 350 **12.14.** Vehicle-mounted signs shall be mounted in a manner such that they are not
351 obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be
352 covered or turned from view when work is not in progress.

- 353 13. ~~Shadow and work vehicles shall display high-intensity rotating, flashing,~~
354 ~~oscillating, or strobe lights.~~ [Moved to Note 1]
355 14. ~~Vehicle hazard warning signals shall not be used instead of the vehicle's high-~~
356 ~~intensity rotating, flashing, oscillating, or strobe lights.~~ [Moved to Note 2]

357 **Figure 6P-6 Comments:** NCUTCD generally agrees with Figure 6P-6 as presented in the NPA,
358 but recommends revisions in accordance with NCUTCD recommendation 20B-TTC-03:
359

- 360 • Add a SHOULDER WORK sign between the ROAD WORK AHEAD sign and the work
area
- 361 • Label figure items as appropriate
- 362 • Add “optional” to signs as appropriate
- 363 • Delete the positive protection note since it is redundant with a note added to the notes
364 page

365
366 **Figure 6P-6. Shoulder Work with Minor Encroachment (TA-6)**



367
368

369 **Notes for Figure 6P-7 Comments:** NCUTCD agrees with Notes for Figure 6P-7 as presented
370 in the NPA.

371 **Notes for Figure 6P-7 — Typical Application 7**
372 **Road Closure with a Diversion**

373
374 Support:

- 375 1. Signs and object markers are shown for one direction of travel only.

376 **Standard:**

- 377 2. Devices similar to those depicted shall be placed for the opposite direction of travel.
378 3. Pavement markings no longer applicable to the traffic pattern of the roadway shall
379 be removed or obliterated before any new traffic patterns are open to traffic.
380 4. Temporary barriers and end treatments shall be crashworthy.

381 **Guidance:**

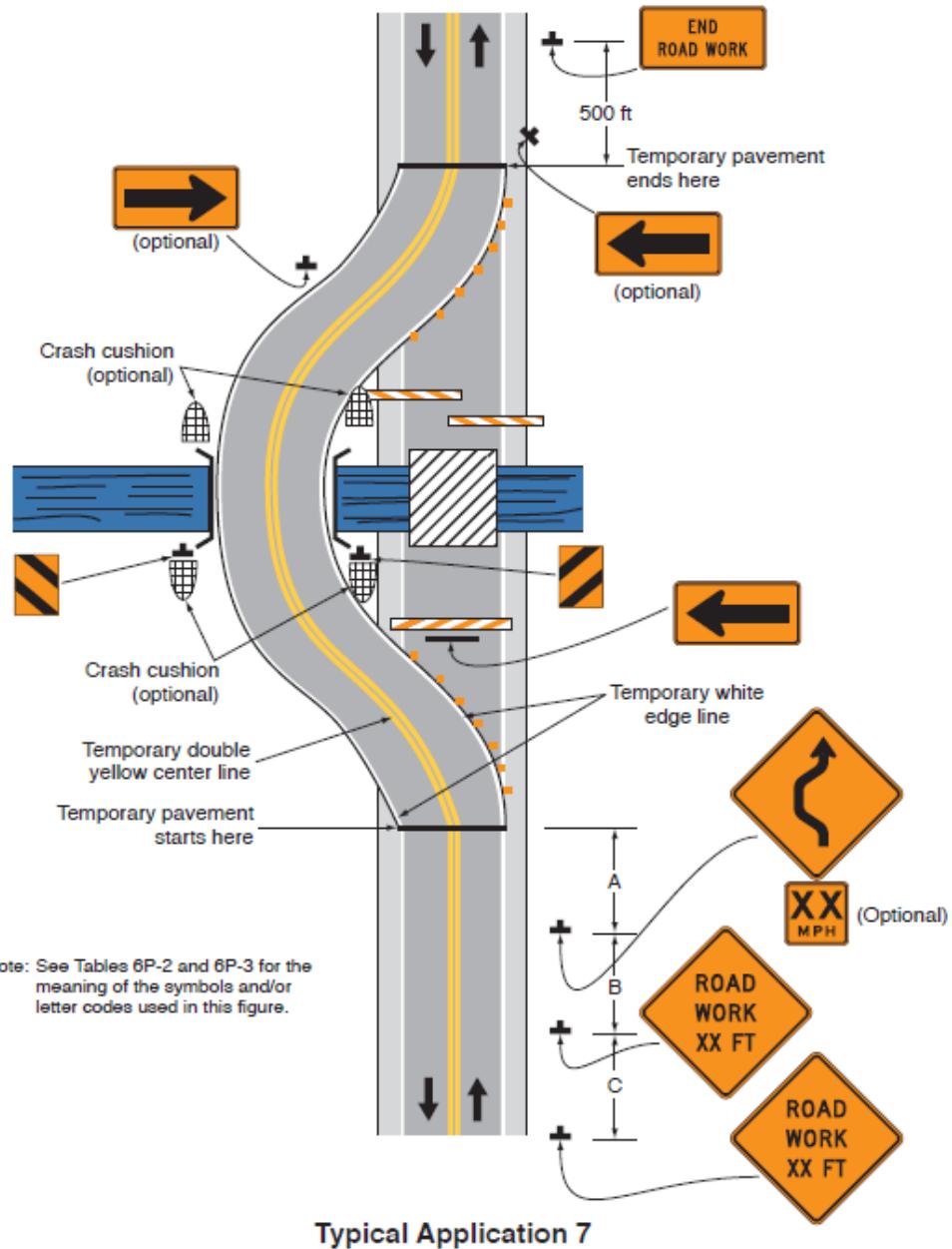
- 382 5. If the tangent distance along the temporary diversion is more than 600 feet, a Reverse
383 Curve sign, left first, should be used instead of the Double Reverse Curve sign, and a
384 second Reverse Curve sign, right first, should be placed in advance of the second reverse
385 curve back to the original alignment.
386 6. When the tangent section of the diversion is more than 600 feet, and the diversion has
387 sharp curves with recommended speeds of 30 mph or less, Reverse Turn signs should be
388 used.
389 7. Where the temporary pavement and old pavement are different colors, the temporary
390 pavement should start on the tangent of the existing pavement and end on the tangent of
391 the existing pavement.
392 8. Delineators or channelizing devices should be used along the diversion.

393 **Option:**

- 394 9. Flashing warning lights and/or flags may be used to call attention to the warning signs.
395 10. On sharp curves, large arrow signs may be used in addition to other advance warning
396 signs.

Figure 6P-7 Comments: NCUTCD agrees with Figure 6P-7 as presented in the NPA.

Figure 6P-7. Road Closure with a Diversion (TA-7)



403 **Notes for Figure 6P-8 Comments:** NCUTCD generally agrees with Notes for Figure 6P-8 as
404 presented in the NPA, but recommends adding a new Note 2 Guidance addressing detour traffic
405 impacts in accordance with NCUTCD recommendation 20B-TTC-02.

406

407 **Notes for Figure 6P-8 — Typical Application 8**
408 **Road Closure with an Off-Site Detour**

409 *Guidance:*

- 410
- 411 1. *Regulatory traffic control devices should be modified as needed for the duration of the*
412 *detour.*
- 413 2. *The detour route should be evaluated using engineering judgment to assess the impacts*
414 *from additional traffic directed onto the detour.* [revise per 20B-TTC-02]

415 Option:

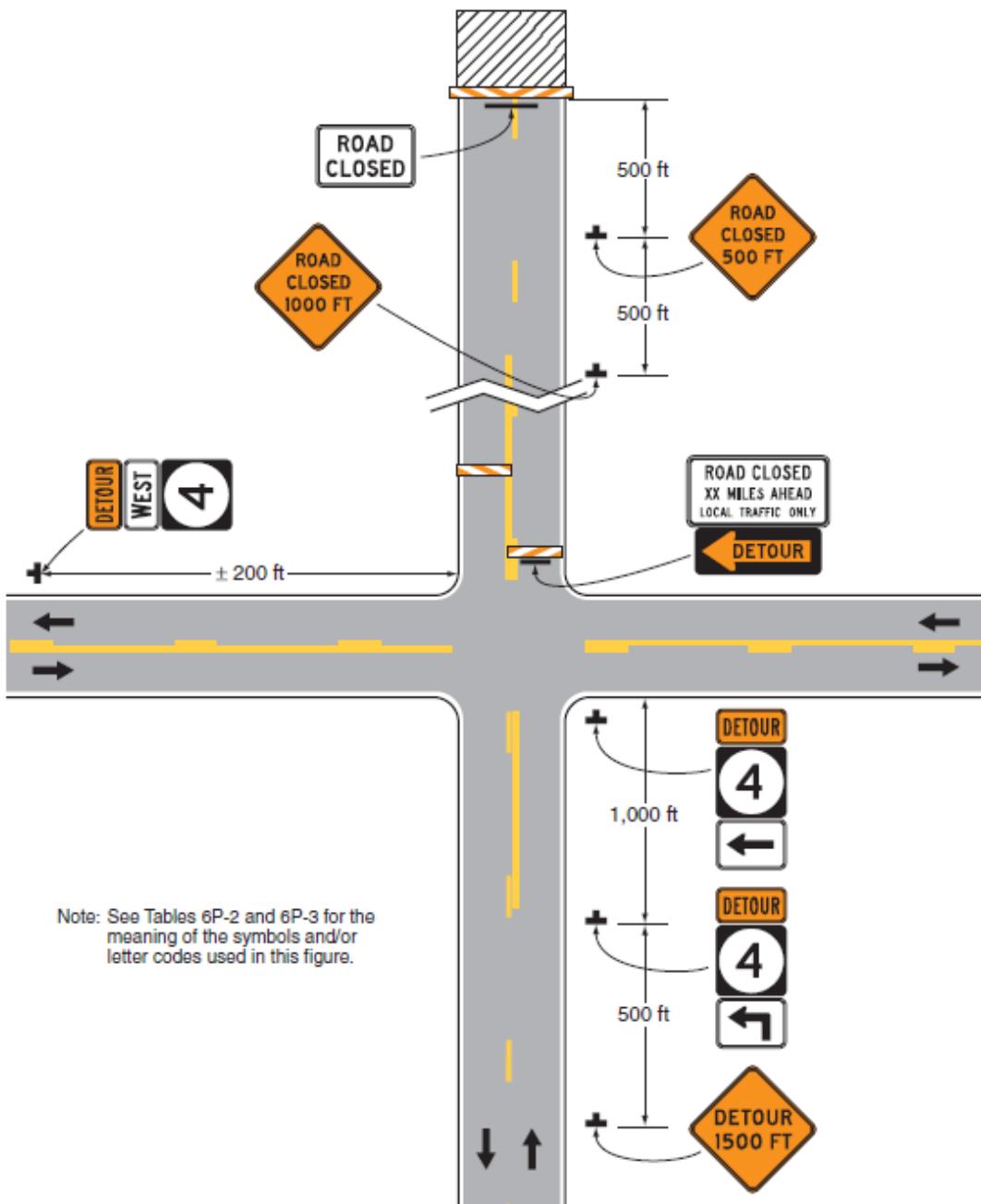
- 416 2.3. If the road is opened for some distance beyond the intersection and/or there are
417 significant origin/destination points beyond the intersection, the ROAD CLOSED and
418 DETOUR signs on Type 3 Barricades may be located at the edge of the traveled way.
- 419 3.4. A Route Sign Directional assembly may be placed on the far left corner of the
420 intersection to augment or replace the one shown on the near right corner.
- 421 4.5. Flashing warning lights and/or flags may be used to call attention to the advance
422 warning signs.
- 423 5.6. Cardinal direction plaques may be used with route signs.

426 **Figure 6P-8 Comments:** NCUTCD agrees with Figure 6P-8 as presented in the NPA.

427

428

429 **Figure 6P-8. Road Closure with an Off-Site Detour (TA-8)**



430

431

432 **Notes for Figure 6P-9 Comments:** NCUTCD generally agrees with Notes for Figure 6P-9 as
433 presented in the NPA, but recommends adding a new Note 4 Guidance addressing detour traffic
434 impacts in accordance with NCUTCD recommendation 20B-TTC-02.

435 **Notes for Figure 6P-9—Typical Application 9**
436 **Overlapping Routes with a Detour**

437 Support:

- 438 1. TTC devices are shown for one direction of travel only.

439 **Standard:**

- 440 2. **Devices similar to those depicted shall be placed for the opposite direction of**
441 **travel.**

442 *Guidance:*

- 443 3. *STOP or YIELD signs displayed to side roads should be installed as needed along the*
444 *temporary route.*
445 4. *The detour route should be evaluated using engineering judgment to assess the impacts*
446 *from additional traffic directed onto the detour.* [revise per 20B-TTC-02]

447 Option:

- 448 4.5. Flashing warning lights and/or flags may be used to call attention to the advance
449 warning signs.
450 5.6. Flashing warning lights may be used on the Type 3 Barricades.
451 6.7. Cardinal direction plaques may be used with route signs.

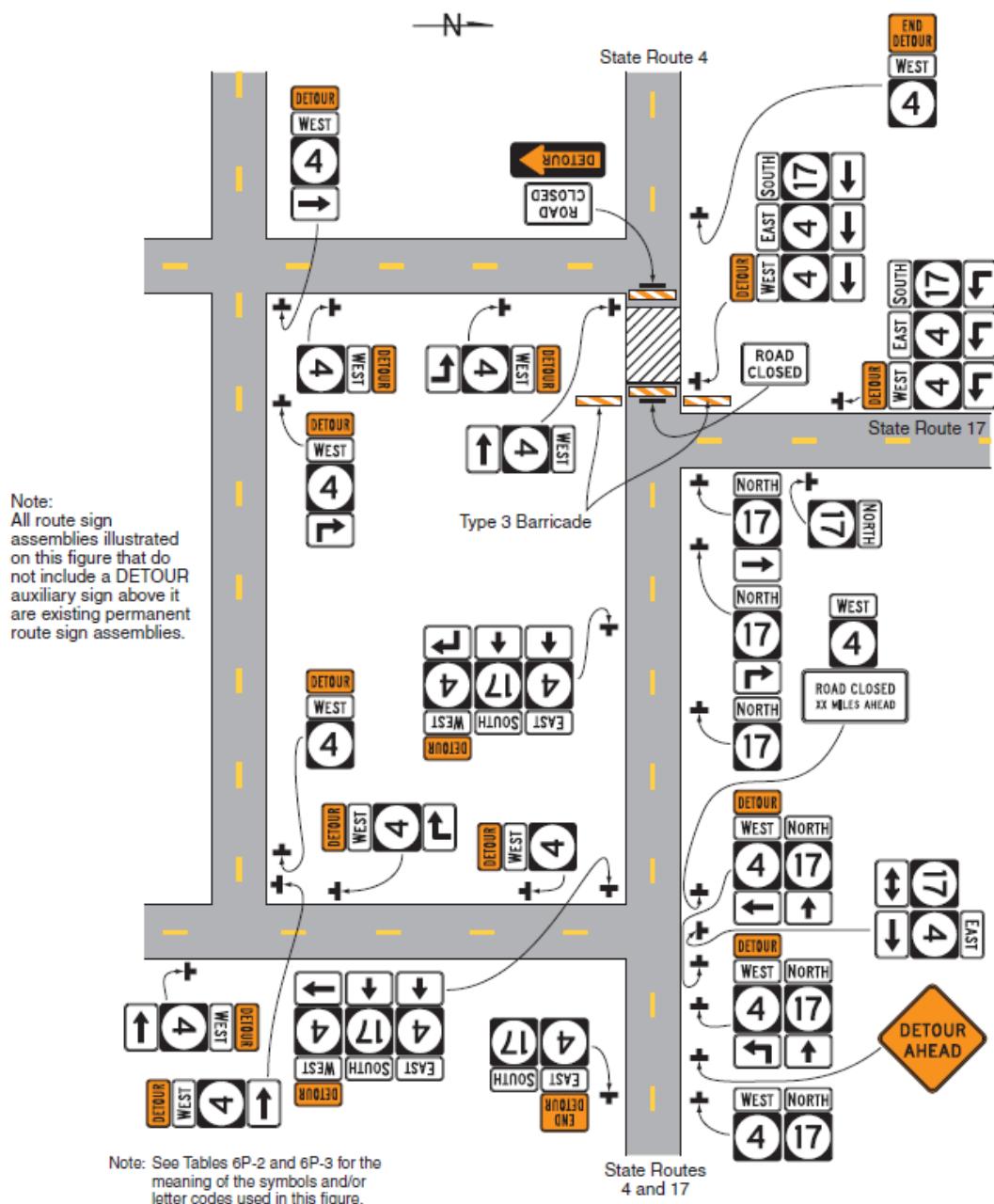
455 **Figure 6P-9 Comments:** NCUTCD agrees with Figure 6P-9 as presented in the NPA.

456

457

458

Figure 6P-9. Overlapping Routes with a Detour (TA-9)



Typical Application 9

459

460 **Notes for Figure 6P-10 Comments:** NCUTCD generally agrees with Notes for Figure 6P-10 as
461 presented in the NPA, but recommends revisions in accordance with NCUTCD
462 recommendations 20B-TTC-01 and 20B-TTC-02 as follows:
463

- 464 • Note 2: revise to simplify the text for single flaggers []
- 465 • Note 3: delete regarding omitting ROAD WORK signs []
- 466 • Note 4 (was Note 5): revise to clarify “stopping” sight distance should be provided []
- 467 • Note 6 (was Note 7): revise to refer to Table 6H-3 for sign spacing []

468 **Notes for Figure 6P-10 — Typical Application 10** 469 **Lane Closure on a Two-Lane Road Using Flaggers**

470 **Option:**

- 471 1. Positive protection devices may be used per Section 6M.02.
- 472 2. ~~For low volume situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger, positioned to be visible to road users approaching from both directions, may be used (see Chapter 6D). A single flagger may be used on straight roadways with low-volumes when road users on both approaches have stopping sight distance to the flagger station (see Section 6E.02).~~ [revise per 20B-TTC-01]
- 473 3. ~~The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations.~~ [revise per 20B-TTC-02]
- 474 4.3. Flashing warning lights and/or flags may be used to call attention to the advance warning signs. A BE PREPARED TO STOP sign may be added to the sign series.

475 **Guidance:**

- 476 5.4. *The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or crest vertical) curve to provide adequate stopping sight distance for the flagger and a queue of stopped vehicles.* [revise per 20B-TTC-01]

477 **Standard:**

- 478 6.5. At night, flagger stations shall be illuminated, except in emergencies.

479 **Guidance:**

- 480 7.6. *When used, the BE PREPARED TO STOP sign should be located between the Flagger sign and the ONE LANE ROAD sign. When the BE PREPARED TO STOP sign is added, sign spacing criteria in Table 6H-3 should be used for all four signs in the sequence.* [revise per 20B-TTC-02]

- 481 8.7. *When a grade crossing exists within or upstream of the transition area and it is anticipated that queues resulting from the lane closure might extend through the grade crossing, the TTC zone should be extended so that the transition area precedes the grade crossing.*

- 482 9.8. *When a grade crossing equipped with active warning devices exists within the activity area, provisions should be made for keeping flaggers informed as to the activation status of these warning devices.*

- 483 10.9. *When a grade crossing exists within the activity area, drivers operating on the left-hand side of the normal center line should be provided with comparable warning devices as for drivers operating on the right-hand side of the normal center line.*

- 484 11.10. *Early coordination with the railroad company or light rail transit agency should occur before work starts.*

506 Option:

507 ~~12.11.~~ A flagger or a uniformed law enforcement officer may be used at the grade crossing to
508 minimize the probability that vehicles are stopped within 15 feet of the grade crossing,
509 measured from both sides of the outside rails.

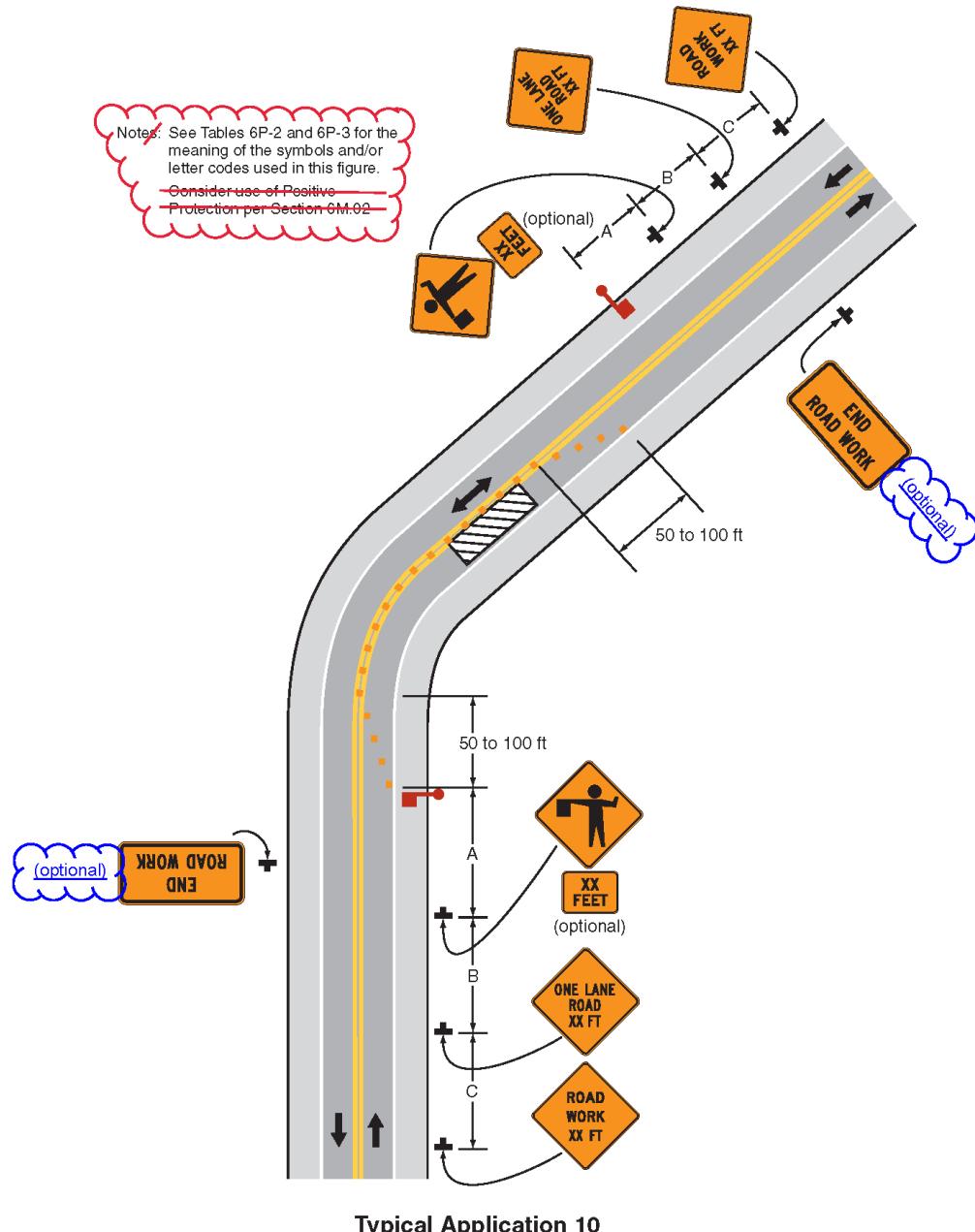
510

511 **Figure 6P-10 Comments:** NCUTCD recommends revising Figure 6P-10 in accordance with
512 NCUTCD recommendation 20B-TTC-02:
513 • Add “optional” to signs as appropriate
514 • Delete the positive protection note since it is redundant with a note added to the notes page

515 **Figure 6P-10. Lane Closure on a Two-Lane Road Using Flaggers (TA-10)**

516

517



518

519 **Notes for Figure 6P-11 Comments:** NCUTCD generally agrees with Notes for Figure 6P-11 as
520 presented in the NPA, but recommends revisions in accordance with NCUTCD recommendation
521 20B-TTC-02 as follows:

- 522 • Note 3: revise to include lights and flags and apply to both day and night work.

523

524 **Notes for Figure 6P-11 — Typical Application 11**
525 **Lane Closure on a Two-Lane Road with Low Traffic Volumes**

526 Option:

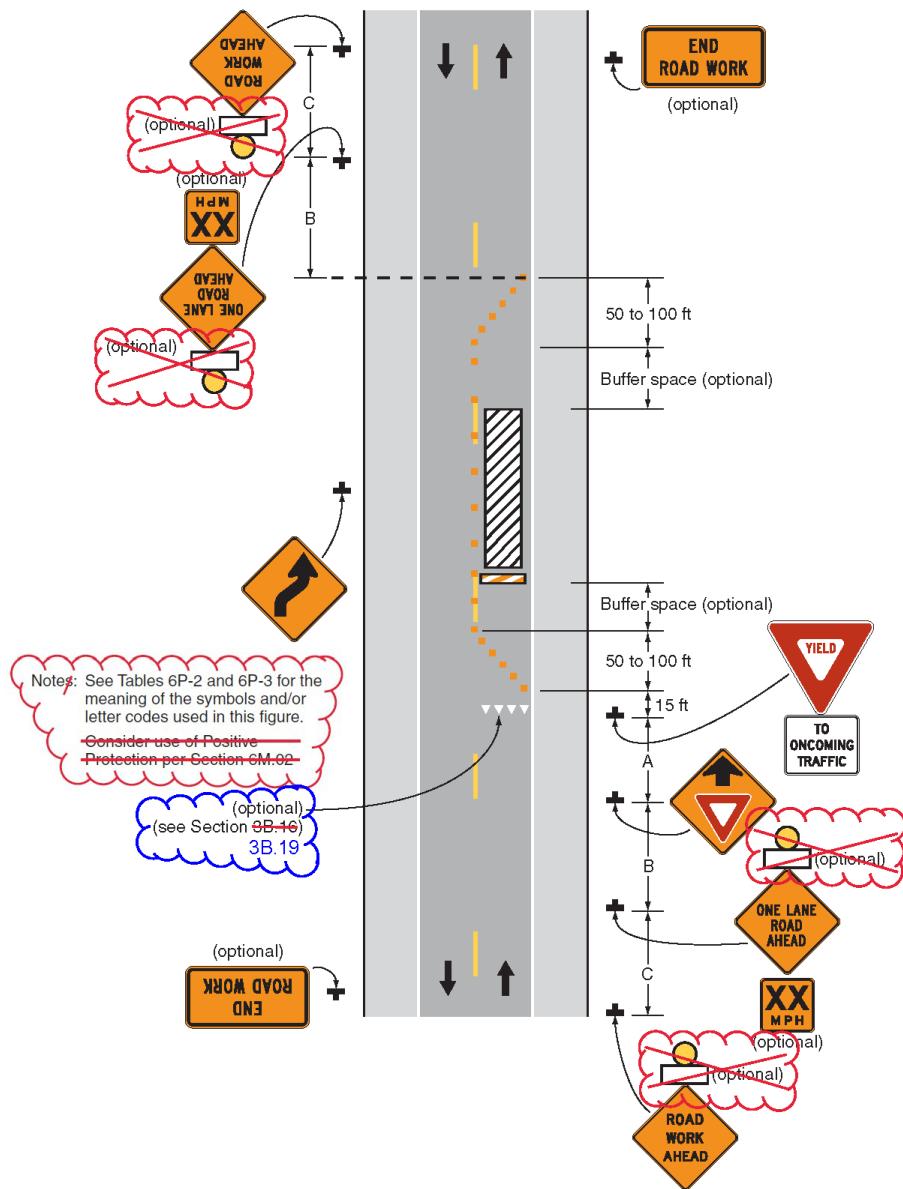
- 527 1. Positive protection devices may be used per Section 6M.02.
- 528 2. This TTC zone application may be used as an alternate to the TTC application shown in
529 Figure 6P-10 (using flaggers) when the following conditions exist:
530 a. Vehicular traffic volume is such that sufficient gaps exist for vehicular traffic that must
531 yield.
532 b. Road users from both directions are able to see approaching vehicular traffic through
533 and beyond the worksite and have sufficient visibility of approaching vehicles.
534 3. ~~The Type B flashing warning lights may be placed on the ROAD WORK AHEAD and
535 the ONE LANE ROAD AHEAD signs whenever a night lane closure is necessary.~~
536 Flashing warning lights and/or flags may be used to call attention to the advance warning
537 signs. [revise per 20B-TTC-02]

540 **Figure 6P-11 Comments:** NCUTCD generally agrees with Figure 6P-11 as presented in the
541 NPA, but recommends the following in accordance with NCUTCD recommendation 20B-TTC-
542 02:

- Delete warning lights on signs
- Add “Optional” to signs as appropriate
- Delete the positive protection note since it is redundant with a note added to the notes
page
- Edit the cross-reference of 3B.16 to 3B.19 to correspond with renumbering in the NPA

543 **Figure 6P-11. Lane Closure on a Two-Lane Road with Low Traffic Volumes (TA-11)**

544



545 Typical Application 11

546

552 **Notes for Figure 6P-12 Comments:** NCUTCD generally agrees with Notes for Figure 6P-12 as
553 presented in the NPA, but recommends revisions in accordance with NCUTCD recommendation
554 20B-TTC-02 as follows:

- 555 • Note 7: delete “recognizing that the distances shown for sign spacings are minimums”
- 556 • Note 9: revise text referencing lights and flags, and add a reference to optional use of a BE
557 PREPARED TO STOP sign
- 558 • Note 11 (new): Add a new Guidance note addressing placement of an optional BE
559 PREPARED TO STOP sign

560

561 **Notes for Figure 6P-12 — Typical Application 12**
562 **Lane Closure on a Two-Lane Road Using Traffic Control Signals**

563

564

565 **Standard:**

- 566 1. **Temporary traffic control signals shall be installed and operated in accordance with**
567 **the provisions of Part 4. Temporary traffic control signals shall meet the physical**
568 **display and operational requirements of conventional traffic control signals.**
- 569 2. **Temporary traffic control signal timing shall be established by authorized officials.**
570 **Durations of red clearance intervals shall be adequate to clear the one-lane section**
571 **of conflicting vehicles.**
- 572 3. **When the temporary traffic control signal is changed to the flashing mode, either**
573 **manually or automatically, red signal indications shall be flashed to both**
574 **approaches.**
- 575 4. **Stop lines shall be installed with temporary traffic control signals for long-term**
576 **closures. Existing conflicting pavement markings and raised pavement marker**
577 **reflectors between the activity area and the stop line shall be removed. After the**
578 **temporary traffic control signal is removed, the stop lines and other temporary**
579 **pavement markings shall be removed and the permanent pavement markings**
580 **restored.**
- 581 5. **Safeguards shall be incorporated to avoid the possibility of conflicting signal**
582 **indications at each end of the TTC zone.**

583 *Guidance:*

- 584 6. *Where no-passing lines are not already in place, they should be added.*
- 585 7. *Adjustments in the location of the advance warning signs should be made as needed to*
586 *accommodate the horizontal or vertical alignment of the roadway, ~~recognizing that the~~*
587 *~~distances shown for sign spacings are minimums~~*. *Adjustments in the height of the signal*
588 *heads should be made as needed to conform to the vertical alignment.* [revise per 20B-
589 **TTC-02]**

590 *Option:*

- 591 8. Positive protection devices may be used per Section 6M.02. [revise 20B-TTC-02]
- 592 9. ~~Flashing warning lights shown on the ROAD WORK AHEAD and the ONE LANE~~
~~ROAD AHEAD signs may be used.~~ Flashing warning lights and/or flags may be used to
call attention to the advance warning signs. A BE PREPARED TO STOP sign may be
added to the sign series. [revise per 20B-TTC-02]
- 593 10. Removable pavement markings may be used.

594 *Guidance:*

598 11. *When used, the BE PREPARED TO STOP sign should be located between the Signal*
599 *Ahead sign and the ONE LANE ROAD sign. When the BE PREPARED TO STOP sign is*
600 *added, sign spacing criteria in Table 6H-3 should be used for all four signs in the*
601 *sequence. [revise per 20B-TTC-02]*

602 Support:

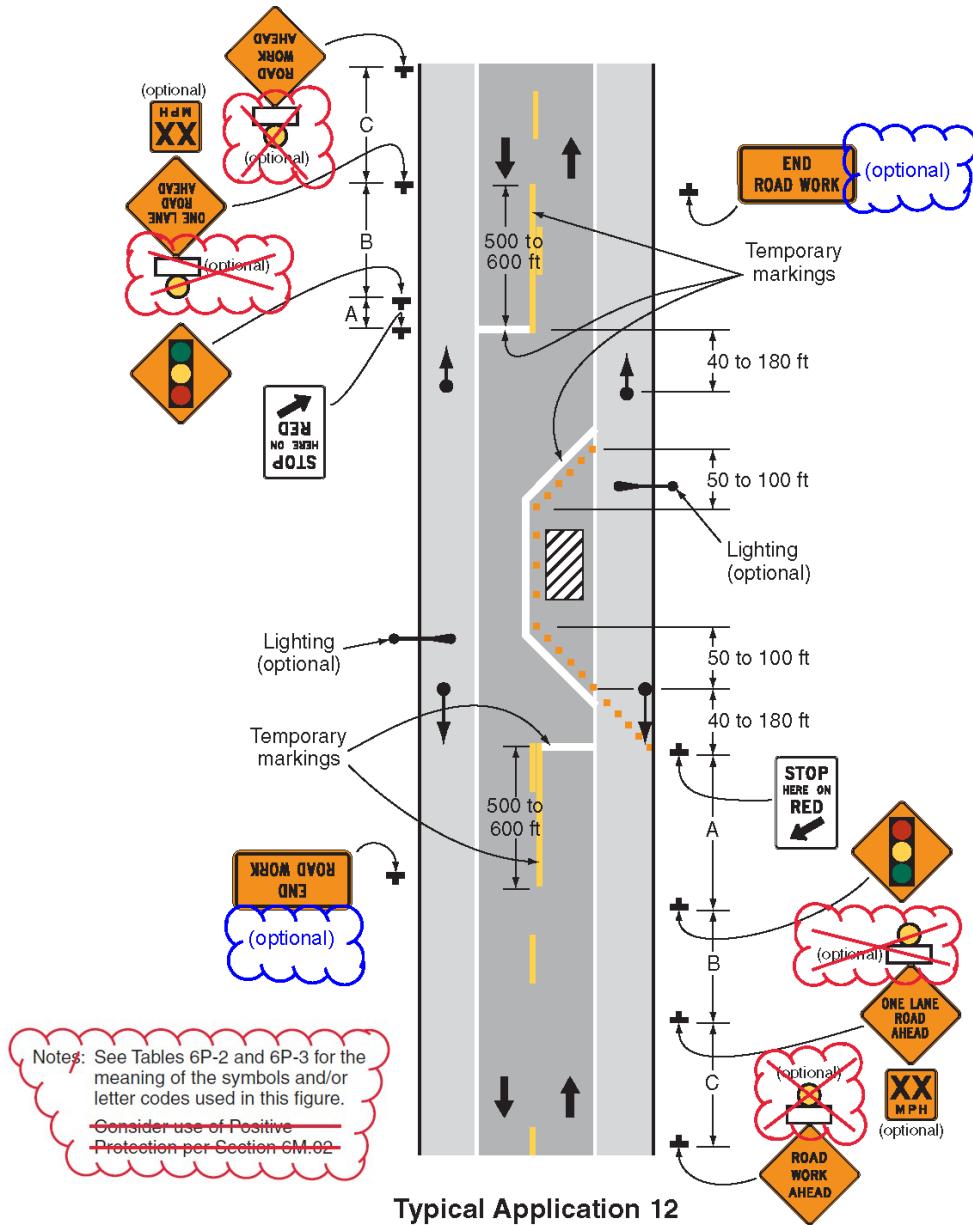
- 603 11. Temporary traffic control signals are preferable to flaggers for long-term projects and
604 other activities that would require flagging at night.
- 605 12. The maximum length of activity area for one-way operation under temporary traffic
606 control signal control is determined by the capacity required to handle the peak demand.

609 **Figure 6P-12 Comments:** NCUTCD generally agrees with Figure 6P-12 as presented in the
610 NPA, but recommends the following in accordance with NCUTCD recommendation 20B-TTC-
611 02:

- Delete warning lights on signs
- Add “optional” to signs as appropriate
- Delete the positive protection note since it is redundant with a note added to the notes page

617 **Figure 6P-12. Lane Closure on a Two-Lane Road using Traffic Control Signals (TA-12)**

Figure 6H-12. Lane Closure on a Two-Lane Road Using
Traffic Control Signals (TA-12)



619 **Notes for Figure 6P-13 Comments:** NCUTCD generally agrees with Notes for Figure 6P-13 as
620 presented in the NPA, but recommends revisions in accordance with NCUTCD recommendation
621 20B-TTC-02 as follows:

- 622 • Note 4: revise to make the use of a BE PREPARED TO STOP sign the default condition
- 623 • Note 6: delete (covered in revised Note 4)

624

625 **Notes for Figure 6P-13 — Typical Application 13**
626 **Temporary Road Closure**

627 Support:

- 628 1. Conditions represented are a planned closure not exceeding 20 minutes during the
629 daytime.

630 **Standard:**

- 631 2. A flagger or uniformed law enforcement officer shall be used for this application.
The flagger, if used for this application, shall follow the procedures provided in
634 Sections 6D.05 and 6D.06.

635 **Guidance:**

- 636 3. The uniformed law enforcement officer, if used for this application, should follow the
637 procedures provided in Sections 6D.05 and 6D.06.

638 **Option:**

- 639 4. A BE PREPARED TO STOP sign may be added omitted from to the sign series where
the space to place signs is constrained. [revise per 20B-TTC-02]
- 640 5. Positive protection devices may be used per Section 6M.02.

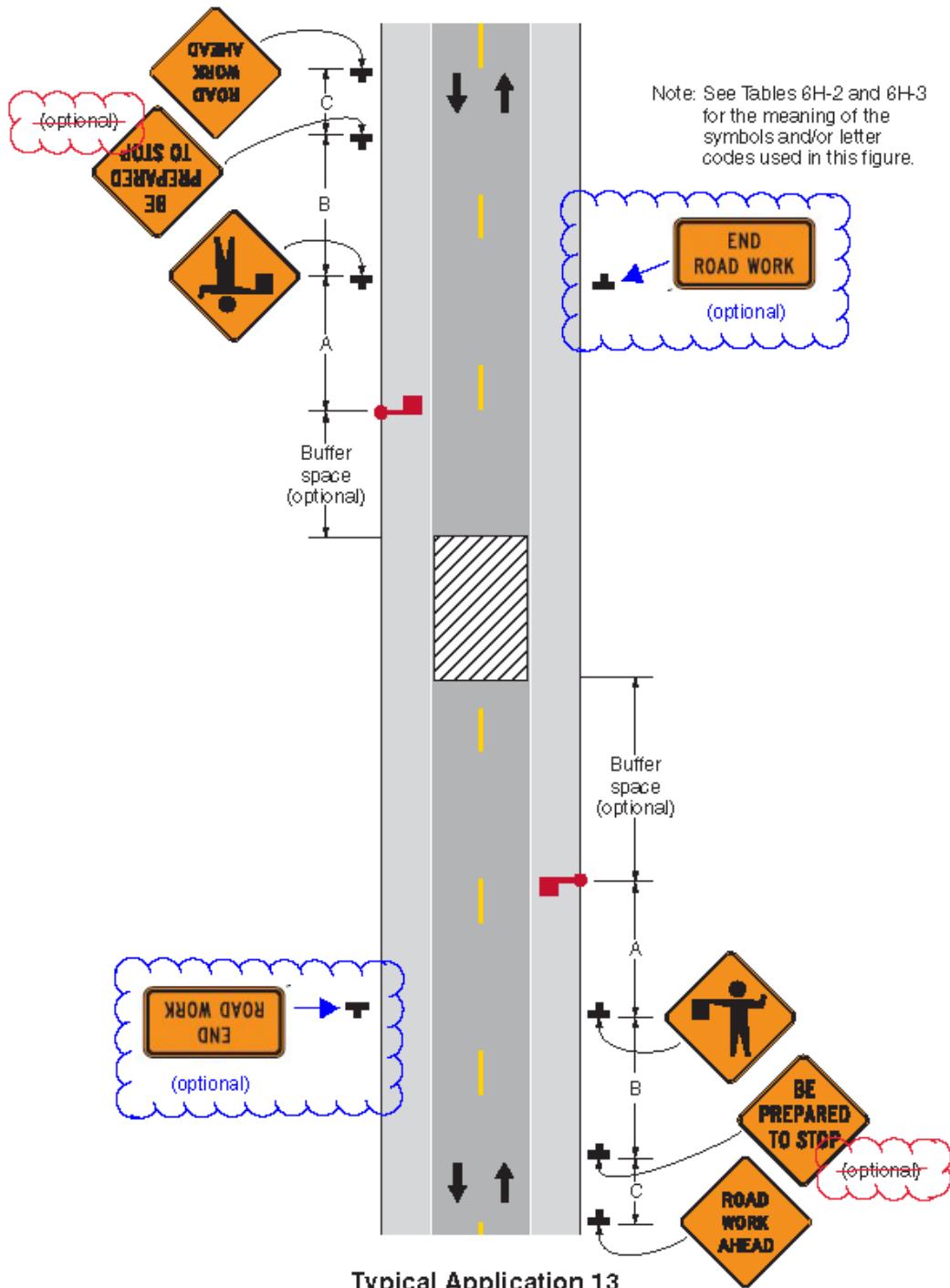
641 **Guidance:**

- 642 6. ~~When used, the BE PREPARED TO STOP sign should be located before the Flagger symbol sign.~~ [revise per 20B-TTC-02]

646 **Figure 6P-13 Comments:** NCUTCD generally agrees with Figure 6P-13 as presented in the
647 NPA, but recommends adding “optional” to signs as appropriate in accordance with NCUTCD
648 recommendation 20B-TTC-02.

649
650
651

Figure 6P-13. Temporary Road Closure (TA-13)



652

653 **Notes for Figure 6P-14 Comments:** NCUTCD generally agrees with Notes for Figure 6P-14 as
654 presented in the NPA, but recommends revisions in accordance with NCUTCD recommendation
655 20B-TTC-02 as follows:

- 656 • Note 12 (new): add a new Option note referring to lights and/or flags

657

658 **Notes for Figure 6P-14 — Typical Application 14**

659 **Haul Road Crossing**

660 *Guidance:*

- 662 1. *Floodlights should be used to illuminate haul road crossings where existing light is*
663 *inadequate.*
- 664 2. *Where no-passing lines are not already in place, they should be added.*

665 **Standard:**

- 666 1. **The traffic control method selected shall be used in both directions.**

667 **Flagging Method**

- 668 4. **When a road used exclusively as a haul road is not in use, the haul road shall be**
669 **closed with Type 3 Barricades and the Flagger symbol signs covered.**
- 670 5. **The flagger shall follow the procedures provided in Sections 6D.05 and 6D.06.**
- 671 6. **At night, flagger stations shall be illuminated, except in emergencies.**

672 **Signalized Method**

- 673 7. **When a road used exclusively as a haul road is not in use, the haul road shall be**
674 **closed with Type 3 Barricades. The signals shall either:**
 - 675 a. **flash yellow on the main road and flash red on the haul road or be covered,**
676 **and the Signal Ahead and STOP HERE ON RED signs shall be covered or**
677 **hidden from view;**
678 **or**
 - 679 b. **display green on the main road and steady red on the haul road, but only if**
680 **actuated signal operation is used such that green is always displayed to the**
681 **main road except when a vehicle is detected on the haul road.**

- 682 8. **The temporary traffic control signals shall control both the highway and the haul**
683 **road and shall meet the physical display and operational requirements of**
684 **conventional traffic control signals as described in Part 4. Traffic control signal**
685 **timing shall be established by authorized officials.**

- 686 9. **Stop lines shall be used on existing highway with temporary traffic control signals.**

- 687 10. **Existing conflicting pavements markings between the stop lines shall be removed.**
688 **After the temporary traffic control signal is removed, the stop lines and other**
689 **temporary pavement markings shall be removed and the permanent pavement**
690 **markings restored.**

691 *Guidance:*

692 **Signalized Method**

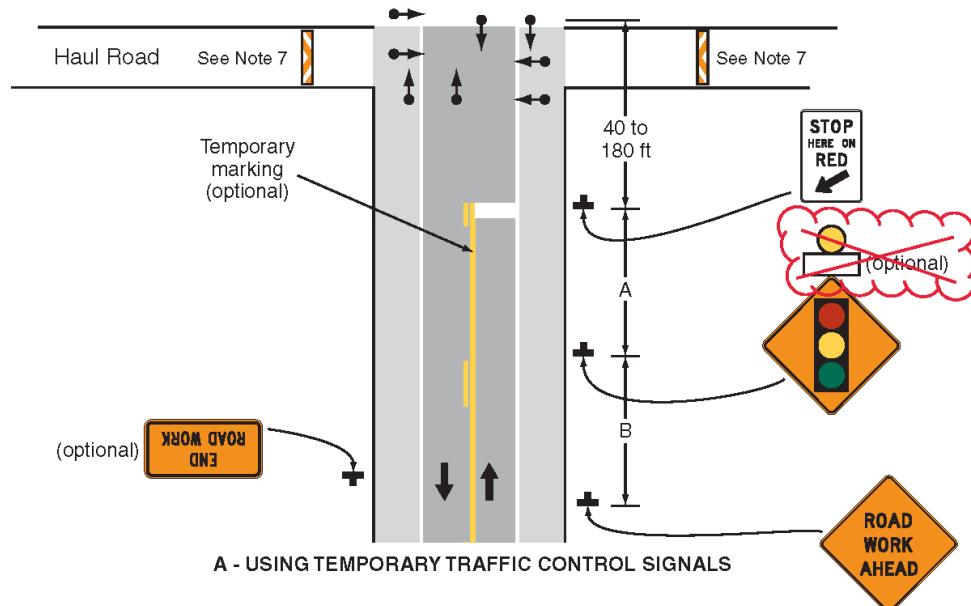
- 693 11. **If actuated signal operation is used (see item 7.b. above) and pedestrian facilities, such**
694 **as sidewalks, are present in the area of the haul road crossing, then consideration should**
695 **be given to providing pedestrian actuation capability at the temporary traffic control**
696 **signal to accommodate any pedestrians who might be depending upon a pedestrian phase**
697 **to cross the main road.**

698 Option
699 12. Flashing warning lights and/or flags may be used to call attention to the advance warning
700 signs. [revise per 20B-TTC-02]

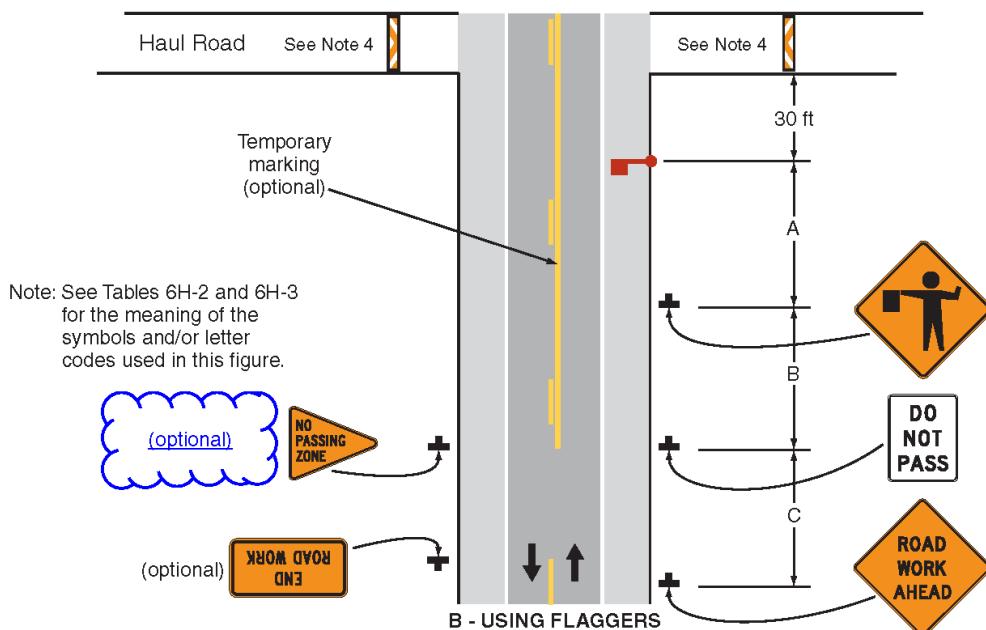
701
702 **Figure 6P-14 Comments:** NCUTCD generally agrees with Figure 6P-14 as presented in the
703 NPA, but recommends deleting warning lights and adding “optional” to signs as appropriate in
accordance with NCUTCD recommendation 20B-TTC-02.

704
705
706

Figure 6P-14. Haul Road Crossing (TA-14)



A - USING TEMPORARY TRAFFIC CONTROL SIGNALS



B - USING FLAGGERS

707

Typical Application 14

708 **Notes for Figure 6P-15 Comments:** NCUTCD recommends Typical Applications 15 and 16 be
709 combined in accordance with NCUTCD recommendation 20B-TTC-02.

710 NCUTCD recommends revisions to Notes for Figure 6P-15 in accordance with NCUTCD
711 recommendation 20B-TTC-02 as follows:

- 712 • Note 2 (new): add a new Guidance note for the use of spotters to warn workers who cannot
713 watch road users
- 714 • Note 3 (new): add a new Guidance note stating TA-15 is appropriate only for low speed
715 minor roads and referring to TA-10 or TA-12 for higher speed or volume conditions
- 716 • Note 5 (new): add a new Option note allowing the use of the SURVEY CREW sign in place
717 of the ROAD WORK sign
- 718 • Note 8 (was Note 5): delete “low volume, low speed roadways” and “heavy commercial” so
719 the note applies to a wider range of roadways, plus editorial revisions
- 720 • Note 9 (was Note 6): revise so this note only applies to mobile and short duration work

722 **Notes for Figure 6P-15 — Typical Application 15** 723 **Work in the Center of a Road with Low Traffic Volumes**

724 *Guidance:*

- 725 1. *The lanes on either side of the center work space should have a minimum width of 10 feet as measured from the near edge of the channelizing devices to the edge of the pavement or the outside edge of the paved shoulder.*
- 726 2. *A spotter or spotters should be used to warn workers and surveyors who cannot watch road users. The spotter(s) should be provided with an audible warning device, such as a two-way radio, air horn, or whistle. [revise per 20B-TTC-02]*
- 727 3. *The treatment shown should be used on a minor road having low speeds. For higher volume or higher speed traffic conditions, a lane closure should be used as shown in Figure 6H-10 or Figure 6H-12. [revise per 20B-TTC-02]*

734 *Option:*

- 735 2.4. Positive protection devices may be used per Section 6M.02.
- 736 5. A SURVEY CREW sign may be used in place of the ROAD WORK AHEAD sign. [revise per 20B-TTC-02]
- 737 3.6. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
- 738 4.7. If the closure continues overnight, warning lights may be used on the channelizing devices.
- 739 5.8. A lane width of 9 feet may be used for short-term stationary work ~~on low volume, low speed roadways~~ when motor vehicle traffic does not include longer and ~~or~~ wider heavy commercial vehicles. [revise per 20B-TTC-02]
- 740 6.9. A For mobile and short duration work, a work vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights may be used instead of the channelizing devices forming the tapers or the high-level warning devices. [revise per 20B-TTC-02]
- 741 7.10. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

750 *Standard:*

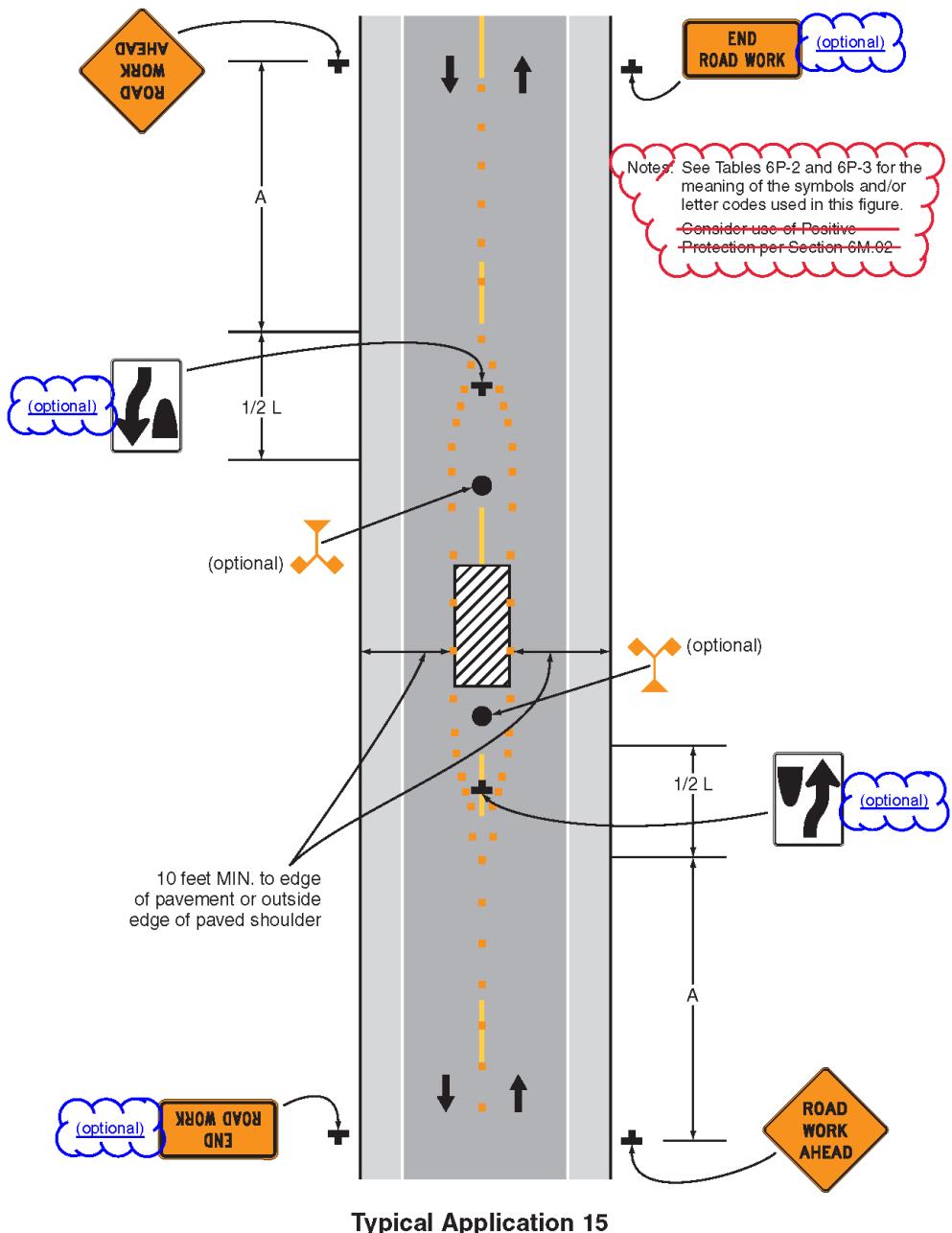
- 751 8.11. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.

754 **Figure 6P-15 Comments:** NCUTCD generally agrees with Figure 6P-15 as presented in the
755 NPA, but recommends the following in accordance with NCUTCD recommendation 20B-TTC-
756 02:

- Add “optional” to signs as appropriate
- Delete the positive protection note since it is redundant with a note added to the notes page

760 **Figure 6P-15. Work in the Center of a Road with Low Traffic Volumes (TA-15)**

761



762

763 **Notes for Figure 6P-16 Comments:** NCUTCD recommends deleting this Typical Application
764 entirely and combining it with Typical Application 15 in accordance with NCUTCD
765 recommendation 20B-TTC-02.

766

767 **~~Notes for Figure 6P-16 – Typical Application 16~~**
768 **~~Surveying Along the Center Line of a Road with Low Traffic Volumes~~**

769

770 ***Guidance:***

- 771 ~~1. The lanes on either side of the center work space should have a minimum width of 10 feet~~
772 ~~as measured from the near edge of the channelizing devices to the edge of the pavement~~
773 ~~or the outside edge of the paved shoulder.~~
- 774 ~~2. Cones should be placed 6 to 12 inches on either side of the center line.~~
- 775 ~~3. A flagger should be used to warn workers who cannot watch road users.~~

776 ***Standard:***

- 777 ~~4. For surveying on the center line of a high volume road, one lane shall be closed~~
778 ~~using the information illustrated in Figure 6P-10.~~

779 ***Option:***

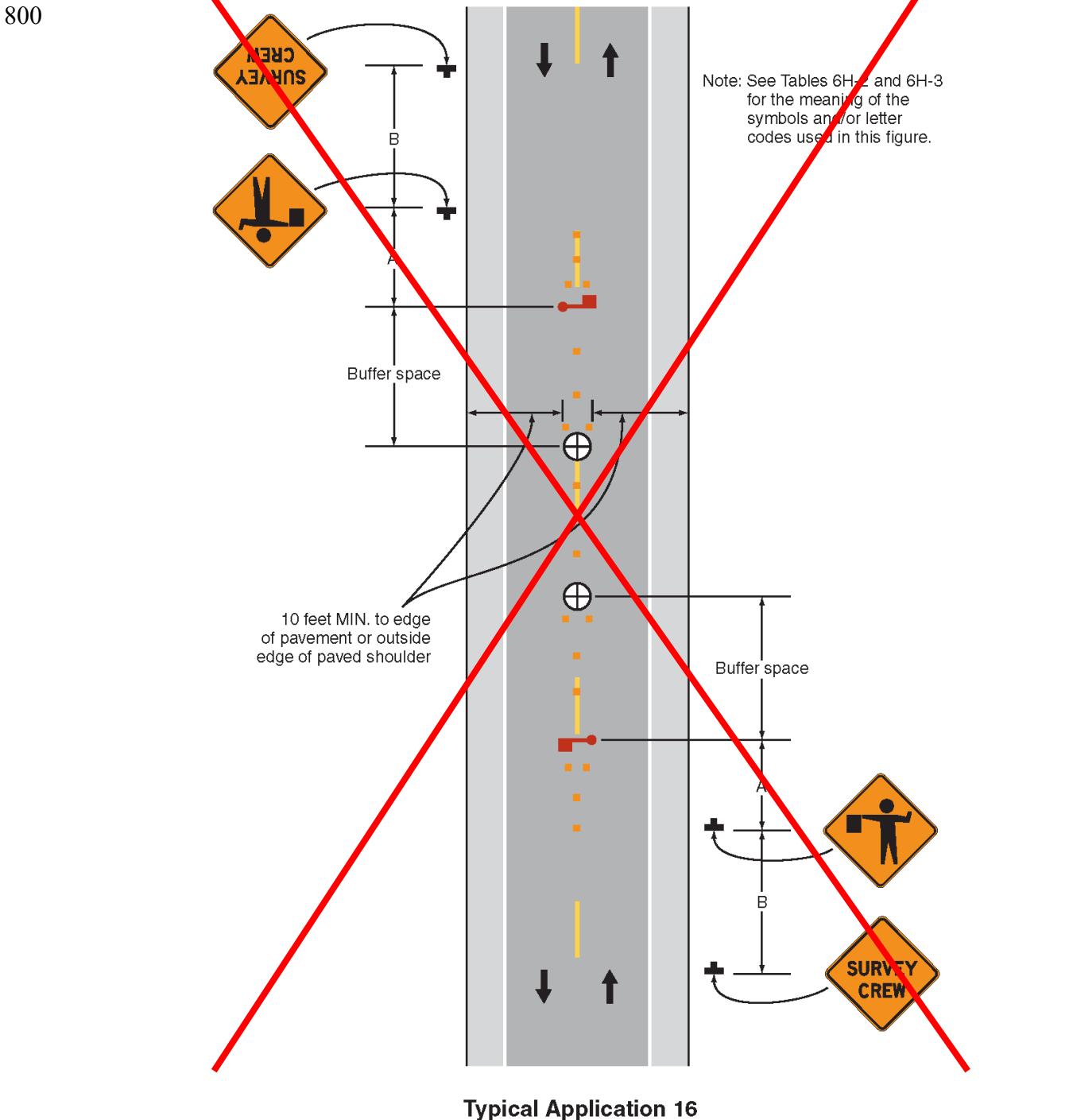
- 780 ~~5. A high level warning device may be used to protect a surveying device, such as a target~~
781 ~~on a tripod.~~
- 782 ~~6. Cones may be omitted for a cross section survey.~~
- 783 ~~7. ROAD WORK AHEAD signs may be used in place of the SURVEY CREW AHEAD~~
784 ~~signs.~~
- 785 ~~8. Flags may be used to call attention to the advance warning signs.~~
- 786 ~~9. If the work is along the shoulder, the flagger may be omitted.~~
- 787 ~~10. For a survey along the edge of the road or along the shoulder, cones may be placed along~~
788 ~~the edge line.~~
- 789 ~~11. A BE PREPARED TO STOP sign may be added to the sign series.~~

790 ***Guidance:***

- 791 ~~12. When used, the BE PREPARED TO STOP sign should be located before the Flagger~~
792 ~~symbol sign.~~

794 **Figure 6P-16 Comment:** NCUTCD recommends deleting this Typical Application entirely and
795 combining it with Typical Application 15 in accordance with NCUTCD recommendation 20B-
796 TTC-02.

797
798 **Figure 6P-16. Surveying Along the Center Line of a Road**
799 **with Low Traffic Volumes (TA-16)**



801 **Notes for Figure 6P-17 Comments:** NCUTCD generally agrees with Notes for Figure 6P-17 as
802 presented in the NPA, but recommends adding “Additional” to the beginning of Note 7, since the
803 truck-mounted attenuator shown in Figure 6P-17 is considered a protection device, and there are
804 additional options available in 6M.02.

805

806 **Notes for Figure 6P-17 — Typical Application 17**
807 **Mobile Operations on a Two-Lane Road**

808

809 **Standard:**

- 810 1. **Vehicle-mounted signs shall be mounted in a manner such that they are not**
811 **obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be**
812 **covered or turned from view when work is not in progress.**
- 813 2. **Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating,**
814 **or strobe lights.**
- 815 3. **If an arrow board is used, it shall be used in the caution mode.**

816 **Guidance:**

- 817 4. *Where practical and when needed, the work and shadow vehicles should pull over*
818 *periodically to allow vehicular traffic to pass.*
- 819 5. *Whenever adequate stopping sight distance exists to the rear, the shadow vehicle should*
820 *maintain the minimum distance from the work vehicle and proceed at the same speed.*
821 *The shadow vehicle should slow down in advance of vertical or horizontal curves that*
822 *restrict sight distance.*
- 823 6. *The shadow vehicles should also be equipped with two high-intensity flashing lights*
824 *mounted on the rear, adjacent to the sign.*

825 **Option:**

- 826 7. Additional positive Positive protection devices may be used per Section 6M.02. [edit for
827 clarity]
- 828 8. The distance between the work and shadow vehicles may vary according to terrain, paint
829 drying time, and other factors.
- 830 9. Additional shadow vehicles to warn and reduce the speed of oncoming or opposing
831 vehicular traffic may be used. Law enforcement vehicles may be used for this purpose.
- 832 10. A truck-mounted attenuator may be used on the shadow vehicle or on the work vehicle.
- 833 11. If the work and shadow vehicles cannot pull over to allow vehicular traffic to pass
834 frequently, a DO NOT PASS sign may be placed on the rear of the vehicle blocking the
835 lane.

836 **Support:**

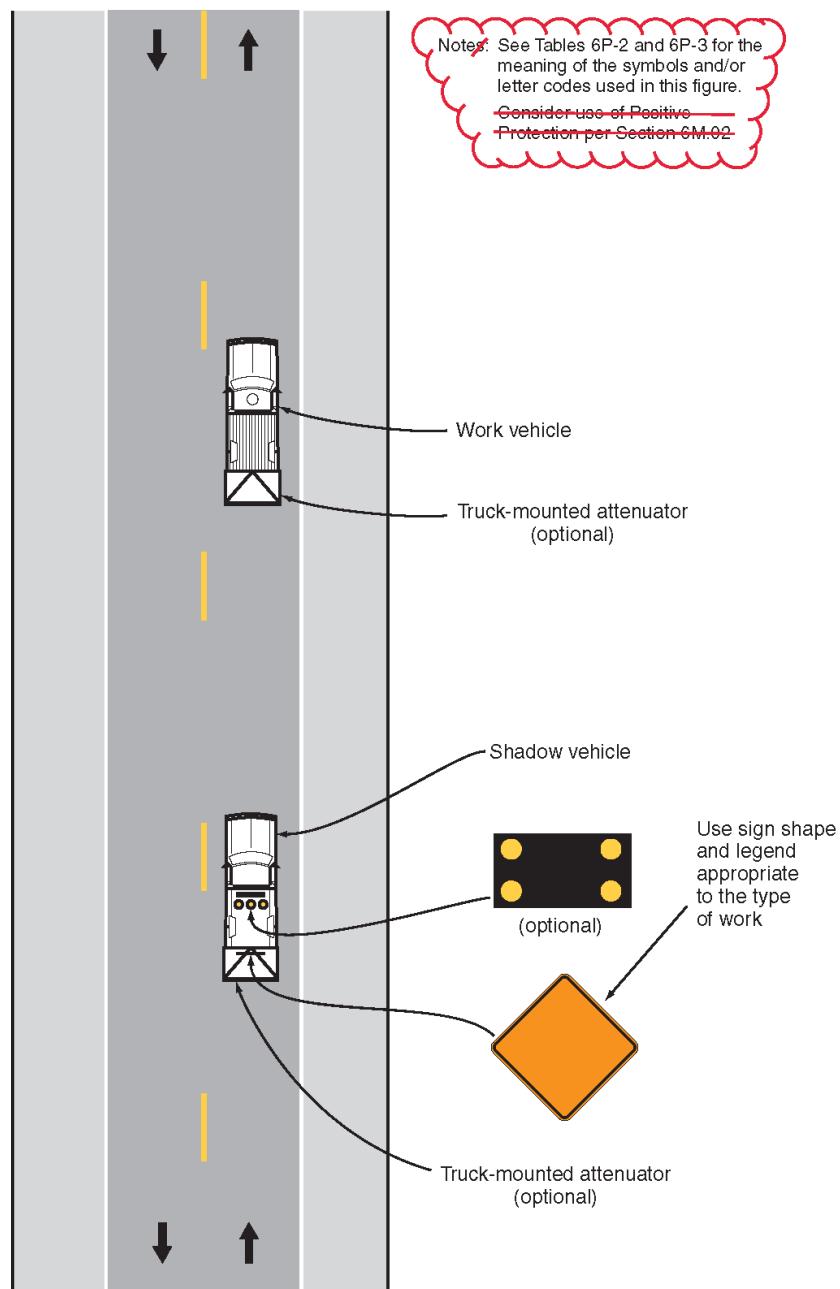
- 837 12. Shadow vehicles are used to warn motor vehicle traffic of the operation ahead.

838 **Standard:**

- 839 13. **Vehicle hazard warning signals shall not be used instead of the vehicle’s high-**
840 **intensity rotating, flashing, oscillating, or strobe lights.**

842 **Figure 6P-17 Comments:** NCUTCD generally agrees with Figure 6P-17 as presented in the
843 NPA, but recommends deleting the positive protection note since it is redundant with a note
844 added to the notes page.

845
846 **Figure 6P-17. Mobile Operations on a Two-Lane Road (TA-17)**
847



Typical Application 17

848

849 **Notes for Figure 6P-18 Comments:** NCUTCD generally agrees with Notes for Figure 6P-18 as
850 presented in the NPA, but recommends adding “Additional” to the beginning of Note 6, since the
851 truck-mounted attenuator shown in Figure 6P-18 is considered a protection device, and there are
852 additional options available in 6M.02.

853

854 **Notes for Figure 6P-18 — Typical Application 18**
855 **Lane Closure on a Minor Street**

856

857 **Standard:**

- 858 **1. This TTC shall be used only for low-speed facilities having low traffic volumes.**

859 Option:

- 860 **2. Where the work space is short, where road users can see the roadway beyond, and where**
861 **volume is low, vehicular traffic may be self-regulating.**

862 **Standard:**

- 863 **3. Where vehicular traffic cannot effectively self-regulate, one or two flaggers shall be**
864 **used as illustrated in Figure 6P-10.**

865 Option:

- 866 **4. Flashing warning lights and/or flags may be used to call attention to the advance warning**
867 **signs.**
- 868 **5. A truck-mounted attenuator may be used on the work vehicle and the shadow vehicle.**
- 869 **6. Additional positive Positive protection devices may be used per Section 6M.02. [edit for**
870 **clarity]**

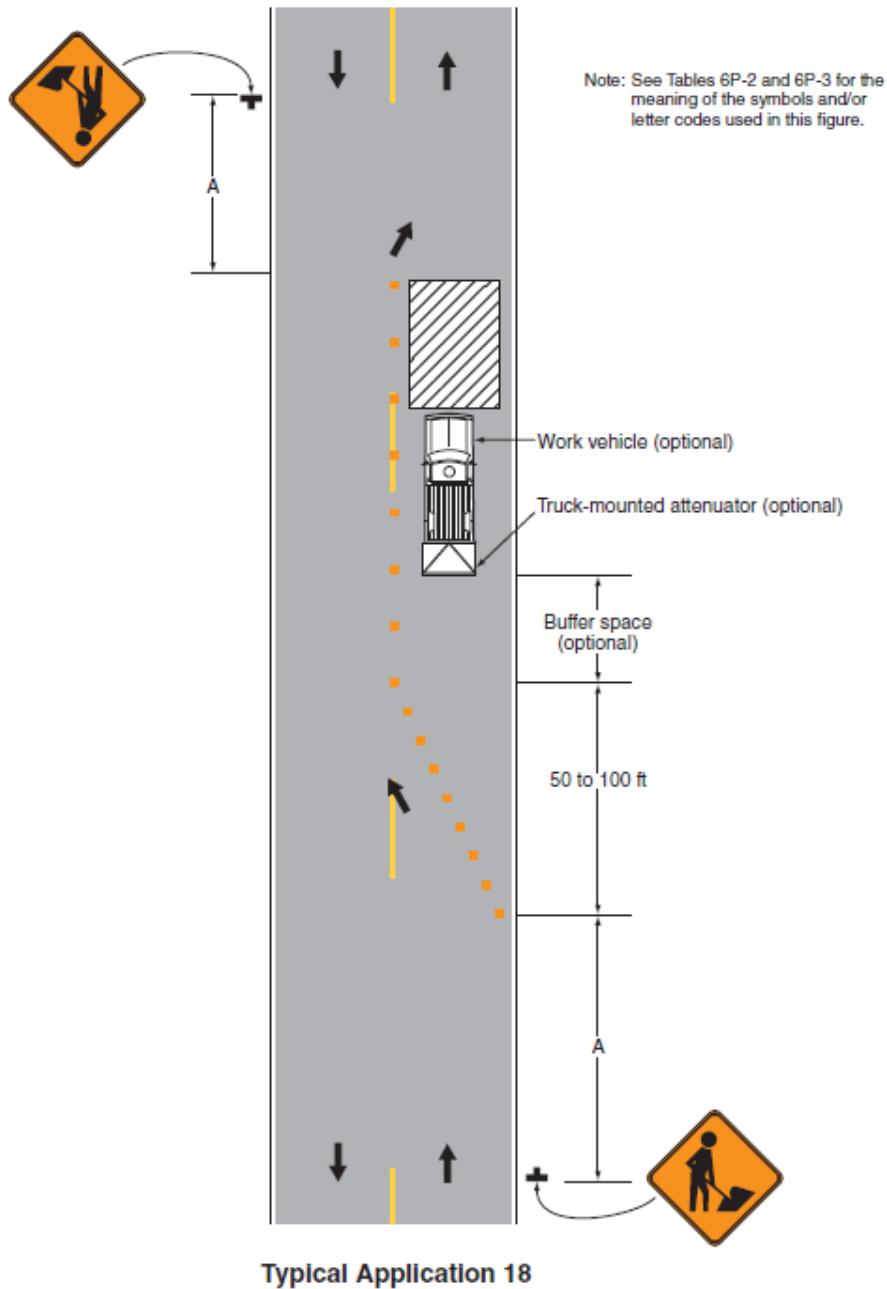
872 **Figure 6P-18 Comments:** NCUTCD agrees with Figure 6P-18 as presented in the NPA.

873

874

875

Figure 6P-18. Lane Closure on a Minor Street (TA-18)



876

877 **Notes for Figure 6P-19 Comments:** NCUTCD generally agrees with Notes for Figure 6P-19 as
878 presented in the NPA, but recommends revisions in accordance with NCUTCD recommendation
879 20B-TTC-02 as follows:

- 880 • Note 2a (new): add a new Guidance note addressing detour traffic impacts

882 **Notes for Figure 6P-19 —Typical Application 19**
883 **Detour for One Travel Direction**

885 *Guidance:*

- 886 1. *This plan should be used for streets without posted route numbers.*
- 887 2. *On multi-lane streets, Detour signs with an Advance Turn Arrow should be used in*
888 *advance of a turn.*
- 889 2a. *The detour route should be evaluated using engineering judgment to assess the impacts*
890 *from additional traffic directed onto the detour.* [revise per 20B-TTC-02]

891 Option:

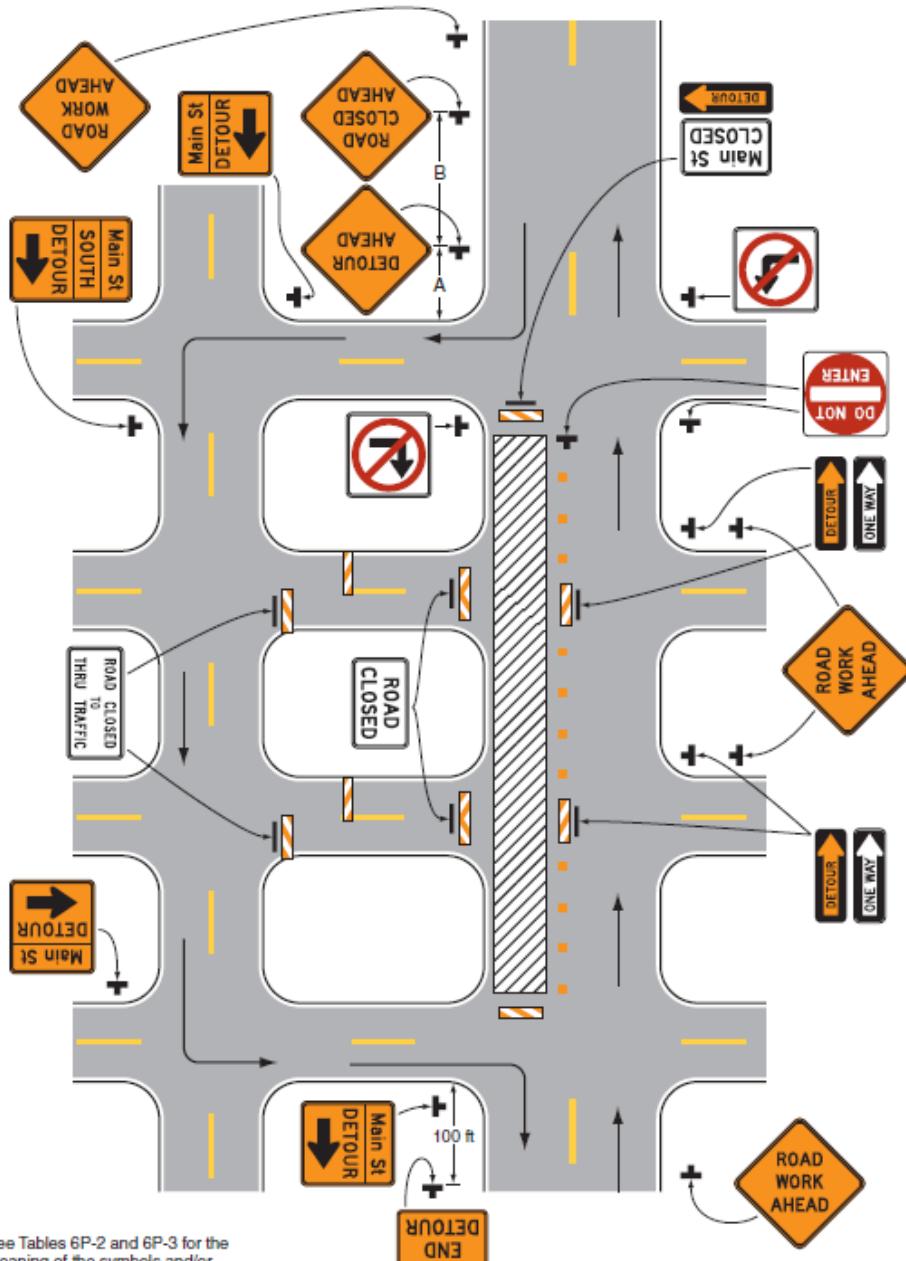
- 892 3. The STREET CLOSED legend may be used in place of ROAD CLOSED.
- 893 4. Additional DO NOT ENTER signs may be used at intersections with intervening streets.
- 894 5. Warning lights may be used on Type 3 Barricades.
- 895 6. Detour signs may be located on the far side of intersections.
- 896 7. A Street Name sign may be mounted with the Detour sign. The Street Name sign may be
897 either white on green or black on orange.

898 **Standard:**

- 899 8. **When used, the Street Name sign shall be placed above the Detour sign.**

903 **Figure 6P-19 Comments:** NCUTCD agrees with Figure 6P-19 as presented in the NPA.
 904
 905
 906

Figure 6P-19. Detour for One Travel Direction (TA-19)



Typical Application 19

907 **Notes for Figure 6P-20 Comments:** NCUTCD generally agrees with Notes for Figure 6P-20 as
908 presented in the NPA, but recommends revisions in accordance with NCUTCD recommendation
909 20B-TTC-02 as follows:

- 910 • Note 2a (new): add a new Guidance note addressing detour traffic impacts

911

912 **Notes for Figure 6P-20 —Typical Application 20** 913 **Detour for a Closed Street**

914

915 *Guidance:*

- 916 1. *This plan should be used for streets without posted route numbers.*
- 917 2. *On multi-lane streets, Detour signs with an Advance Turn Arrow should be used in*
918 *advance of a turn.*
- 919 [2a. The detour route should be evaluated using engineering judgment to assess the impacts](#)
920 [from additional traffic directed onto the detour.](#) [revise per 20B-TTC-02]

921 Option:

- 922 3. Flashing warning lights and/or flags may be used to call attention to the advance warning
923 signs.
- 924 4. Flashing warning lights may be used on Type 3 Barricades.
- 925 5. Detour signs may be located on the far side of intersections. A Detour sign with an
926 advance arrow may be used in advance of a turn.
- 927 6. A Street Name sign may be mounted with the Detour sign. The Street Name sign may be
928 either white on green or black on orange.

929 **Standard:**

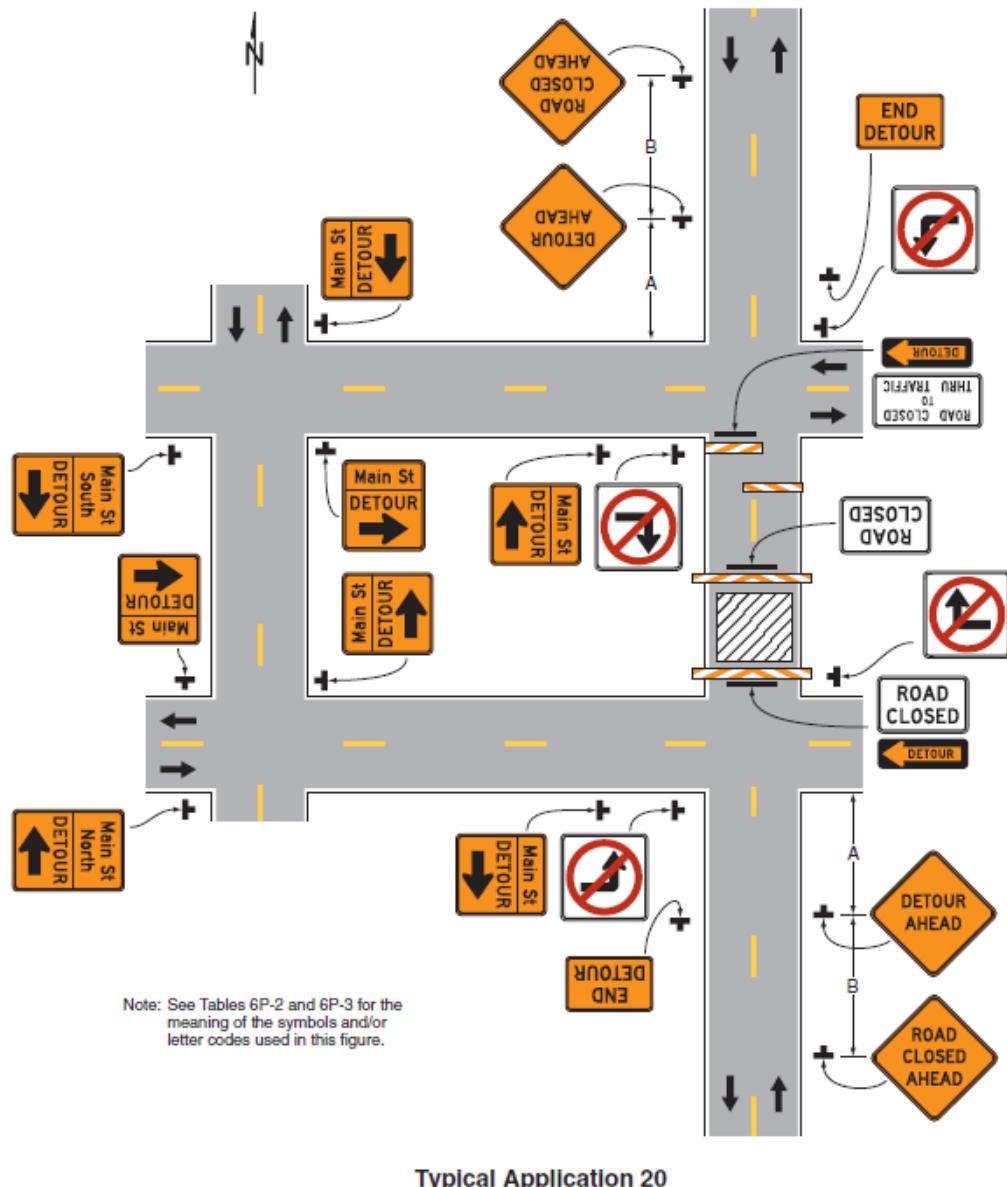
- 930 7. **When used, the Street Name sign shall be placed above the Detour sign.**

931 Support:

- 932 8. See Figure 6P-9 for the information for detouring a numbered highway.

935 **Figure 6P-20 Comments:** NCUTCD agrees with Figure 6P-20 as presented in the NPA.
936
937
938

Figure 6P-20. Detour for a Closed Street (TA-20)



939 **Notes for Figure 6P-21 Comments:** NCUTCD agrees with Notes for Figure 6P-21 as
940 presented in the NPA.

941

942 **Notes for Figure 6P-21 —Typical Application 21**
943 **Lane Closure on the Near Side of an Intersection**

944 **Standard:**

- 945 1. **The merging taper shall direct vehicular traffic into either the right-hand or left-**
946 **hand lane, but not both.**

947 **Guidance:**

- 948 2. *In this typical application, a left taper should be used so that right-turn movements will*
949 *not impede through motor vehicle traffic. However, the reverse should be true for left-*
950 *turn movements.*
- 951 3. *If the work space extends across a crosswalk, the crosswalk should be closed using the*
952 *information and devices shown in Figure 6P-29.*

953 **Option:**

- 954 4. Positive protection devices may be used per Section 6M.02.
- 955 5. Flashing warning lights and/or flags may be used to call attention to the advance warning
956 signs.
- 957 6. A shadow vehicle with a truck-mounted attenuator may be used.
- 958 7. A work vehicle with high-intensity rotating, flashing, oscillating, or strobe lights may be
959 used with the high-level warning device.
- 960 8. Vehicle hazard warning signals may be used to supplement high-intensity rotating,
961 flashing, oscillating, or strobe lights.

962 **Standard:**

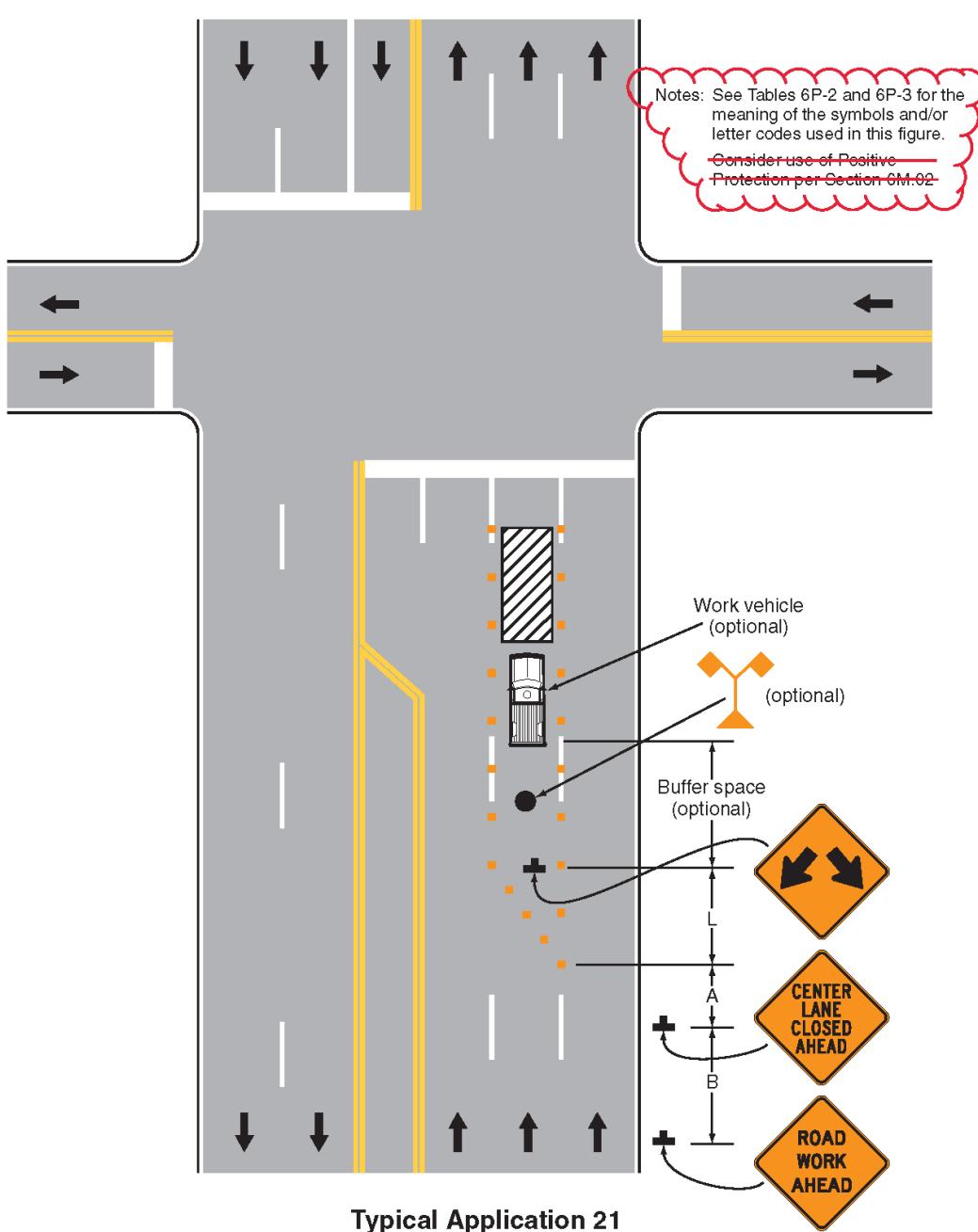
- 963 9. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-**
964 **intensity rotating, flashing, oscillating, or strobe lights.**

966 **Figure 6P-21 Comments:** NCUTCD generally agrees with Figure 6P-21 as presented in the
967 NPA, but recommends deleting the positive protection note since it is redundant with a note
968 added to the notes page.

969

970 **Figure 6P-21. Lane Closure on the Near Side of an Intersection (TA-21)**

971



972

973 **Notes for Figure 6P-22 Comments:** NCUTCD generally agrees with Notes for Figure 6P-22 as
974 presented in the NPA, but recommends revising Note 8 on closing the lane and providing a turn
975 bay.

976

977 **Notes for Figure 6P-22 — Typical Application 22**
978 **Right-Hand Lane Closure on the Far Side of an Intersection**

979

980 *Guidance:*

- 981 1. *If the work space extends across a crosswalk, the crosswalk should be closed using the*
982 *information and devices shown in Figure 6P-29.*

983 Option:

- 984 2. Positive protection devices may be used per Section 6M.02.
985 3. The normal procedure is to close on the near side of the intersection any lane that is not
986 carried through the intersection, as shown. When this results in the closure of a right-hand
987 lane having significant right turning movements, then the right-hand lane may be
988 restricted to right turns only, requiring through traffic to use the left lane.
989 4. For intersection approaches reduced to a single lane, left-turning movements may be
990 prohibited to maintain capacity for through vehicular traffic.
991 5. Flashing warning lights and/or flags may be used to call attention to the advance warning
992 signs.
993 6. Where the turning radius is large, it may be possible to create a right-turn island using
994 channelizing devices or pavement markings.
995 7. If dimension “A” is not available to create a temporary right turn lane, continuous
996 channelizers may be installed from the end of the taper to the intersection and, as a result,
997 the RIGHT LANE MUST TURN RIGHT signs would not be installed.

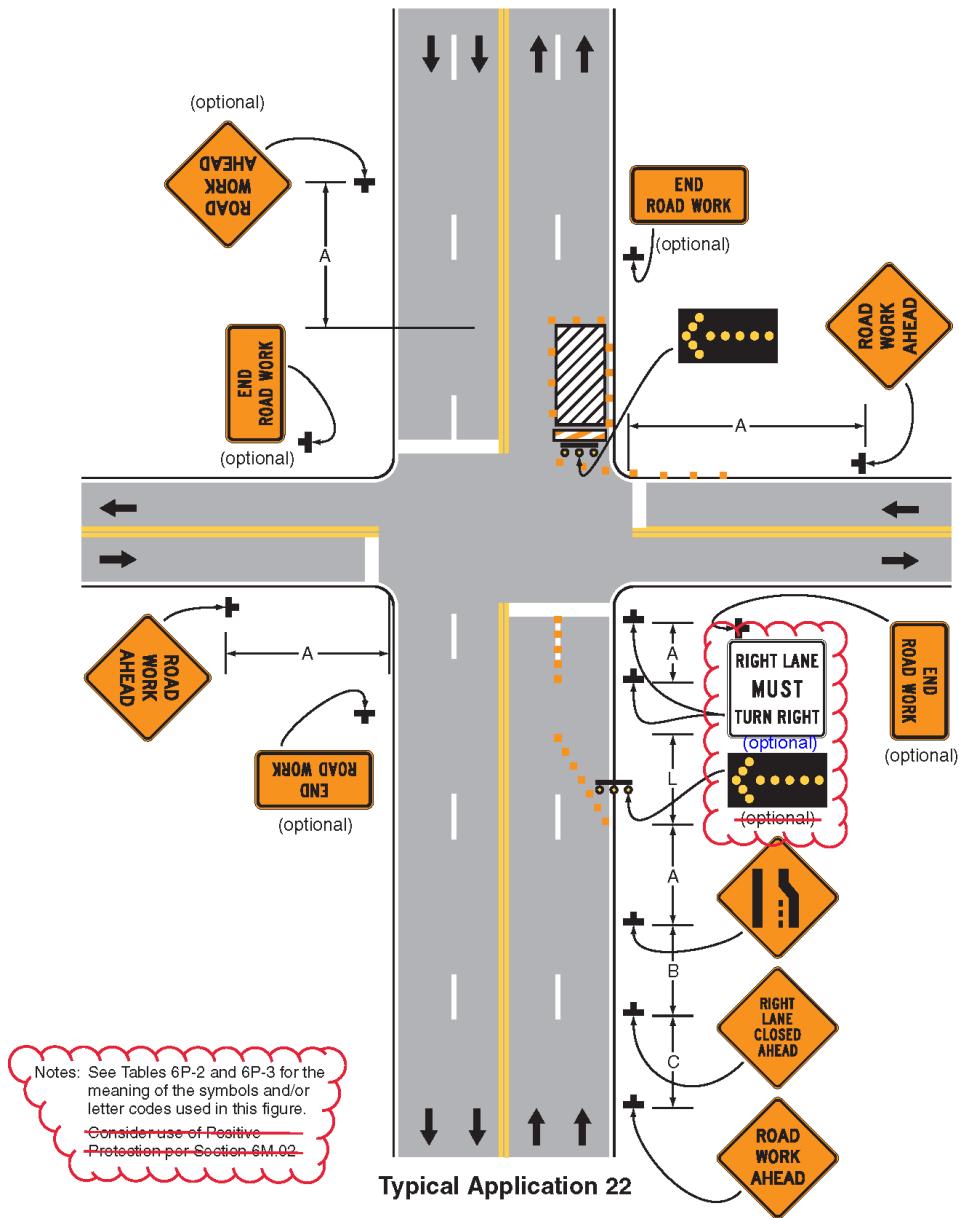
998 Support:

- 999 8. By first closing off the ~~left~~ right-hand lane and then reopening it as a turn bay, the
1000 ~~through~~ capacity is increased by eliminating of the through lane is preserved by
1001 separating the right ~~turns~~ turning vehicles from the ~~open~~ through lane vehicles. [edit to
1002 correlate with Figure 6P-22]

1004 **Figure 6P-22 Comments:** NCUTCD generally agrees with Figure 6P-22 as presented in the
1005 NPA, but recommends revising as follows:
1006

- Delete the positive protection note since it is redundant with a note added to the notes
1007 page
- Relocate the “(optional)” text from under the arrow board to be under the RIGHT LANE
1008 MUST TURN RIGHT sign
- 1009
- 1010
- 1011
- 1012

Figure 6P-22. Lane Closure on the Far Side of an Intersection (TA-22)



1013

1014 **Notes for Figure 6P-23 Comments:** NCUTCD agrees with Notes for Figure 6P-23 as presented
1015 in the NPA.

1016

1017 **Notes for Figure 6P-23 —Typical Application 23**
1018 **Left-Hand Lane Closure on the Far Side of an Intersection**

1019 *Guidance:*

- 1020 1. *If the work space extends across a crosswalk, the crosswalk should be closed using the*
1021 *information and devices shown in Figure 6P-29.*

1022 Option:

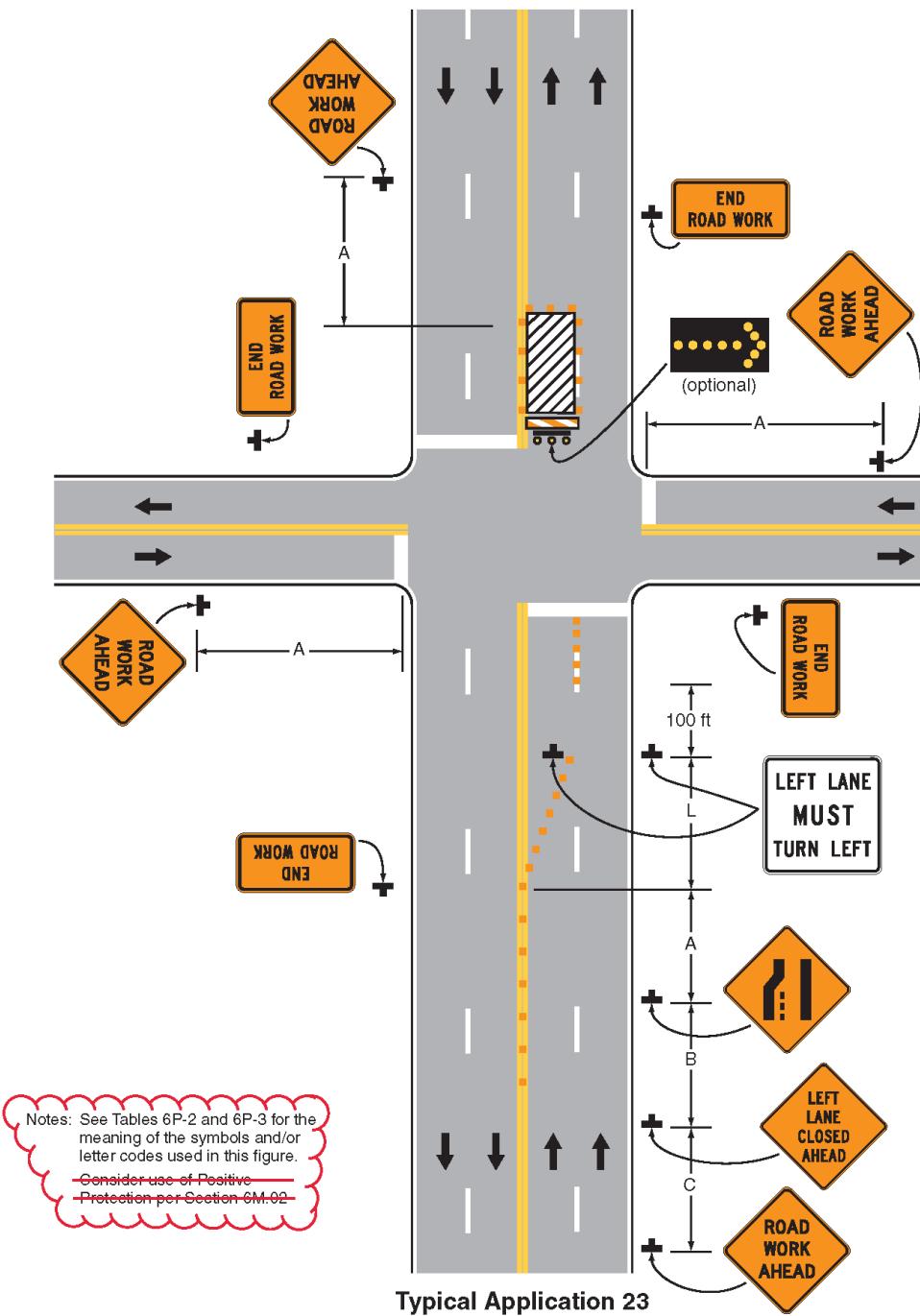
- 1023 2. Positive protection devices may be used per Section 6M.02.
1024 3. Flashing warning lights and/or flags may be used to call attention to the advance warning
1025 signs.
1026 4. The normal procedure is to close on the near side of the intersection any lane that is not
1027 carried through the intersection. However, when this results in the closure of a left-hand
1028 lane having significant left-turning movements, then the left-hand lane may be reopened
1029 as a turn bay for left turns only, as shown.

1030 Support:

- 1031 5. By first closing off the left-hand lane and then reopening it as a turn bay, the left-turn bay
1032 allows storage of turning vehicles so that the movement of through traffic is not impeded.
1033 A left-turn bay that is long enough to accommodate all turning vehicles during a traffic
1034 signal cycle will provide the maximum benefit for through traffic. Also, an island is
1035 created with channelizing devices that allows the LEFT LANE MUST TURN LEFT sign
1036 to be repeated on the left adjacent to the lane that it controls.

1039 **Figure 6P-23 Comments:** NCUTCD generally agrees with Figure 6P-23 as presented in the
1040 NPA, but recommends deleting the positive protection note since it is redundant with a note
1041 added to the notes page.

1042
1043 **Figure 6P-23. Lane Closure on the Far Side of an Intersection (TA-23)**
1044



1045

1046
1047 **Notes for Figure 6P-24 Comments:** NCUTCD generally agrees with Notes for Figure 6P-24 as
1048 presented in the NPA, but recommends revisions in accordance with NCUTCD recommendation
1049 20B-TTC-01as follows: [redacted]

- 1050 • Note 3 (new): add a new Guidance note recommending arrow boards under high traffic, high
1051 speed, limited sight distance, or unexpected conditions [redacted]
- 1052 • Note 6 (new): Add a new Standard note addressing location of arrow boards

1053
1054 **Notes for Figure 6P-24 — Typical Application 24**
1055 **Half Road Closure on the Far Side of an Intersection**

1056
1057 **Guidance:**

- 1058 1. *If the work space extends across a crosswalk, the crosswalk should be closed using*
1059 *the information and devices shown in Figure 6P-29.*
- 1060 2. *When turn prohibitions are implemented, two turn prohibition signs should be used,*
1061 *one on the near side and, space permitting, one on the far side of the intersection.*
- 1062 3. *Arrow boards should be used to advise approaching traffic of a lane closure in any of*
1063 *the following situations: high traffic volumes, high speeds, limited sight distances, or*
1064 *conditions where road users are less likely to expect such lane closures (see Section*
1065 *6L.06). [revise per 20B-TTC-01]*

1066 **Option:**

- 1067 3.4. Positive protection devices may be used per Section 6M.02.
- 1068 4.5. A buffer space may be used between opposing directions of vehicular traffic as
1069 shown in this application.

1070 **Standard:**

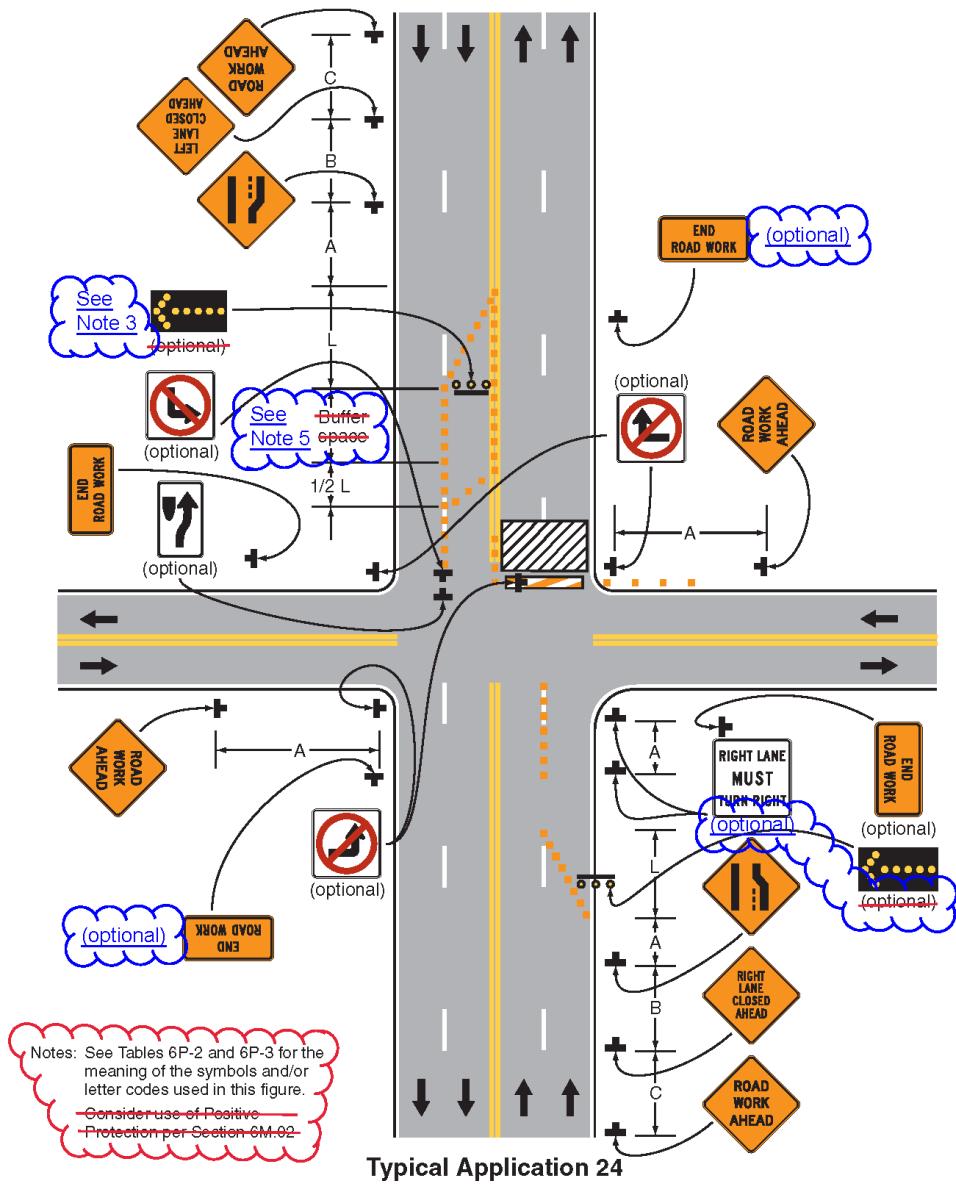
- 1071 6. If an arrow board is used in the closed lane, the longitudinal distance
1072 downstream of the arrow board shall not be used as buffer space. [revise per
1073 20B-TTC-01]
1074 5.7. The normal procedure is to close on the near side of the intersection any lane that is
1075 not carried through the intersection, as shown. When this results in the closure of a
1076 right-hand lane having significant right-turning movements, then the right-hand lane
1077 may be restricted to right turns only, requiring through traffic to use the left lane.
- 1078 6.8. Where the turning radius is large, a right-turn island using channelizing devices or
1079 pavement markings may be used.
- 1080 7.9. There may be insufficient space to place the back-to-back Keep Right sign and No
1081 Left Turn symbol signs at the end of the row of channelizing devices separating
1082 opposing vehicular traffic flows. In this situation, the No Left Turn symbol sign may
1083 be placed on the right and the Keep Right sign may be omitted.
- 1084 8.10. For intersection approaches reduced to a single lane, left-turning movements may be
1085 prohibited to maintain capacity for through vehicular traffic.
- 1086 9.11. Flashing warning lights and/or flags may be used to call attention to advance warning
1087 signs.
- 1088 10.12. Temporary pavement markings may be used to delineate the travel path through the
1089 intersection.
- 1090 11.13. If dimension "A" is not available to create a temporary right turn lane, continuous
1091 channelizers may be installed from the end of the taper to the intersection and, as a
1092 result, the RIGHT LANE MUST TURN RIGHT signs would not be installed.

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Figure 6P-24 Comments: NCUTCD generally agrees with Figure 6P-24 as presented in the NPA, but recommends revising in accordance with NCUTCD recommendation 20B-TTC-01 as follows:

- Delete a new positive protection note in the typical application figure since it is redundant with a note added to the notes page
- Relocate the “(optional)” text from under the arrow board to be under the RIGHT LANE MUST TURN RIGHT sign

Figure 6P-24. Half Road Closure on the Far Side of an Intersection (TA-24)



1103

1104 **Notes for Figure 6P-25 Comments:** NCUTCD agrees with Notes for Figure 6P-25 as presented
1105 in the NPA.

1106

1107 **Notes for Figure 6P-25 —Typical Application 25**

1108 **Multiple Lane Closures at an Intersection**

1109 *Guidance:*

- 1110 1. *If the work space extends across a crosswalk, the crosswalk should be closed using the*
1111 *information and devices shown in Figure 6P-29.*

1112 *Support:*

- 1113 2. The normal procedure is to close on the near side of the intersection any lane that is not
1114 carried through the intersection, as shown.

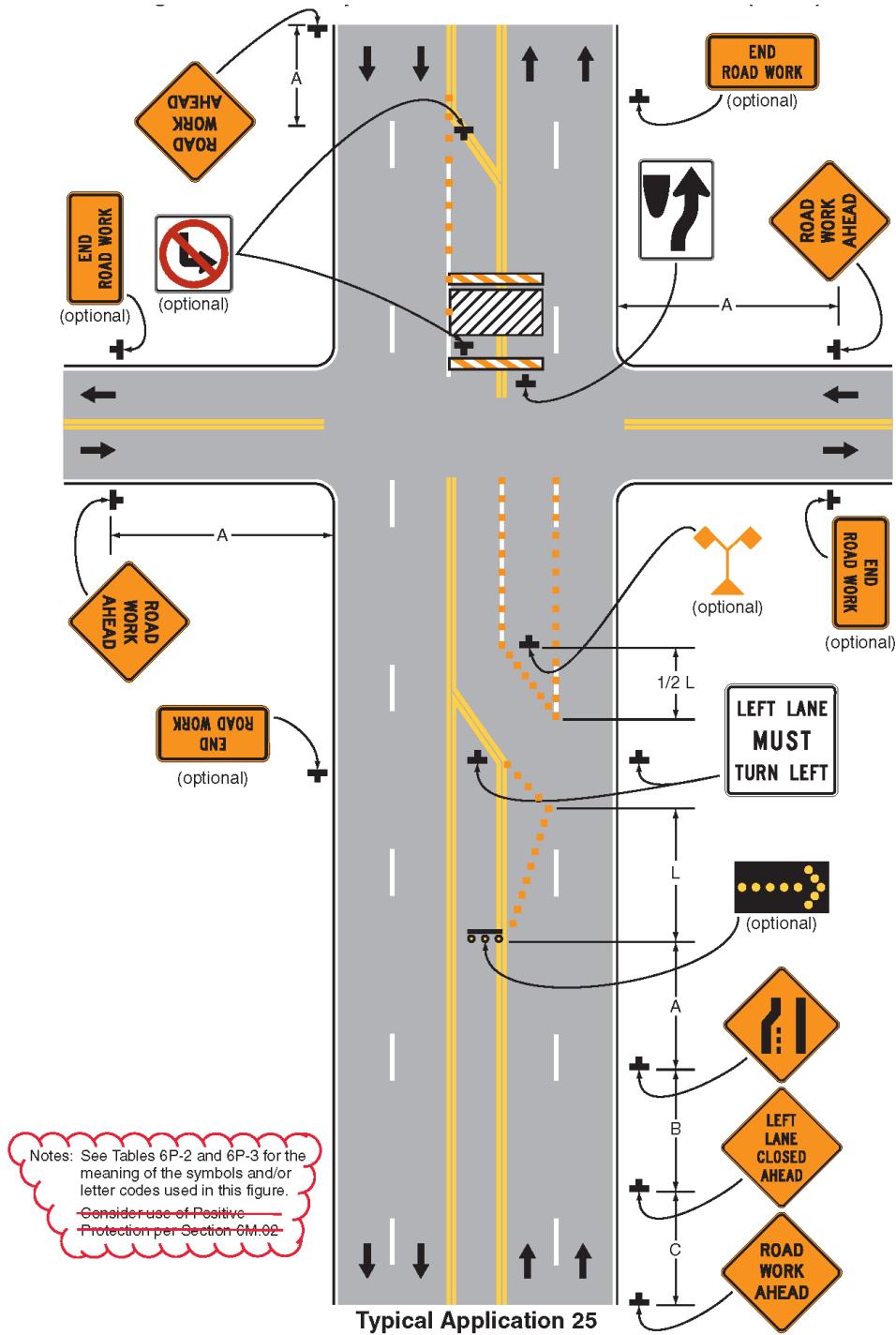
1115 *Option:*

- 1116 3. Positive protection devices may be used per Section 6M.02.
- 1117 4. If the left-turning movement that normally uses the closed turn bay is small and/or the
1118 gaps in opposing vehicular traffic are frequent, left turns may be permitted on that
1119 approach.
- 1120 5. Flashing warning lights and/or flags may be used to call attention to the advance warning
1121 signs.

1122

1123
1124 **Figure 6P-25 Comments:** NCUTCD generally agrees with Figure 6P-25 as presented in the
1125 NPA, but recommends deleting a new positive protection note in the typical application figure
since it is redundant with a note added to the notes page.
1126

1127 **Figure 6P-25. Multiple Lane Closures at an Intersection (TA-25)**
1128



1129

1130 **Notes for Figure 6P-26 Comments:** NCUTCD agrees with Notes for Figure 6P-26 as presented
1131 in the NPA.

1132

1133 **Notes for Figure 6P-26 —Typical Application 26**
1134 **Closure in the Center of an Intersection**

1135 *Guidance:*

- 1136 1. *All lanes should be a minimum of 10 feet in width as measured to the near face of the*
1137 *channelizing devices.*

1138 Option:

- 1139 2. A high-level warning device may be placed in the work space, if there is sufficient room.
1140 3. For short-term use on low-volume, low-speed roadways with vehicular traffic that does
1141 not include longer and wider heavy commercial vehicles, a minimum lane width of 9 feet
1142 may be used.
1143 4. Flashing warning lights and/or flags may be used to call attention to advance warning
1144 signs.
1145 5. Unless the streets are wide, it may be physically impossible to turn left, especially for
1146 large vehicles. Left turns may be prohibited as required by geometric conditions.
1147 6. For short-duration work operations, the channelizing devices may be eliminated if a
1148 vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights is
1149 positioned in the work space.
1150 7. Vehicle hazard warning signals may be used to supplement high-intensity rotating,
1151 flashing, oscillating, or strobe lights.

1152 Standard:

- 1153 8. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-**
1154 **intensity rotating, flashing, oscillating, or strobe lights.**

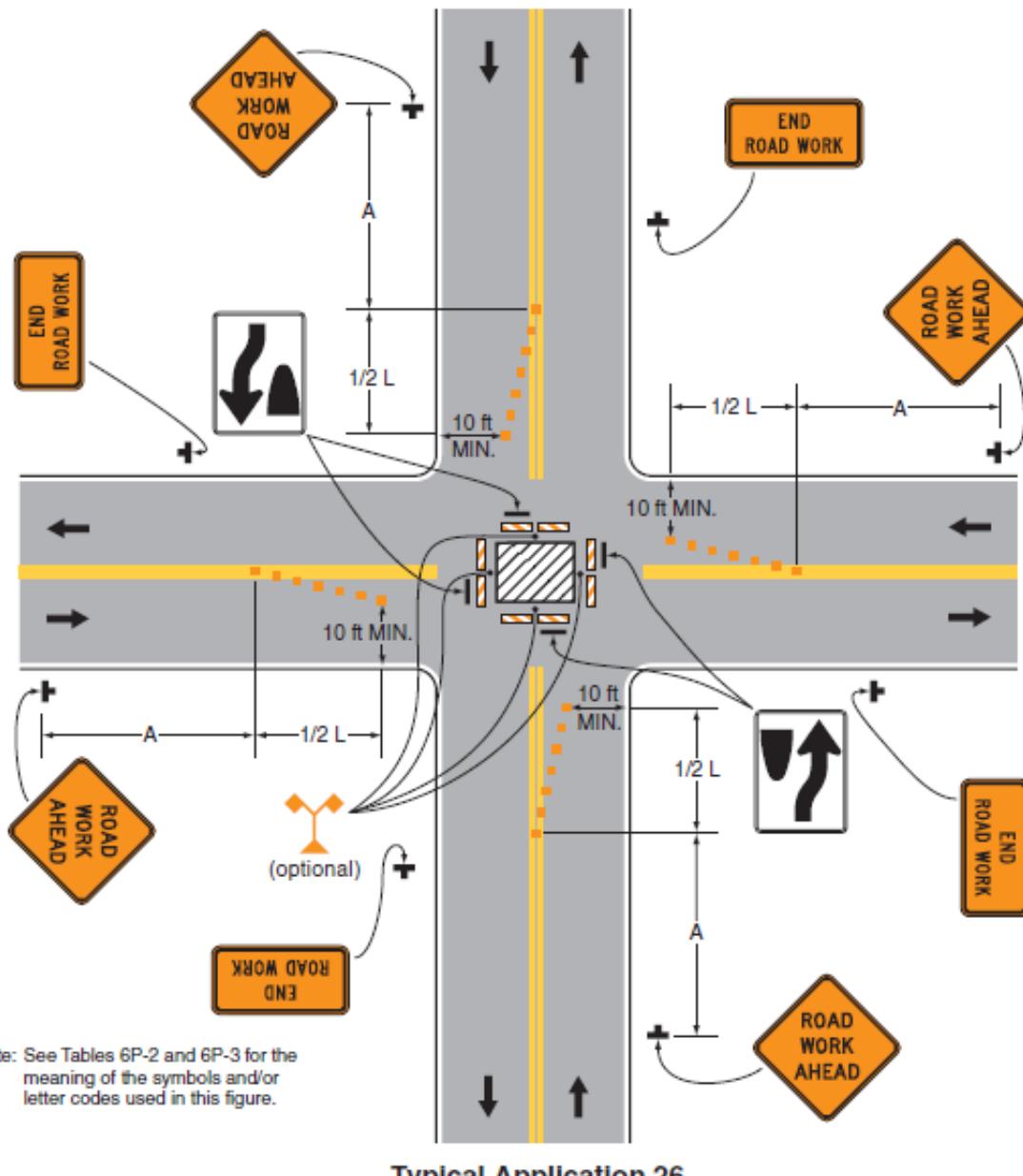
1156 **Figure 6P-26 Comments:** NCUTCD agrees with Figure 6P-26 as presented in the NPA.

1157

1158

Figure 6P-26. Closure in the Center of an Intersection (TA-26)

1159



1160

1161 **Notes for Figure 6P-27 Comments:** NCUTCD agrees with Notes for Figure 6P-27 as presented
1162 in the NPA.

1163

1164 **Notes for Figure 6P-27 —Typical Application 27**

1165 **Closure at the Side of an Intersection**

1166 *Guidance:*

- 1167 1. *The situation depicted can be simplified by closing one or more of the intersection*
1168 *approaches. If this cannot be done, and/or when capacity is a problem, through*
1169 *vehicular traffic should be directed to other roads or streets.*
- 1170 2. *Depending on road user conditions, flagger(s) or uniformed law enforcement officer(s)*
1171 *should be used to direct road users within the intersection.*

1172 **Standard:**

- 1173 3. **At night, flagger stations shall be illuminated, except in emergencies.**

1174 **Option:**

- 1175 4. Flashing warning lights and/or flags may be used to call attention to the advance warning
1176 signs.
- 1177 5. For short-duration work operations, the channelizing devices may be eliminated if a
1178 vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights is
1179 positioned in the work space.
- 1180 6. A BE PREPARED TO STOP sign may be added to the sign series.

1181 *Guidance:*

- 1182 7. *When used, the BE PREPARED TO STOP sign should be located before the Flagger*
1183 *symbol sign.*
- 1184 8. *ONE LANE ROAD AHEAD signs should also be used to provide adequate advance*
1185 *warning.*

1186 **Support:**

- 1187 9. Turns can be prohibited as required by vehicular traffic conditions. Unless the streets are
1188 wide, it might be physically impossible to make certain turns, especially for large
1189 vehicles.

1190 **Option:**

- 1191 10. Positive protection devices may be used per Section 6M.02.
- 1192 11. Vehicle hazard warning signals may be used to supplement high-intensity rotating,
1193 flashing, oscillating, or strobe lights.

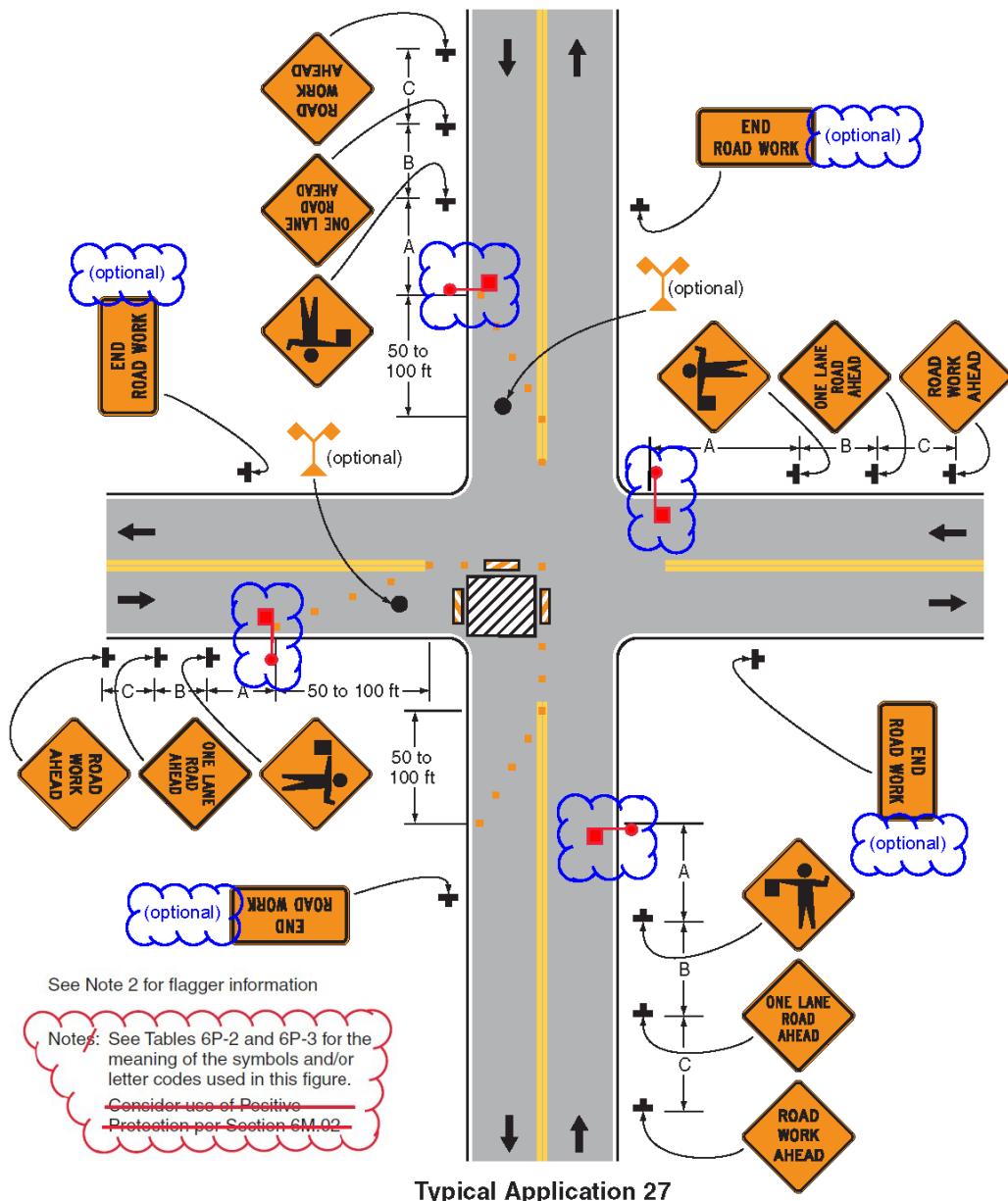
1194 **Standard:**

- 1195 12. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-**
1196 **intensity rotating, flashing, oscillating, or strobe lights.**

1198 **Figure 6P-27 Comments:** NCUTCD generally agrees with Figure 6P-27 as presented in the
1199 NPA, but recommends revising in accordance with NCUTCD recommendation 20B-TTC-01 as
1200 follows:
1201

- Add flaggers to all approaches
- Add “optional” to signs as appropriate
- Delete a new positive protection note in the typical application figure since it is redundant with a note added to the notes page

1205 **Figure 6P-27. Closure at the Side of an Intersection (TA-27)**



1208

1209 **Notes for Figure 6P-28 Comments:** NCUTCD generally agrees with Notes for Figure 6P-28 as
1210 presented in the NPA, but recommends adding ‘sidewalk’ to Note 6 for clarity.

1211

1212 **Notes for Figure 6P-28 — Typical Application 28**
1213 **Sidewalk Detour or Diversion**

1214

1215 **Standard:**

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. A pedestrian channelizing device, Figure 6K-2, that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
2. When used, temporary ramps shall provide a 12:1 (8%) or flatter slope, with a slip-resistant surface. The ramp landing area shall provide a 48 inch x 48 inch minimum area with a 2% or flatter cross-slope.
3. When used, Longitudinal Channelizing Devices used for temporary pedestrian routes shall comply with Section 6K.02.
4. Temporary traffic barriers, if used, shall comply with the provisions of Section 6M.02.
5. SIDEWALK CLOSED CROSS HERE signs shall include audible information devices to provide adequate communication to pedestrians with visual disabilities.
6. Audible information devices shall be provided where midblock sidewalk closings and changed crosswalk areas cause inadequate communication to be provided to pedestrians who have visual disabilities. [edit for clarity]

1216

1217 **Guidance:**

7. The surface of an alternate pathway should meet the requirements of the Americans with Disabilities Act.
8. The protective requirements of a TTC situation have priority in determining the need for temporary traffic barriers and their use in this situation should be based on engineering judgment.

1218

1219 **Option:**

9. Street lighting may be considered.
10. Only the TTC devices related to pedestrians are shown. Other devices, such as lane closure signing or ROAD NARROWS signs, may be used to control vehicular traffic.
11. For nighttime closures, Type A Flashing warning lights may be used on barricades that support signs and close sidewalks.
12. Type C Steady-Burn or Type D 360-degree Steady-Burn warning lights may be used on channelizing devices separating the temporary sidewalks from vehicular traffic flow.
13. Signs, such as KEEP RIGHT (LEFT), may be placed along a temporary sidewalk to guide or direct pedestrians.
14. The width of the alternate pedestrian route may be 48 inches with a passing area of 60 inches every 200 feet.

1252 **Figure 6P-28 Comments:** NCUTCD agrees with Figure 6P-28 as presented in the NPA.

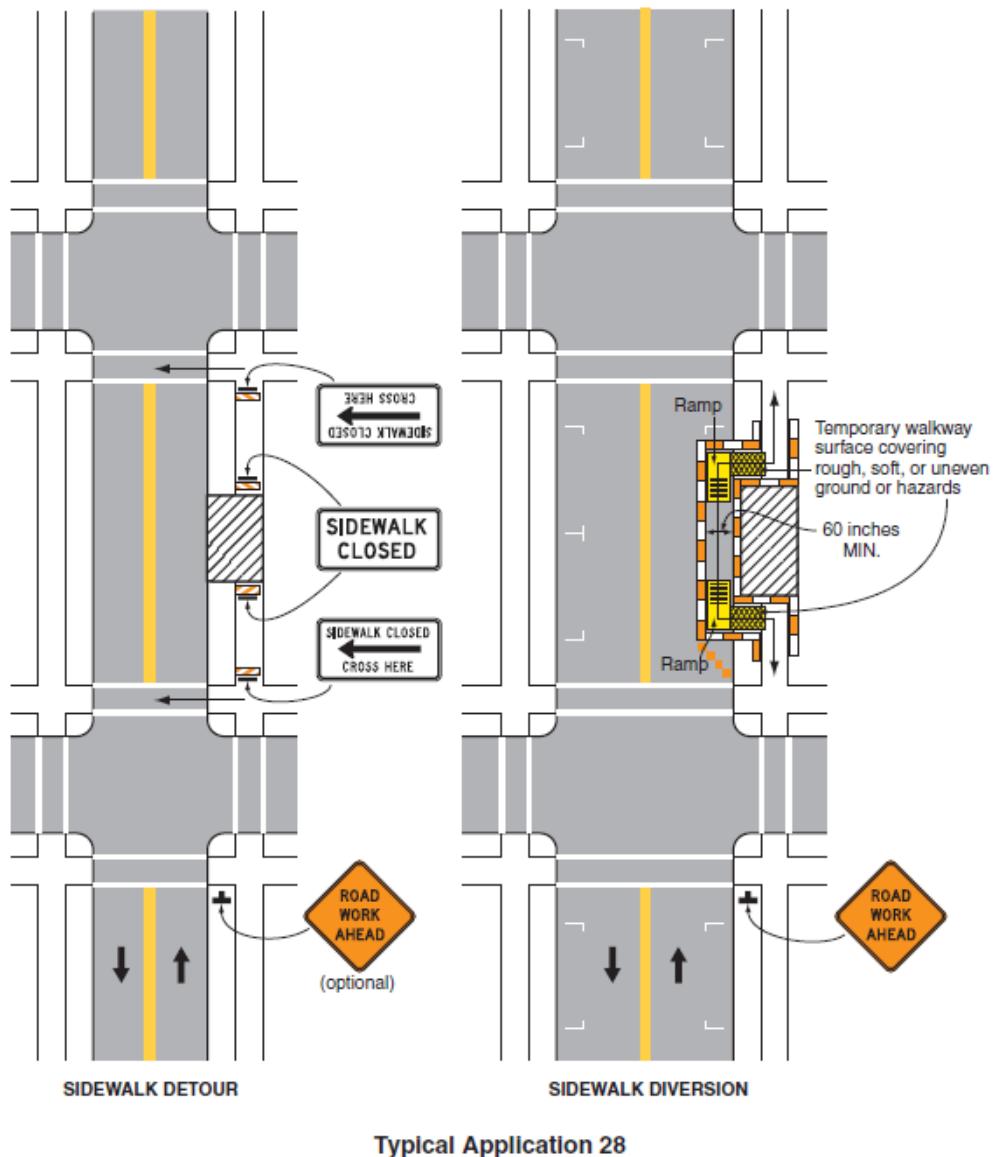
1253

1254

Figure 6P-28. Sidewalk Detour or Diversion (TA-28)

1255

Figure 6P-28. Sidewalk Detour or Diversion (TA-28)



Note: See Tables 6P-2 and 6P-3 for the meaning of the symbols and/or letter codes used in this figure.

1256

1257 **Notes for Figure 6P-29 Comments:** NCUTCD generally agrees with Notes for Figure 6P-29 as
1258 presented in the NPA, but recommends adding ‘sidewalk’ to Note 4 for clarity.

1259

1260 **Notes for Figure 6P-29 — Typical Application 29**

1261 **Crosswalk Closures and Pedestrians Detours**

1262 **Standard:**

- 1263 1. When crosswalks or other pedestrian facilities are closed or relocated, temporary
1264 facilities shall be detectable and shall include accessibility features consistent with
1265 the features present in the existing pedestrian facility.
- 1266 2. Curb parking shall be prohibited for at least 50 feet in advance of the midblock
1267 crosswalk.
- 1268 3. **SIDEWALK CLOSED CROSS HERE signs shall include audible information**
devices to provide adequate communication to pedestrians with visual disabilities.
- 1269 4. **Audible information devices shall be provided where midblock sidewalk closings**
and changed crosswalk areas cause inadequate communication to be provided to
pedestrians who have visual disabilities. [edit for clarity]

1270

1271 **Guidance:**

- 1272 5. *Pedestrian traffic signal displays controlling closed crosswalks should be covered or*
deactivated.

1273

1274 **Option:**

- 1275 6. Street lighting may be considered.
- 1276 7. Only the TTC devices related to pedestrians are shown. Other devices, such as lane
1277 closure signing or ROAD NARROWS signs, may be used to control vehicular traffic.
- 1278 8. For nighttime closures, Type A Flashing warning lights may be used on barricades
1279 supporting signs and closing sidewalks.
- 1280 9. Type C Steady-Burn or Type D 360-degree Steady-Burn warning lights may be used on
1281 channelizing devices separating the work space from vehicular traffic.
- 1282 10. In order to maintain the systematic use of the fluorescent yellow-green background for
1283 pedestrian, bicycle, and school warning signs in a jurisdiction, the fluorescent yellow-
1284 green background for pedestrian, bicycle, and school warning signs may be used in TTC
1285 zones.

1286

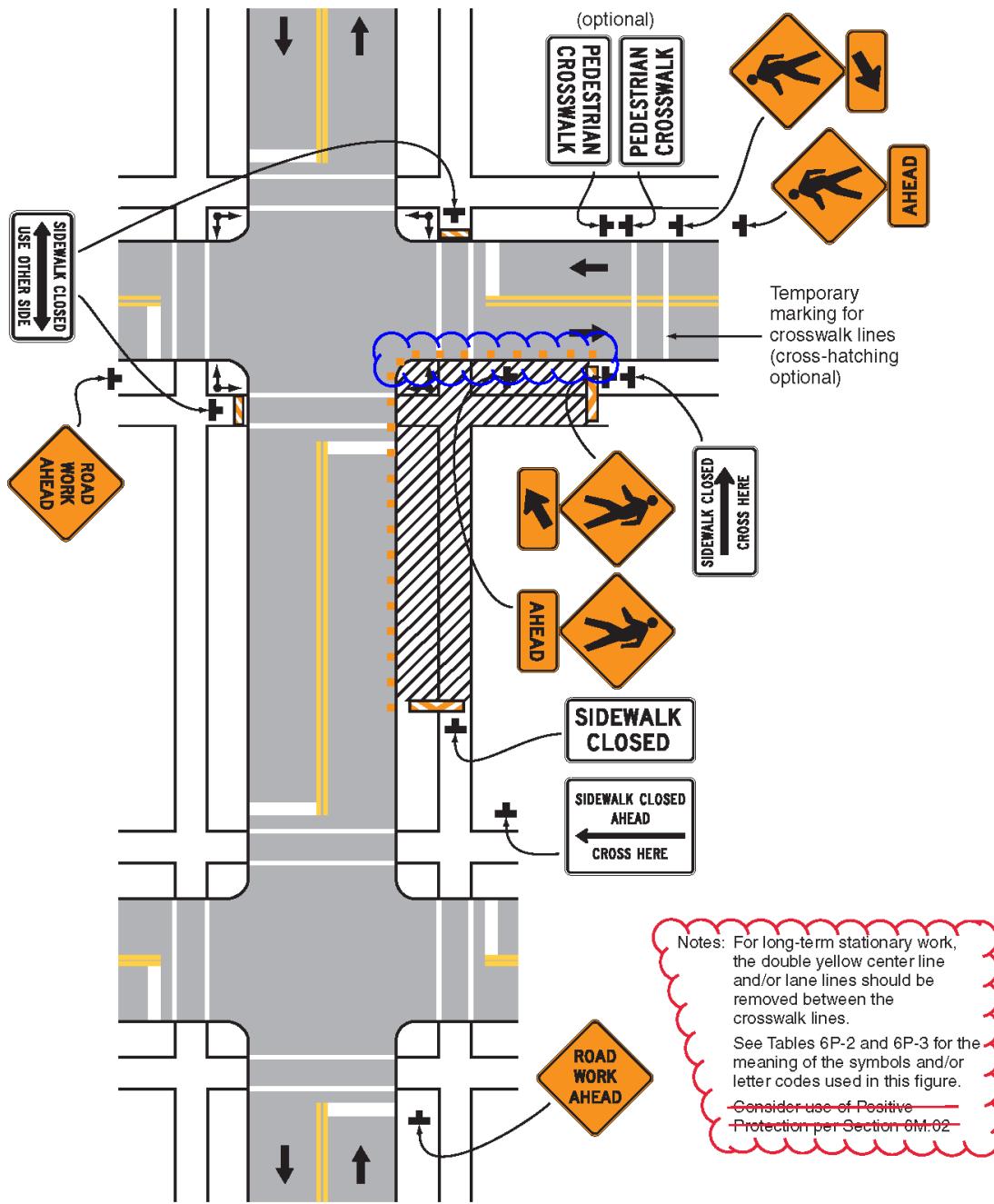
1287

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1289

1290 **Figure 6P-29 Comments:** NCUTCD generally agrees with Figure 6P-29 as presented in the
1291 NPA, but recommends revising as follows:
1292 • Delete a new positive protection note in the typical application figure since it is redundant
1293 with a note added to the notes page
1294 • Add channelizing devices along the work space of the cross street

1295
1296 **Figure 6P-29. Crosswalk Closures and Pedestrian Detours (TA-29)**



1297
Typical Application 29

1298 **Notes for Figure 6P-30 Comments:** NCUTCD generally agrees with Notes for Figure 6P-30 as
1299 presented in the NPA, but recommends revising as follows:

- 1300 • Note 1: replace existing text with new Guidance text recommending arrow boards under
1301 high traffic, high speed, limited sight distance, or unexpected conditions
- 1302 • Note 2 (new): add a new Standard note addressing location of arrow boards
- 1303 • Note 3 (new): add a new Option note allowing vehicle mounting of arrow boards
- 1304 • Note 4 (was Note 2): add “Additional” to the beginning of the note since the truck-
1305 mounted attenuator shown in Figure 6P-30 is considered a protection device, and there
1306 are additional options available in 6M.02

1307

1308 **Notes for Figure 6P-30 — Typical Application 30**
1309 **Interior Lane Closure on a Multi-Lane Street**

1310

1311 *Guidance:*

- 1312 1. *This information applies to low speed, low volume urban streets. Where speed or
1313 volume is higher, additional signing such as LEFT LANE CLOSED XX FT should be
1314 used between the signs shown. Arrow boards should be used to advise approaching
1315 traffic of a lane closure in any of the following situations: high traffic volumes, high
1316 speeds, limited sight distances, or conditions where road users are less likely to expect
1317 such lane closures (see Section 6L.06).* [revise per 20B-TTC-01]

1318 **Standard:**

- 1319 2. **If an arrow board is used in the closed lane, the longitudinal distance downstream
1320 of the arrow board shall not be used as buffer space.** [revise per 20B-TTC-01]

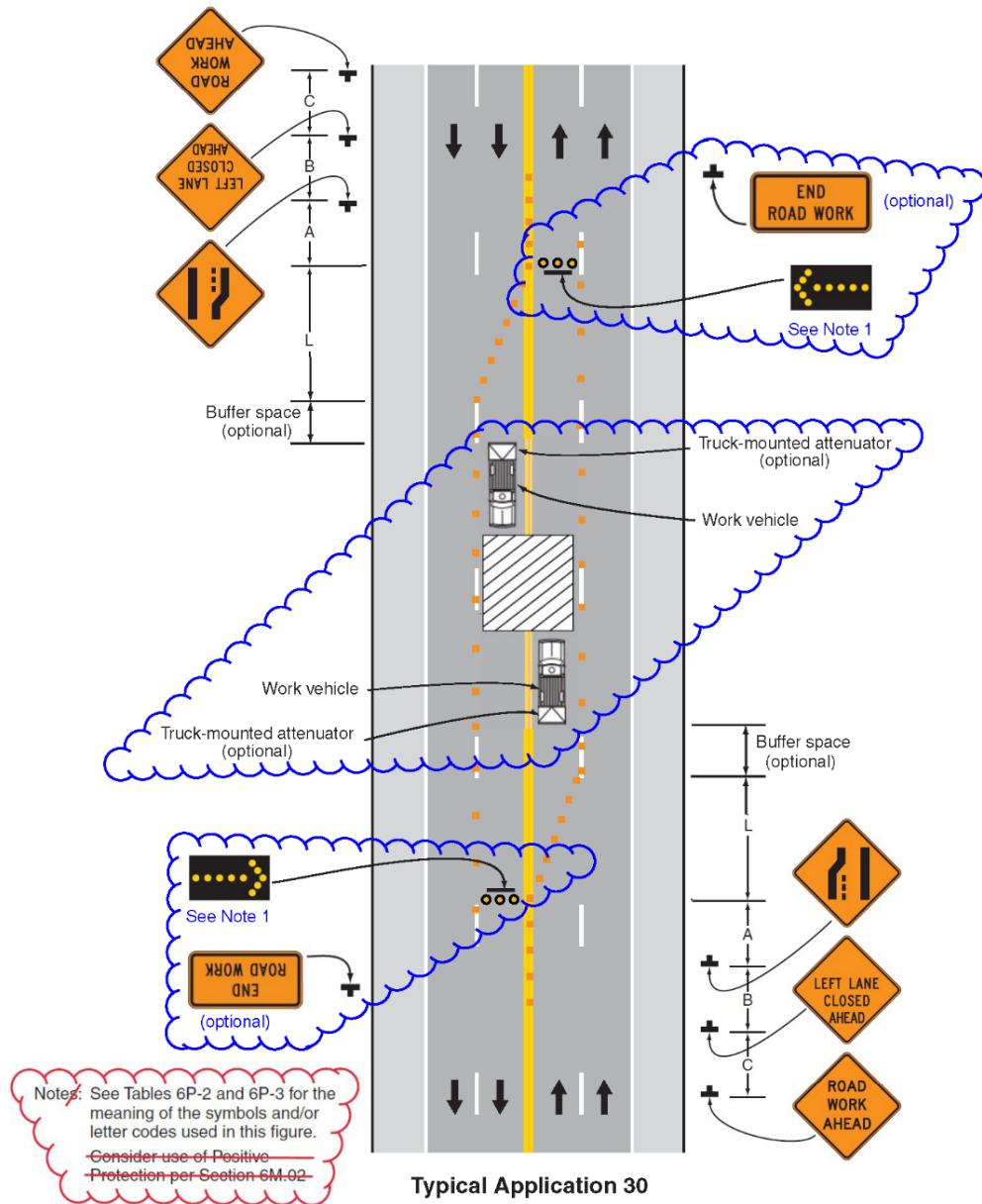
1321 **Option:**

- 1322 3. **Arrow boards, if used, may be vehicle-mounted.** [revise per 20B-TTC-01]
- 1323 2.4. **Additional positive Positive** protection devices may be used per Section 6M.02. [edit
1324 for clarity]
- 1325 3.5. The closure of the adjacent interior lane in the opposing direction may not be necessary,
1326 depending upon the activity being performed and the work space needed for the
1327 operation.
- 1328 4.6. Shadow vehicles with a truck-mounted attenuator may be used.

1331 **Figure 6P-30 Comments:** NCUTCD generally agrees with Figure 6P-30 as presented in the
1332 NPA, but recommends revising in accordance with NCUTCD recommendation 20B-TTC-01 as
1333 follows:

- Add truck-mounted attenuators in both directions
- Add arrow boards and END ROAD WORK signs in both directions
- Delete a new positive protection note in the typical application figure since it is redundant with a note added to the notes page

1339 **Figure 6P-30. Interior Lane Closure on a Multi-Lane Street (TA-30)**



1341 **Typical Application 30**

1342 **Notes for Figure 6P-31 Comments:** NCUTCD generally agrees with Notes for Figure 6P-31 as
1343 presented in the NPA, but recommends revising in accordance with NCUTCD recommendation
1344 20B-TTC-01 as follows:

- 1345 • Note 2 (new): add a new Standard note addressing location of arrow boards
- 1346 • Note 4 (was Note 3): replace existing text with new Guidance text recommending arrow
1347 boards under high traffic, high speed, limited sight distance, or unexpected conditions
- 1348 • Note 10 (new): add a new Option note allowing vehicle mounting of arrow boards
- 1349 • Note 13 (was Note 11): delete extra parenthesis

1350

1351 **Notes for Figure 6P-31 —Typical Application 31**
1352 **Lane Closure on a Street with Uneven Directional Volumes**

1353

1354 **Standard:**

- 1355 1. The illustrated information shall be used only when the vehicular traffic volume
1356 indicates that two lanes of vehicular traffic shall be maintained in the direction of
1357 travel for which one lane is closed.
- 1358 2. If an arrow board is used in the closed lane, the longitudinal distance downstream
1359 of the arrow board shall not be used as buffer space. [revise per 20B-TTC-01]

1360 Option:

- 1361 2.3. The procedure may be used during a peak period of vehicular traffic and then changed
1362 to provide two lanes in the other direction for the other peak.

1363 *Guidance:*

- 1364 3.4. *For high speeds, a LEFT LANE CLOSED XX FT sign should be added for vehicular*
1365 *traffic approaching the lane closure, as shown in Figure 6P-32. Arrow boards should*
1366 *be used to advise approaching traffic of a lane closure in any of the following*
1367 *situations: high traffic volumes, high speeds, limited sight distances, or conditions*
1368 *where road users are less likely to expect such lane closures (see Section 6L.06).*
1369 [revise per 20B-TTC-01]

- 1370 4.5. *Conflicting pavement markings should be removed for long-term projects. For short-*
1371 *term and intermediate-term projects where this is not practical, the channelizing*
1372 *devices in the area where the pavement markings conflict should be placed at a*
1373 *maximum spacing of 1/2 S feet where S is the speed in mph. Temporary markings*
1374 *should be installed where needed.*

- 1375 5.6. *If the lane shift has curves with recommended speeds of 30 mph or less, Reverse Turn*
1376 *signs should be used.*

- 1377 6.7. *Where the shifted section is long, a Reverse Curve sign should be used to show the*
1378 *initial shift and a second sign should be used to show the return to the normal*
1379 *alignment.*

- 1380 7.8. *If the tangent distance along the temporary diversion is less than 600 feet, the Double*
1381 *Reverse Curve sign should be used at the location of the first Two Lane Reverse Curve*
1382 *sign. The second Two Lane Reverse Curve sign should be omitted.*

1383 **Standard:**

- 1384 8.9. **The number of lanes illustrated on the Reverse Curve or Double Reverse Curve**
1385 **signs shall be the same as the number of through lanes available to road users,**
1386 **and the direction of the reverse curves shall be appropriately illustrated.**

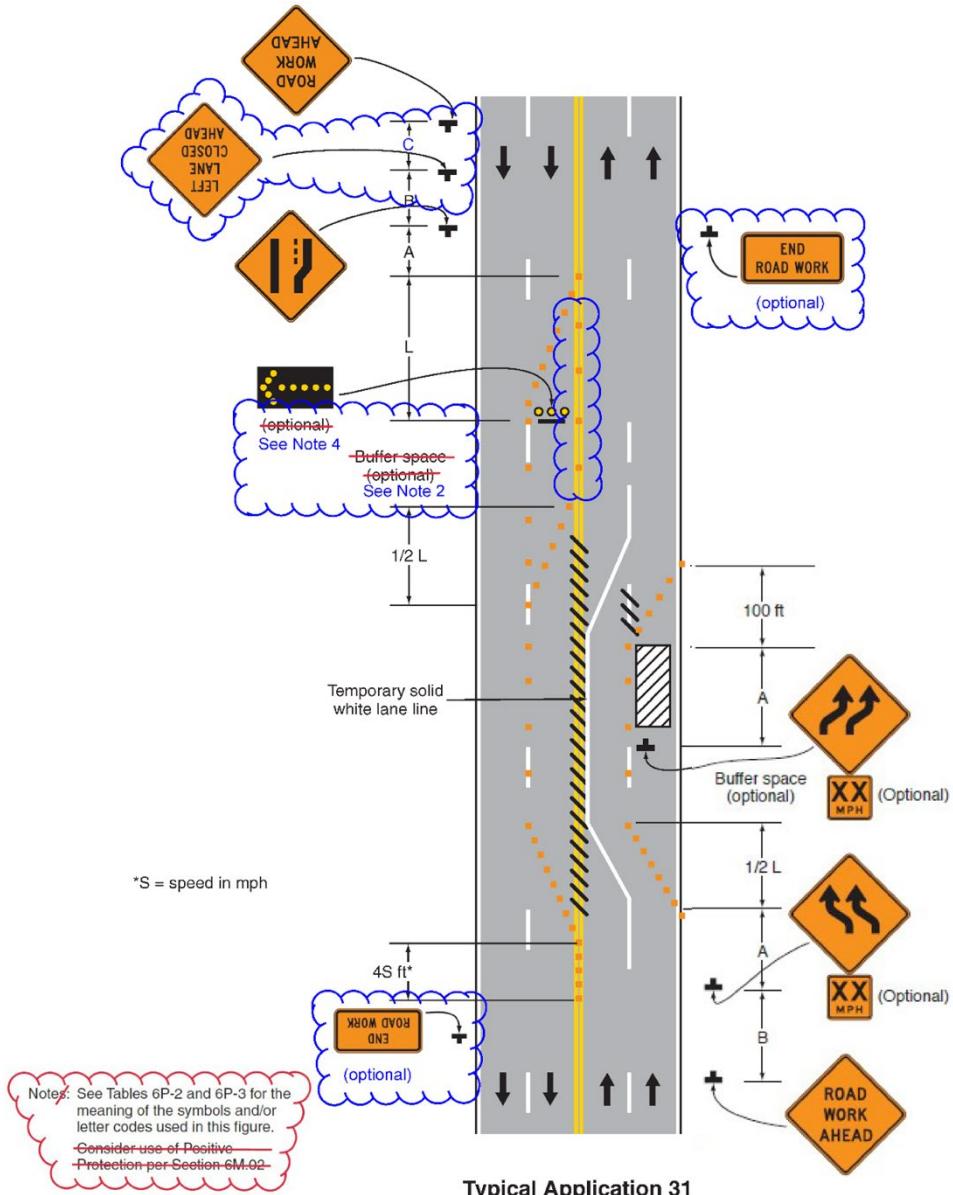
1387 Option:

- 1388 10. Arrow boards, if used, may be vehicle-mounted. [revise per 20B-TTC-01]
1389 9.11. Positive protection devices may be used per Section 6M.02.
1390 10.12. A longitudinal buffer space may be used in the activity area to separate opposing
1391 vehicular traffic.
1392 11.13. Where two or more lanes are being shifted, a Reverse Curve (or Reverse Turn) sign
1393 with an ALL LANES ~~θ~~ plaque (see Figure 6H-1) may be used instead of a sign that
1394 illustrates the number of lanes. [delete parentheses]
1395 12.14. Where more than three lanes are being shifted, the Reverse Curve (or Turn) sign may
1396 be rectangular.
1397 13.15. A work vehicle or a shadow vehicle may be equipped with a truck-mounted
1398 attenuator.
1399
1400
1401

1402 **Figure 6P-31 Comments:** NCUTCD generally agrees with Figure 6P-31 as presented in the
1403 NPA, but recommends revising in accordance with NCUTCD recommendation 20B-TTC-01 as
1404 follows:

- Add a LEFT LANE CLOSED AHEAD sign in the downward direction
- Add devices on centerline
- Delete “(optional)” on arrow board and buffer space
- Add END ROAD WORK signs in both directions
- Delete a new positive protection note in the typical application figure since it is redundant with a note added to the notes page

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1412 **Figure 6P-31. Lane Closure on a Street with Uneven Directional Volumes (TA-31)**



1413
1414 **Typical Application 31**

1415 **Notes for Figure 6P-32 Comments:** NCUTCD generally agrees with Notes for Figure 6P-32 as
1416 presented in the NPA, but recommends revisions in accordance with NCUTCD recommendation
1417 20B-TTC-03 as follows:

- 1418 • Title: Delete "High-Speed" so the figure is applicable to a wider range of speeds
- 1419 • Note 1: Revise to clarify criteria for marking removal
- 1420 • Note 2 (new): add a new Standard note addressing location of arrow boards
- 1421 • Note 2 (original in Guidance): delete this note
- 1422 • Note 7: editorial revision

1423

1424 **Notes for Figure 6P-32 —Typical Application 32**
1425 **Half Road Closure on a Multi-Lane, ~~High-Speed~~ Highway**
1426 [revise per 20B-TTC-03]

1427 **Standard:**

- 1428 1. **For long-term stationary situations, conflicting Pavement markings no longer**
applicable shall be removed or obliterated and temporary markings shall be
provided as soon as practical. Except for intermediate term and short term
situations, temporary markings shall be provided to clearly delineate the temporary
travel path. For short-term stationary and intermediate-term stationary situations
where it is not feasible to remove and restore pavement markings, closely spaced
channelizingation devices shall be used made dominant by using a very close device
spacing. [revise per 20B-TTC-03]
- 1436 2. **If an arrow board is used in the closed lane, the longitudinal distance downstream of**
the arrow board shall not be used as buffer space. [revise per 20B-TTC-03]

1438 **Guidance:**

- 1439 2. **When paved shoulders having a width of 8 feet or more are closed, channelizing**
devices should be used to close the shoulder in advance of the merging taper to direct
vehicular traffic to remain within the traveled way. [revise per 20B-TTC-03]
- 1442 3. *Where channelizing devices are used instead of pavement markings, the maximum*
spacing should be $1/2 S$ feet where S is the speed in mph.
- 1444 4. *If the tangent distance along the temporary diversion is less than 600 feet, a Double*
Reverse Curve sign should be used instead of the first Reverse Curve sign, and the
second Reverse Curve sign should be omitted.

1447 **Option:**

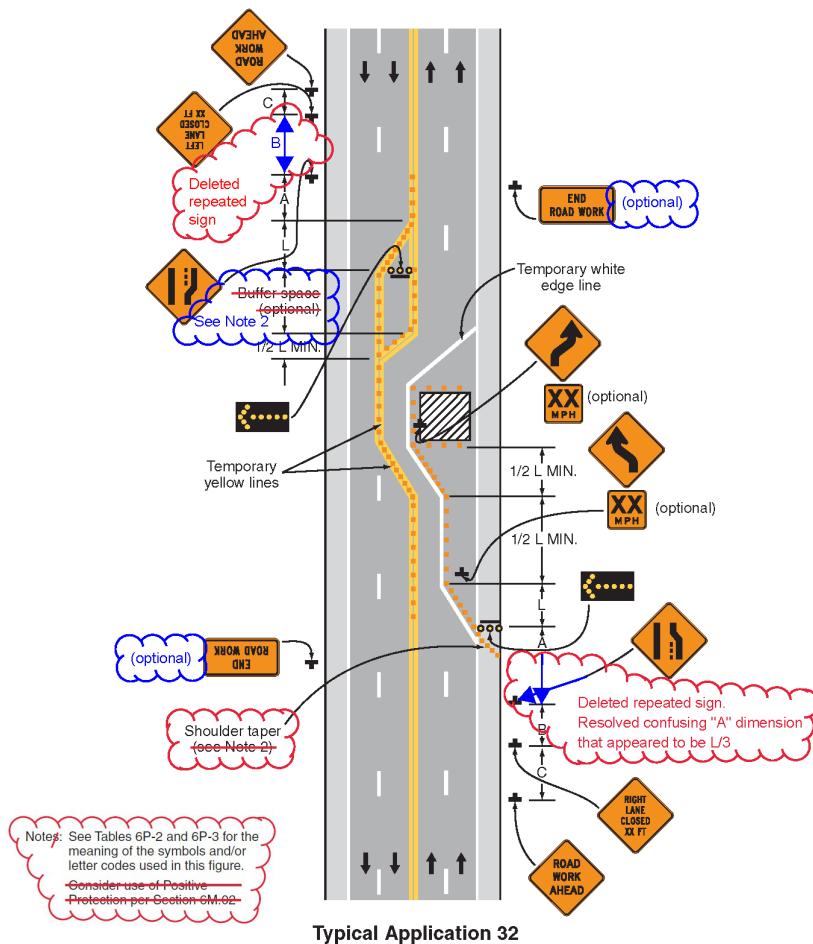
- 1448 5. **Positive protection devices may be used per Section 6M.02.**
- 1449 6. Warning lights may be used to supplement channelizing devices at night.
- 1450 7. A truck-mounted attenuator may be used on ~~the~~ **a shadow vehicle or on a** work vehicle
and/or the shadow vehicle. [revise per 20B-TTC-03]

1453 **Figure 6P-32 Comments:** NCUTCD generally agrees with Figure 6P-32 as presented in the
1454 NPA, but recommends revising in accordance with NCUTCD recommendation 20B-TTC-03 as
1455 follows:

- Delete repeated signs to resolve confusing "A" dimension
- Revise several notes to refer to new Note 2
- Add "optional" to signs as appropriate
- Delete a new positive protection note in the typical application figure since it is redundant with a note added to the notes page

1461 **Figure 6P-32. Half Road Closure on a Multi-Lane, High-Speed Highway (TA-32)**

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1463

1464 **Notes for Figure 6P-33 Comments:** NCUTCD generally agrees with Notes for Figure 6P-33 as
1465 presented in the NPA, but recommends revising in accordance with NCUTCD recommendation
1466 20B-TTC-03 as follows:

- 1467 • Note 3 (new): add a new Standard note requiring vehicle warning lights
- 1468 • Note 3 (original in Guidance): delete this note
- 1469 • Note 4: editorial revision
- 1470 • Note 5: add “Additional” to the beginning of the note since the truck-mounted attenuator
1471 shown in Figure 6P-33 is considered a protection device, and there are additional options
1472 available in 6M.02.

1473

1474 **Notes for Figure 6P-33 —Typical Application 33**
1475 **Stationary Lane Closure on a Divided Highway**

1476

1477 **Standard:**

- 1478 1. This information also shall be used when work is being performed in the lane
1479 adjacent to the median on a divided highway. In this case, the LEFT LANE
1480 CLOSED signs and the corresponding Lane Ends signs shall be substituted.
- 1481 2. When a side road intersects the highway within the TTC zone, additional TTC
1482 devices shall be placed as needed.
- 1483 3. **Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating,**
1484 **or strobe lights.** [revise per 20B-TTC-03]

1485 *Guidance:*

- 1486 *3. When paved shoulders having a width of 8 feet or more are closed, channelizing devices*
1487 *should be used to close the shoulder in advance of the merging taper to direct vehicular*
1488 *traffic to remain within the traveled way.* [revise per 20B-TTC-03]

1489 **Option:**

- 1490 4. A truck-mounted attenuator may be used on the shadow vehicle or on a work vehicle
~~and/or the shadow vehicle.~~ [revise per 20B-TTC-03]
- 1491 5. Additional positive Positive protection devices may be used per Section 6M.02. [edit for
1492 clarity]

1493 **Support:**

- 1494 6. Where conditions permit, restricting all vehicles, equipment, workers, and their activities
to one side of the roadway might be advantageous.

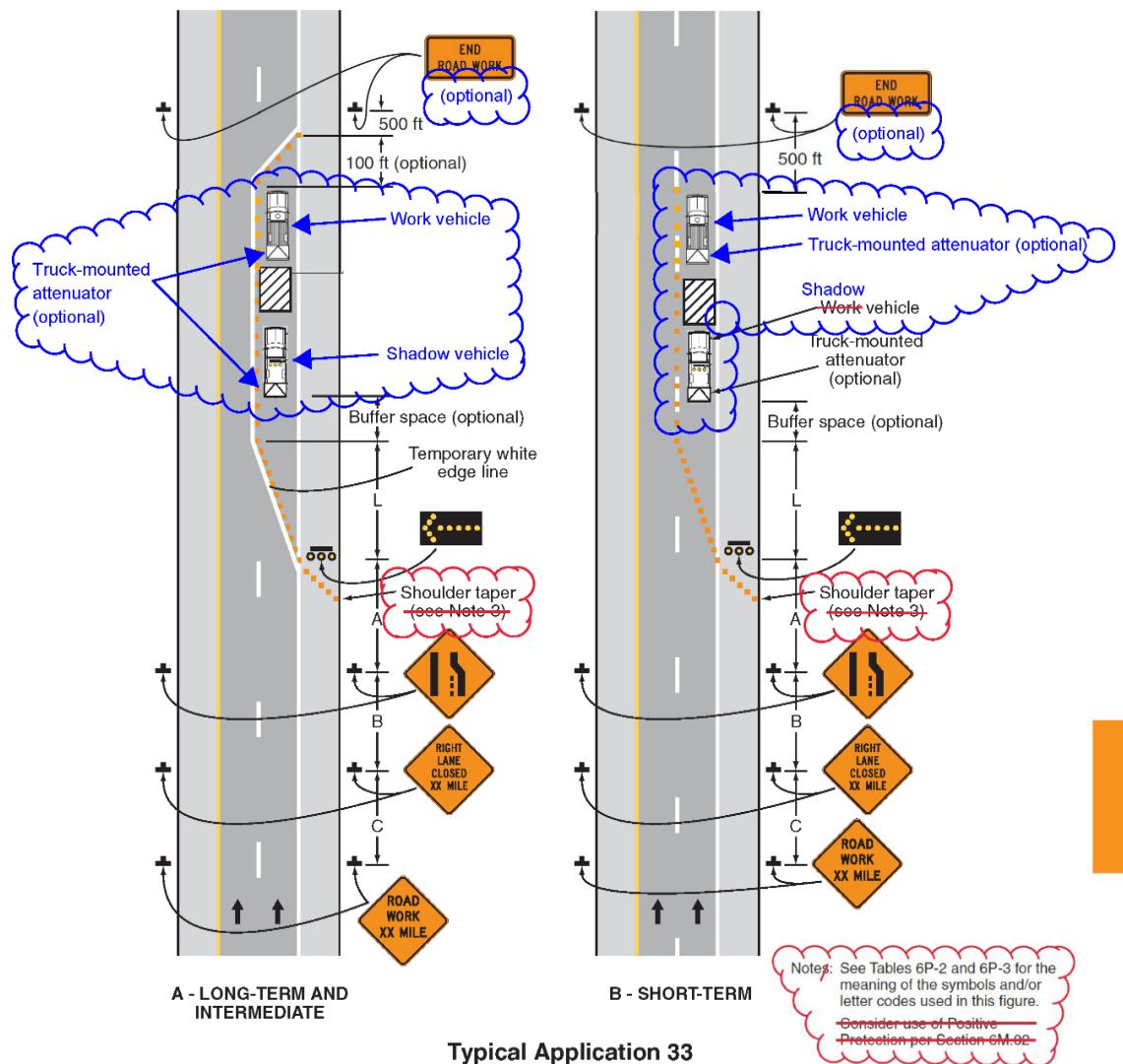
1495 **Standard:**

- 1496 7. An arrow board shall be used when a freeway lane is closed. When more than one
1497 freeway lane is closed, a separate arrow board shall be used for each closed lane.

1501 **Figure 6P-33 Comments:** NCUTCD generally agrees with Figure 6P-33 as presented in the
1502 NPA, but recommends revising in accordance with NCUTCD recommendation 20B-TTC-03 as
1503 follows:

- Add a work vehicle, shadow vehicle, and optional truck-mounted attenuators to both examples
- Revise several notes to delete reference to Note 2
- Add "optional" to signs as appropriate
- Delete a new positive protection note in the typical application figure since it is redundant with a note added to the notes page

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1511 **Figure 6P-33. Stationary Lane Closure on a Divided Highway (TA-33)**



1512

1513 **Notes for Figure 6P-34 Comments:** NCUTCD agrees with Notes for Figure 6P-34 as presented
1514 in the NPA.

1515

1516 **Notes for Figure 6P-34 — Typical Application 34**

1517 **Lane Closure with a Temporary Traffic Barrier**

1518 **Standard:**

- 1519 **1. This information also shall be used when work is being performed in the lane**
1520 **adjacent to the median on a divided highway. In this case, the LEFT LANE**
1521 **CLOSED signs and the corresponding Lane Ends signs shall be substituted.**

1522 **Guidance:**

- 1523 **2. For long-term lane closures on facilities with permanent edge lines, a temporary edge**
1524 **line should be installed from the upstream end of the merging taper to the downstream**
1525 **end of the downstream taper, and conflicting pavement markings should be removed.**
- 1526 **3. The use of a barrier should be based on engineering judgment.**

1527 **Standard:**

- 1528 **4. Temporary traffic barriers, if used, shall comply with the provisions of Section**
6M.02.
- 1529 **5. The barrier shall not be placed along the merging taper. The lane shall first be**
closed using channelizing devices and pavement markings.

1530 **Option:**

- 1531 **6. Type C Steady-Burn warning lights may be placed on channelizing devices and the**
1532 **barrier parallel to the edge of pavement for nighttime lane closures.**
- 1533 **7. The barrier shown in this typical application is an example of one method that may be**
1534 **used to close a lane for a long-term project. If the work activity permits, a movable**
1535 **barrier may be used and relocated to the shoulder during non-work periods or peak-**
1536 **period vehicular traffic conditions, as appropriate.**

1537 **Standard:**

- 1538 **8. If a movable barrier is used, the temporary white edge line shown in the typical**
1539 **application shall not be used. During the period when the right-hand lane is**
1540 **opened, the sign legends and the channelization shall be changed to indicate that**
1541 **only the shoulder is closed, as illustrated in Figure 6P-5. The arrow board, if used,**
1542 **shall be placed at the downstream end of the shoulder taper and shall display the**
1543 **caution mode.**

1544 **Guidance:**

- 1545 **9. If a movable barrier is used, the shift should be performed in the following manner. When**
1546 **closing the lane, the lane should be initially closed with channelizing devices placed along a**
1547 **merging taper using the same information employed for a stationary lane closure. The lane**
1548 **closure should then be extended with the movable-barrier transfer vehicle moving with**
1549 **vehicular traffic. When opening the lane, the movable-barrier transfer vehicle should travel**
1550 **against vehicular traffic from the termination area to the transition area. The merging taper**
1551 **should then be removed using the same information employed for a stationary lane closure.**

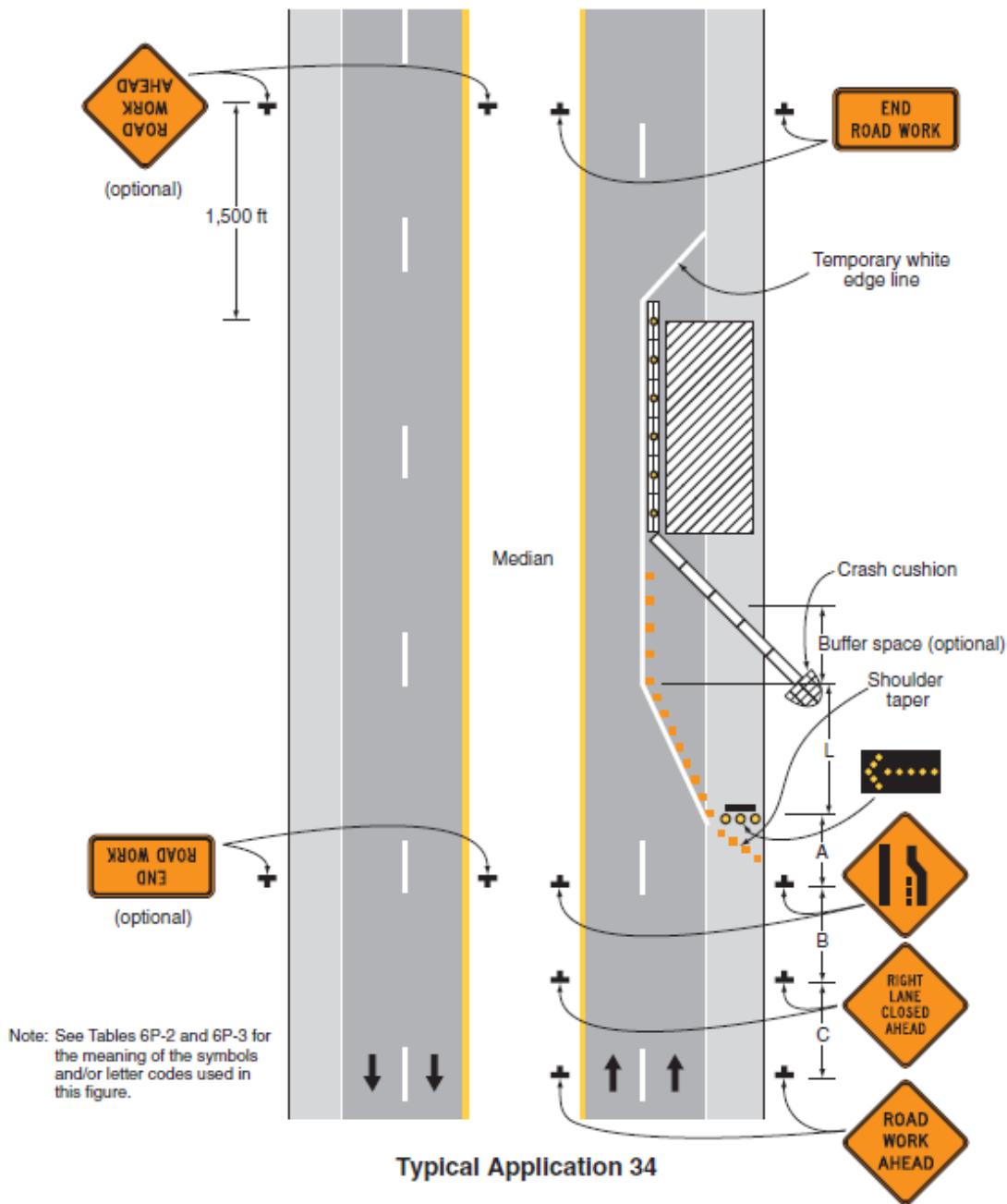
1555 **Figure 6P-34 Comments:** NCUTCD agrees with Figure 6P-34 as presented in the NPA.

1556

1557

1558

Figure 6P-34. Lane Closure with a Temporary Traffic Barrier (TA-34)



1559

1560 **Notes for Figure 6P-35 Comments:** NCUTCD generally agrees with Notes for Figure 6P-35 as
1561 presented in the NPA, but recommends revising in accordance with NCUTCD recommendation
1562 20B-TTC-01 as follows:

- 1563 • Note 8: revise to clarify “stopping” sight distance should be provided
- 1564 • Note 13: add “Additional” to the beginning of the note since the truck-mounted
1565 attenuator shown in Figure 6P-35 is considered a protection device, and there are
1566 additional options available in 6M.02

1567

1568 **Notes for Figure 6P-35—Typical Application 35** 1569 **Mobile Operation on a Multi-Lane Road**

1570 **Standard:**

- 1571 1. Arrow boards shall, as a minimum, be Type B, with a size of 60 x 30 inches.
- 1572 2. Vehicle-mounted signs shall be mounted in a manner such that they are not
1573 obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be
1574 covered or turned from view when work is not in progress.
- 1575 3. Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating,
1576 or strobe lights.
- 1577 4. An arrow board shall be used when a freeway lane is closed. When more than one
1578 freeway lane is closed, a separate arrow board shall be used for each closed lane.

1579 **Guidance:**

- 1580 5. Vehicles used for these operations should be made highly visible with appropriate
1581 equipment, such as flags, signs, or arrow boards.
- 1582 6. Shadow Vehicle 1 should be equipped with an arrow board and truck-mounted
1583 attenuator.
- 1584 7. Shadow Vehicle 2 should be equipped with an arrow board. An appropriate lane closure
1585 sign should be placed on Shadow Vehicle 2 so as not to obscure the arrow board.
- 1586 8. Shadow Vehicle 2 should travel at a varying distance from the work operation so as to
1587 provide *adequate stopping* sight distance for vehicular traffic approaching from the rear.
1588 [revise per 20B-TTC-01]
- 1589 9. The spacing between the work vehicles and the shadow vehicles, and between each
1590 shadow vehicle should be minimized to deter road users from driving in between.
- 1591 10. Work should normally be accomplished during off-peak hours.
- 1592 11. When the work vehicle occupies an interior lane (a lane other than the far right or far
1593 left) of a directional roadway having a right-hand shoulder 10 feet or more in width,
1594 Shadow Vehicle 2 should drive the right-hand shoulder with a sign indicating that work
1595 is taking place in the interior lane.

1596 **Option:**

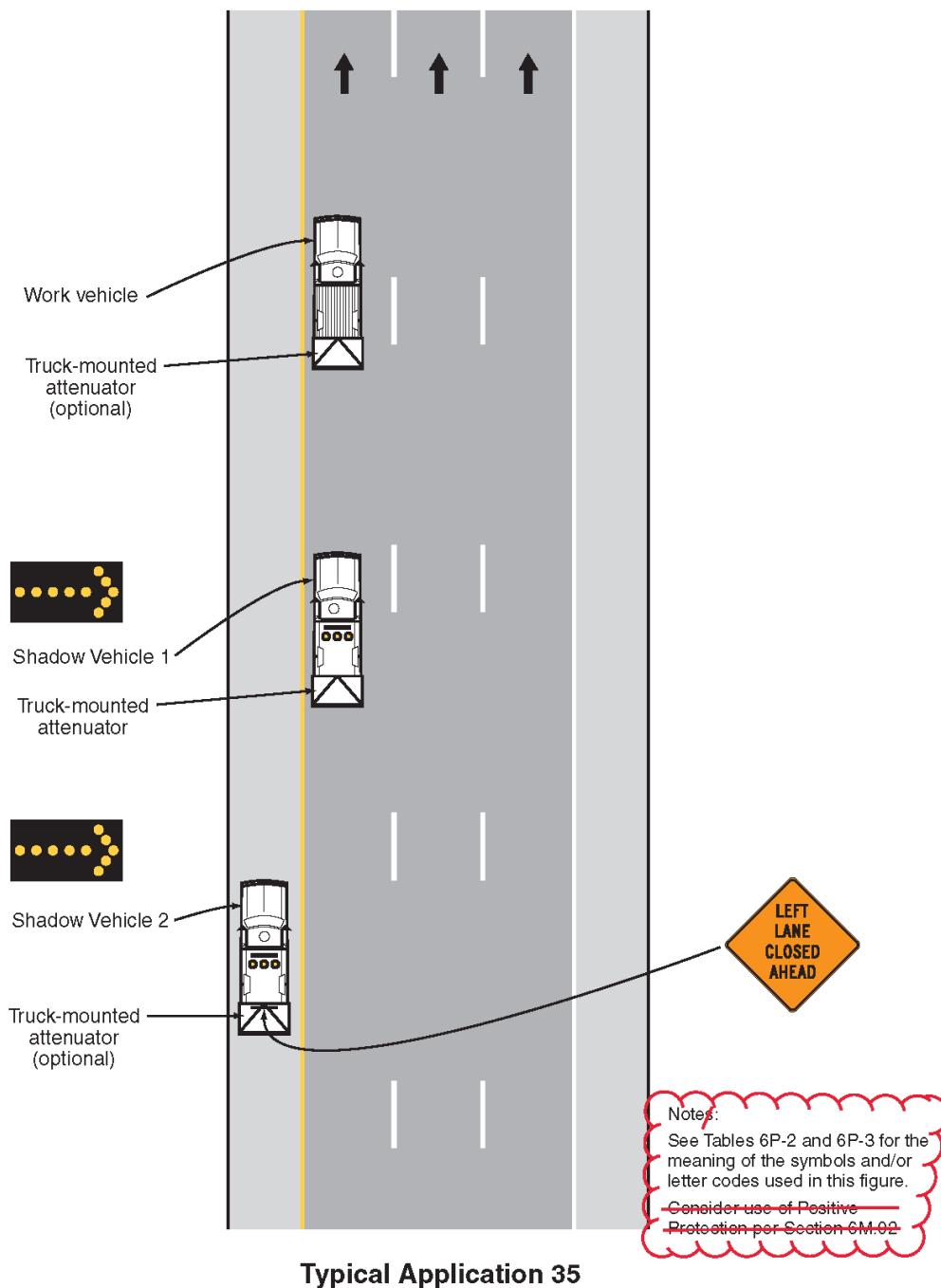
- 1597 12. A truck-mounted attenuator may be used on Shadow Vehicle 2.
- 1598 13. *Additional positive Positive* protection devices may be used per Section 6M.02. [edit for
1599 clarity]
- 1600 14. On high-speed roadways, a third shadow vehicle (not shown) may be used with Shadow
1601 Vehicle 1 in the closed lane, Shadow Vehicle 2 straddling the edge line, and Shadow
1602 Vehicle 3 on the shoulder.
- 1603 15. Where adequate shoulder width is not available, Shadow Vehicle 3 may also straddle the
1604 edge line.

1605 **Figure 6P-35 Comments:** NCUTCD generally agrees with Figure 6P-35 as presented in the
1606 NPA, but recommends deleting a new positive protection note in the typical application figure
1607 since it is redundant with a note added to the notes page.

1608

1609 **Figure 6P-35. Mobile Operation on a Multi-Lane Road (TA-35)**

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1611

1612 **Notes for Figure 6P-36 Comments:** NCUTCD generally agrees with Notes for Figure 6P-36 as
1613 presented in the NPA, but recommends revisions in accordance with NCUTCD recommendation
1614 20B-TTC-04 as follows:

- 1615 • Note 3: delete “all”, as not all notes may apply
- 1616 • Note 12: add “when used as a temporary travel” to clarify the shoulder width is for a
1617 temporary lane
- 1618 • Note 15: revise to improve guidance regarding heavy vehicles
- 1619 • Note 18 (new): add an Option note suggesting a portable changeable message sign for
1620 informing heavy vehicles of lane selection

1621

1622 **Notes for Figure 6P-36 — Typical Application 36** 1623 **Lane Shift on a Freeway**

1624 *Guidance:*

- 1625 1. *The lane shift should be used when the work space extends into either the right-hand or
1626 left-hand lane of a divided highway and it is not practical, for capacity reasons, to reduce
1627 the number of available lanes.*

1628 *Support:*

- 1629 2. When a lane shift is accomplished by using (1) geometry that meets the design speed at
1630 which the permanent highway was designed, (2) full normal cross-section (full lane width
1631 and full shoulders), and (3) complete pavement markings, then only the initial general
1632 work-zone warning sign is required.

1633 *Guidance:*

- 1634 3. *When the conditions in Note 2 are not met, the information shown in the typical
1635 application should be employed and ~~all~~ the following notes apply. [revise per 20B-TTC-
1636 04]*

1637 *Standard:*

- 1638 4. **Temporary traffic barriers, if used, shall comply with the provisions of Section
1639 6M.02.**
- 1640 5. **The barrier shall not be placed along the shifting taper. The lane shall first be
1641 shifted using channelizing devices and pavement markings.**

1642 *Guidance:*

- 1643 6. *A warning sign should be used to show the changed alignment.*

1644 *Standard:*

- 1645 7. **The number of lanes illustrated on the Reverse Curve signs shall be the same as the
1646 number of through lanes available to road users, and the direction of the reverse
1647 curves shall be appropriately illustrated.**

1648 *Option:*

- 1649 8. Where two or more lanes are being shifted, a W1-4 (or W1-3) sign with an ALL LANES
1650 (W24-1cP) plaque (see Figure 6H-1) may be used instead of a sign that illustrates the
1651 number of lanes.
- 1652 9. Where more than three lanes are being shifted, the Reverse Curve (or Turn) sign may be
1653 rectangular.

1654 *Guidance:*

- 1655 10. *Where the shifted section is longer than 600 feet, one set of Reverse Curve signs should
1656 be used to show the initial shift and a second set should be used to show the return to the
1657 normal alignment. If the tangent distance along the temporary diversion is less than 600*

1658 feet, a Double Reverse Curve sign should be used instead of the first Reverse Curve sign,
1659 and the second Reverse Curve sign should be omitted.

1660 11. If a STAY IN LANE sign is used, then solid white lane lines should be used.

1661 **Standard:**

1662 12. The minimum width of the shoulder, when used as a temporary travel lane, shall be
1663 10 feet. [revise per 20B-TTC-04]

1664 13. For long-term stationary work, existing conflicting pavement markings shall be
1665 removed and temporary markings shall be installed before traffic patterns are
1666 changed.

1667 Option:

1668 14. For short-term stationary work, lanes may be delineated by channelizing devices or
1669 removable pavement markings instead of temporary markings.

1670 **Guidance:**

1671 15. Engineering judgment should be used to determine if the shoulder can accommodate
1672 heavy vehicles. If the shoulder cannot adequately accommodate trucks, trucks Heavy
1673 vehicles should be directed to use the normal travel lanes if they cannot be adequately
1674 accommodated on the shoulder. [revise per 20B-TTC-04]

1675 16. The use of a barrier should be based on engineering judgment.

1676 Option:

1677 17. Type C Steady-Burn warning lights may be placed on channelizing devices and the
1678 barrier parallel to the edge of the pavement for nighttime lane closures.

1679 18. A Portable Changeable Message Sign or special regulatory sign (see Section 6G.08) may
1680 be used to indicate which lanes are appropriate for heavy vehicle use. [revise per 20B-
1681 TTC-04]

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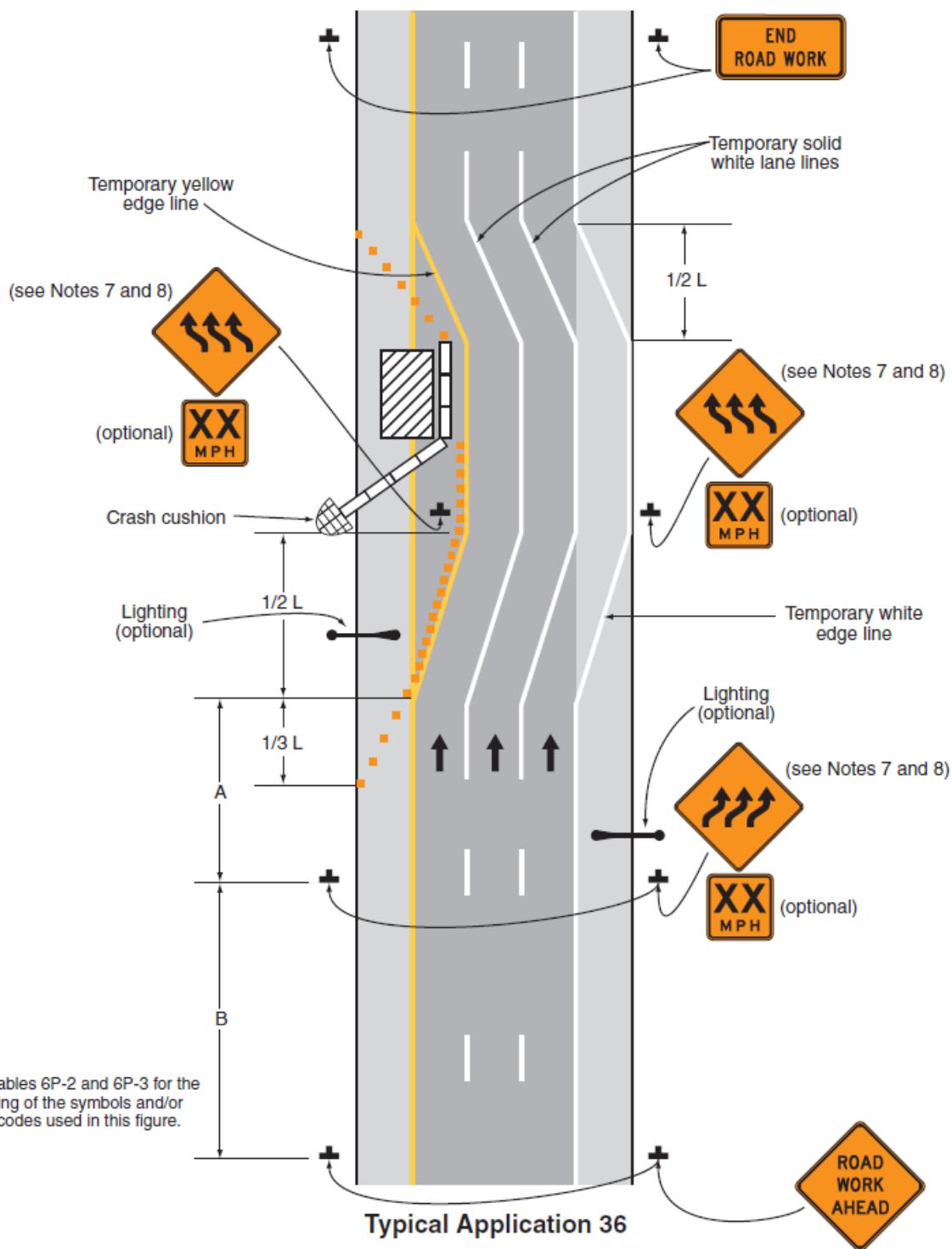
1685 **Figure 6P-36 Comments:** NCUTCD agrees with Figure 6P-36 as presented in the NPA.

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Figure 6P-36. Lane Shift on a Freeway (TA-36)



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1690 **Notes for Figure 6P-37 Comments:** NCUTCD generally agrees with Notes for Figure 6P-37 as
1691 presented in the NPA, but recommends revising in accordance with NCUTCD recommendations
1692 20B-TTC-03 and 20B-TTC-04 as follows:
1693

- 1694 • Note 2 (new): add a new Standard note requiring vehicle warning lights
- 1695 • Note 5: add “Additional” to the beginning of Note 5 since the truck-mounted attenuator
1696 shown in Figure 6P-37 is considered a protection device, and there are additional options
1697 available in 6M.02
- 1698 • Note 7: revise to improve guidance regarding heavy vehicles
- 1699 • Note 8 (new): add an Option note suggesting a portable changeable message sign for
informing heavy vehicles of lane selection

1700

1701 **Notes for Figure 6P-37 —Typical Application 37** 1702 **Double Lane Closure on a Freeway**

1703 **Standard:**

- 1704 1. An arrow board shall be used when a freeway lane is closed. When more than one
1705 freeway lane is closed, a separate arrow board shall be used for each closed lane.
- 1706 2. **Shadow and work vehicles shall display high-intensity rotating, flashing,**
1707 **oscillating, or strobe lights.** [revise per 20B-TTC-03]

1708 **Guidance:**

- 1709 2. *Ordinarily, the preferred position for the second arrow board is in the closed exterior
1710 lane at the upstream end of the second merging taper. However, the second arrow board
1711 should be placed in the closed interior lane at the downstream end of the second merging
1712 taper in the following situations:*
 - 1713 a. *When a shadow vehicle is used in the interior closed lane, and the second arrow board
1714 is mounted on the shadow vehicle;*
 - 1715 b. *If alignment or other conditions create any confusion as to which lane is closed by the
1716 second arrow board; and*
 - 1717 c. *When the first arrow board is placed in the closed exterior lane at the downstream end
1718 of the first merging taper (the alternative position when the shoulder is narrow).*

1719 **Option:**

- 1720 3. Flashing warning lights and/or flags may be used to call attention to the initial warning
1721 signs.
- 1722 4. A truck-mounted attenuator may be used on the shadow vehicle or on the work vehicle.
1723 [revise per 20B-TTC-03]
- 1724 5. Additional positive Positive protection devices may be used per Section 6M.02. [edit for
1725 clarity]
- 1726 6. If a paved shoulder having a minimum width of 10 feet and sufficient strength is
1727 available, the left hand and adjacent interior lanes may be closed and vehicular traffic
1728 carried around the work space on the right-hand lane and a right-hand shoulder.

1729 **Guidance:**

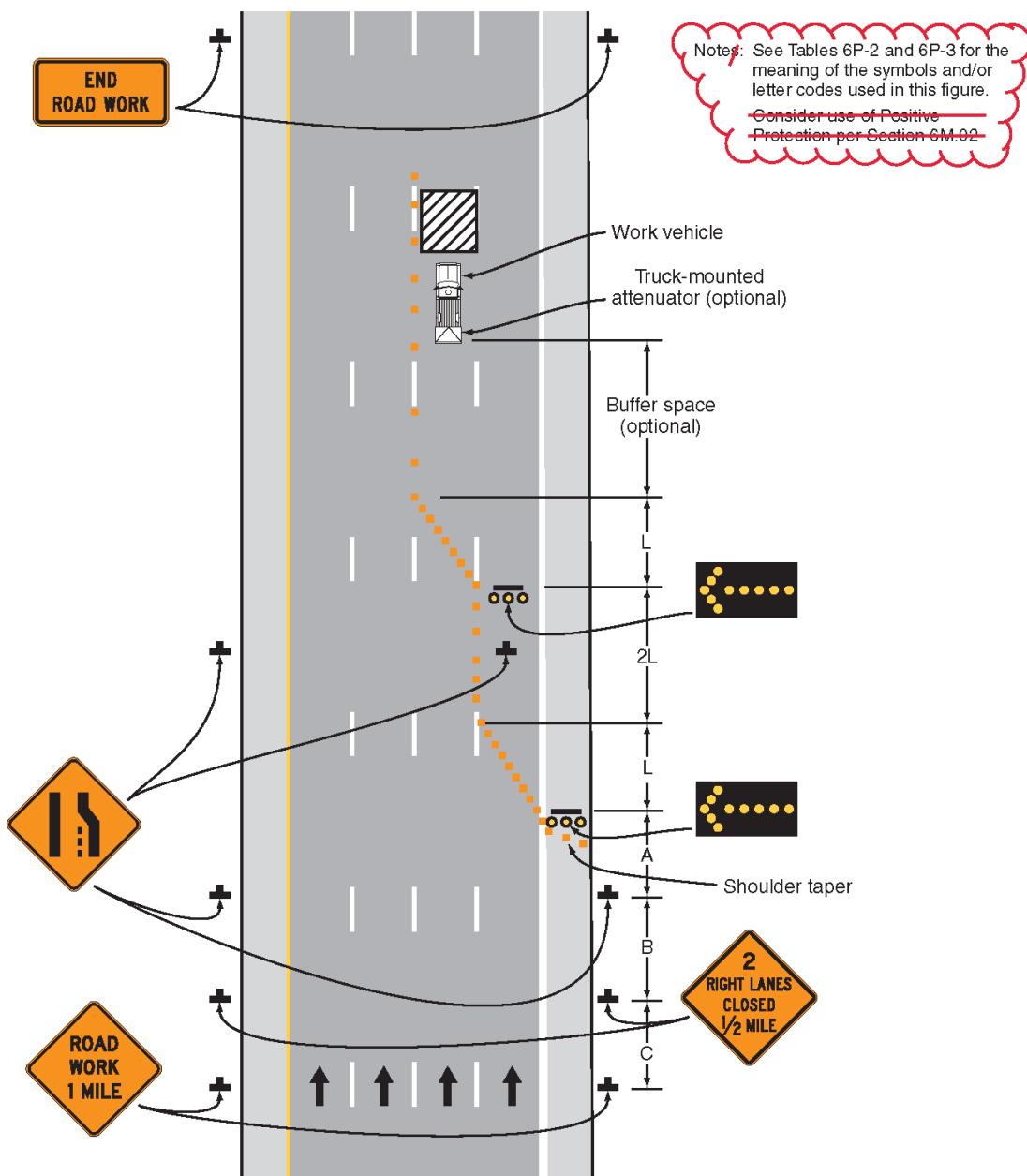
- 1730 7. *When a shoulder is used as a temporary travel lane, engineering judgment should be
1731 used to determine if the shoulder can accommodate heavy vehicles. is used that
1732 cannot adequately accommodate trucks, trucks Heavy vehicles should be directed to
1733 use the normal travel lanes if they cannot be adequately accommodated on the
1734 shoulder. [revise per 20B-TTC-04]*

1735 **Option:**

1736 8. A Portable Changeable Message Sign or special regulatory sign (see Section 6F.15)
1737 may be used to indicate which lanes are appropriate for heavy vehicle use. [revise per
1738 20B-TTC-04]

1739
1740 **Figure 6P-37 Comments:** NCUTCD generally agrees with Figure 6P-37 as presented in the
1741 NPA, but recommends deleting a new positive protection note in the typical application figure
1742 since it is redundant with a note added to the notes page.
1743

1744 **Figure 6P-37. Double Lane Closure on a Freeway (TA-37)**
1745



Typical Application 37

1746

1747 **Notes for Figure 6P-38 Comments:** NCUTCD generally agrees with Notes for Figure 6P-38 as
1748 presented in the NPA, but recommends revising in accordance with NCUTCD recommendation
1749 20B-TTC-04 as follows:

- 1750 • Resolve the conflict between W9-4 signs in Part 2 and Part 6 in the NPA with the same sign
1751 designation - W9-4 in Part 2 is the LANES MERGE word legend sign and W9-4 in Part 6 is
1752 the Interior Lane Shift Ahead symbol sign
- 1753 • Note 8: delete sign code, as sign designations are not normally used in the typical
1754 applications notes
- 1755 • Note 14: revise to improve guidance regarding heavy vehicles
- 1756 • Note 15 (new): add an Option note suggesting a portable changeable message sign for
1757 informing heavy vehicles of lane selection

1760 **Notes for Figure 6P-38 —Typical Application 38** 1761 **Interior Lane Closure on a Freeway**

1762 **Standard:**

- 1763 1. An arrow board shall be used when a freeway lane is closed. When more than one
1764 freeway lane is closed, a separate arrow board shall be used for each closed lane.
- 1765 2. If temporary traffic barriers are installed, they shall comply with the provisions and
1766 requirements in Section **6M.02**.
- 1767 3. The barrier shall not be placed along the shifting taper. The lane shall first be
1768 shifted using channelizing devices and pavement markings.
- 1769 4. For long-term stationary work, existing conflicting pavement markings shall be
1770 removed and temporary markings shall be installed before traffic patterns are
1771 changed.

1772 **Guidance:**

- 1773 5. For a long-term closure, a barrier should be used to provide additional safety to the
1774 operation in the closed interior lane. A buffer space should be used at the upstream end
1775 of the closed interior lane.
- 1776 6. The arrow board displaying an arrow pointing to the right should be on the left-hand
1777 shoulder at the beginning of the taper.
- 1778 7. For long-term use, the broken lane lines should be made solid white in the two-lane
1779 section.

1780 **Option:**

- 1781 8. As an alternative to initially closing the left-hand lane, as shown in the typical
1782 application, the right-hand lane may be closed in advance of the interior lane closure with
1783 appropriate channelization and signs. The Interior Lane Shift Ahead (W9-4) symbol sign
1784 may be mirrored to indicate a right lane shift. [delete sign code]
- 1785 9. A short, single row of channelizing devices in advance of the vehicular traffic split to
1786 restrict vehicular traffic to their respective lanes may be added.
- 1787 10. DO NOT PASS signs may be used.
- 1788 11. If a paved shoulder having a minimum width of 10 feet and sufficient strength is
1789 available, the left hand and center lanes may be closed and motor vehicle traffic carried
1790 around the work space on the right-hand lane and a right-hand shoulder.
- 1791 12. A work vehicle with a truck mounted attenuator may be utilized within the closed interior
1792 lane between the buffer space and the work area.

1793 13. Positive protection devices may be used per Section 6M.02.

1794 *Guidance:*

1795 14. When a shoulder is used as a temporary travel lane, engineering judgment should be
1796 used to determine if the shoulder can accommodate heavy vehicles. ~~is used that cannot~~
1797 ~~adequately accommodate trucks, trucks~~ Heavy vehicles should be directed to use the
1798 normal travel lanes if they cannot be adequately accommodated on the shoulder. [revise
1799 per 20B-TTC-04]

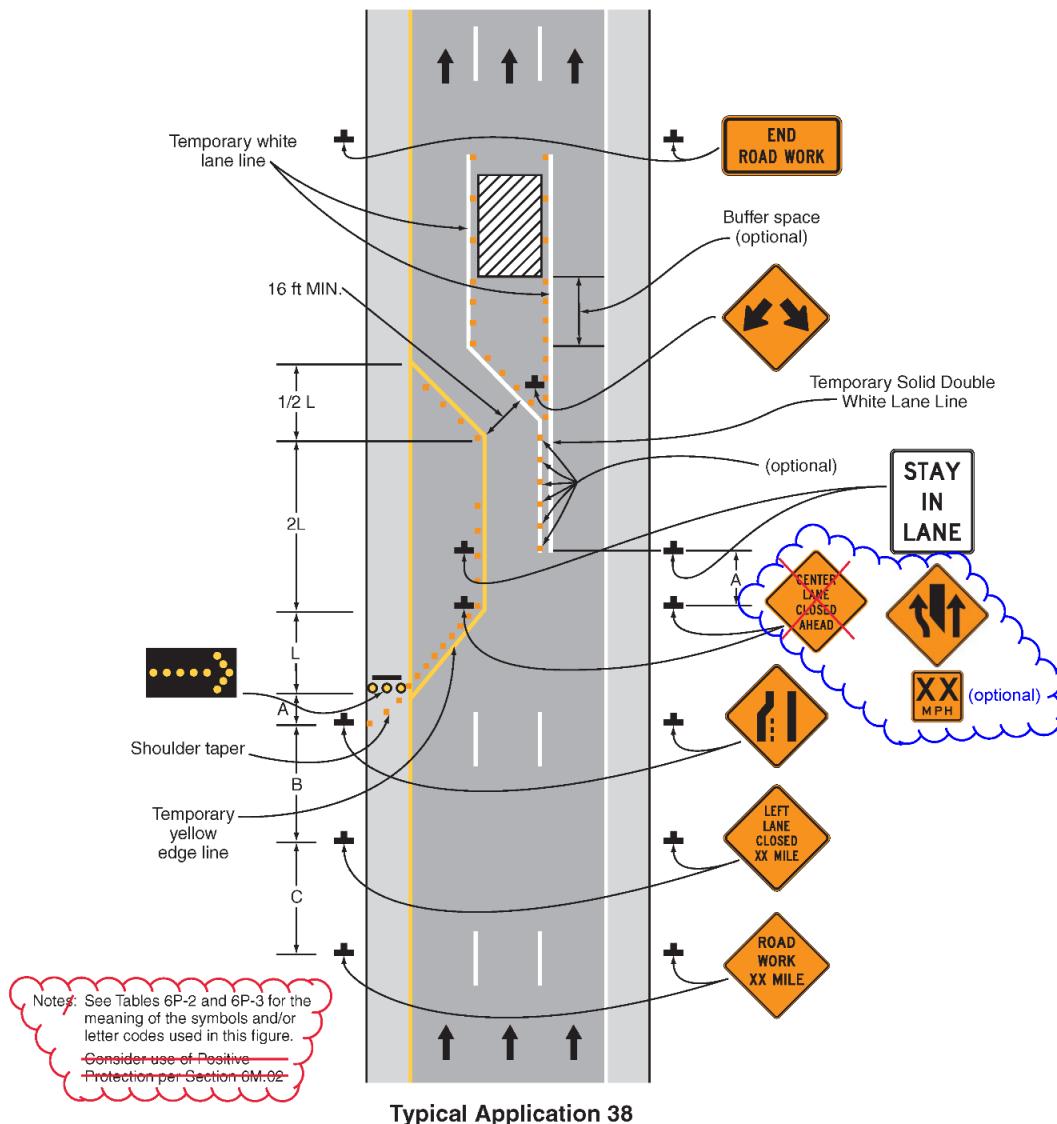
1800 Option:

1801 15. A Portable Changeable Message Sign or special regulatory sign (see Section 6G.08) may
1802 be used to indicate which lanes are appropriate for heavy vehicle use. [revise per 20B-
1803 TTC-04]

1805 **Figure 6P-38 Comments:** NCUTCD generally agrees with Figure 6P-38 as presented in the
1806 NPA, but recommends revising as follows:
1807

- 1807 • Delete the CENTER LANE CLOSED AHEAD sign in accordance with NCUTCD
1808 recommendation 17B-TTC-01 because at the location where the sign is shown, the center
1809 lane is not closed, but rather shifted.
- 1810 • Reintroduce the Interior Lane Shift Ahead symbol sign to this figure in accordance with
1811 NCUTCD recommendation 17B-TTC-01, as the sign has been reintroduced on Section
1812 6H.06 and Figure 6H-1 of the NPA - note there is a conflict between W9-4 signs in Part 2
1813 and Part 6 in the NPA with the same sign designation.
- 1814 • Delete a new positive protection note in the typical application figure since it is redundant
1815 with a note added to the notes page.

1816 **Figure 6P-38. Interior Lane Closure on a Freeway (TA-38)**



1818 **Typical Application 38**

1819

1820 **Notes for Figure 6P-39 Comments:** NCUTCD agrees with Notes for Figure 6P-39 as presented
1821 in the NPA.

1822

1823 **Notes for Figure 6P-39 — Typical Application 39**

1824 **Median Crossover on a Freeway**

1825

1826 **Standard:**

- 1827 1. Channelizing devices or temporary traffic barriers shall be used to separate
1828 opposing vehicular traffic.
- 1829 2. An arrow board shall be used when a freeway lane is closed. When more than one
1830 freeway lane is closed, a separate arrow board shall be used for each closed lane.

1831 *Guidance:*

- 1832 3. For long-term work on high-speed, high-volume highways, consideration should be given
1833 to using a temporary traffic barrier to separate opposing vehicular traffic.

1834 *Option:*

- 1835 4. When a temporary traffic barrier is used to separate opposing vehicular traffic, the Two-
1836 Way Traffic, DO NOT PASS, KEEP RIGHT, and DO NOT ENTER signs may be
1837 eliminated.
- 1838 5. The alignment of the crossover may be designed as a reverse curve.

1839 *Guidance:*

- 1840 6. When the crossover follows a curved alignment, the design criteria contained in the
1841 AASHTO "Policy on the Geometric Design of Highways and Streets" (see Section 1A.05)
1842 should be used.
- 1843 7. When channelizing devices have the potential of leading vehicular traffic out of the
1844 intended traffic space, the channelizing devices should be extended a distance in feet of
1845 2.0 times the speed limit in mph beyond the downstream end of the transition area as
1846 depicted.
- 1847 8. Where channelizing devices are used, the Two-Way Traffic signs should be repeated
1848 every 1 mile.

1849 *Option:*

- 1850 9. NEXT XX MILES Supplemental Distance plaques may be used with the Two-Way
1851 Traffic signs, where XX is the distance to the downstream end of the two-way section.

1852 *Support:*

- 1853 10. When the distance is sufficiently short that road users entering the section can see the
1854 downstream end of the section, they are less likely to forget that there is opposing
1855 vehicular traffic.
- 1856 11. The sign legends for the four pairs of signs approaching the lane closure for the non-
1857 crossover direction of travel are not shown. They are similar to the series shown for the
1858 crossover direction, except that the left-hand lane is closed.

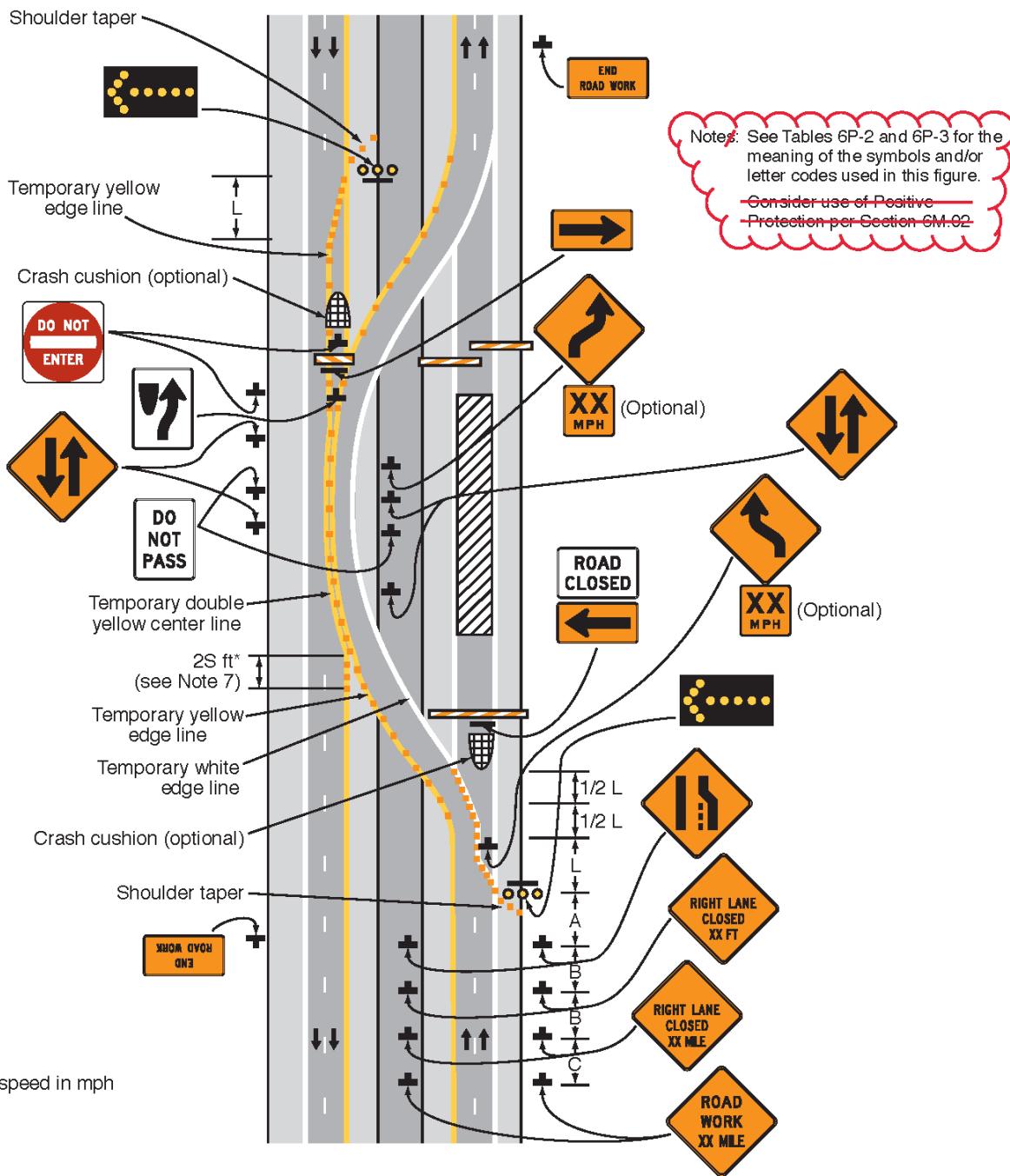
1859

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Figure 6P-39 Comments: NCUTCD generally agrees with Figure 6P-39 as presented in the NPA, but recommends deleting a new positive protection note in the typical application figure since it is redundant with a note added to the notes page.

Figure 6P-39. Median Crossover on a Freeway (TA-39)



Typical Application 39

1867

1868 **Notes for Figure 6P-40 Comments:** NCUTCD generally agrees with Notes for Figure 6P-40 as
1869 presented in the NPA, but recommends revising in accordance with NCUTCD recommendations
1870 16B-TTC-06 and 20B-TTC-01 and for concurrence with Typical Application 44 as follows:
1871

- 1872 • Note 2 (new): add a new Standard note stating a STOP sign shall be used where inadequate
acceleration distance exists
- 1873 • Note 4 (was Note 3): revise to clarify "stopping" sight distance should be provided
- 1874 • Note 5 (new): add a new Guidance note addressing closing the ramp
- 1875 • Note 10 (new): add a new Option note suggesting a stop beacon or red flasher over a stop
sign
- 1876 • Note 11 (new): add a new Option note referencing the NO MERGE AREA plaque

1879 **Notes for Figure 6P-40 —Typical Application 40** 1880 **Median Crossover for an Entrance Ramp**

1881 *Guidance:*

- 1882 1. *The typical application illustrated should be used for carrying an entrance ramp across
a closed directional roadway of a divided highway.*

1884 Standard

2. Where inadequate acceleration distance exists for the temporary entrance, a
STOP sign shall be installed. [revise per 16B-TTC-06]

1887 *Guidance:*

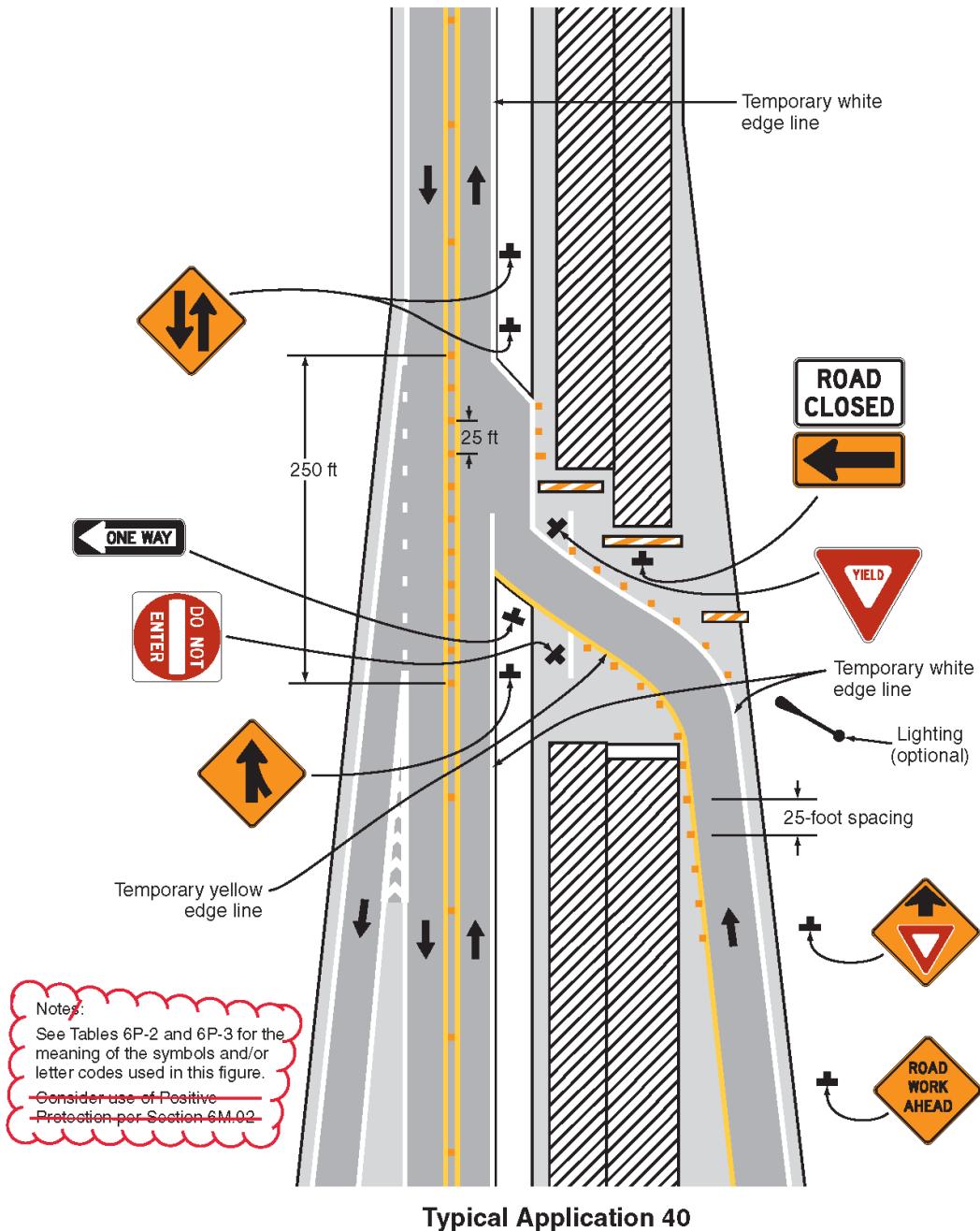
- 2.3. A temporary acceleration lane should be used to facilitate merging.
- 3.4. When used, the YIELD or STOP sign should be located far enough forward to provide
adequate stopping sight distance of oncoming mainline vehicular traffic to select an
acceptable gap, but should not be located so far forward that motorists will be
encouraged to stop in the path of the mainline traffic. If needed, yield or stop lines
should be installed across the ramp to indicate the point at which road users should
yield or stop. Also, a longer acceleration lane should be provided beyond the sign to
reduce the gap size needed. [revise 20B-TTC-01]
5. If sufficient gaps are not available, consideration should be given to closing the ramp.
[revise per 16B-TTC-06]

1888 *Option:*

- 4.6. Positive protection devices may be used per Section 6M.02. 5.7. If vehicular traffic
conditions allow, the ramp may be closed.
- 6.8. A broken edge line may be carried across the temporary entrance ramp to assist in
defining the through vehicular traffic lane.
- 7.9. When a temporary traffic barrier is used to separate opposing vehicular traffic, the
Two-Way Traffic signs and the DO NOT ENTER signs may be eliminated.
10. A Stop Beacon (see Section 4L.05) or a Type B high-intensity warning flasher with a
red lens may be placed above the STOP sign. [revise per 16B-TTC-06]
11. Where the acceleration distance is significantly reduced, a supplemental plaque may be
placed below the Yield Ahead sign reading NO MERGE AREA. [revise per 16B-TTC-
06]

1910
1911 **Figure 6P-40 Comments:** NCUTCD generally agrees with Figure 6P-40 as presented in the
1912 NPA, but recommends deleting a new positive protection note in the typical application figure
since it is redundant with a note added to the notes page.
1913
1914

1915 **Figure 6P-40. Median Crossover for an Entrance Ramp (TA-40)**
1916



1917 **Typical Application 40**

1918 **Notes for Figure 6P-41 Comments:** NCUTCD agrees with Notes for Figure 6P-41 as presented
1919 in the NPA.

1920

1921 **Notes for Figure 6P-41 —Typical Application 41**

1922 **Median Crossover for an Exit Ramp**

1923 *Guidance:*

- 1924 1. *This typical application should be used for carrying an exit ramp across a closed*
1925 *directional roadway of a divided highway. The design criteria contained in the AASHTO*
1926 *“Policy on the Geometric Design of Highways and Streets” (see Section 1A.05) should*
1927 *be used for determining the curved alignment.*
- 1928 2. *The guide signs should indicate that the ramp is open, and where the temporary ramp is*
1929 *located. Conversely, if the ramp is closed, guide signs should indicate that the ramp is*
1930 *closed.*
- 1931 3. *When the exit is closed, a black on orange EXIT CLOSED sign panel should be placed*
1932 *diagonally across the interchange/intersection guide signs and channelizing devices*
1933 *should be placed to physically close the ramp.*
- 1934 4. *In the situation (not shown) where channelizing devices are placed along the mainline*
1935 *roadway, the devices’ spacing should be reduced in the vicinity of the off ramp to*
1936 *emphasize the opening at the ramp itself. Channelizing devices and/or temporary*
1937 *pavement markings should be placed on both sides of the temporary ramp where it*
1938 *crosses the median and the closed roadway.*
- 1939 5. *Advance guide signs providing information related to the temporary exit should be*
1940 *relocated or duplicated adjacent to the temporary roadway.*

1941 **Standard:**

- 1942 6. **A temporary EXIT sign shall be located in the temporary gore. For better visibility,**
1943 **it shall be mounted a minimum of 7 feet from the pavement surface to the bottom of**
1944 **the sign.**

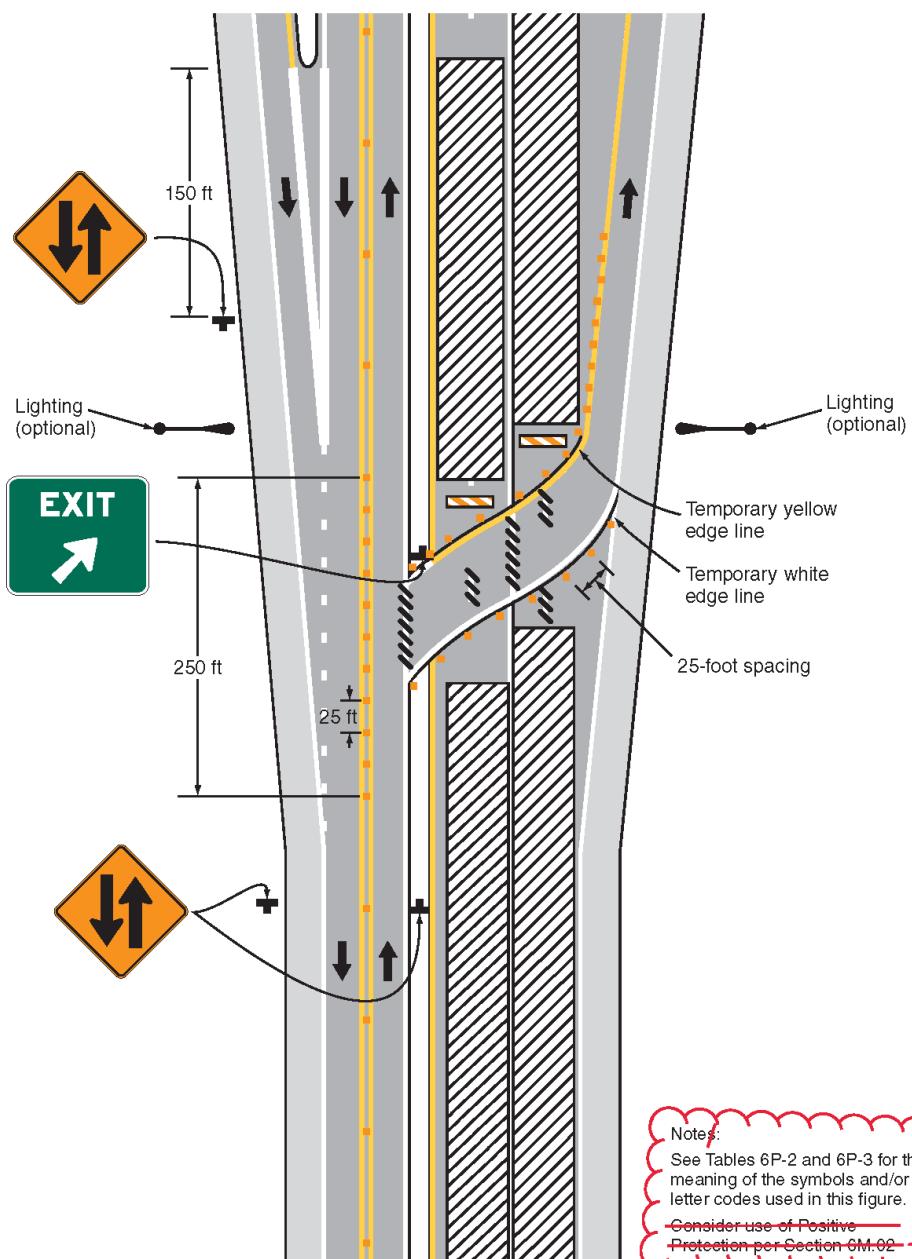
1945 Option:

- 1946 7. Positive protection devices may be used per Section 6M.02.
- 1947 8. Guide signs referring to the exit may need to be relocated to the median.
- 1948 9. The temporary EXIT sign placed in the temporary gore may be either black on orange or
1949 white on green.
- 1950 10. In some instances, a temporary deceleration lane may be useful in facilitating the exiting
1951 maneuver.
- 1952 11. When a temporary traffic barrier is used to separate opposing vehicular traffic, the Two-
1953 Way Traffic signs may be omitted.

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Figure 6P-41 Comments: NCUTCD generally agrees with Figure 6P-41 as presented in the NPA, but recommends deleting a new positive protection note in the typical application figure since it is redundant with a note added to the notes page.

Figure 6P-41. Median Crossover for an Exit Ramp (TA-41)



Typical Application 41

1961

1962 **Notes for Figure 6P-42 Comments:** NCUTCD agrees with Notes for Figure 6P-42 as presented
1963 in the NPA.

1964

1965 **Notes for Figure 6P-42 —Typical Application 42**

1966 **Work in the Vicinity of an Exit Ramp**

1967 *Guidance:*

- 1968 1. *The guide signs should indicate that the ramp is open, and where the temporary ramp is*
1969 *located. However, if the ramp is closed, guide signs should indicate that the ramp is*
1970 *closed.*
- 1971 2. *When the exit ramp is closed, a black on orange EXIT CLOSED sign panel should be*
1972 *placed diagonally across the interchange/intersection guide signs.*
- 1973 3. *The design criteria contained in the AASHTO "Policy on the Geometric Design of*
1974 *Highways and Streets" (see Section 1A.05) should be used for determining the alignment.*

1975 **Standard:**

- 1976 4. **A temporary EXIT sign shall be located in the temporary gore. For better visibility,**
1977 **it shall be mounted a minimum of 7 feet from the pavement surface to the bottom of**
1978 **the sign.**

1979 **Option:**

- 1980 5. Positive protection devices may be used per Section 6M.02.
- 1981 6. The temporary EXIT sign placed in the temporary gore may be either black on orange or
1982 white on green.
- 1983 7. An alternative procedure that may be used is to channelize exiting vehicular traffic onto
1984 the right-hand shoulder and close the lane as necessary.

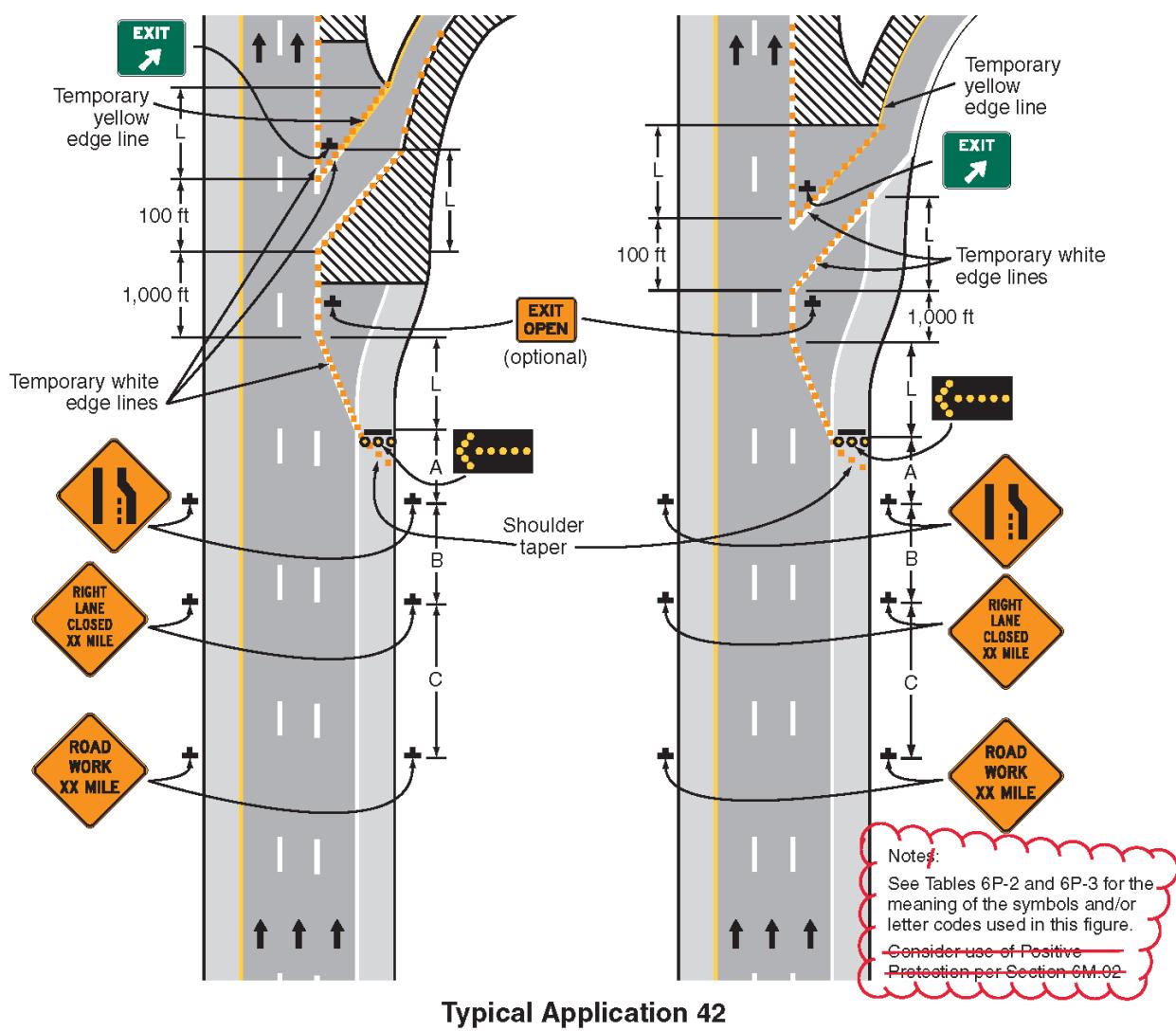
1985 **Standard:**

- 1986 8. **An arrow board shall be used when a freeway lane is closed. When more than one**
1987 **freeway lane is closed, a separate arrow board shall be used for each closed lane.**

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1994

Figure 6P-42 Comments: NCUTCD generally agrees with Figure 6P-42 as presented in the NPA, but recommends deleting a new positive protection note in the typical application figure since it is redundant with a note added to the notes page.

Figure 6P-42. Work in the Vicinity of an Exit Ramp (TA-42)



1995

1996 **Notes for Figure 6P-43 Comments:** NCUTCD agrees with Notes for Figure 6P-43 as presented
1997 in the NPA.

1998

1999 **Notes for Figure 6P-43 —Typical Application 43**
2000 **Partial Exit Ramp Closure**

2001

2002 *Guidance:*

2003 1. *Truck off-tracking should be considered when determining whether the minimum lane*
2004 *width of 10 feet is adequate (see Section 6N.07).*

2005 Option:

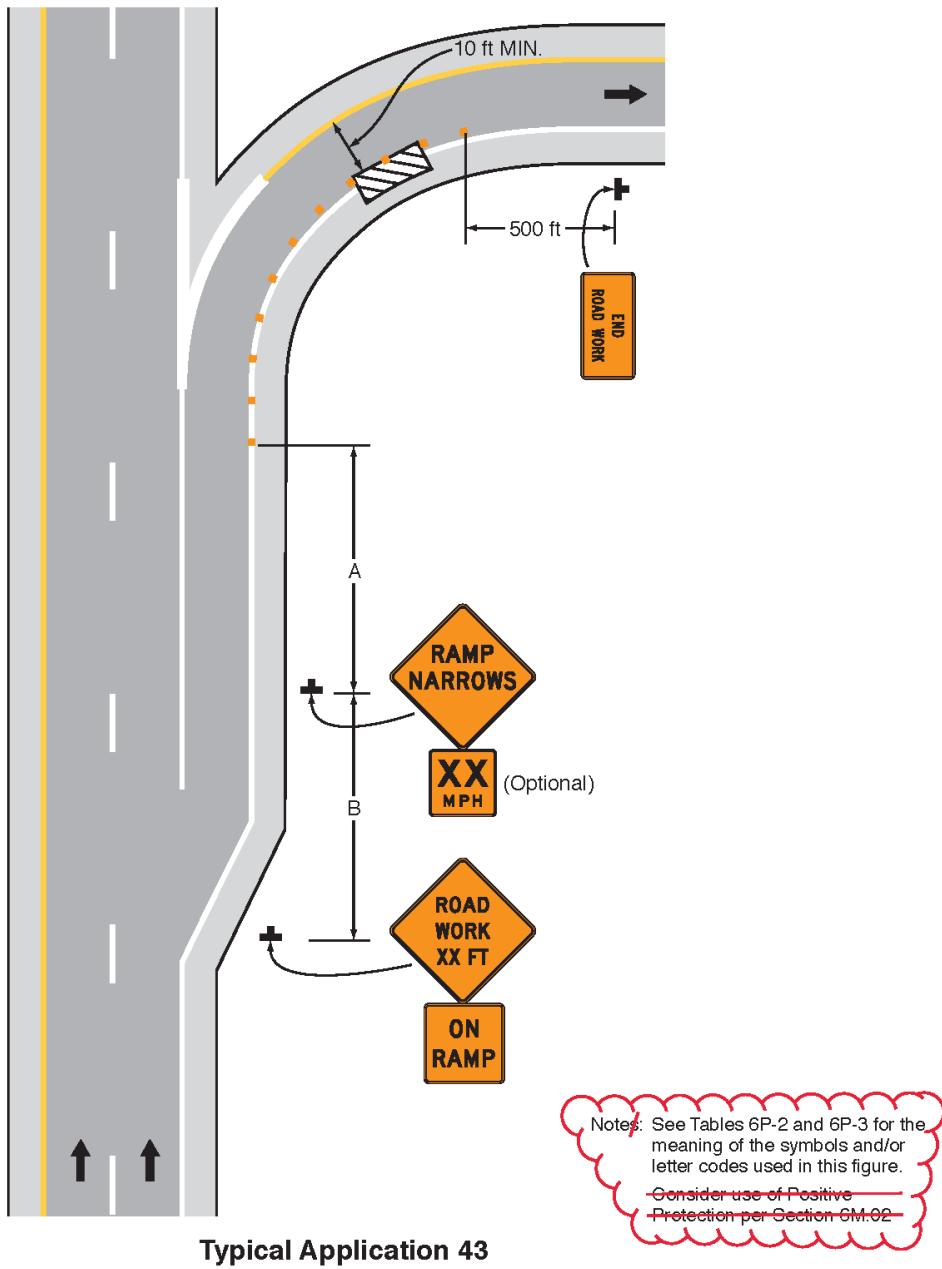
2006 2. Positive protection devices may be used per Section 6M.02.

2007

2008
2009
2010
Figure 6P-43 Comments: NCUTCD generally agrees with Figure 6P-43 as presented in the NPA, but recommends deleting a new positive protection note in the typical application figure since it is redundant with a note added to the notes page.

2011
2012
2013

Figure 6P-43. Partial Exit Ramp Closure (TA-43)



2014

2015 Notes for Figure 6P-44 Comments: NCUTCD generally agrees with Notes for Figure 6P-44 as
2016 presented in the NPA, but recommends revising in accordance with NCUTCD recommendations
2017 16B-TTC-06 and 20B-TTC-01 as follows:

- 2018 • Note 2: revise to simplify where a STOP sign shall be used
- 2019 • Note 3: revise to clarify "stopping" sight distance should be provided and editorial revisions
- 2020 • Note 4: editorial revisions

2021
2022 **Notes for Figure 6P-44 —Typical Application 44**
2023 **Work in the Vicinity of an Entrance Ramp**

2024 *Guidance:*

- 2025 1. *An acceleration lane of sufficient length should be provided whenever possible as shown*
2026 *on the diagram on the left.*

2027 **Standard:**

- 2028 2. **For the information shown on the diagram on the right-hand side of the typical**
2029 **application, where inadequate acceleration distance exists for the temporary**
2030 **entrance, a STOP sign shall be installed. the YIELD sign shall be replaced with**
2031 **STOP signs (one on each side of the approach). [revise per 16B-TTC-06]**

2032 *Guidance:*

- 2033 3. *When used, the YIELD or STOP sign should be located so that ramp vehicular traffic has*
2034 *adequate stopping sight distance of oncoming mainline vehicular traffic to select an*
2035 *acceptable gap in the mainline vehicular traffic flow, but should not be located so far*
2036 *forward that motorists will be encouraged to stop in the path of the mainline traffic. Also,*
2037 *a longer acceleration lane should be provided beyond the sign to reduce the gap size*
2038 *needed. If sufficient insufficient gaps are not available, consideration should be given to*
2039 *closing the ramp. [revise per 16B-TTC-06 and 20B-TTC-01]*

- 2040 4. *Where a STOP sign is signs are used, a temporary stop line should be placed across the*
2041 *ramp at the desired stop location. [revise per 16B-TTC-06]*
- 2042 5. *The mainline merging taper with the arrow board at its starting point should be located*
2043 *sufficiently in advance so that the arrow board is not confusing to drivers on the entrance*
2044 *ramp, and so that the mainline merging vehicular traffic from the lane closure has the*
2045 *opportunity to stabilize before encountering the vehicular traffic merging from the ramp.*
- 2046 6. *If the ramp curves sharply to the right, warning signs with advisory speeds located in*
2047 *advance of the entrance terminal should be placed in pairs (one on each side of the*
2048 *ramp).*

2049 **Option:**

- 2050 7. Positive protection devices may be used per Section 6M.02.
- 2051 8. A Stop Beacon (see Section 4S.05) or a Type B high-intensity warning flasher with a red
2052 lens may be placed above the STOP sign.
- 2053 9. Where the acceleration distance is significantly reduced, a supplemental plaque may be
2054 placed below the Yield Ahead sign reading NO MERGE AREA.

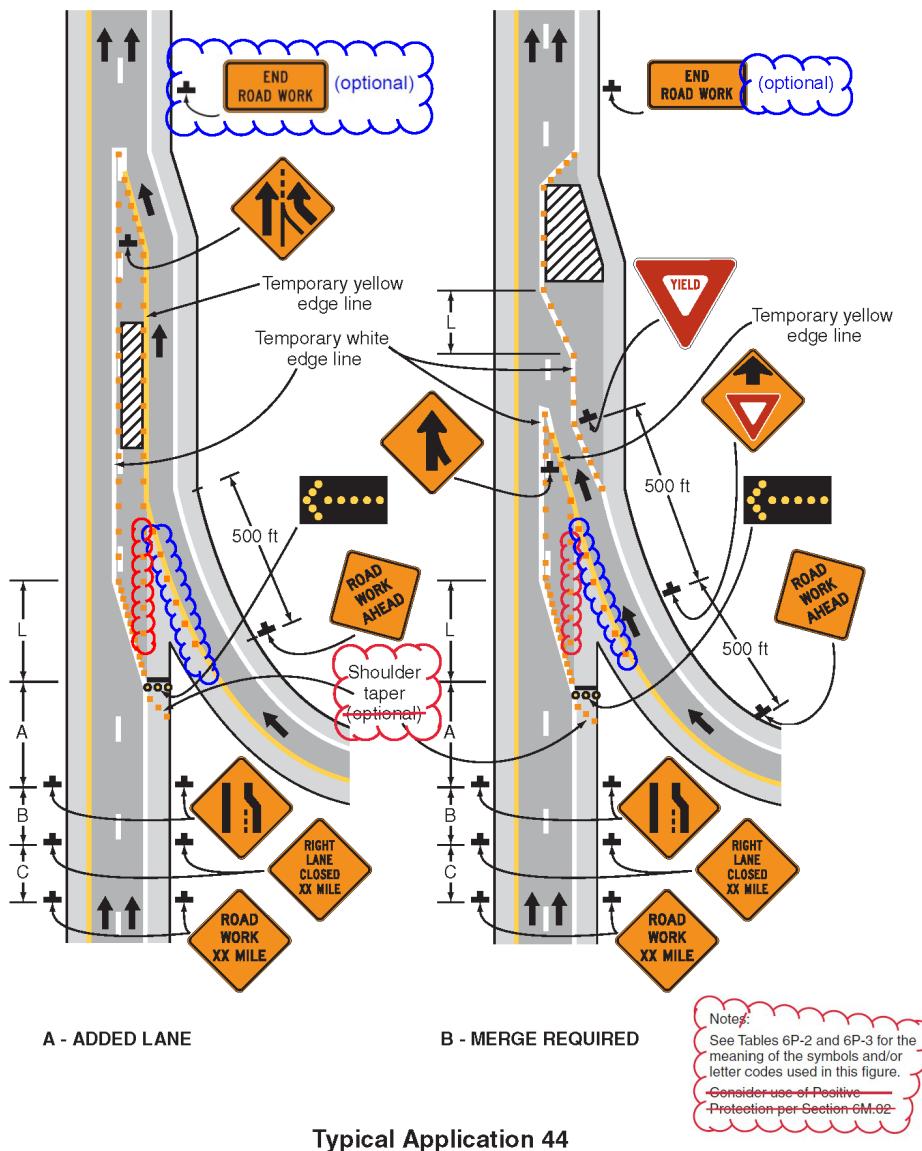
2055 **Standard:**

- 2056 10. **An arrow board shall be used when a freeway lane is closed. When more than one**
2057 **freeway lane is closed, a separate arrow board shall be used for each closed lane.**

2058
2059 **Figure 6P-44 Comments:** NCUTCD generally agrees with Figure 6P-44 as presented in the
2060 NPA, but recommends revising in accordance with NCUTCD recommendation 20B-TTC-03 as
2061 follows:

- Add devices on edge lines
- Add END ROAD WORK sign to left example
- Add “optional” to END ROAD WORK signs
- Delete “optional” from shoulder taper callout
- Delete a new positive protection note in the typical application figure since it is redundant
2062 with a note added to the notes page

2063
2064
2065
2066
2067 **Figure 6P-44. Work in the Vicinity of an Entrance Ramp (TA-44)**



2068
2069

2070 **Notes for Figure 6P-45 Comments:** NCUTCD agrees with Notes for Figure 6P-45 as presented
2071 in the NPA.

2072

2073 **Notes for Figure 6P-45 — Typical Application 45**

2074 **Temporary Reversible Lane Using Movable Barriers**

2075 Support:

2076 1. This application addresses one of several uses for movable barriers (see Section 6M.02)
2077 in highway work zones. In this example, one side of a 6-lane divided highway is closed
2078 to perform the work operation, and vehicular traffic is carried in both directions on the
2079 remaining 3-lane roadway by means of a median crossover.

2080 To accommodate unbalanced peak-period vehicular traffic volumes, the direction of
2081 travel in the center lane is switched to the direction having the greater volume, with the
2082 transfer typically being made twice daily. Thus, there are four vehicular traffic phases
2083 described as follows:

- 2084 a. Phase A—two travel lanes northbound and one lane southbound;
2085 b. Transition A to B—one travel lane in each direction;
2086 c. Phase B—one travel lane northbound and two lanes southbound; and
2087 d. Transition B to A—one travel lane in each direction.

2088 The typical application on the left illustrates the placement of devices during Phase A.

2089 The typical application on the right shows conditions during the transition (Transition A
2090 to B) from Phase A to Phase B.

2091 *Guidance:*

2092 2. *For the reversible-lane situation depicted, the ends of the movable barrier should
2093 terminate in a protected area or a crash cushion should be provided. During Phase A,
2094 the transfer vehicle should be parked behind the downstream end of the movable barrier
2095 for southbound traffic as shown in the typical application on the left. During Phase B,
2096 the transfer vehicle should be parked behind between the downstream ends of the
2097 movable barriers at the north end of the TTC zone as shown in the typical application on
2098 the right.*

2099 *The transition shift from Phase A to B should be as follows:*

- 2100 a. *Change the signs in the northbound advance warning area and transition area from a
2101 LEFT LANE CLOSED AHEAD to a 2 LEFT LANES CLOSED AHEAD. Change the
2102 mode of the second northbound arrow board from Caution to Right Arrow.*
- 2103 b. *Place channelizing devices to close the northbound center lane.*
- 2104 c. *Move the transfer vehicle from south to north to shift the movable barrier from the
2105 west side to the east side of the reversible lane.*
- 2106 d. *Remove the channelizing devices closing the southbound center lane.*
- 2107 e. *Change the signs in the southbound transition area and advance warning area from a
2108 2 LEFT LANES CLOSED AHEAD to a LEFT LANE CLOSED AHEAD. Change the
2109 mode of the second southbound arrow board from Right Arrow to Caution.*
- 2110 3. *Where the lane to be opened and closed is an exterior lane (adjacent to the edge of the
2111 traveled way or the work space), the lane closure should begin by closing the lane with
2112 channelizing devices placed along a merging taper using the same information employed
2113 for a stationary lane closure. The lane closure should then be extended with the
2114 movable-barrier transfer vehicle moving with vehicular traffic. When opening the lane,*

2115 *the transfer vehicle should travel against vehicular traffic. The merging taper should be*
2116 *removed in a method similar to a stationary lane closure.*

2117 Option:

- 2118 4. The procedure may be used during a peak period of vehicular traffic and then changed to
2119 provide two lanes in the other direction for the other peak.
- 2120 5. A longitudinal buffer space may be used in the activity area to separate opposing
2121 vehicular traffic.
- 2122 6. A work vehicle or a shadow vehicle may be equipped with a truck-mounted attenuator.

2123 Standard:

- 2124 7. **An arrow board shall be used when a freeway lane is closed. When more than one**
2125 **freeway lane is closed, a separate arrow board shall be used for each closed lane.**

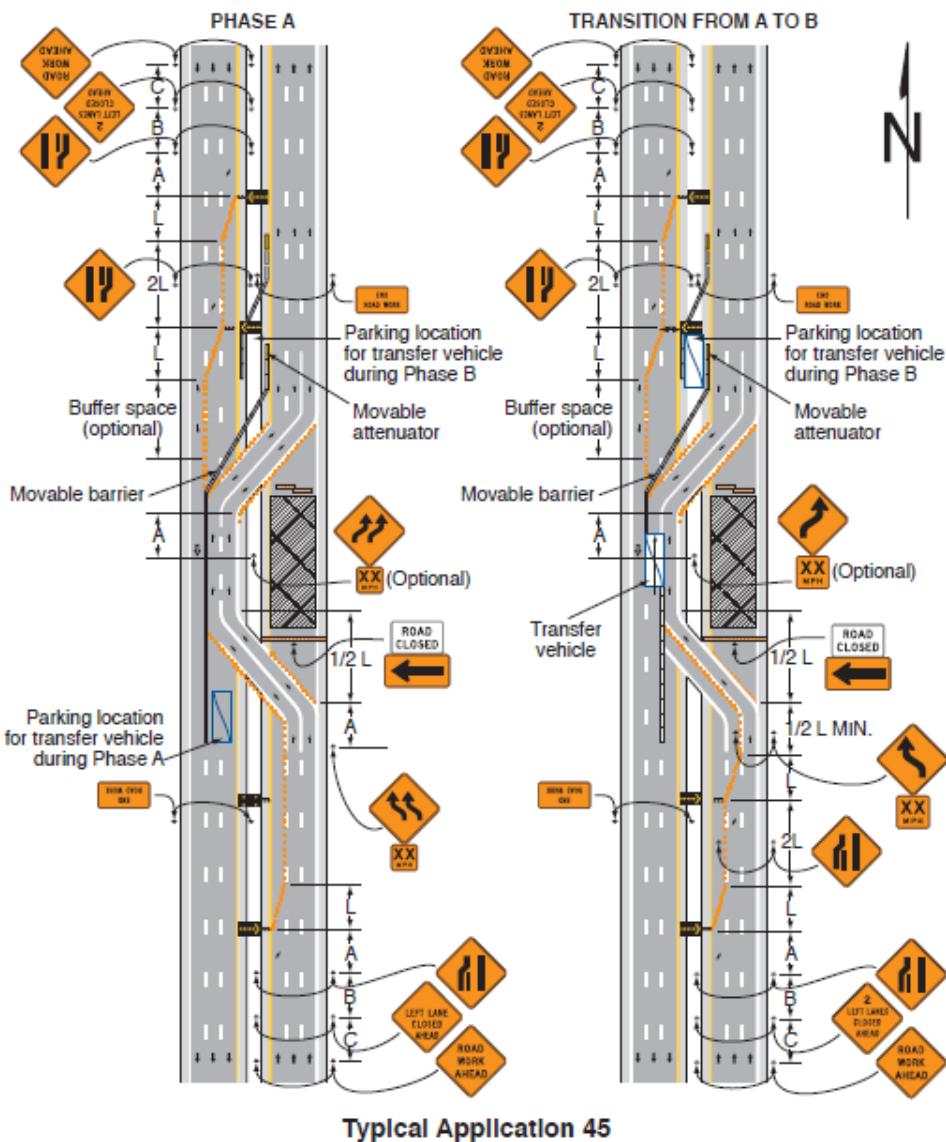
2128 **Figure 6P-45 Comments:** NCUTCD agrees with Figure 6P-45 as presented in the NPA.

2129

2130

2131

Figure 6P-45. Temporary Reversible Lane Using Movable Barriers (TA-45)



Note: See Tables 6P-2 and 6P-3 for the meaning of the symbols and/or letter codes used in this figure.
Although leader lines point to the signs on the right-hand side of the roadway, most of these signs should be installed on both sides of the roadway.

2132

2133 **Notes for Figure 6P-46 Comments:** NCUTCD agrees with Notes for Figure 6P-46 as presented
2134 in the NPA.

2135

2136 **Notes for Figure 6P-46 —Typical Application 46**

2137 **Work in the Vicinity of a Grade Crossing**

2138 *Guidance:*

- 2139 1. *When grade crossings exist either within or in the vicinity of roadway work activities,*
2140 *extra care should be taken to minimize the probability of conditions being created, by*
2141 *lane restrictions, flagging, or other operations, where vehicles might be stopped within*
2142 *the grade crossing, considered as being 15 feet on either side of the closest and farthest*
2143 *rail.*

2144 **Standard:**

- 2145 2. **If the queuing of vehicles across active rail tracks cannot be avoided, a uniformed**
2146 **law enforcement officer or flagger shall be provided at the grade crossing to prevent**
2147 **vehicles from stopping within the grade crossing (as described in Note 1), even if**
2148 **automatic warning devices are in place.**

2149 *Guidance:*

- 2150 3. *Early coordination with the railroad company or light rail transit agency should occur*
2151 *before work starts.*
- 2152 4. *In the example depicted, the buffer space of the activity area should be extended*
2153 *upstream of the grade crossing (as shown) so that a queue created by the flagging*
2154 *operation will not extend across the grade crossing.*
- 2155 5. *The DO NOT STOP ON TRACKS sign should be used on all approaches to a grade*
2156 *crossing within the limits of a TTC zone.*

2157 **Option:**

- 2158 6. Positive protection devices may be used per Section 6M.02.
- 2159 7. Flashing warning lights and/or flags may be used to call attention to the advance warning
2160 signs.
- 2161 8. A BE PREPARED TO STOP sign may be added to the sign series.

2162 *Guidance:*

- 2163 9. *When used, the BE PREPARED TO STOP sign should be located before the Flagger*
2164 *symbol sign.*

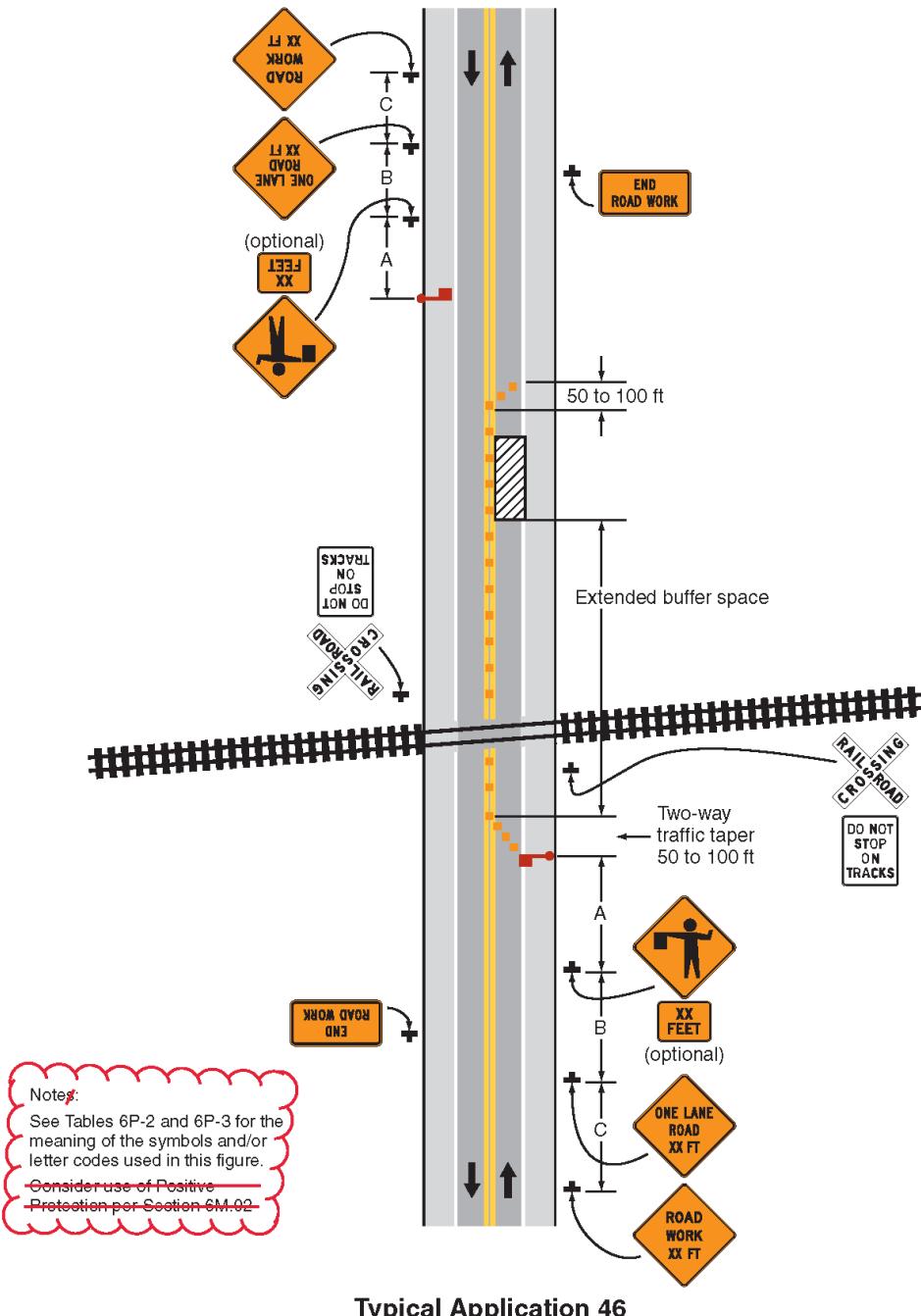
2165 **Standard:**

- 2166 10. **At night, flagger stations shall be illuminated, except in emergencies.**

2169 **Figure 6P-46 Comments:** NCUTCD generally agrees with Figure 6P-46 as presented in the
2170 NPA, but recommends deleting a new positive protection note in the typical application figure
2171 since it is redundant with a note added to the notes page.

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2174
2175

Figure 6P-46. Work in the Vicinity of a Grade Crossing (TA-46)



Typical Application 46

2176

2177 **Notes for Figure 6P-47 Comments:** NCUTCD generally agrees with Notes for Figure 6P-47 as
2178 presented in the NPA, but recommends revising as follows: [redacted]

- 2179 • Notes 2 and 3: revise the 17 feet for lane widths to 14 feet in accordance with NCUTCD
2180 recommendation 13A-BIK-01, as it is generally uncommon to have a 17 foot wide lane
2181 adjacent to a bicycle lane, and if retained, the option would nearly always default to the less
2182 than 17 feet alternative [redacted]
- 2183 • Note 3: edit the name of the two signs to conform to Chapter 2C

2184

2185 **Notes for Figure 6P-47—Typical Application 47**
2186 **Bicycle Lane Closure without Detour**

2187 *Guidance:*

- 2188 1. If a bicycle lane on a roadway having a speed limit of 35 mph or higher is closed and
2189 conditions are not appropriate to direct bicyclists into a shared lane, a separate bicycle
2190 facility or detour route should be considered. Refer to Figure 6P-48 or Figure 6P-51.

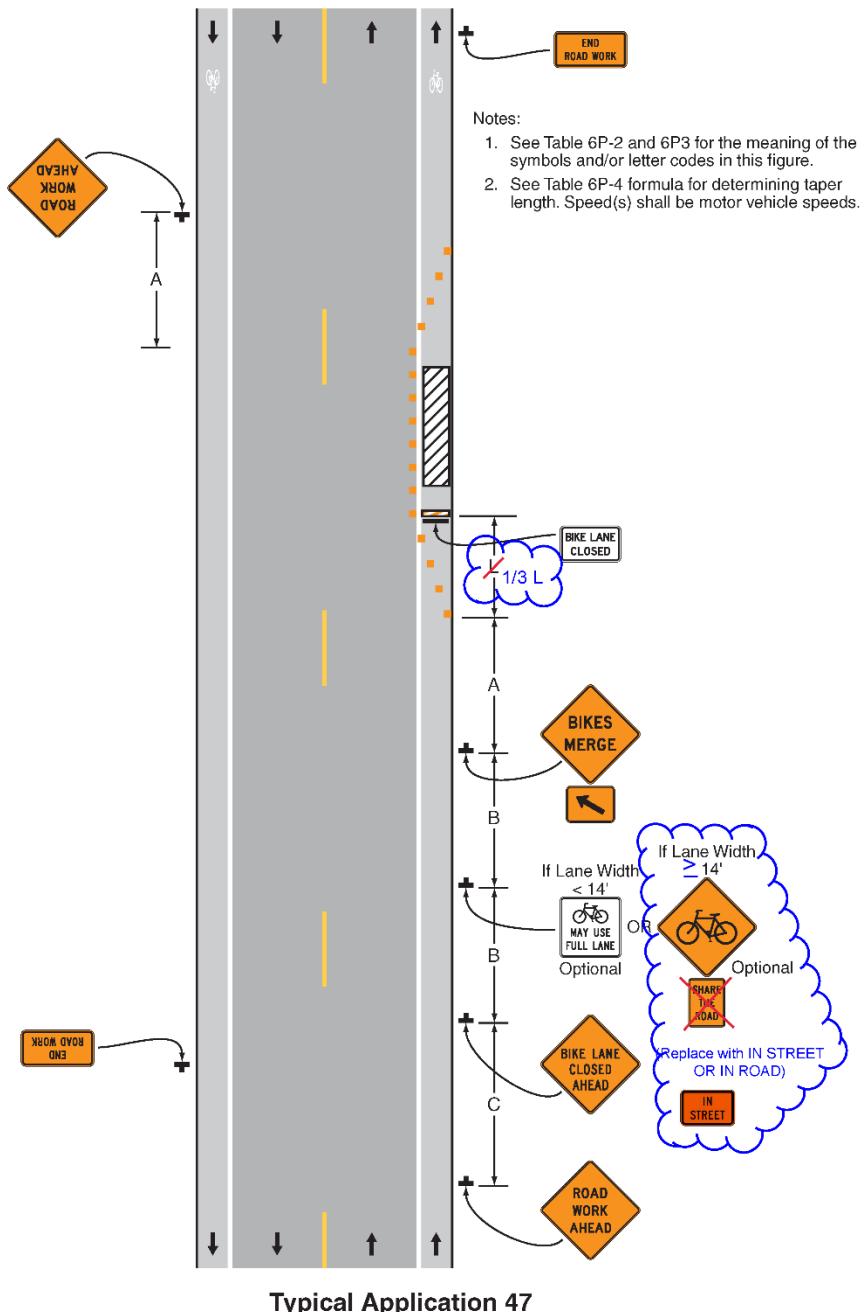
2191 *Option:*

- 2192 2. If a bicycle lane on a roadway having a speed limit of 30 mph or less is closed, and the
2193 adjacent travel lane is less than 17 14 feet wide, then BICYCLES MAY USE FULL
2194 LANE signs may be used. [edit width]
- 2195 3. If a bicycle lane on a roadway having a speed limit of 30 mph or less is closed, and the
2196 adjacent travel lane is at least 17 14 feet wide throughout the TTC zone, then Bicycle
2197 Warning signs in association with ON IN STREET or ON IN ROADWAY plaques may
2198 be used. [edit width and name of sign]

2200 **Figure 6P-47 Comments:** NCUTCD generally agrees with Figure 6P-47 as presented in the
2201 NPA, but recommends revising as follows:
2202

- Edit the taper length to 1/3 L instead of L for consistency with Chapter 6B
- Change the plaque to IN ROAD or IN STREET for consistency with Chapter 2C and the notes for the figure

2205
2206 **Figure 6P-47. Bicycle Lane Closure without Detour (TA-47)**



2207

2208 **Notes for Figure 6P-48 Comments:** NCUTCD agrees with Notes for Figure 6P-48 as presented
2209 in the NPA.

2210

2211 **Notes for Figure 6P-48 –Typical Application 48**

2212 **Bicycle Lane Closure with On-Road Detour**

2213 **Guidance:**

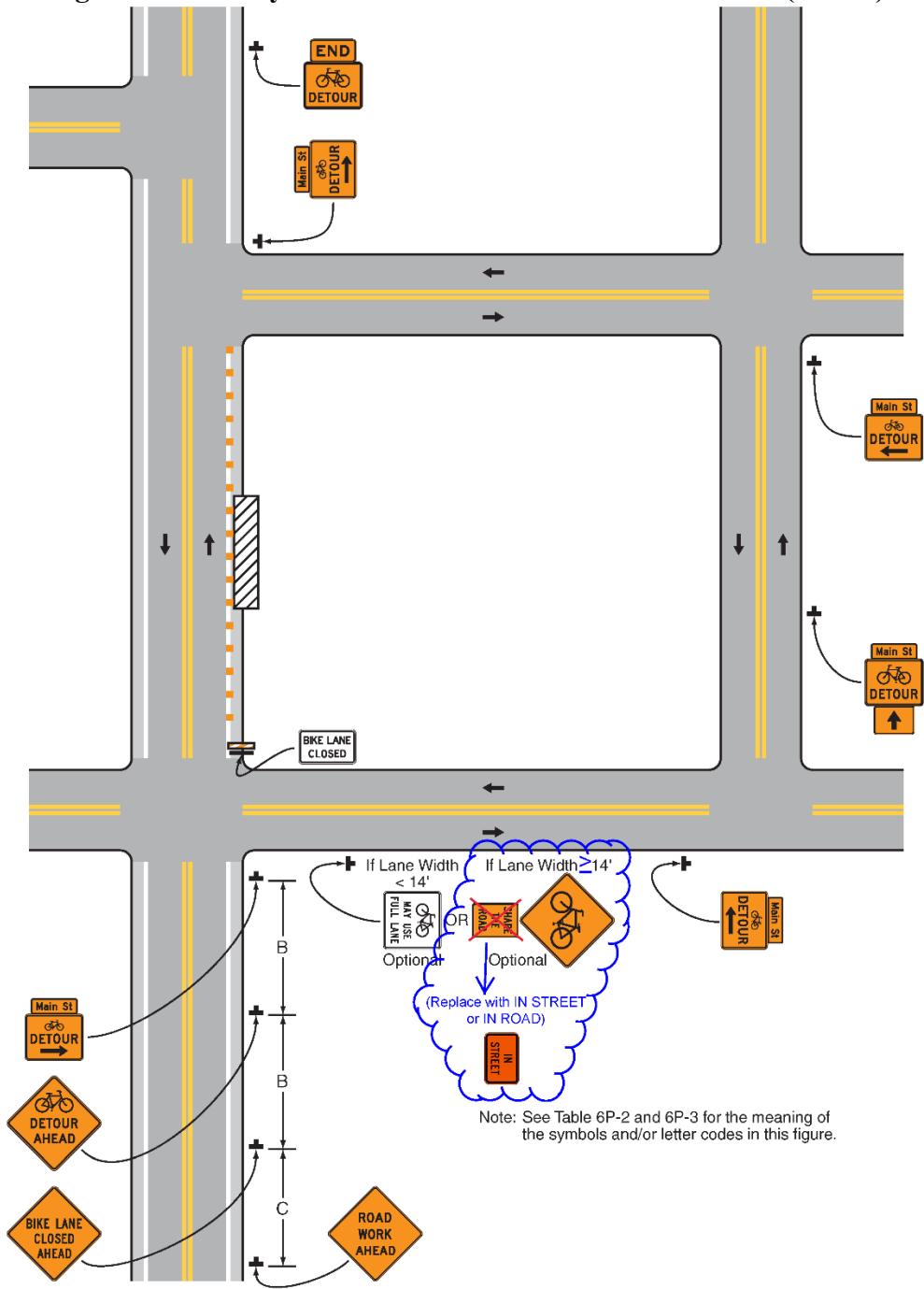
- 2214 1. *A detour route for bicycle traffic where a section of bicycle lane is closed should use the*
2215 *most direct route practical on roadways where conditions are appropriate for bicycling.*
- 2216 2. *Bicycle related regulatory and/or warning signs should be considered along the bicycle*
2217 *detour based on engineering judgment and traffic conditions.*
- 2218 3. *A Street Name sign or Bike Route Name sign should be mounted with the Bike Detour*
2219 *sign. The Street Name sign or Bike Route Name sign may be either white on green or*
2220 *black on orange.*

2221 **Standard:**

- 2222 4. **Where used, the Street Name sign or Bike Route Name sign shall be placed above**
2223 **the Bike Detour sign.**

2225
2226
2227
2228
2229 **Figure 6P-48 Comments:** NCUTCD generally agrees with Figure 6P-48 as presented in the
NPA, but recommends changing the plaque to IN ROAD or IN STREET for consistency with
Chapter 2C.

Figure 6P-48. Bicycle Lane Closure with on-Road Detour (TA-48)



2230

2231 **Notes for Figure 6P-49 Comments:** NCUTCD agrees with Notes for Figure 6P-49 as presented
2232 in the NPA.

2233

2234 **Notes for Figure 6P-49—Typical Application 49**

2235 **Shared-Use Path Closure with a Diversion**

2236

2237 *Guidance:*

- 2238 1. *The temporary paved shared-use path should be at least as wide as the shared-use path*
2239 *that was temporarily closed.*

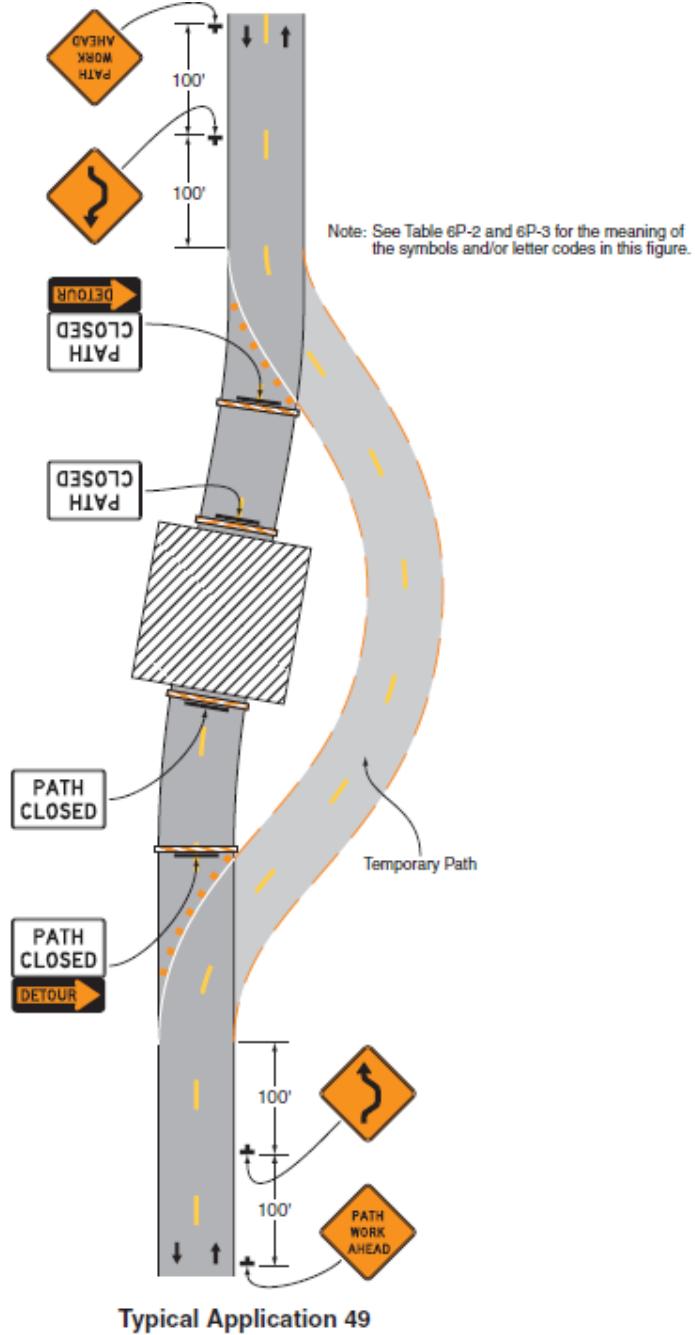
2240

2241

2242 **Figure 6P-49 Comments:** NCUTCD agrees with Figure 6P-49 as presented in the NPA.

2243
2244
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2246

Figure 6P-49. Shared-Use Path Closure with a Diversion (TA-49)



Typical Application 49

2247
2248

2249 **Notes for Figure 6P-50 Comments:** NCUTCD agrees with Notes for Figure 6P-50 as presented
2250 in the NPA.

2251

2252 **Notes for Figure 6P-50—Typical Application 50**

2253 **On-Road Detour for Shared-Use Path**

2254

2255 *Guidance:*

- 2256 *1. The on-road detour route for bicycle traffic should use the most direct route practical on*
2257 *roadways where conditions are appropriate for bicycling.*
- 2258 *2. Bicycle related regulatory and/or warning signs should be considered along the bicycle*
2259 *detour based on engineering judgment and traffic conditions.*
- 2260 *3. A Street Name sign or Bike Route Name sign should be mounted with the Bike Detour*
2261 *sign. The Street Name sign or Bike Route Name sign may be either white on green or*
2262 *black on orange.*

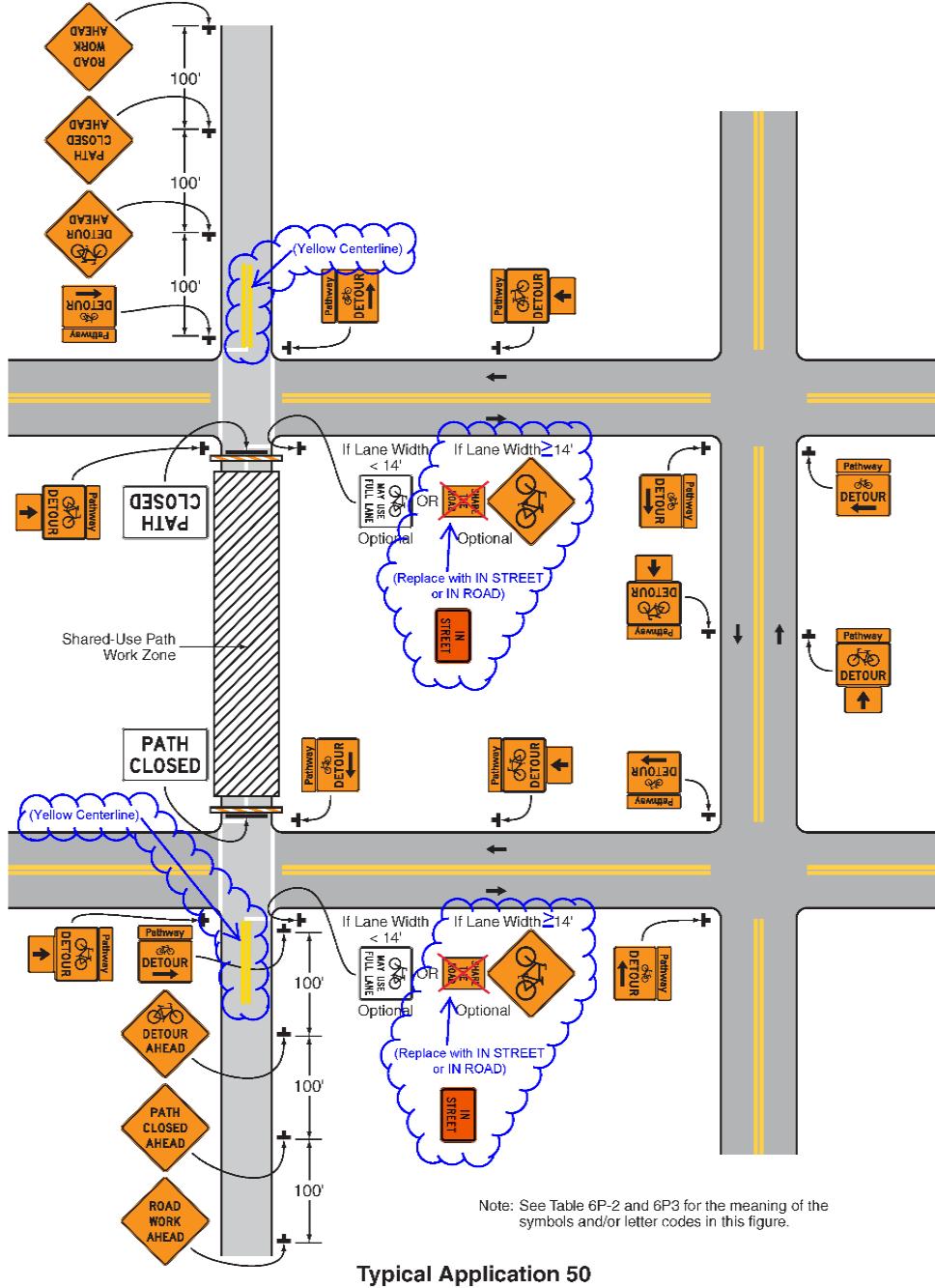
2263 **Standard:**

- 2264 **4. Where used the Street Name sign or Bike Route Name sign shall be placed above the**
2265 **Bike Detour sign.**

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2268
2269
2270
2271

Figure 6P-50 Comments: NCUTCD generally agrees with Figure 6P-50 as presented in the NPA, but recommends changing the plaque to IN ROAD or IN STREET for consistency with Chapter 2C.

Figure 6P-50. On-Road Detour for Shared-Use Path (TA-50)



2272

2273 **Notes for Figure 6P-51 Comments:** NCUTCD agrees with Notes for Figure 6P-51 as presented
2274 in the NPA.

2275

2276 **Notes for Figure 6P-51—Typical Application 51**
2277 **Paved Shoulder Closure with Bicycle Diversion onto Temporary Path**

2278

2279 **Option:**

- 2280 1. This plan may be used where a paved shoulder is closed and a temporary paved path is
2281 provided for bicyclists.

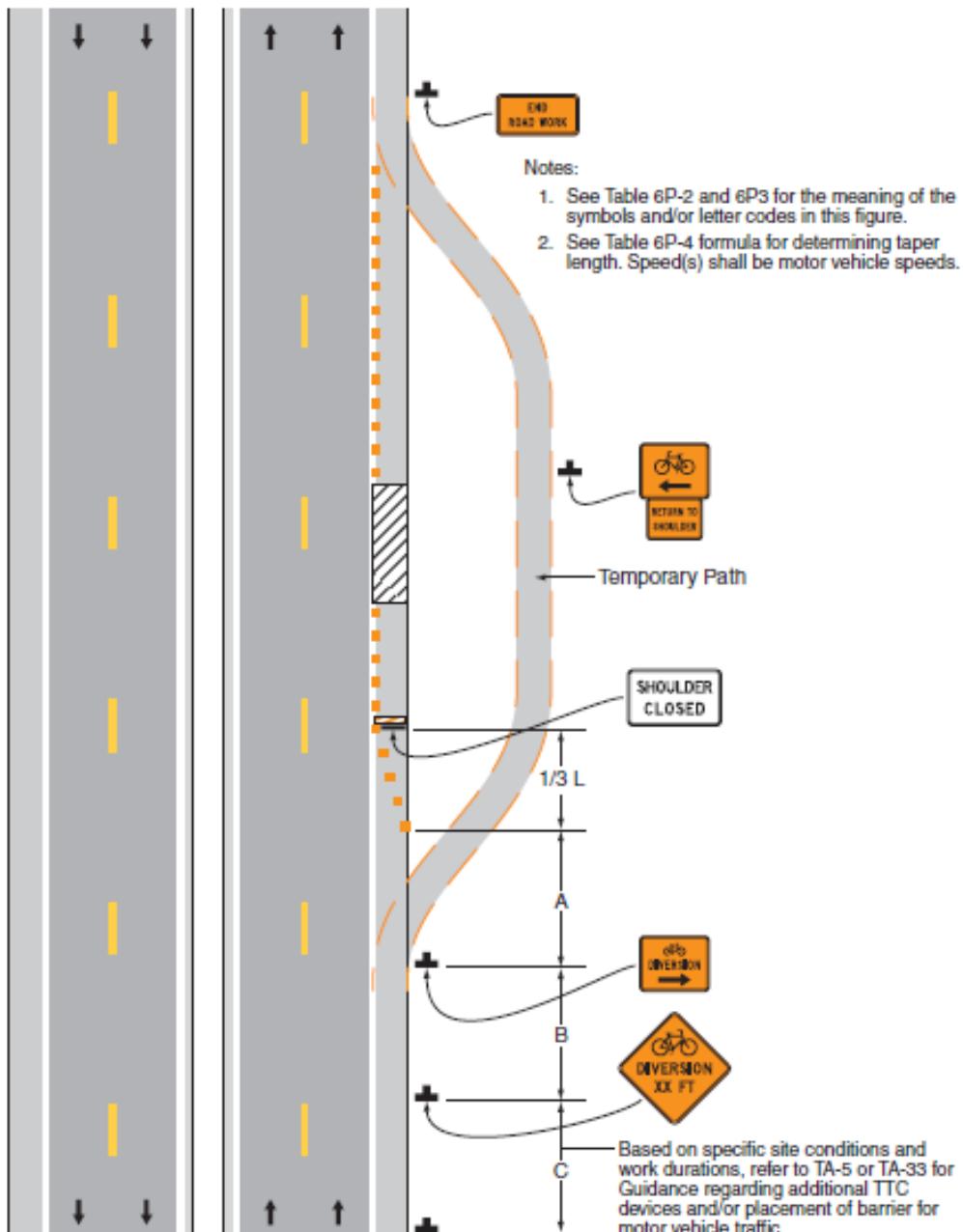
2282 **Guidance:**

- 2283 2. This plan should be used where a paved shoulder is closed on a roadway having a speed
2284 limit greater than or equal to 45 mph that is part of a bikeway system (local, county or
2285 state) and a temporary paved path is provided for bicyclists.
- 2286 3. The A, B, C dimensions should be based on anticipated bicycle speeds.

2290 **Figure 6P-51 Comments:** NCUTCD agrees with Figure 6P-51 as presented in the NPA.

2291

2292 **Figure 6P-51. Paved Shoulder Closure with Bicycle Diversion onto Temporary Path (TA-51)**



Typical Application 51

2293

2294 **Notes for Figure 6P-52 Comments:** NCUTCD generally agrees with Notes for Figure 6P-52 as
2295 presented in the NPA, but recommends renumbering the typical application to 6P-27a and []
2296 placing it between TA-27—Closure at the Side of an Intersection and TA-28—Sidewalk Detour
2297 or Diversion, since this typical application is intersection related. []

2298

2299 **Notes for Figure 6P-~~52~~ 27a – Typical Application ~~52~~ 27a**
2300 **Short-Term or Short Duration Work in a Roundabout**
2301 [recommend renumbering to group with intersection TAs]

2302

2303 **Option:**

- 2304 1. Flashing warning lights and/or flags may be used to call attention to the advance warning
2305 signs. A BE PREPARED TO STOP sign may be added to the sign series.
2306 2. If closure continues overnight, warning lights may be used on the channelizing devices.

2307 **Standard:**

- 2308 3. Where a quadrant of the roundabout is closed as shown in Figure 6P-47, only one
2309 direction of approach traffic shall be released at a time.
2310 4. At night, flagger stations shall be illuminated, except in emergencies.
2311 5. WRONG WAY signs shall be covered.

2312 **Guidance:**

- 2313 6. When used, the BE PREPARED TO STOP sign should be located between the Flagger
2314 sign and the ONE LANE ROAD sign.
2315 7. YIELD, ONE WAY, and Directional arrow signs should be covered or removed.
2316 8. Confusing or misleading guide or lane-use control signs should be covered.

2317 **Option:**

- 2318 9. Crosswalks may be closed.
2319 10. As an alternative to closing crosswalks, warning signs may be added informing
2320 pedestrians that there is traffic coming from the left.

2321 **Guidance:**

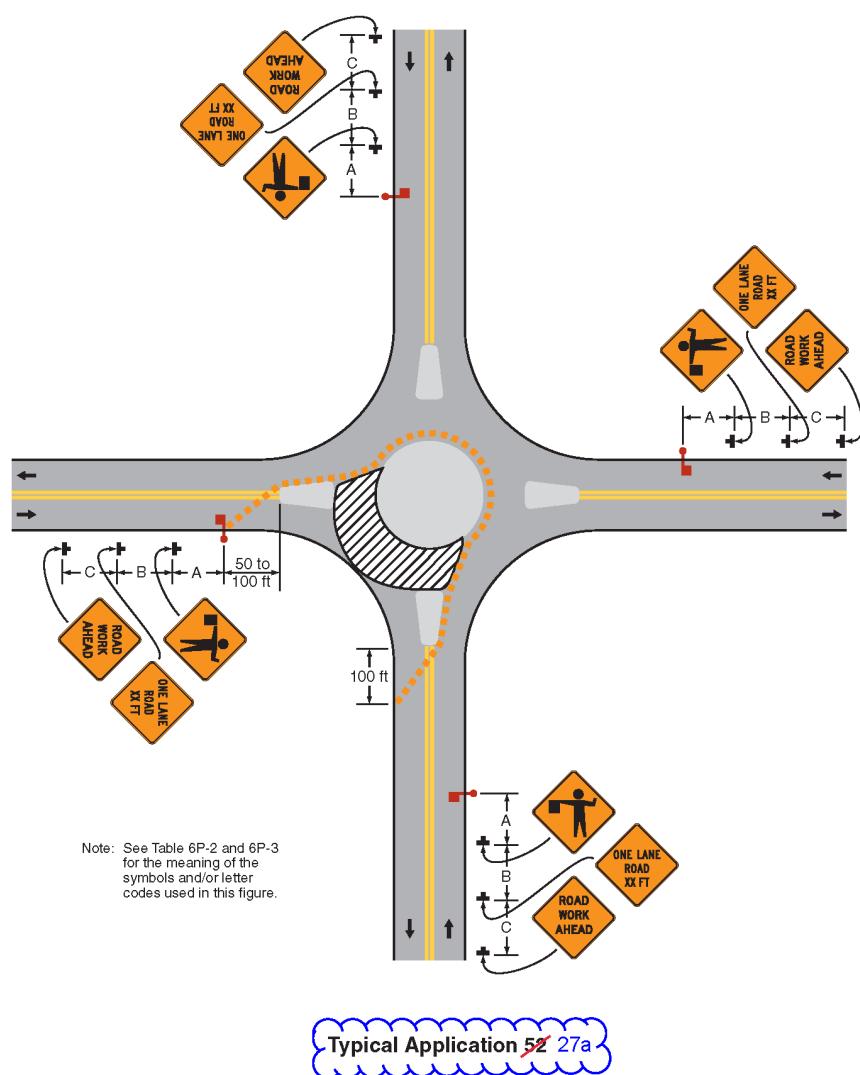
- 2322 11. Since the geometrics of the roundabout will be temporarily altered, consideration should
2323 be given to establishing a truck detour for the duration of the project.
2324 12. For intermediate or long-term work, the roundabout should be closed and traffic
2325 detoured, with appropriate detour signing provided.

2327 **Figure 6P-52 Comments:** NCUTCD generally agrees with Figure 6P-52 as presented in the
2328 NPA, but recommends revising as follows:
2329

- 2330 • Renumber the typical application to 6P-27a and place it between TA-27—Closure at the Side
2331 of an Intersection and TA-28—Sidewalk Detour or Diversion, since the typical application is
2332 intersection related.
- 2333 • Add a hyphen between “short” and “term” and replace “Circular Intersection” with
2334 “Roundabout” in the figure title for consistency with the notes.

2335 **Figure 6P-~~52~~ 27a. Short-Term or Short Duration Work in a ~~Circular Intersection~~
2336 ~~Roundabout~~ (TA-~~52~~ 27a)**

2337 [recommend renumbering to group with intersection TAs]



2339

2340 **Notes for Figure 6P-53 Comments:** NCUTCD generally agrees with Notes for Figure 6P-53 as
2341 presented in the NPA, but recommends renumbering the typical application to 6P-27b and
2342 placing it between TA-27—Closure at the Side of an Intersection and TA-28—Sidewalk Detour
2343 or Diversion, since this typical application is intersection related.

2344

2345 **Notes for Figure 6P-~~53~~ 27b—Typical Application ~~53~~ 27b**
2346 **Flagging Operation on a Single-Lane Roundabout**
2347 [recommend renumbering to group with intersection TAs]

2348 **Standard:**

- 2349 **1. Flaggers shall follow the procedures provided in Sections 6D.05 and 6D.06.**
- 2350 **2. When crosswalks or other pedestrian facilities are closed or relocated, temporary**
2351 **facilities shall be detectable and shall include accessibility features consistent with**
2352 **the features present in the existing pedestrian facility. See Figure 6P-29, Crosswalk**
2353 **Closures and Pedestrian Detours (TA-29).**
- 2354 **3. At night, flagger stations shall be illuminated, except in emergencies.**

2355 **Guidance:**

- 2356 **4. Flaggers on each approach to the intersection should coordinate with each other so that**
2357 **traffic may proceed through the roundabout from only one entry point at any one time.**
- 2358 **5. When designing the temporary traffic control and installing the channelizing devices for**
2359 **work activities at roundabouts, accommodations for the turning radius of wider heavy**
2360 **commercial vehicles should be considered.**
- 2361 **6. Since the geometrics of the roundabout will temporarily be altered, consideration should**
2362 **be given to establishing a truck detour for the duration of the project.**
- 2363 **7. For intermediate or long-term work, the roundabout should be closed if traffic cannot be**
2364 **accommodated, and traffic detoured with appropriate detour signing provided. See**
2365 **Figure 6P-8, Road Closure with an Off-Site Detour (TA-8).**
- 2366 **8. Conflicting pavement markings should be removed for long-term projects. For short-term**
2367 **and intermediate-term projects where this is not practical, the channelizing devices in the**
2368 **area where the pavement markings conflict should be placed at a maximum spacing of**
2369 **1/2 S feet where S is the speed in mph. Temporary markings should be installed where**
2370 **needed.**
- 2371 **9. When used, the BE PREPARED TO STOP sign should be located between the 96 Flagger**
2372 **sign and the ONE LANE ROAD sign.**
- 2373 **10. The buffer space should be extended so that the two-way traffic taper is placed before a**
2374 **98 horizontal (or crest vertical) curve to provide adequate sight distance for the flagger**
2375 **99 and a queue of stopped vehicles.**
- 2376 **11. Care should be exercised when establishing the limits of the work zone to ensure**
2377 **adequate sight distance in advance of the transition.**

2378 **Option:**

- 2379 **12. Periodic adjustments to the channelizing devices may be allowed in an active work zone**
2380 **to accommodate the turning movements of tractor trailer vehicles and other large**
2381 **vehicles.**
- 2382 **13. On the approaches where traffic flow will be split, two pilot vehicles may be used to**
2383 **guide traffic through the roundabout.**

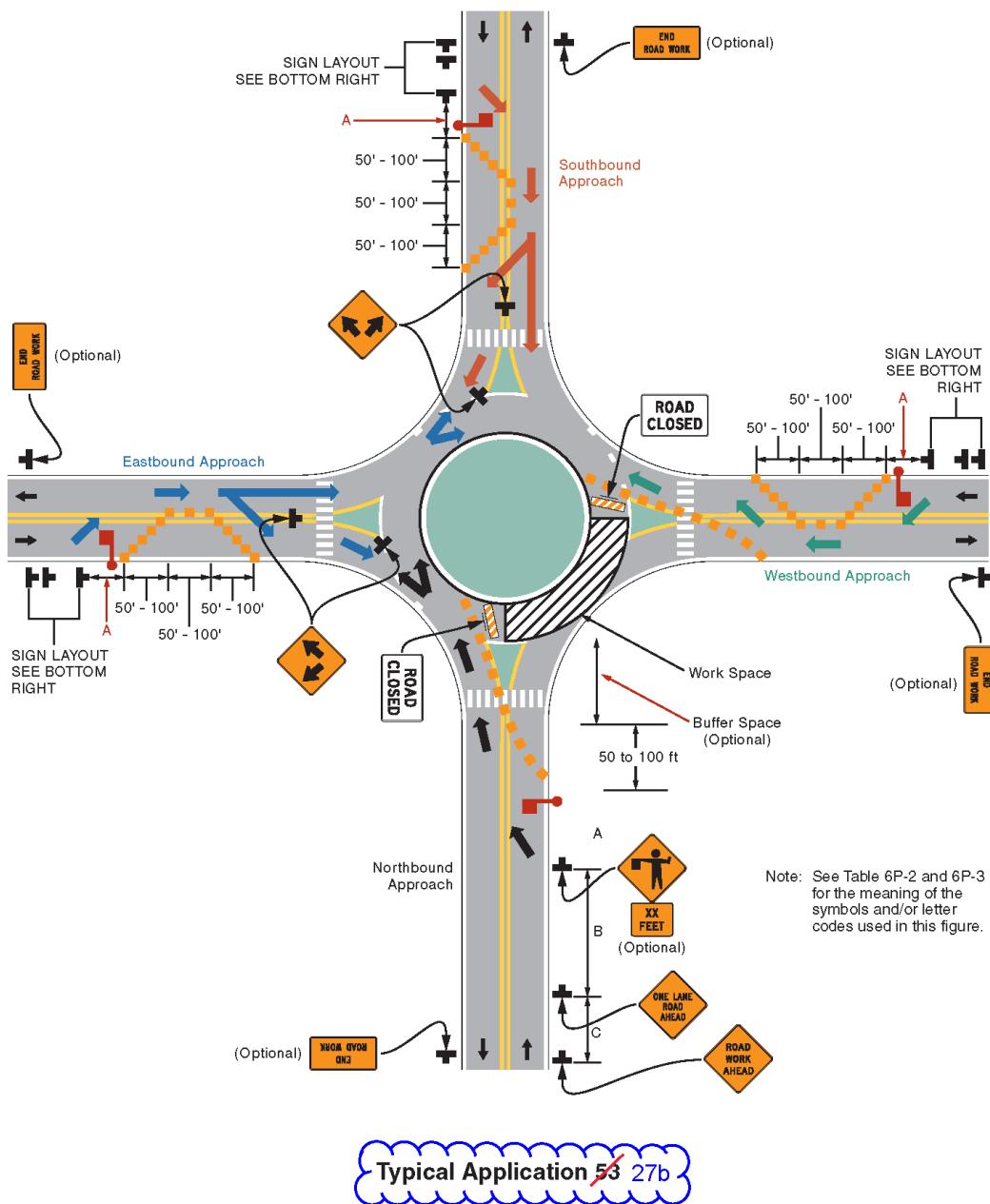
2386 **Figure 6P-53 Comments:** NCUTCD generally agrees with Figure 6P-53 as presented in the
2387 NPA, but recommends renumbering the typical application to 6P-27b and placing it between TA-
2388 27—Closure at the Side of an Intersection and TA-28—Sidewalk Detour or Diversion, since this
2389 typical application is intersection related.

2390

2391 **Figure 6P-53 27b. Flagging Operation on a Single-Lane Roundabout (TA-53 27b)**
2392 [recommend renumbering to group with intersection TAs]

2393

2394



2395

2396 **Notes for Figure 6P-54 Comments:** NCUTCD generally agrees with Notes for Figure 6P-54 as
2397 presented in the NPA, but recommends renumbering the typical application to 6P-27c and []
2398 placing it between TA-27—Closure at the Side of an Intersection and TA-28—Sidewalk Detour
2399 or Diversion, since this typical application is intersection related.

2400

2401 **Notes for Figure 6P-~~54~~ 27c -- Typical Application ~~54~~ 27c**
2402 **Inside Lane Closure on a Multi-Lane Roundabout**
2403 [recommend renumbering to group with intersection TAs]

2404

2405 **Standard:**

- 2406 1. **When crosswalks or other pedestrian facilities are closed or relocated, temporary**
2407 **facilities shall be detectable and shall include accessibility features consistent with**
2408 **the features present in the existing pedestrian facility. See Figure 6P-29. Crosswalk**
2409 **Closures and Pedestrian Detours (TA-29).**

2410 **Guidance:**

- 2411 2. **Care should be exercised when establishing the limits of the work zone to sight distance**
2412 **in advance of the transition.**
- 2413 3. **When designing the temporary traffic control and installing the channelizing devices for**
2414 **work activities at roundabouts, accommodations for the turning radius of wider heavy**
2415 **commercial vehicles should be considered.**
- 2416 4. **Since the geometrics of the roundabout will temporarily be altered, consideration should**
2417 **be given to establishing a truck detour for the duration of the project.**
- 2418 5. **For intermediate or long-term work, the roundabout should be closed if traffic cannot be**
2419 **accommodated, and traffic detoured with appropriate detour signing provided. See**
2420 **Figure 6P-8, Road Closure with an Off-Site Detour (TA-8).**
- 2421 6. **Conflicting pavement markings should be removed for long-term projects. For short-term**
2422 **and intermediate-term projects where this is not practical, the channelizing devices in the**
2423 **area where the pavement markings conflict should be placed at a maximum spacing of**
2424 **1/2 S feet where S is the speed in mph. Temporary markings should be installed where**
2425 **needed.**

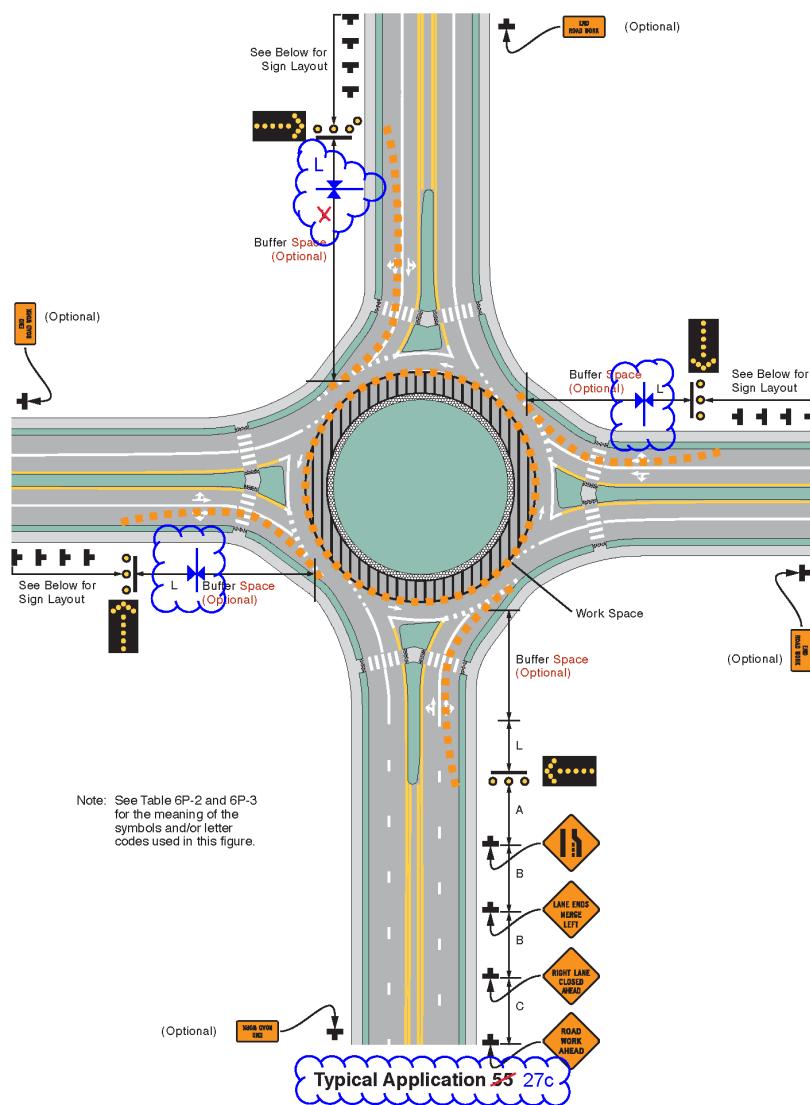
2426 **Option:**

- 2427 7. **A portable changeable message sign may be utilized as part of the temporary traffic**
2428 **control plan to provide clear guidance to motorist on all approaches of the roundabout.**
- 2429 8. **On a multi-lane approach, either lane may be closed.**

2431 **Figure 6P-54 Comment:** NCUTCD generally agrees with Figure 6P-54 as presented in the
2432 NPA, but recommends revising as follows:
2433

- Renumber the typical application to 6P-27c and place it between TA-27-Closure at the Side of an Intersection and TA-28-Sidewalk Detour or Diversion, since the typical application is intersection related
- Add missing dimension arrows

2438 **Figure 6P-54 27c. Inside Lane Closure on a Multi-Lane Roundabout (TA-54 27c)**
2439 [recommend renumbering for consistency]
2440



2441

2442 **Notes for Figure 6P-27d Comments:** NCUTCD recommends adding a new Typical
2443 Application 27d titled “Circulating Lane Closure in a Multi-Lane Roundabout” in accordance
2444 with NCUTCD recommendation 19B-TTC-01, and placing the new typical application between
2445 TA-27—Closure at the Side of an Intersection and TA-28—Sidewalk Detour or Diversion since
2446 the typical application is intersection related.

2447

2448 **Notes for Figure 6P-27d – Typical Application 27d**
2449 **Circulating Lane Closure in a Multi-Lane Roundabout**

2450

2451 **Standard:**

- 2452 1. **Detour routes shall be provided for affected roundabout approaches. See Figures**
2453 **6P-8, 6P-9, 6P-19, and 6P-20.**
- 2454 2. **When crosswalks or other pedestrian facilities are closed or relocated, temporary**
2455 **facilities shall be detectable and shall include accessibility features consistent with**
2456 **the features present in the existing pedestrian facility. See Figure 6P-29, Crosswalk**
2457 **Closures and Pedestrian Detours (TA-29).**

2458 **Guidance:**

- 2459 3. **When designing the temporary traffic control and installing the channelizing devices for**
2460 **work activities at roundabouts, accommodations for the turning radius of wider heavy**
2461 **commercial vehicles should be considered.**
- 2462 4. **Since the geometrics of the roundabout will temporarily be altered, consideration should**
2463 **be given to establishing a truck detour for the duration of the project.**
- 2464 5. **For intermediate or long term work, the roundabout should be closed if traffic cannot be**
2465 **accommodated, and traffic detoured with appropriate detour signing provided. See**
2466 **Figure 6P-8, Road Closure with an Off-Site Detour (TA-8).**
- 2467 6. **Conflicting signs and pavement markings should be removed for long-term projects. For**
2468 **short-term and intermediate-term projects where this is not practical, the channelizing**
2469 **devices in the area where the pavement markings conflict should be placed at a maximum**
2470 **spacing of 1/2 S feet where S is the speed in mph. Temporary markings should be**
2471 **installed where needed.**

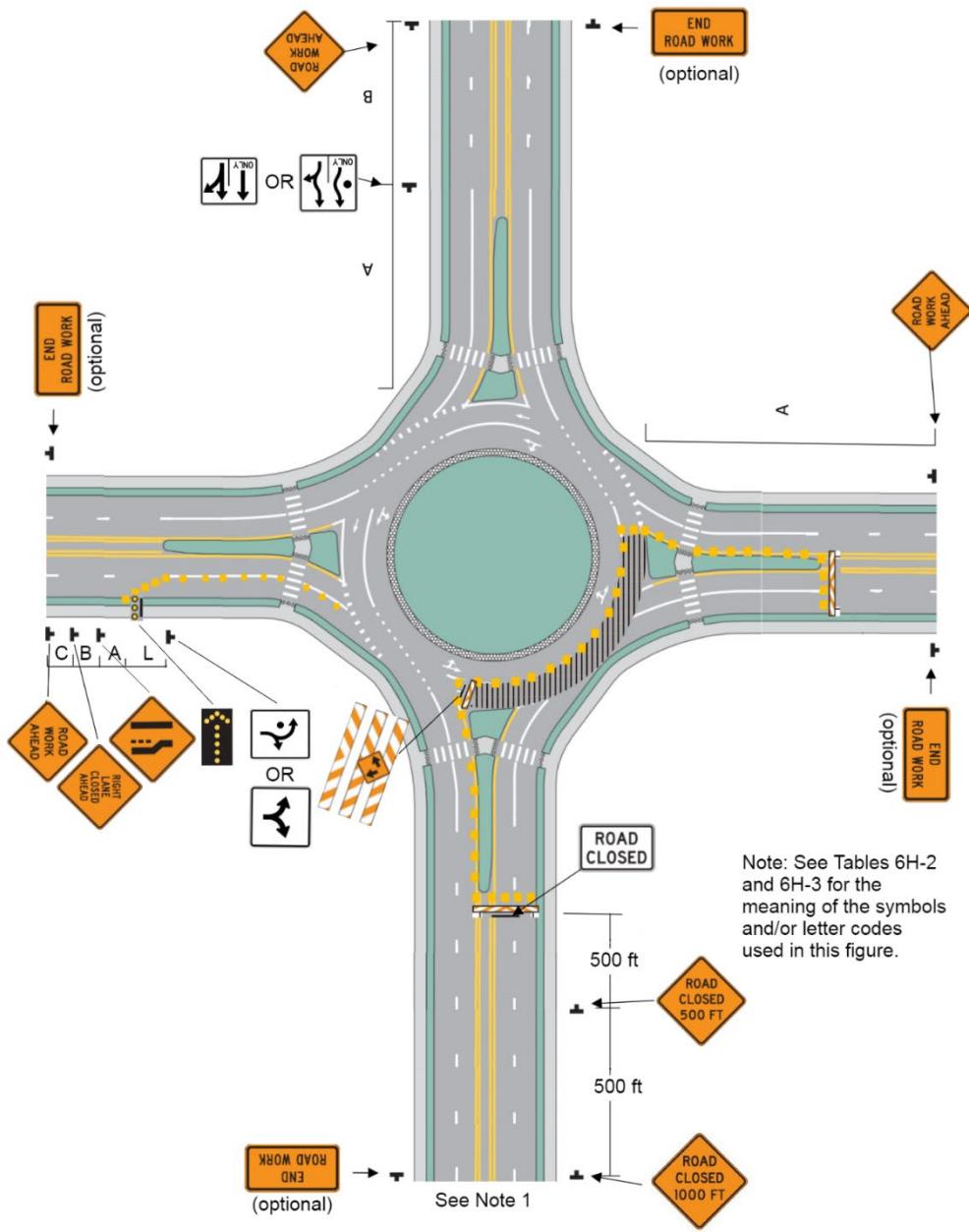
2472 **Option:**

- 2473 7. **Flashing warning lights and/or flags may be used to call attention to the advance warning**
2474 **signs.**
- 2475 8. **Portable changeable message signs may be utilized as part of the temporary traffic**
2476 **control plan to provide clear guidance to motorists on all approaches of the roundabout.**
- 2477 9. **Positive protection devices may be used per Section 6M.02.**

2478 **[add per 19B-TTC-01]**

2479
2480
2481
2482
2483
Figure 6P-27d Comments: NCUTCD recommends adding a new Typical Application 27d
2484 titled "Circulating Lane Closure in a Multi-Lane Roundabout" in accordance with NCUTCD
2485 recommendation 19B-TTC-01, and placing the new typical application between TA-27—Closure
at the Side of an Intersection and TA-28—Sidewalk Detour or Diversion since the typical
application is intersection related.

Figure 6P-27d. Circulating Lane Closure in a Multi-Lane Roundabout (TA-27d)



2486

[add per 19B-TTC-01]