



# National Committee on Uniform Traffic Control Devices

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Item No.: 20B-TTC-03

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

**TECHNICAL COMMITTEE:**

Temporary Traffic Control Technical Committee

**ITEM NUMBER:**

20B-TTC-03

**TOPIC:**

Shoulder Work

**ORIGIN OF REQUEST:**

Tim Baughman

**AFFECTED SECTIONS OF THE MUTCD:**

Sections 6C.08, 6G.05, 6G.06, 6G.07  
Table 6H-1  
Notes for Figure 6H-1  
Notes for Figure 6H-3, Figure 6H-3  
Notes for Figure 6H-4, Figure 6H-4  
Notes for Figure 6H-5, Figure 6H-5  
Notes for Figure 6H-6, Figure 6H-6  
Notes for Figure 6H-32, Figure 6H-32  
Notes for Figure 6H-33, Figure 6H-33  
Notes for Figure 6H-37  
Figure 6H-44

**TASK FORCE MEMBERS:**

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**DEVELOPMENT HISTORY:**

- Approved by Task Force: 06/17/2020
- Approved by Technical Committee: 06/17/2020
- Revisions from sponsor comments approved by Task Force: 01/05/2021
- Revisions from sponsor comments approved by Technical Committee: 01/13/2021
- Approved by NCUTCD Council: 01/20/2021

13            *This is a proposal for recommended changes to the MUTCD that has been approved by the*  
14            *NCUTCD Council. This proposal does not represent a revision of the MUTCD and does not*  
15            *constitute official MUTCD standards, guidance, or options. It will be submitted to FHWA for*  
16            *consideration for inclusion in a future MUTCD revision. The MUTCD can be revised only through*  
17            *the federal rulemaking process.*  
18

19    **SUMMARY:**

20    The proposed changes are for several sections and typical applications in Part 6 regarding shoulder work.  
21    Most concern clarifications and corrections to enhance consistency within Part 6. There are proposals to  
22    modify Typical Applications 1, 3, 4, 5, 6, 32, 33, 37 and 44. Additionally, some typographical errors in  
23    Part 6 are proposed to be corrected.  
24

25    **DISCUSSION**

26    Proposed revisions to Part 6 are described in order of appearance.  
27

28    *Section 6C.08*

29    There is typographical error in the first line of Section 6C.08, P10. “Activity” is spelled “a ctivity.” It is  
30    proposed that this be corrected.  
31

32    Three typical applications (TA-3, TA-32, and TA-33) contain a note that direct practitioners to use  
33    channelizing devices on shoulder closures when the paved shoulder is 8 feet or more. This condition  
34    should be applicable to all of the typical applications, not just three. The note could be added to TA-5,  
35    TA-6, TA-10, TA-11, TA-12, TA-34, TA-36, TA-37, TA-38, TA-39, TA-42, and TA-44. Rather than  
36    adding the note to each of those typical applications, it is proposed to add the note, as a new paragraph, to  
37    Section 6C.08 and to remove the note from the typical applications.  
38

39    *Section 6G.05*

40    The section addresses work affecting pedestrian and bicycle facilities. The shoulder work described in  
41    paragraph 06 seems out of place in this section and is better covered by Sections 6G.06, 6G.07, 6G.08,  
42    and the proposed P11a in Section 6C.08. The last sentence of Section 6G.05, P06 is relevant to work  
43    affecting pedestrian and bicycle facilities and is retained.  
44

45    *Section 6G.06*

46    The task force proposes adding the UTILITY WORK AHEAD and SURVEY CREW signs to P03 to  
47    coincide with proposed revisions to Typical Application 1.  
48

49    The task force also proposes moving P06 to immediately after P02.  
50

51    *Section 6G.07*

52    Section 6G.07, P01 conflicts with P09. P01 indicates that the section applies to “short-term through  
53    long-term stationary operations” while P09 refers to typical applications that include “mobile work on  
54    shoulders.” It is proposed that paragraph 01 be deleted to remove the conflict. However, deletion of P01  
55    implies that channelizing devices are applicable to short duration and mobile operations. An exception is  
56    made to the second sentence of P02 and P04.  
57

58    Then it is proposed that Section 6G.07, P04 be moved in front of Section 6G.07 and revised for  
59    consistency and clarity. Moving P04 to P01 introduces the idea of warning road users that a shoulder is

60 closed. Then P02 makes this a requirement where road users could perceive the paved shoulder as a lane  
61 open to traffic. P03 then warns users on freeways or expressways that there is no pull-off for disabled  
62 vehicles.

63  
64 In the paragraph moved from P04 to P01, it is recommended that “When an improved shoulder is closed  
65 on a high-speed roadway, it should be treated as a closure of a portion of the road system ...” This  
66 should apply to any road, regardless if the shoulder is improved or not. It is proposed to replace  
67 “improved” with “paved” and delete “high-speed.” The word “ample” in the second sentence is not  
68 needed.

69  
70 In the same paragraph, it is recommended that road users should be warned that the shoulder is closed  
71 “...throughout a specified length of the approaching TTC zone. The sign(s) should read *SHOULDER*  
72 *CLOSED (W21-5a) with distances indicated.*” Because this addressed extensively in Section 6G.07, P03  
73 and is redundant here, it is proposed that this guidance be deleted.

74  
75 In Section 6G.07, P03, it is proposed to replace “extends beyond the distance that can be perceived” with  
76 “cannot be seen” for human factors reasons.

77  
78 The last sentence of Section 6G.07, P03, recommends that “On multi-lane, divided highways, signs  
79 advising of shoulder work or the condition of the shoulder should be placed only on the side of the  
80 affected shoulder.” However, as suggested in the paragraph moved to P01, “When a shoulder is closed, it  
81 should be treated as a closure of a portion of the road system.” When working on freeways and  
82 expressways, it is common practice to install advance warning signs on both sides of the travelway as  
83 shown in Figures 6H-33, 6H-34, 6H-36, 6H-37, 6H-38, 6H-39, 6H-42, 6H-44, and 6H-45. It is proposed  
84 that this sentence be made a new paragraph and be modified to recommend signs on right and left sides  
85 of freeways or expressways.

86  
87 It is proposed that Section 6G.07, P09 be modified to include expressways.

88  
89 *Table 6H-1*  
90 It is proposed to modify the title of Typical Application 5 to include “or Expressways” and the title of  
91 Typical Application 32 to remove “high speed.”

92  
93 *Typical Application 1*  
94 An editorial revision is proposed for note 1 to indicate that the one traffic control device shown in the  
95 typical application be placed on the left side of a divided highway when the work space is in the median.

96  
97 In note 2, the second sentence is redundant and it is proposed that it be removed.

98  
99 Note 4 gives the option to eliminate all signs and channelizing devices for short-term, short duration, or  
100 mobile operations. Since channelizing devices are not shown on this typical and only one advance  
101 warning is shown, it is proposed that “all” and “and channelizing devices” be deleted from the note, and  
102 “all signs” be made singular. Also in note 4, “operation” in the note needs to be plural.

103  
104 *Typical Application 3*

105 Note 1 recommends that “A SHOULDER WORK sign should be placed on the left side of the roadway  
106 for a divided or one-way street only if the left shoulder is affected.” Divided highways are covered by  
107 Typical Application 5 so it is proposed to delete “divided” from note 1. A slight modification is  
108 proposed to read “The SHOULDER WORK sign ...” and “... one-way street if only the left shoulder ...”  
109

110 Note 5 (numbering from 19B-TTC-02, originally note 4) provides an option for “short duration  
111 operations of 60 minutes or less”. However, short duration is defined in Section 6G.02, P02, D as “up to  
112 1 hour.” The intent of Typical Application 3 is to address short-term stationary to long-term stationary  
113 work since Typical Application 4 addresses short-duration or mobile operations. Since notes 4 through 6  
114 apply to short duration operations, it is proposed to delete notes 4 through 6 and add a new note to “See  
115 Figure 6H-4 for short duration and mobile operations.”  
116

117 Note 8 (numbering from 19B-TTC-02, originally note 7) is already covered in Section 6G.07, P02 and  
118 proposed P11a in Section 6C.08. To avoid redundancy, the note is proposed to be deleted.  
119

120 In Figure 6H-3, the SHOULDER WORK sign shown in the top left corner is redundant and should be  
121 removed. If the “A” dimension to the remaining SHOULDER WORK sign shown on the left or shoulder  
122 taper extend past the intersection, then the practitioner should place the sign, or sign and taper should be  
123 on the other side of the intersection. A SHOULDER WORK sign is added to the left side of the figure to  
124 warn a driver turning left of the shoulder work near the top right of the drawing. The “(see note 7)”  
125 under Shoulder taper note is proposed to be removed since the note is proposed to be deleted. Added the  
126 text “(optional)” next to the END ROAD WORK and ROAD WORK NEXT XX MILES signs to be  
127 consistent with other typical applications.  
128

#### 129 *Typical Application 4*

130 It is proposed that a new standard be added before note 1, similar to Typical Applications 17 and 35  
131 reading “Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe  
132 lights.”  
133

134 Note 5 (originally note 3 and then note 4 in 19B-TTC-02) provides an option of replacing ROAD WORK  
135 AHEAD sign with a ROAD WORK NEXT XX MILES sign for work more than 2 miles. The sign  
136 should supplement, not replace, the advance warning sign. It is proposed to modify note 3 to indicate  
137 that the ROAD WORK NEXT XX MILES sign may be used before the ROAD WORK AHEAD sign.  
138 Further, it is proposed that a sentence be added that the Supplemental Distance plaque may be omitted  
139 from the ROAD WORK AHEAD sign assembly if the ROAD WORK NEXT XX MILES sign is used.  
140

141 The addition of a new note before note 1 makes the last half of note 4 unnecessary.  
142

143 A new note regarding use of a truck-mounted attenuator on the shadow vehicle or on the work vehicle is  
144 added for consistency with other typical applications.  
145

146 In the title for Figure 6H-4, “Short Duration” is hyphenated and the hyphen needs to be removed for  
147 consistency. The specific reference to a note number is corrected to reflect the new note numbering and  
148 “(optional)” is proposed to be removed from the Supplemental Distance plaque to reflect the guidance  
149 note regarding its use.  
150

151 *Typical Application 5*

152 It is proposed that the typical application title on the notes page and figure be modified to include  
153 expressways.

154  
155 To correspond with Figure 6F-4 and Section 6F.37, note 1 should be revised to read RIGHT (LEFT)  
156 SHOULDER CLOSED.

157  
158 Note 2 recommends that if drivers cannot see a pull-off area, the length of the shoulder closure should be  
159 provided in feet or miles. To clarify the note, several revisions are suggested.

160  
161 The sign spacing dimensions in Figure 6H-5 are proposed to be revised to indicate ordinary A-B-C  
162 placement.

163  
164 In Figure 6H-5, the first shoulder closed assembly is a RIGHT SHOULDER CLOSED warning sign with  
165 a XX FT supplemental plaque. To conform with Section 6F.37, P02, the warning sign legend is proposed  
166 to be revised to RIGHT SHOULDER CLOSED AHEAD (W21-5b) with no plaque.

167  
168 In conjunction with the proposed modifications to Section 6G.07, P03, it is proposed in Figure 6H-5 that  
169 the SHOULDER CLOSED signs be shown on both left and right shoulders of a freeway or expressway.

170  
171 *Typical Application 6*

172 To stress their importance, it is proposed that notes 12 and 13 be moved to before note 1.

173  
174 Note 4 (originally note 2) is proposed to be revised to reference Typical Applications 10 or 12 if the  
175 roadway has higher volumes or higher speeds.

176  
177 Note 10 (originally note 8 and then note 9 in 19B-TTC-02) is proposed to be revised to correspond with  
178 proposed revisions to Figure 6H-6 and to indicate that a truck-mounted attenuator may also be used on  
179 the work vehicle for consistency with other typical applications.

180  
181 On Figure 6H-6, the work vehicle is proposed to be replaced with a work vehicle and a shadow vehicle to  
182 match the vehicles shown on Figure 6H-4. Since channeling devices are shown, the shadow vehicle is  
183 indicated as “(optional)” to correlate with note 10 (originally note 7, then note 8 in 19B-TTC-02). A  
184 SHOULDER WORK sign is proposed to be added near the bottom right corner of the figure. The text  
185 “(optional)” is added adjacent to the END ROAD WORK signs to be consistent with other typical  
186 applications.

187  
188 *Typical Application 32*

189 High-speed is proposed to be deleted from the typical application title. The typical application can be  
190 used for any multi-lane highway or road, not only a high-speed highway.

191  
192 In Typical Application 32 for a multi-lane highway, the use of a shoulder taper is necessary to delineate  
193 the arrow board, regardless of the shoulder width or whether it is paved or not. It is proposed that note 2  
194 be deleted and added to Section 6C.08 as P11a so the concepts are applicable to all typical applications.

195

196 A new standard, inserted as a new note 2, is proposed to address the arrow board placement and buffer  
197 space conflict shown at the top of Figure 6H-32. This concept crosses over with the concepts in 20B-  
198 TTC-01. See 20B-TTC-01 for further discussion.

199  
200 The RIGHT (LEFT) LANE CLOSED XX FT sign is repeated at the top and bottom of Figure 6H-32.  
201 For consistency with the three advance warning sign series in most typical applications, the repeated sign  
202 is proposed to be deleted. On the bottom right corner of the figure, the “A” dimension is proposed to be  
203 modified to make it clear that the sign spacing and the 1/3 L length of the shoulder taper are not the same  
204 distance. Deletion of old note 2 on the notes page necessitates the removal of “(see Note 2)” from the  
205 figure. The buffer space note is removed from the figure and a reference to new note 2 is added to  
206 correlate with the proposed changes to the notes. The text “(optional)” is added adjacent to the END  
207 ROAD WORK signs to be consistent with other typical applications.

208  
209 *Typical Application 33*  
210 In Typical Application 33 for a divided highway, the use of a shoulder taper is necessary to delineate the  
211 arrow board, regardless of the shoulder width or whether it is paved or not. It is proposed that note 3 be  
212 deleted and added to Section 6C.08 as P11a so the concepts are applicable to all typical applications.

213  
214 A new standard, inserted as a new note 3, is proposed to be added to require that shadow and work  
215 vehicles display high-intensity rotating, flashing, oscillating, or strobe lights to be consistent with other  
216 typical applications.

217  
218 On Figure 6H-33, a work vehicle and shadow vehicle are added to A – long-term and intermediate. A  
219 shadow vehicle is added and the work vehicle moved in B – short-term to coordinate with TA-4 and the  
220 proposed revisions to TA-6. Deletion of old note 3 on the notes page necessitates the removal of “(see  
221 Note 3)” from the figure. The text “(optional)” is added adjacent to the END ROAD WORK signs to be  
222 consistent with other typical applications.

223  
224 *Typical Application 37*  
225 A new standard, inserted after note 1, is proposed to be added to require that shadow and work vehicles  
226 display high-intensity rotating, flashing, oscillating, or strobe lights to be consistent with other typical  
227 applications.

228  
229 “Or on the work vehicle” is added to note 5 (originally note 4) for consistency with other typical  
230 applications.

231  
232 *Typical Application 44*  
233 In Figure 6H-44, the shoulder tapers are indicated as optional. Because the shoulder tapers are necessary  
234 to delineate the arrow boards, it is proposed that the label “(optional)” be deleted. The task force  
235 proposes removing the channelizing devices from the right side of the freeway or expressway mainline  
236 and moving them to the left side of the entrance ramps in A and B. The text “(optional)” is added  
237 adjacent to the END ROAD WORK signs to be consistent with other typical applications.

238 **RECOMMENDED MUTCD CHANGES**

239 The following present the proposed changes to the current MUTCD within the context of the current  
240 MUTCD language. Proposed additions to the MUTCD are shown in blue underline and proposed  
241 deletions from the MUTCD are shown in ~~red strikethrough~~. Changes previously approved by NCUTCD  
242 Council (but not yet adopted by FHWA) are shown in green double underline for additions and ~~green~~  
243 ~~double strikethrough~~ for deletions. In some cases, background comments may be provided with the  
244 MUTCD text. These comments are indicated by [black font in brackets highlighted light blue].  
245

246  
247 **PART 6. TEMPORARY TRAFFIC CONTROL**

248  
249 **CHAPTER 6C. TEMPORARY TRAFFIC CONTROL ELEMENTS**

250  
251 **Section 6C.08 Tapers**

252 [Section 6C.08 has 16 paragraphs. Only paragraphs 10 through 12 are shown.]

253 Support:

254 10 A shoulder taper might be beneficial on a high-speed roadway where shoulders are part of the ~~a-ctivity~~  
255 activity area and are closed, or when improved shoulders might be mistaken as a driving lane. In these  
256 instances, the same type, but abbreviated, closure procedures used on a normal portion of the roadway  
257 can be used.

258 *Guidance:*

259 11 *If used, shoulder tapers should have a length of approximately 1/3 L (see Tables 6C-3 and 6C-4). If a*  
260 *shoulder is used as a travel lane, either through practice or during a TTC activity, a normal merging or*  
261 *shifting taper should be used.*

262 11a When paved shoulders having a width of 8 feet or more are closed, channelizing devices should be  
263 used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the  
264 traveled way.

265 Support:

266 12 A downstream taper might be useful in termination areas to provide a visual cue to the driver that  
267 access is available back into the original lane or path that was closed.  
268

269 **CHAPTER 6G. TYPE OF TEMPORARY TRAFFIC CONTROL ZONE ACTIVITIES**

270  
271 **Section 6G.05 Work Affecting Pedestrian and Bicycle Facilities**

272 Support:

273 01 It is not uncommon, particularly in urban areas, that road work and the associated TTC will affect  
274 existing pedestrian or bicycle facilities. It is essential that the needs of all road users, including  
275 pedestrians with disabilities, are considered in TTC zones.

276 02 In addition to specific provisions identified in Sections 6G.06 through 6G.14, there are a number of  
277 provisions that might be applicable for all of the types of activities identified in this Chapter.

278 *Guidance:*

279 03 *Where pedestrian or bicycle usage is high, the typical applications should be modified by giving*  
280 *particular attention to the provisions set forth in Chapter 6D, this Chapter, Section 6F.74, and in other*  
281 *Sections of Part 6 related to accessibility and detectability provisions in TTC zones.*

282 04 *Pedestrians should be separated from the worksite by appropriate devices that maintain the*  
283 *accessibility and detectability for pedestrians with disabilities.*

284 05 Bicyclists and pedestrians should not be exposed to unprotected excavations, open utility access,  
285 overhanging equipment, or other such conditions.  
286 06 ~~Except for short duration and mobile operations, when a highway shoulder is occupied, a SHOULDER~~  
287 ~~WORK (W21-5) sign should be placed in advance of the activity area. When work is performed on a~~  
288 ~~paved shoulder 8 feet or more in width, channelizing devices should be placed on a taper having a length~~  
289 ~~that conforms to the requirements of a shoulder taper. Signs should be placed such that they do not~~  
290 narrow any existing pedestrian passages to less than 48 inches.  
291 07 Pedestrian detours should be avoided since pedestrians rarely observe them and the cost of providing  
292 accessibility and detectability might outweigh the cost of maintaining a continuous route. Whenever  
293 possible, work should be done in a manner that does not create a need to detour pedestrians from  
294 existing routes or crossings.

295 **Standard:**

296 08 **Where pedestrian routes are closed, alternate pedestrian routes shall be provided.**

297 09 **When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the**  
298 **temporary facilities shall be detectable and shall include accessibility features consistent with the**  
299 **features present in the existing pedestrian facility.**

300  
301 **Section 6G.06 Work Outside of the Shoulder**

302 **Support:**

303 01 When work is being performed off the roadway (beyond the shoulders, but within the right-of-way),  
304 little or no TTC might be needed. TTC generally is not needed where work is confined to an area 15 feet  
305 or more from the edge of the traveled way. However, TTC is appropriate where distracting situations  
306 exist, such as vehicles parked on the shoulder, vehicles accessing the worksite via the highway, and  
307 equipment traveling on or crossing the roadway to perform the work operations (for example, mowing).  
308 For work beyond the shoulder, see Figure 6H-1.

309 **Guidance:**

310 02 *Where the situations described in Paragraph 1 exist, a single warning sign, such as ROAD WORK AHEAD*  
311 *(W20-1), should be used. If the equipment travels on the roadway, the equipment should be equipped with*  
312 *appropriate flags, high-intensity rotating, flashing, oscillating, or strobe lights, and/or a SLOW MOVING*  
313 *VEHICLE (W21-4) sign.*

314 02a *A general warning sign like ROAD MACHINERY AHEAD (W21-3) should be used if workers and*  
315 *equipment must occasionally move onto the shoulder.* [moved from paragraph 06]

316 **Option:**

317 03 If work vehicles are on the shoulder, a SHOULDER WORK (W21-5) sign may be used. ~~For mowing~~  
318 ~~operations, When applicable, the sign MOWING AHEAD (W21-8) may be used. UTILITY WORK~~  
319 ~~AHEAD (W21-7), SURVEY CREW (W21-6), or other warning signs may be used.~~

320 04 Where the activity is spread out over a distance of more than 2 miles, the SHOULDER WORK  
321 (W21-5) sign may be repeated every 1 mile.

322 05 A supplementary plaque with the message NEXT XX MILES (W7-3aP) may be used.

323 **Guidance:**

324 ~~06 *A general warning sign like ROAD MACHINERY AHEAD (W21-3) should be used if workers and*~~  
325 ~~*equipment must occasionally move onto the shoulder.* [moved to paragraph 02a]~~

326  
327 **Section 6G.07 Work on the Shoulder with No Encroachment**

328 **Support**

329 ~~01 The provisions of this Section apply to short-term through long-term stationary operations.~~

330 Guidance  
331 01 When a paved shoulder is closed, it should be treated as a closure of a portion of the road system  
332 because road users expect to be able to use it in emergencies. Road users should be given advance  
333 warning that shoulders are closed for use as refuge areas. The work space on the shoulder should be  
334 closed off by a taper or channelizing devices with a length of 1/3 L using the formulas in Tables 6C-3 and  
335 6C-4. [moved and modified from paragraph 04]

336 **Standard**

337 **02 When paved shoulders having a width of 8 feet or more are closed, at least one advance warning**  
338 **sign shall be used. In addition, Except for short duration or mobile operations, channelizing devices**  
339 **shall be used to close the shoulder in advance to delineate the beginning of the work space and**  
340 **direct motor vehicle traffic to remain within the traveled way.**

341 Guidance

342 03 When paved shoulders having a width of 8 feet or more are closed on freeways and expressways, road  
343 users should be warned about potential disabled vehicles that cannot get off the traveled way. An initial  
344 general warning sign, such as ROAD WORK AHEAD (W20-1), should be used, followed by a RIGHT or  
345 LEFT SHOULDER CLOSED (W21-5a) sign. Where the downstream end of the shoulder closure extends  
346 beyond the distance that can be perceived cannot be seen by road users, a supplementary plaque bearing  
347 the message NEXT XX FEET (W16-4P) or MILES (W7-3aP) should be placed below the SHOULDER  
348 CLOSED (W21-5a) sign. ~~On multi-lane, divided highways, signs advising of shoulder work or the~~  
349 ~~condition of the shoulder should be placed only on the side of the affected shoulder.~~

350 ~~04 When an improved shoulder is closed on a high-speed roadway, it should be treated as a closure of a~~  
351 ~~portion of the road system because road users expect to be able to use it in emergencies. Road users~~  
352 ~~should be given ample advance warning that shoulders are closed for use as refuge areas throughout a~~  
353 ~~specified length of the approaching TTC zone. The sign(s) should read SHOULDER CLOSED (W21-5a)~~  
354 ~~with distances indicated. The work space on the shoulder should be closed off by a taper or channelizing~~  
355 ~~devices with a length of 1/3 L using the formulas in Tables 6C-3 and 6C-4. [modified and moved to~~  
356 ~~paragraph 01]~~

357 04 When shoulder work occurs on a freeway or expressway, advance warning signs should be placed on  
358 both the right and left sides of the roadway except for short duration or mobile operations.

359 05 When the shoulder is not occupied but work has adversely affected its condition, the LOW SHOULDER  
360 (W8-9) or SOFT SHOULDER (W8-4) sign should be used, as appropriate.

361 06 Where the condition extends over a distance in excess of 1 mile, the sign should be repeated at 1-mile  
362 intervals.

363 **Option:**

364 07 In addition, a supplementary plaque bearing the message NEXT XX MILES (W7-3aP) may be used.  
365 Temporary traffic barriers may be needed to inhibit encroachment of errant vehicles into the work space  
366 and to protect workers.

367 **Standard:**

368 **08 When used for shoulder work, arrow boards shall operate only in the caution mode.**

369 **Support:**

370 09 A typical application for stationary work operations on shoulders is shown in Figure 6H-3. Short  
371 duration or mobile work on shoulders is shown in Figure 6H-4. Work on freeway or expressway  
372 shoulders is shown in Figure 6H-5.

**CHAPTER 6H. TYPICAL APPLICATIONS**  
**Table 6H-1. Index to Typical Applications**

Typical Application Description	Typical Application Number
<b>Work Outside of the Shoulder (see Section 6G.06)</b>	
Work Beyond the Shoulder	TA-1
Blasting Zone	TA-2
<b>Work on the Shoulder (see Sections 6G.07 and 6G.08)</b>	
Work on the Shoulders	TA-3
Short Duration or Mobile Operation on a Shoulder	TA-4
Shoulder Closure on a Freeway or Expressway	TA-5
Shoulder Work with Minor Encroachment	TA-6
<b>Work Within the Traveled Way of a Two-Lane Highway (see Section 6G.10)</b>	
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
<b>Work Within the Traveled Way of an Urban Street (see Section 6G.11)</b>	
Lane Closure on a Minor Street	TA-18
Detour for One Travel Direction	TA-19
Detour for a Closed Street	TA-20
<b>Work Within the Traveled Way at an Intersection and on Sidewalks (see Section 6G.13)</b>	
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
<b>Work Within the Traveled Way of a Multi-Lane, Non-Access Controlled Highway (see Section 6G.12)</b>	
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, <del>High-Speed</del> 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
<b>Work Within the Traveled Way of a Freeway or Expressway (see Section 6G.14)</b>	
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
<b>Work in the Vicinity of a Grade Crossing (see Section 6G.18)</b>	
Work in the Vicinity of a Grade Crossing	TA-46

375 **Notes for Figure 6H-1 – Typical Application 1**  
376 **Work Beyond the Shoulder**

377 *Guidance:*

- 378 1. *If the work space is in the median of a divided highway, ~~an~~ the advance warning sign should ~~also~~ be placed*  
379 *on the left side of the ~~directional roadway~~ highway in both directions.*

380 *Option:*

- 381 2. The ROAD WORK AHEAD sign may be replaced with other appropriate signs such as ~~the~~ SHOULDER  
382 WORK, UTILITY WORK AHEAD, MOWING AHEAD, or SURVEY CREW signs. ~~The SHOULDER~~  
383 ~~WORK sign may be used for work adjacent to the shoulder.~~  
384 3. The ROAD WORK AHEAD sign may be omitted where the work space is behind a barrier, more than  
385 24 inches behind the curb, or 15 feet or more from the edge of any roadway.  
386 4. For short-term, short duration or mobile operations, all the signs ~~and channelizing devices~~ may be  
387 eliminated if a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.  
388 5. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or  
389 strobe lights.

390 **Standard:**

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

393  
394  
395 **Notes for Figure 6H-3 – Typical Application 3**  
396 **Work on the Shoulders**

397 *Guidance:*

- 398 1. *A The SHOULDER WORK sign should be placed on the left side of ~~the roadway for a divided or a~~ one-*  
399 *way street ~~only~~ if only the left shoulder is affected.*

400 *Option:*

- 401 2. Positive protection devices may be used per Section 6F.84a. [approved by Council 01/10/2020]  
402 ~~2.3.~~ The Workers symbol signs may be used ~~instead of~~ addition to SHOULDER WORK signs.  
403 ~~3.4.~~ The SHOULDER WORK ~~AHEAD~~ sign on an intersecting roadway may be omitted where drivers  
404 emerging from that roadway will encounter another advance warning sign prior to this activity area.  
405 ~~4.5. For short duration operations of 60 minutes or less, all signs and channelizing devices may be eliminated if~~  
406 ~~a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.~~  
407 ~~5.6. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or~~  
408 ~~strobe lights.~~

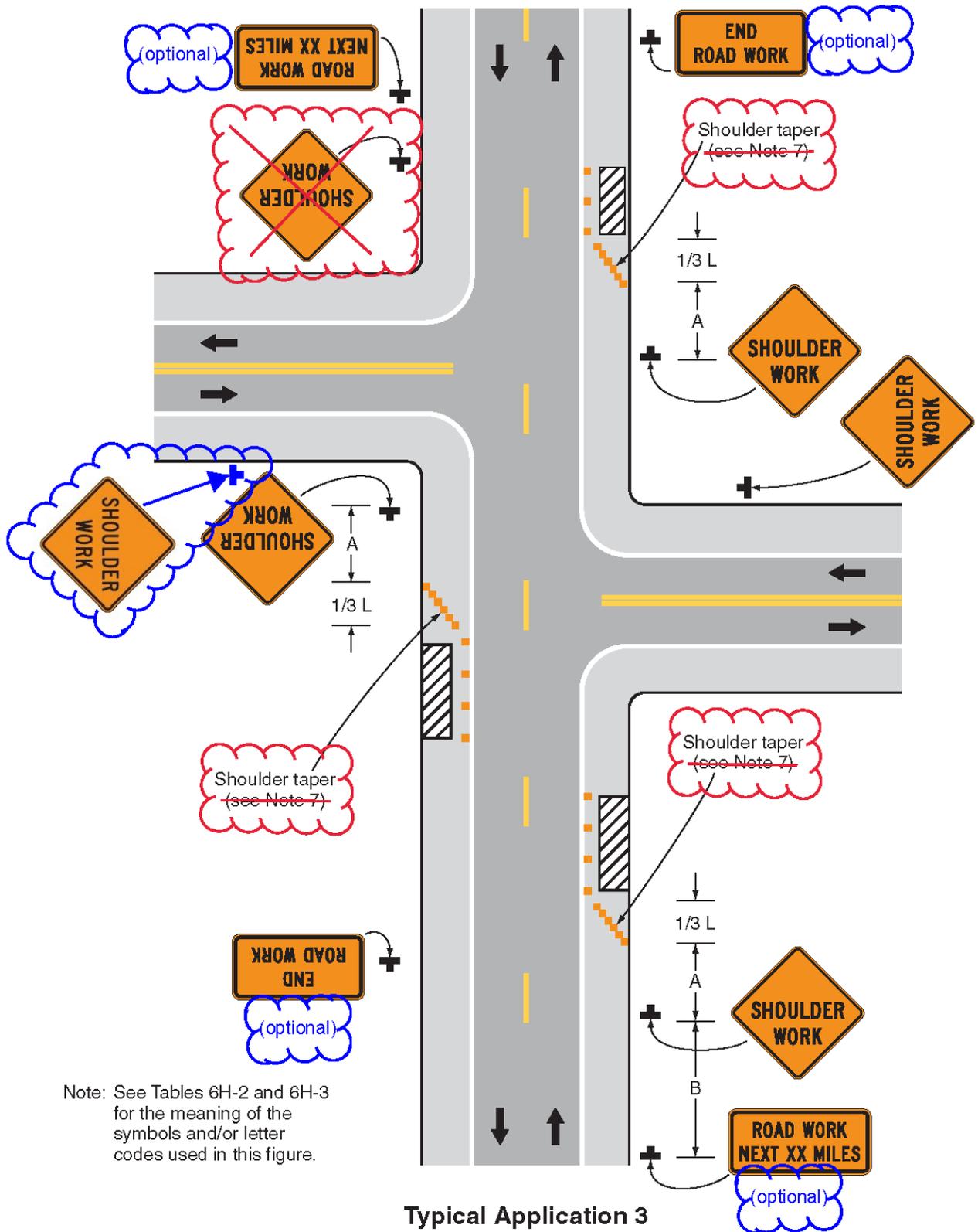
409 **Standard:**

- 410 ~~6.7. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating,~~  
411 ~~flashing, oscillating, or strobe lights.~~  
412 ~~7.8. When paved shoulders having a width of 8 feet or more are closed, at least one advance warning sign~~  
413 ~~shall be used. In addition, channelizing devices shall be used to close the shoulder in advance to~~  
414 ~~delineate the beginning of the work space and direct vehicular traffic to remain within the traveled~~  
415 ~~way. [Identical text is in Section 6G.07 P02.]~~

416 Support:

- 417 5. See Figure 6H-4 for short duration and mobile operations.

Figure 6H-3. Work on the Shoulders (TA-3)



Typical Application 3

Shoulder Work

Notes for Figure 6H-4 – Typical Application 4  
Short Duration or Mobile Operation on a Shoulder

**Standard:**

- 1. Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.**

*Guidance:*

- ~~1.2.~~ *In those situations where multiple work locations within a limited distance make it practical to place stationary signs, the distance between the advance warning sign and the work should not exceed 5 miles.*
- ~~2.3.~~ *In those situations where When the distance between the advance warning signs and the work is 2 miles to 5 miles, a Supplemental Distance plaque should be used with the ROAD WORK AHEAD sign.*

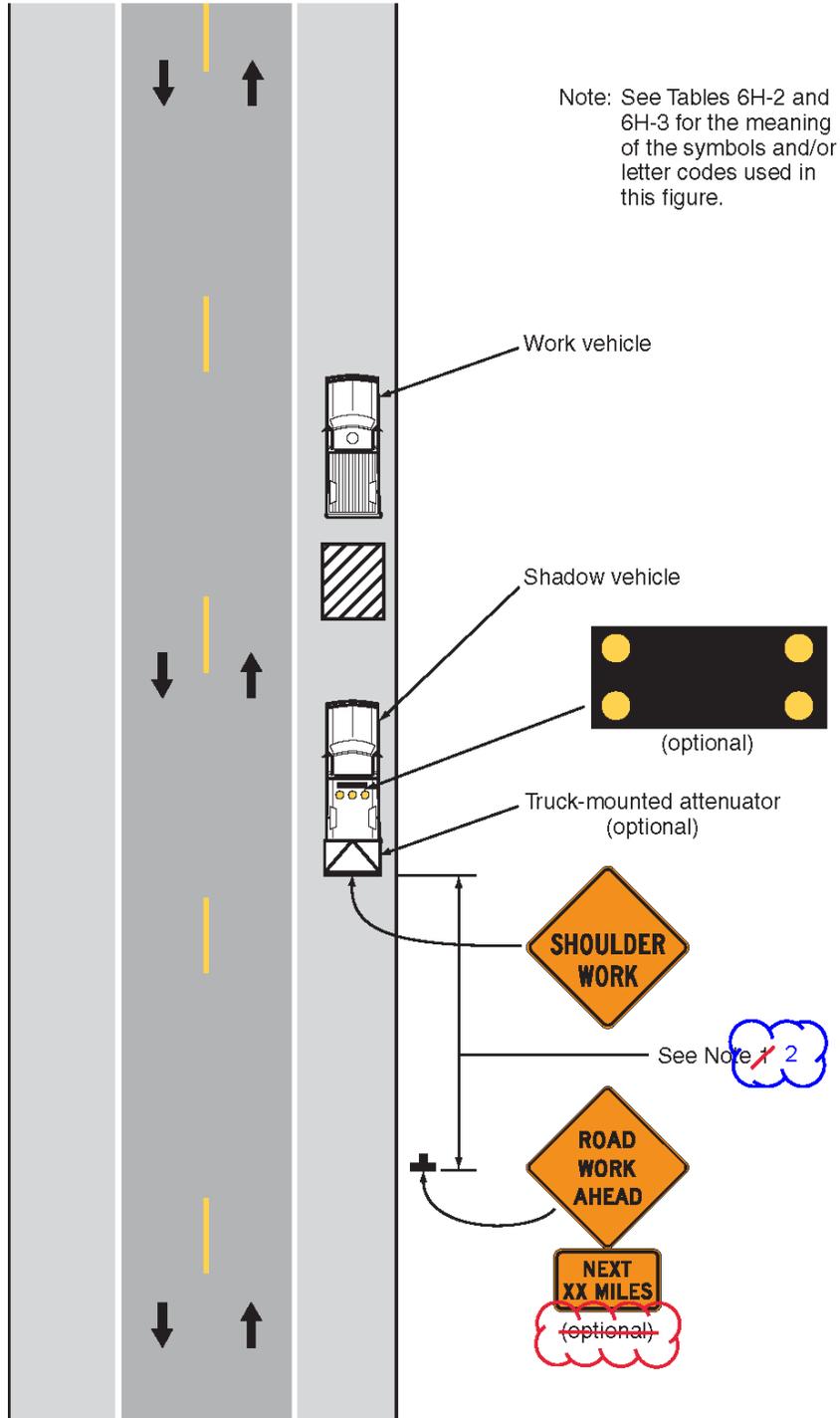
*Option:*

- ~~3.4.~~ Additional positive protection devices may be used per Section 6F.84a. [approved by Council 01/10/2020]
- ~~4.5.~~ The ROAD WORK NEXT XX MILES sign may be used ~~instead of~~ before the ROAD WORK AHEAD sign if the work locations occur over a distance of more than 2 miles. If the ROAD WORK NEXT XX MILES sign is used, the Supplementary Distance plaque may be omitted from the ROAD WORK AHEAD sign assembly.
- ~~4.6.~~ Stationary warning signs may be omitted for short duration or mobile operations. ~~if the work vehicle displays high-intensity rotating, flashing, oscillating, or strobe lights.~~
- ~~5.7.~~ Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.
8. A truck-mounted attenuator may be used on the shadow vehicle or on the work vehicle.

**Standard:**

- ~~6.9.~~ Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.
- ~~7.10.~~ If an arrow board is used for an operation on the shoulder, the caution mode shall be used.
- ~~8.11.~~ Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.

Figure 6H-4 Short Duration or Mobile Operation on a Shoulder (TA-4)



450 **Notes for Figure 6H-5 – Typical Application 5**  
451 **Shoulder Closure on a Freeway or Expressway**

452 *Guidance:*

- 453 1. RIGHT (LEFT) SHOULDER CLOSED signs should be used on limited-access highways where  
454 there is no opportunity for disabled vehicles to pull off the roadway.
- 455 2. If drivers cannot see a pull-off area beyond the closed shoulder, ~~information regarding a plaque~~  
456 indicating the length of the shoulder closure should be provided below the warning sign nearest  
457 the closure in feet or miles, as appropriate with the legend NEXT XX FT or NEXT XX MILES.
- 458 3. The use of a temporary traffic barrier should be based on engineering judgment.

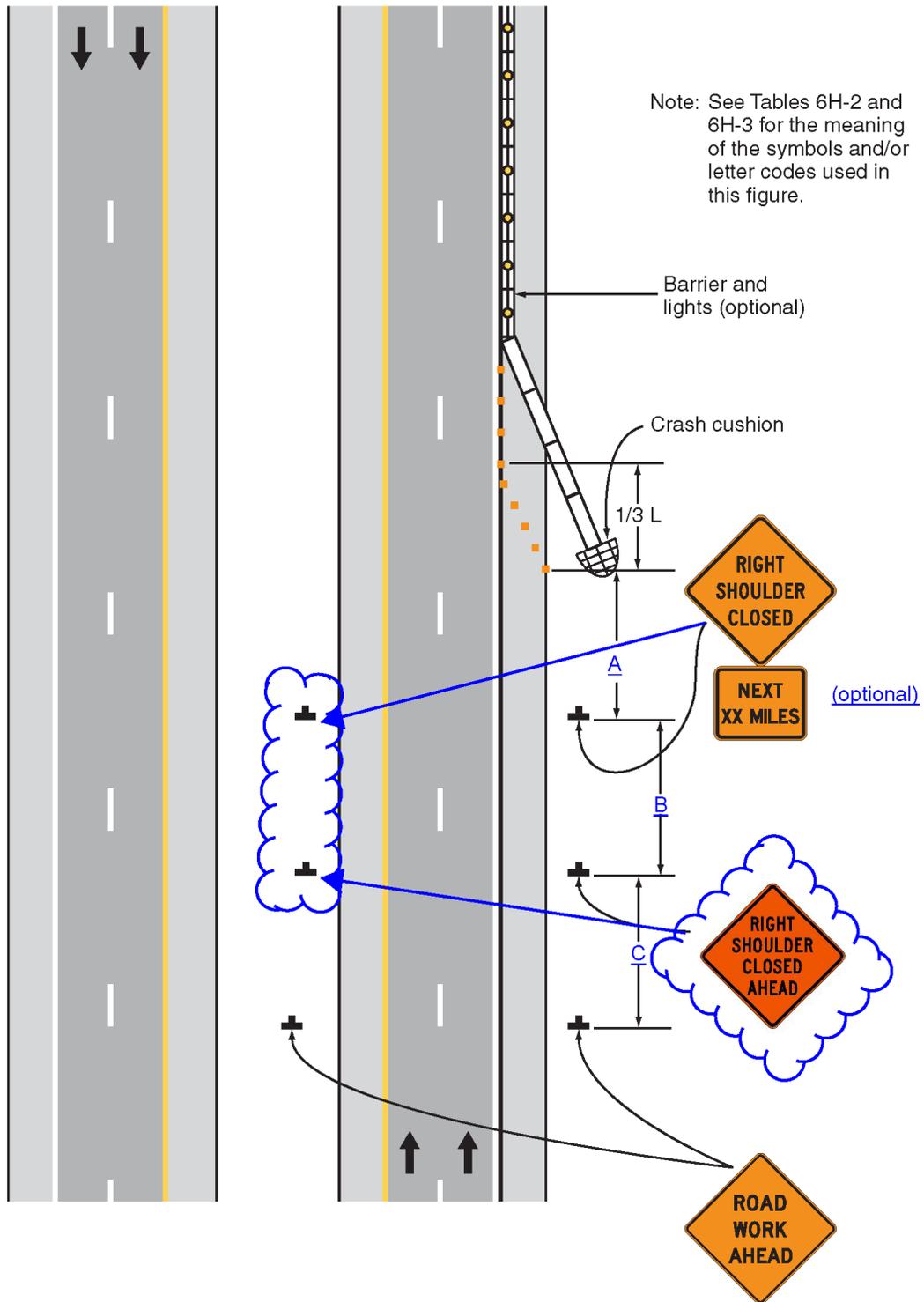
459 **Standard:**

- 460 4. Temporary traffic barriers, if used, shall comply with the provisions of Section 6F.85.

461 *Option:*

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

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



Typical Application 5

Notes for Figure 6H-6 – Typical Application 6  
Shoulder Work with Minor Encroachment

**Standard:**

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

**Guidance:**

- ~~1.3.~~ All lanes should be a minimum of 10 feet in width as measured to the near face of the channelizing devices.
- ~~2.4.~~ The treatment shown should be used on a minor road having low speeds. For higher volume or higher-speed higher speed traffic conditions, a lane closure should be used as shown in Figure 6H-10 or Figure 6H-12.

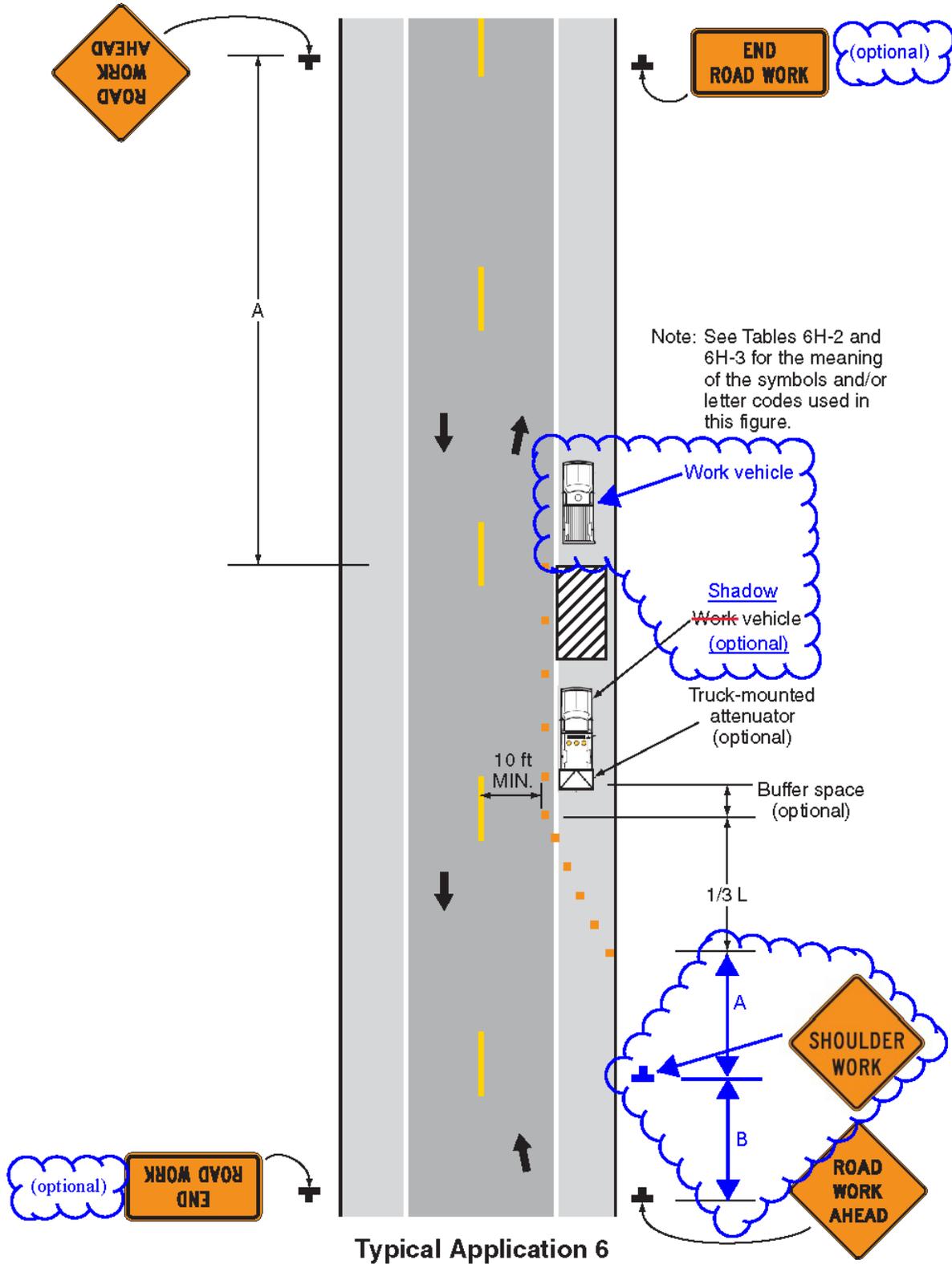
**Option:**

- ~~3.5.~~ Additional positive protection devices may be used per Section 6F.84a. [approved by Council 01/10/2020]
- ~~3.6.~~ For short-term use on low-volume, low-speed roadways with vehicular traffic that does not include longer and wider heavy commercial vehicles, a minimum lane width of 9 feet may be used.
- ~~4.7.~~ Where the opposite shoulder is suitable for carrying vehicular traffic and of adequate width, lanes may be shifted by use of closely-spaced channelizing devices, provided that the minimum lane width of 10 feet is maintained.
- ~~5.8.~~ Additional advance warning may be appropriate, such as a ROAD NARROWS sign.
- ~~6.9.~~ Temporary traffic barriers may be used along the work space.
- ~~7.10.~~ The shadow vehicle may be omitted if a taper and channelizing devices are used.
- ~~8.10.~~ A truck-mounted attenuator may be used on the shadow vehicle or on the work vehicle.
- ~~9.12.~~ For short-duration work, the SHOULDER WORK sign, taper and channelizing devices may be omitted if a shadow vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.
- ~~10.13.~~ Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

**Standard:**

- ~~11.14.~~ **Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.**
- ~~12.13.~~ **~~Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.~~** [Moved to note 1]
- ~~13.14.~~ **~~Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.~~** [Moved to note 2]

Figure 6H-6. Shoulder Work with Minor Encroachment (TA-6)



Typical Application 6

Shoulder Work

Notes for Figure 6H-32 – Typical Application 32  
Half Road Closure on a Multi-Lane, ~~High-Speed~~ Highway

Standard:

1. For long-term stationary situations, conflicting Ppavement 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 channelizing ~~ation~~ devices shall be used ~~made dominant by using a very close device spacing.~~
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.

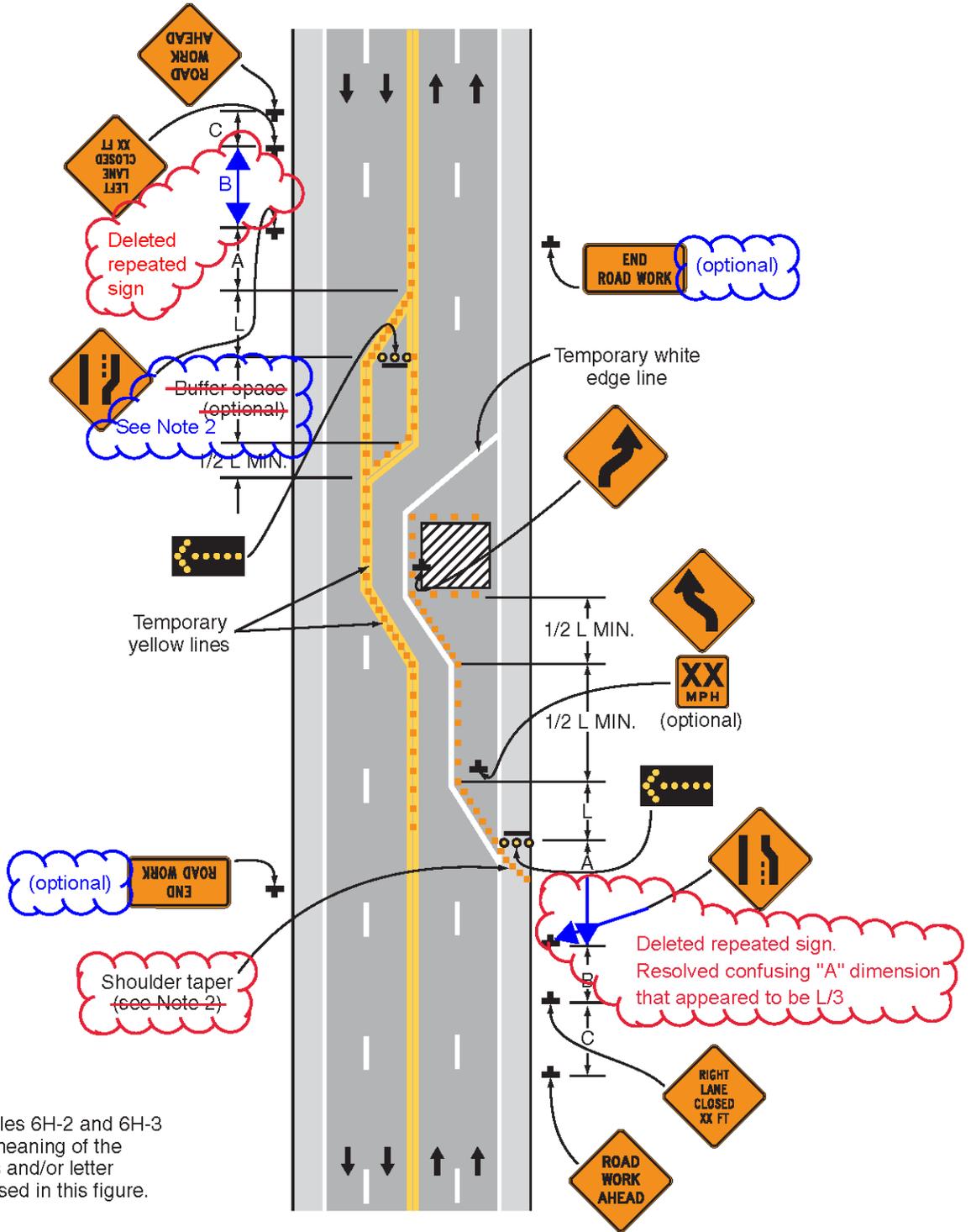
Guidance:

- ~~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.~~
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.
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.

Option:

5. Positive protection devices may be used per Section 6F.84a. [approved by Council 01/10/2020]
- ~~5.6.~~ Warning lights may be used to supplement channelizing devices at night.
- ~~6.7.~~ A truck-mounted attenuator may be used on ~~the~~ a shadow vehicle or on a work vehicle ~~and/or the shadow vehicle.~~

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



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

Typical Application 32

Notes for Figure 6H-33 – Typical Application 33  
Stationary Lane Closure on a Divided Highway

Standard:

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

Guidance:

- ~~3. 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.~~

Option:

4. A truck-mounted attenuator may be used on the shadow vehicle or on a work vehicle ~~and/or the shadow vehicle.~~
5. Additional positive protection devices may be used per Section 6F.84a. [approved by Council 01/10/2020]

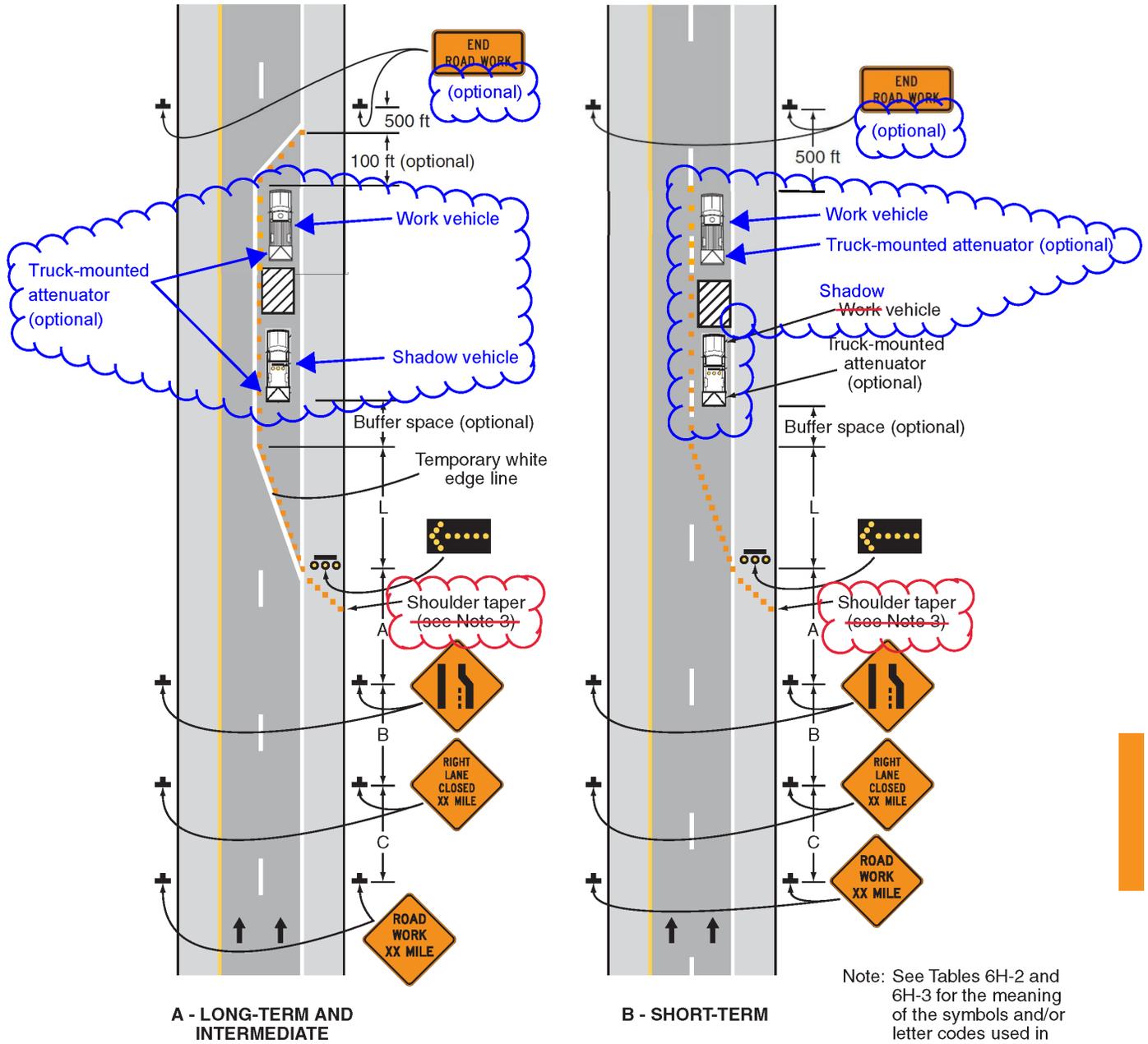
Support:

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

Standard:

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

Figure 6H-33. Stationary Lane Closure on a Divided Highway (TA-33)



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

559  
560

Typical Application 33

Notes for Figure 6H-37—Typical Application 37  
Double Lane Closure on a Freeway

Standard:

1. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.
2. Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.

Guidance:

- ~~2.3.~~ Ordinarily, the preferred position for the second arrow board is in the closed exterior lane at the upstream end of the second merging taper. However, the second arrow board should be placed in the closed interior lane at the downstream end of the second merging taper in the following situations:
- a. When a shadow vehicle is used in the interior closed lane, and the second arrow board is mounted on the shadow vehicle;
  - b. If alignment or other conditions create any confusion as to which lane is closed by the second arrow board; and
  - c. When the first arrow board is placed in the closed exterior lane at the downstream end of the first merging taper (the alternative position when the shoulder is narrow).

Option:

- ~~3.4.~~ Flashing warning lights and/or flags may be used to call attention to the initial warning signs.
- ~~4.5.~~ A truck-mounted attenuator may be used on the shadow vehicle or on the work vehicle.
- ~~5.6.~~ Additional positive protection devices may be used per Section 6F.84a. [approved by Council 01/10/2020]
- ~~5.7.~~ If a paved shoulder having a minimum width of 10 feet and sufficient strength is available, the left and adjacent interior lanes may be closed and vehicular traffic carried around the work space on the right-and lane and a right-hand shoulder.

Guidance:

- ~~6.8.~~ When a shoulder lane is used that cannot adequately accommodate trucks, trucks should be directed to use the normal travel lanes.

Figure 6H-44. Work in the Vicinity of an Entrance Ramp (TA-44)

