

National Committee on Uniform Traffic Control Devices

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Item No.: 18B-RW-03

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

TECHNICAL COMMITTEE: Regulatory & Warning Signs Committee and Signals Technical Committee
ITEM NUMBER: 18B-RW-03
TOPIC: Setting Speed Limits
ORIGIN OF REQUEST: NTSB recommendation to FHWA in July 2017 Report: Reducing Speeding-Related Crashes Involving Passenger Vehicles.
RW Technical Committees Joint Task Force: Randy McCourt (chair); Kay Fitzpatrick, Charles Meyer, Dan Paddick, Jim Pline, Bob Seyfried (RWSTC); Peter Koonce & Bill Fox (BTC)

AFFECTED SECTIONS OF MUTCD: Section 2B.13

DEVELOPMENT HISTORY:

- Task Force: 6-14-18, revised 7-17-18, updated 8-15-18, modified based upon sponsor comments 11-28-18, revised following sponsor comments 1-9-19
- Approved by RW Technical Committee: 08/15/2018
- Approved by RW Technical Committee following sponsor comments: 01/09/2019
- Approved by NCUTCD Council: 01/11/2019

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

SUMMARY:

In July 2017, the National Transportation Safety Board issued a report on *Reducing Speeding-Related Crashes Involving Passenger Vehicles* (<https://www.nts.gov/safety/safety-studies/Documents/SS1701.pdf>). In this report, the NTSB made several recommendations. Two of the recommendations were directed to FHWA and involved the MUTCD (Page 57):

- (H-17-27) Revise Section 2B.13 of the MUTCD so that:
 - ♦ The factors currently listed as optional for all engineering studies are required,
 - ♦ Require that an expert system such as USLIMITS2 be used as a validation tool, and

- 30 ♦ Remove the guidance that speed limits in speed zones be within 5 mph of the 85th
- 31 percentile speed.
- 32 • (H-17-28) Revise Section 2B.13 of the MUTCD to (at a minimum) incorporate the Safe
- 33 System approach for urban roads to strengthen protection for vulnerable road users.

34

35 In January of 2018 RWSTC established a Task Force to address these recommendations. The

36 Task Force initiated a survey in the spring of 2018 to better understand how speed limits are set.

37 Significant interest exists in the setting of posted speed limits from many sources within the

38 NCUTCD sponsoring organizations and outside. The survey reached many of these groups (sent

39 to NCUTCD, ITE, AASHTO/CTE, APWA, ASCE, NACTO, APBP and TRB). The survey was

40 completed by 740 participants (see attached summaries and highlights below). Concurrently,

41 Texas Transportation Institute (TTI) is completing the National Cooperative Highway Research

42 Program (NCHRP) project 17-76 (*Guidance for the Setting of Speed Limits*) which is scheduled

43 to be complete Fall 2019. The Task Force survey data were provided to the TTI team to assist

44 with the investigation. AAA is conducting a similar survey of speed limits and the results of the

45 draft Task Force survey results were shared with them this summer. The Task Force met several

46 times and discussed the findings on June 14th in the context of the need for MUTCD changes.

47 From this discussion two changes were forwarded to RWSTC for consideration (adding bicycle

48 to the factors listed in paragraph 16 and changing from may to should for the factors to be

49 considered in paragraph 16).

50

51 At the June 21, 2018 RWSTC meeting, discussions focused on the role of the MUTCD in setting

52 traffic control device criteria as compared to establishing practice(s) for the setting of speed

53 limits (and to what extent). Key comments made included:

- 54 1. many states/local agencies have their own laws/criteria for setting of speed limits (many
- 55 are very detailed),
- 56 2. professionals who actually perform the studies rarely use only the 85th percentile speed
- 57 (i.e. they use several other factors),
- 58 3. practitioners consider pace as an important factor when considering speed data
- 59 (particularly increasing the percentage of vehicles within the 10-mph pace),
- 60 4. an expansion of statutory requirements for speed limits could be considered (beyond
- 61 single or a few speed categories) from which fewer engineering studies would be needed
- 62 to establish reasonable speed limits, and
- 63 5. the use of 85th percentile for rural roads or interstate/freeways is different than urban
- 64 streets (on urban streets, 85th percentile plays a less significant role). It is clear from the
- 65 survey that analysts that establish speed zones utilize many factors beyond 85th percentile
- 66 in their studies, including the context, i.e. where the street is and what function it serves.
- 67

68

69 Two votes were taken within RWSTC. The first asked if the MUTCD should address (a) both the

70 criteria of speed limits signs as traffic control devices (e.g. color, size, retroreflectivity, etc...)

71 and the factors for setting of speed limits or, (b) just the criteria for the traffic control device. The

72 first vote was a choice between the options. Twelve voted for traffic control device only and 8

73 voted for traffic control device and factors for setting speed limits. A second vote was taken on a

74 draft proposal prepared by the Task Force (which changed the factors in paragraph 16 of section

75 2B.13 to should and added reference to bicyclists). It was rejected 8-11, noting a concern about
76 the need for research (NCHRP 17-76) which is underway.

77
78 Because of the split votes, it was decided to ask Council on June 22 to provide direction to the
79 Task Force about the two options (a. and b. from above). About 10 comments were received. The
80 general direction was that the MUTCD should reference the broad factors regarding setting of
81 speed limits and leave the definition and procedures to guidelines and/or states to set more
82 detailed criteria.

83
84 With that direction, the Task Force has prepared the following proposal which:

- 85 • Changes the MUTCD to reinforce the stated understanding that other factors have a role
86 in setting speed limits (in addition to 85th percentile).
- 87 • Refines the factors in Paragraph 16 and moves this paragraph up along with the three
88 other paragraphs that speak to setting of speed limits (#10 (unchanged), #12 and #13
89 (unchanged)) to follow paragraph 1 which is the standard that speaks to setting of speed
90 limits in response to NTSB.
- 91 • Retains reference to 85th percentile as a factor that should be considered, particularly for
92 freeways, expressways and rural areas (modified paragraph 12 in response to NTSB).
- 93 • Leaves reference to setting of speed zones in broad terms allowing states/locals to
94 establish detailed criteria based upon national guidance or based upon research, outside
95 the MUTCD (this is our response to NTSB to include USLIMITS2 and Safe Systems).
- 96 • Anticipates the development of a national speed management guide (in development
97 through NCHRP 17-76) for states and local agencies to use uniformly in establishing
98 process of setting speed zones.
- 99 • Recommend that statutory speeds in states/local agencies follow speed management
100 guidance being developed in NCHRP 17-76, but not address such in the MUTCD.

101
102 These guiding principles outline the Task Force proposal for MUTCD changes which are
103 outlined below. It leaves the role of the MUTCD broad, as requested by the NCUTCD Council.
104 In responding to the NTSB proposal, changes have been made accordingly. The Task Force
105 anticipates more detailed guidance from impending national research and state/local procedures;
106 however, this should not affect the MUTCD. The MUTCD role is clarified and reorganized, but
107 not expanded.

108
109 The NTSB also referenced two processes that are more detailed: USLIMITS2 and Safe Systems.
110 Based upon the survey, discussion of the Task Force, technical committee and council it was
111 determined to not include a more detailed process in the MUTCD. The survey findings indicated
112 that about 84% of respondents had not utilized USLIMITS2. This raises a question as to why a
113 process that was established in 2006 has not garnered greater practical use. The Task Force
114 believes that this question must be answered before suggesting that they be included in the
115 MUTCD. USLIMITS2 and Safe Systems are both detailed procedures that may be better placed
116 in national guidelines rather than the MUTCD. The inclusion of USLIMITS2 or Safe Systems
117 would expand the role of the MUTCD and could conflict with future research and local/state
118 procedures; therefore, this NTSB proposal was not advanced.

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120

121 **SURVEY HIGHLIGHTS:**

122

123 **Background**

- 124 • While consultants were the most represented group in the survey (~27%), state
125 agency/DOT (~18%), smaller cities (~17%), county/regional agency (~16%) and larger
126 cities (~9%) were also well represented.
- 127 • Survey respondents averaged 20 years of professional experience (nearly 15,000
128 collective years of experience).
- 129 • Participants had a wide range of experience with speed limit studies, somewhat equally
130 spread over the five survey categories of 0, 1-5, 6-20, 21-50, 50+.
- 131 • Over 85% of the respondent have regularly (just less than 60%) or occasionally (about
132 25%) used the MUTCD.

133

134 **Resources**

- 135 • A majority of respondents depend upon the MUTCD or state/local guides/requirements
136 in setting a speed zone.
- 137 • Few respondents have used USLIMITS2 (16%) – this reinforces an AASHTO/CTE
138 August 2017 survey that indicated limited state use of USLIMITS2.

139

140 **Criteria**

- 141 • The top criteria that are always used in setting speed limits (over 50% responses) were:
 - 142 ♦ For practitioners who had done >5 studies: speed of vehicles, statutory
143 requirements, crash history, context (location), geometrics (curve), facility
144 classification type.
 - 145 ♦ For practitioners who had done 0 studies: context (location), context (land use),
146 pedestrian activity, crash history.
- 147 • When asked what the five most important factors were the over 50% responses were:
 - 148 ♦ For practitioners who had done >5 studies: speed of vehicles, crash history, context
149 (location).
 - 150 ♦ For practitioners who had done 0 studies: pedestrian activity, context (location),
151 bicycle activity.
- 152 • When asked what the one or two most relied upon measures were the top responses
153 were:
 - 154 ♦ For practitioners who had done >5 studies: 85th percentile speed (88%), design
155 speed (21%), pace speed (17%).
 - 156 ♦ For practitioners who had done 0 studies: design speed (43%), 85th percentile speed
157 (40%), average speed (20%).
- 158 • Related to setting speed limits and rounding the most frequent response was to round to
159 the nearest 5 mph of the 85th percentile; but when given the option to choose how
160 “would” they do it they offered nearly 350 comments.
- 161 • Table 1 below highlights the response to target/desired speed by facility type.

162

163 **DISCUSSION:**

164 There are 21 paragraphs in Section 2B.13. Five are standards, 4 are support, 5 are options and 7
165 are guidance. Based upon the findings of the Task Force so far, the key paragraphs in Section
166 2B.13 are paragraphs 12 (guidance) and 16 (option). All the other paragraphs focus on statutory

167 speed limits, need for engineering study, requiring limits to be multiples of 5 mph, placement of
168 signs, use of warning signs with speed limit signs, where to conduct speed studies, special speed
169 limits, changeable message signs, and school zones.

170

171 The NTSB recommendations focus on the input provided related to the engineering studies. The
172 Task Force asked several questions of the RWSTC. The summary of the discussion is provided
173 below:

174

- 175 1. To what extent should the MUTCD define procedures/criteria for engineering studies?
176 *There was support on both sides of the question as to whether the MUTCD should be*
177 *focused on traffic control device criteria or both TCD criteria and setting of speed limit*
178 *criteria. Discussion at Council provided the Task Force direction to keep the MUTCD*
179 *discussion about setting speed limits broad allowing states/locals to define the*
180 *procedures in more detail.*
- 181 2. Given the implicit understanding of what 85th percentile means, is there a need to better
182 define the five items in paragraph 16 to be on a uniform level of understanding (e.g. what
183 defines crash experience comparable to our understanding of the 85th percentile)? Why
184 are bicyclists not noted in paragraph 16? Should any criteria be added to paragraph 16?
185 *Greater definition should be left to national research and state/local procedures.*
186 *However, bicyclists should be listed in the factors of paragraph 16.*
- 187 3. What is the balance between “analysis of the current speed distribution of free-flowing
188 vehicles (standard paragraph 1)” to other criteria (paragraph 12) as part of an engineering
189 study? How would this affect paragraph 12?
190 *This should be left to guidelines, not in the MUTCD.*
- 191 4. Is a specific reference to USLIMITS2 appropriate and is the current NCHRP research
192 project (17-76) going to provide alternative guidance that should be considered?
193 *Given the survey finding that 84% of the respondents had not utilized USLIMITS2, the*
194 *question as to “why” should be answered before change to the MUTCD is considered.*
195 *Adding USLIMITS2 would substantially further the MUTCD role of defining the process*
196 *or procedure of setting speed limits. This level of detail would be inconsistent with the*
197 *MUTCD establishing broad criteria of setting speed limits and could impact state/local*
198 *agencies who have detailed procedures.*
- 199 5. Should the rounding approach to speed data be defined?
200 *This is a detail of setting a speed limit that would not be appropriate for the MUTCD.*
- 201 6. What will enforcement and/or the judicial system accept if not the 85th percentile
202 (paragraph 12)? Could speed limits for high crash corridors be set below the 85th
203 percentile (note California recent approval) and is this a MUTCD role or a states/local
204 role in defining the speed limit process?
205 *This should be left to guideline documents and national research rather than the*
206 *MUTCD.*
- 207 7. Given the commonality of responses to target speed for various facility types from the
208 survey, should a reference be provided that would guide practitioners to further study
209 when setting speeds above/below certain levels nationally (for example the 50%
210 percentile response levels of the survey, Table 1)?
211 *This is a detail of setting speed limits and would be better in guidelines (or statutory*
212 *change/requirements) rather than the MUTCD.*

213 **Table 1: Median Response to Target Speeds by Facility Type from June 2018 Survey**

| Functional Class/Type | Speed, mph |
|--|------------|
| Interstate Freeway (rural) | 70 |
| Interstate Freeway (urban) | 60 |
| State Highway (rural) | 60 |
| County Road (rural) | 50 |
| County Road (rural unpaved) | 35 |
| Suburban Arterial (5+ lanes) | 45 |
| Urban Arterial (multi-lane) | 35 |
| Collector Street | 30 |
| Business/Commercial District Street | 25 |
| Neighborhood Street (used to leave a residential area) | 25 |
| Local Residential Street | 25 |
| School Zone Street | 20 |

214
 215 8. A criterion suggested for setting speed limits that is relatively new is “context –
 216 location”. Some may consider “road characteristics” or “environment” to be similar in
 217 concept (terms currently in the MUTCD). NCHRP Report 855 recommends an expanded
 218 functional classification system with five roadway types (freeways, principal arterial,
 219 minor arterial, collector, and local) and five context types (rural, rural town, suburban,
 220 urban, and urban core). These contexts “have been determined to not only represent
 221 unique land use environments, but also identify distinctions that require wholly different
 222 geometric design practices in terms of **desired operating speeds**, mobility/access
 223 demands and user groups”. Should the MUTCD recognize these different roadway
 224 type/context combinations especially if different speed limit setting practices are
 225 suggested for the different roadway type/context combinations? Table 1 shows the
 226 suggested target speeds from NCHRP Report 855.

227
 228 **Table 1. NCHRP Report 855 Suggested Target Speed for Context/Roadway**

| Roadway | Context | | | | |
|---|---|------------|------------|-----------|------------|
| | Rural | Rural Town | Suburban | Urban | Urban Core |
| Freeways | Not addressed in 855 since “designs are based on federally developed standards with little flexibility”. Assumed to be High | | | | |
| Principal Arterial | High | Low / Med | Med / High | Low / Med | Low |
| Minor Arterial | High | Low / Med | Med | Low / Med | Low |
| Collector | Med | Low | Med | Low | Low |
| Local | Med | Low | Low | Low | Low |
| Suggested target speeds: Low (<30 mph), Med (30 to 45 mph), high (> 45 mph) | | | | | |

229
 230 *This is a detail of setting speed limits and would be better as a subject of guidelines (or*
 231 *statutory change/requirements) rather than the MUTCD.*

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235 The Task Force discussed these matters and found the following:
236

- 237 • Use of speed distribution in setting of speed zones is important and is one of the factors
238 in setting speed zones.
- 239 • Re-enforce that the “other” factors than speed should be considered in setting speed
240 zones (include in paragraph 16 and change to should (guidance) from may (option)).
- 241 • The inclusion of bicycle activity as a factor in paragraph 16 is important and should be
242 included.
- 243 • Clarify “other factors” to include lane widths, medians, driveways, land use and past
244 study data. Past studies provide valuable insights into understanding if or how speed
245 distribution may have changed over time.
- 246 • To clarify the use of the 85th percentile speed (paragraph 12), limit the specificity of
247 setting speed zones within 5 mph of the 85th percentile to use on freeways, expressways
248 and rural highways.
- 249 • The industry uses and knowledge of USLIMITS2 is very limited. Before prescriptively
250 requiring it as a methodology in MUTCD for setting speed zones (it was originally
251 developed in 2006), more information is needed about why analysts do not use it
252 currently. One request was to make the assessment more transparent to users (less of a
253 black box). This level of detail is not likely appropriate for the MUTCD and rather should
254 be part of national guidance document(s) for states/locals to utilize in establishing their
255 policies.
- 256 • Setting of reasonable speed zones requires consideration of many factors that are not well
257 defined in the MUTCD. These factors are best defined as part of national
258 guidance/research documents and do not need to be defined in the MUTCD as they can
259 involve state/local interpretation.
- 260 • The Task Force was not supportive of the elimination of studies in setting of non-
261 statutory speed zones (that consider the appropriate factors) given the safety, enforcement
262 and legal consequences
- 263 • As the NCHRP 17-76 research progresses, consideration of target speeds (reflecting on
264 survey findings in Table 1 and NCHRP 855 Table 2) should be considered further, but
265 not part of MUTCD.

266
267 Following RSWTC comments changes were made to:
268

- 269 • Use the MUTCD definition for rural highways;
- 270 • Move functional class to the list of factors;
- 271 • Clarify when signals are spaces less than 1 mile, where to observe speeds;
- 272 • Clarify the use of the pace; and
- 273 • Move paragraph 14 below paragraph 15 and clarify its language.

274 275 **RECOMMENDED MUTCD CHANGES**

276 The following present the proposed changes to the current MUTCD within the context of the
277 current MUTCD language. Proposed additions to the MUTCD are shown in blue underline and
278 proposed deletions from the MUTCD are shown in ~~red strikethrough~~. Changes previously
279 approved by NCUTCD Council (but not yet adopted by FHWA) are shown in green double
280 underline for additions and ~~green double strikethrough~~ for deletions. In some cases, background

281 comments may be provided with the MUTCD text. These comments are indicated by
282 [highlighted light blue in brackets].

283
284 **PART 1. GENERAL**

285
286 **CHAPTER 1A. GENERAL**

287
288 **Section 1A.13 Definitions of Headings, Words, and Phrases in this Manual**
289 **(Approved by Edit Committee 1-9-19).**

290 **132a. Pace – see Speed.**

291
292
293 **PART 2. SIGNS**

294
295 **CHAPTER 2B. REGULATORY SIGNS, BARRICADES, AND GATES**

296
297 **Section 2B.13 Speed Limit Sign (R2-1)**

298 **Standard:**

299 01 **Speed zones (other than statutory speed limits) shall only be established on the basis of**
300 **an engineering study that has been performed in accordance with traffic engineering**
301 **practices. ~~The engineering study shall include an analysis of the current speed distribution~~**
302 **~~of free-flowing vehicles.~~**

303 **Guidance:**

304 01a ~~Other factors~~ Factors that ~~may~~ should be considered when establishing or reevaluating
305 speed limits within speed zones are the following: [paragraph 01a and A-D moved from
306 paragraph 16 and revised as indicated]

- 307 A. Speed distribution of free-flowing vehicles (such as current 85th percentile, the pace, and
308 review of past speed studies)
309 B. Reported crash experience for at least a 12-month period relative to similar roadways.
310 C. Road characteristics (such as lane widths, curb/shoulder condition, grade, alignment,
311 median type, and sight distance).
312 D. Road context (such as roadside development and environment including number of
313 driveways and land use, functional classification, parking practices, presence of
314 sidewalks/bicycle facilities).
315 E. Road Users (such as pedestrian activity, bicycle activity)

316 01b When a speed limit within a speed zone is posted on freeways, expressways, or rural
317 highways, it should maximize the percentage of vehicles in the pace and should be within 5 mph
318 of the 85th-percentile speed of free-flowing-~~traffic~~-vehicles. [paragraph 01b moved from
319 paragraph 12 and revised as indicated]

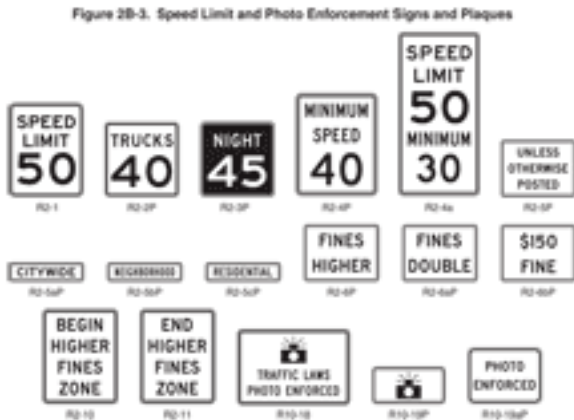
320 01c States and local agencies should conduct engineering studies to reevaluate non-statutory
321 speed limits on segments of their roadways that have undergone significant changes since the
322 last review. (such as in ~~the addition or elimination of parking or driveways, changes in the~~
323 ~~number of travel lanes, changes in the configuration of bicycle lanes, road geometrics, road~~
324 ~~context, traffic control signal coordination, or traffic volumes).~~ [paragraph 01c moved from
325 paragraph 10 and revised as indicated]

326 01d Speed studies for signalized intersection approaches should be taken outside the influence
 327 area of the traffic control signal, which is generally considered to be approximately 1/2 mile to
 328 avoid obtaining skewed results for the 85th-percentile speed. If the signal spacing is less than 1
 329 mile, the speed study should be at approximately the middle of the segment. [paragraph 01d
 330 moved from paragraph 13 and revised as indicated]

331 **Standard:**

332 02 The Speed Limit (R2-1) sign (see **Figure 2B-3**) shall display the limit established by
 333 law, ordinance, regulation, or as adopted by the authorized agency based on the
 334 engineering study. The speed limits displayed shall be in multiples of 5 mph.

335 **Figure 2B-3 Speed Limit and Photo Enforcement Signs and Plaques**



336
 337 03 Speed Limit (R2-1) signs, indicating speed limits for which posting is required by law,
 338 shall be located at the points of change from one speed limit to another.

339 04 At the downstream end of the section to which a speed limit applies, a Speed Limit sign
 340 showing the next speed limit shall be installed. ~~Additional Speed Limit signs shall be~~
 341 ~~installed beyond major intersections and at other locations where it is necessary to remind~~
 342 ~~road users of the speed limit that is applicable.~~

343 **Support:**

344 04a The Traffic Control Devices Handbook contains suggested criteria on the spacing of speed
 345 limit signs. [approved by Council 1/20/2011, moved from the paragraph 07a position to this
 346 location]

347 **Guidance:**

348 04b Additional Speed Limit signs should be installed beyond major intersections and at other
 349 locations to remind road users of the speed limit that is applicable. [approved by Council
 350 6/24/2011]

351 **Standard:**

352 05 Speed Limit signs indicating the statutory speed limits shall be installed at entrances to
 353 the State and, where appropriate, at jurisdictional boundaries in urban areas.

354 **Support:**

355 06 In general, the maximum speed limits applicable to rural and urban roads are established:

- 356 A. Statutorily – a maximum speed limit applicable to a particular class of road, such as
- 357 freeways or city streets, that is established by State law; or
- 358 B. As altered speed zones – based on engineering studies.

359 07 State statutory limits might restrict the maximum speed limit that can be established on a
 360 particular road, notwithstanding what an engineering study might indicate.

361 ~~07a~~ ~~The Traffic Control Devices Handbook contains suggested criteria on the spacing of speed~~
362 ~~limit signs.~~ [approved by Council 1/20/2011, moved to paragraph 4a above]

363 ~~24-15-07a~~ Advisory Speed signs and plaques are discussed in Sections 2C.08 and 2C.14.
364 Temporary Traffic Control Zone Speed signs are discussed in Part 6. The WORK ZONE (G20-
365 5aP) plaque intended for installation above a Speed Limit sign is discussed in Section 6F.12.
366 School Speed Limit signs are discussed in Section 7B.15 [moved from paragraph 15]

367 Option:

368 08 If a jurisdiction has a policy of installing Speed Limit signs in accordance with statutory
369 requirements only on the streets that enter a city, neighborhood, or residential area to indicate the
370 speed limit that is applicable to the entire city, neighborhood, or residential area unless otherwise
371 posted, a CITYWIDE (R2-5aP), NEIGHBORHOOD (R2-5bP), or RESIDENTIAL (R2-5cP)
372 plaque may be mounted above the Speed Limit sign and an UNLESS OTHERWISE POSTED
373 (R2-5P) plaque may be mounted below the Speed Limit sign (see Figure 2B-3).

374 *Guidance:*

375 09 *A Reduced Speed Limit Ahead (W3-5 or W3-5a) sign (see Section 2C.38) should be used to*
376 *inform road users of a reduced speed zone where the speed limit is being reduced by more than*
377 *10 mph, or where engineering judgment indicates the need for advance notice to comply with the*
378 *posted speed limit ahead.*

379 ~~10 *States and local agencies should conduct engineering studies to reevaluate non-statutory*~~
380 ~~*speed limits on segments of their roadways that have undergone significant changes since the*~~
381 ~~*last review, such as the addition or elimination of parking or driveways, changes in the number*~~
382 ~~*of travel lanes, changes in the configuration of bicycle lanes, changes in traffic control signal*~~
383 ~~*coordination, or significant changes in traffic volumes.*~~ [moved to paragraph 01c]

384 ~~11 *No more than three speed limits should be displayed on any one Speed Limit sign or*~~
385 ~~*assembly.*~~

386 ~~12 *When a speed limit within a speed zone is posted, it should be within 5 mph of the 85th-*~~
387 ~~*percentile speed of free-flowing traffic.*~~ [moved to paragraph 01b]

388 ~~13 *Speed studies for signalized intersection approaches should be taken outside the influence*~~
389 ~~*area of the traffic control signal, which is generally considered to be approximately 1/2 mile, to*~~
390 ~~*avoid obtaining skewed results for the 85th percentile speed.*~~ [moved to paragraph 01d]

391 *Support:*

392 ~~14 *Advance warning signs and other traffic control devices to attract the motorist's attention to*~~
393 ~~*a signalized intersection are usually more effective than a reduced speed limit zone.*~~ [moved to
394 paragraph 11a]

395 *Guidance:*

396 ~~15 *11 An advisory speed plaque (see Section 2C.08) mounted below a warning sign should be used*~~
397 ~~*to warn road users of an advisory speed for a roadway condition. A Speed Limit sign should not*~~
398 ~~*be used for this situation.*~~

399 ~~11a *Advance traffic control warning signs (see Section 2C.36), advance intersection warning*~~
400 ~~*signs (see Section 2C.46), and/or other traffic control devices are provide appropriate warning*~~
401 ~~*prior to attract the motorist's attention to a signalized intersection. are usually more effective*~~
402 ~~*than a reduced A speed limit sign zone should not be used for this purpose.*~~ [moved from
403 paragraph 14 and revised as indicated]

404 Option:

405 ~~16 *Other factors that may be considered when establishing or reevaluating speed limits are the*~~
406 ~~*following:*~~

- 407 ~~A. Road characteristics, shoulder condition, grade, alignment, and sight distance;~~
- 408 ~~B. The pace;~~
- 409 ~~C. Roadside development and environment;~~
- 410 ~~D. Parking practices and pedestrian activity; and~~
- 411 ~~E. Reported crash experience for at least a 12-month period.~~ [moved to paragraph 01a]

412 ~~17.12~~ Two types of Speed Limit signs may be used: one to designate passenger car speeds,
413 including any nighttime information or minimum speed limit that might apply; and the other to
414 show any special speed limits for trucks and other vehicles.

415 ~~18.13~~ A ~~changeable message variable speed limit~~ sign that changes the speed limit for traffic and
416 ambient conditions may be installed provided that the appropriate speed limit is displayed at the
417 proper times and locations in accordance with paragraphs (04) and (05). [approved by Council
418 1/19/2012) (1/28/2014)]

419 **Standard:**

420 ~~18a 13a~~ **The variable speed limit sign legend “SPEED LIMIT” shall be a black legend on a**
421 **white retroreflective background.**

422 **Option:**

423 ~~18b 13b~~ The variable speed limit legend may be indicated by a display of white-LEDs which are
424 white on an opaque black background.

425 ~~19.14~~ ~~A changeable message~~ The driver feedback sign (WX-XX) that displays to approaching
426 drivers the speed at which they are traveling may be installed ~~in conjunction with a Speed Limit~~
427 ~~sign to supplement the Speed Limit sign (See Section 2C.XX)~~

428 **Guidance:**

429 ~~20~~ ~~If a changeable message sign displaying approach speeds is installed, the legend YOUR~~
430 ~~SPEED XX MPH or such similar legend should be displayed. The color of the changeable~~
431 ~~message legend should be a yellow legend on a black background or the reverse of these colors.~~
432 [approved by Council 1/28/2014]

433 **Support:**

434 ~~21-15~~ ~~Advisory Speed signs and plaques are discussed in Sections 2C.08 and 2C.14. Temporary~~
435 ~~Traffic Control Zone Speed signs are discussed in Part 6. The WORK ZONE (G20-5aP) plaque~~
436 ~~intended for installation above a Speed Limit sign is discussed in Section 6F.12. School Speed~~
437 ~~Limit signs are discussed in Section 7B.15.~~ [moved to paragraph 07a]

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