

interchanges. Accordingly, the FHWA adds an OPTION statement after the STANDARD statement to indicate that a normal line may be used to extend a wide line through an intersection. In addition, the FHWA adds an OPTION statement after the first GUIDANCE to clarify that dotted extensions of edge lines may be used as line extensions. The FHWA received two comments from the NCUTCD and the City of Tucson, Arizona, supporting these changes.

The FHWA clarifies the first paragraph of the second GUIDANCE statement by including "major driveways" to be consistent with other changes made in this chapter.

151. In Figure 3B-11, Examples of Extensions through Intersections or Interchanges, the FHWA deletes "Interchanges" from the title, because this figure does not include interchanges, and makes other modifications to the graphic and legend for clarity.

152. In Figure 3B-12, Examples of Lane Reduction Markings, the FHWA adds a graphic "c", which was contained in the 2000 MUTCD and incorporates modifications in the graphic to be consistent with changes in the MUTCD in order to address two comments; one from the NCUTCD and the other from the Wisconsin DOT suggesting that graphic "c" be added.

153. In Section 3B.10 Approach Markings for Obstructions, the FHWA revises the first STANDARD and GUIDANCE statements to change "diagonal" to "tapered" where it refers to the line type. This change is as a result of the decision made by the FHWA in Official Interpretation #3-156²⁸ to correct an error in word usage and clarify the text. The FHWA received no comments regarding this change.

154. In Section 3B.11 Raised Pavement Markers, the FHWA changes the first SUPPORT statement to a STANDARD because this is a definition and all definitions are standards. Because there were several comments from the NCUTCD, Caltrans, and a traffic control device manufacturer opposed to specifying 10 mm (0.4 in) as the height of the retroreflective surface, the FHWA withdraws this proposal due to lack of research to support a specific height of retroreflective surface and restores the language to that used in the 2000 MUTCD, indicating that the height of the device is at least 10 mm (0.4 in).

The FHWA adds an OPTION statement after the STANDARD statement, which states that blue raised pavement markers may be used to mark the positions of fire hydrants. This is common practice in many jurisdictions.

The FHWA adds a second STANDARD statement describing the spacing for raised pavement markers. This statement is moved from Section 3A.05 Widths and Patterns of Longitudinal Pavement Markings (Section 3A.06 in the NPA).

The FHWA also adds a SUPPORT statement at the end of this section that references the Institute of Transportation Engineers 2001 "Traffic Control Devices Handbook"²⁹ for more information regarding the spacing of raised pavement markings.

155. In Section 3B.12 Raised Pavement Markers as Vehicle Positioning Guides with Other Longitudinal Markings, the FHWA received one comment from the City of Tucson, Arizona, supporting the changes and comments from the NCUTCD and the Ohio DOT suggesting clarifications and reversion back to some of the 2000 MUTCD text. Accordingly, the FHWA withdraws this proposal to indicate that raised pavement markers as positioning guides should be spaced "no greater than 3N" and retains the 2000 MUTCD language of the SUPPORT, indicating that typical spacing for raised pavement markers as positioning guides is "2N". The FHWA also revises the second OPTION statement to the language of the 2000 MUTCD for consistency.

To address the Ohio DOT comment and provide agencies with flexibility in raised pavement marker spacing, the FHWA adds an OPTION statement to indicate that a spacing of 3N may be used for some applications on freeways and expressways. A 1997 study by the Ohio Department of Transportation³⁰ found that 120 foot spacing (3N) spacing is adequate in providing guidance to the wet-night driver on freeways in some, but not all, circumstances.

156. In Section 3B.13 Raised Pavement Markers Supplementing Other Markings, the FHWA's proposal to revise item B1 of the GUIDANCE statement to indicate that raised pavement markers should not

supplement right edge line markings unless they are spaced closely enough (no greater than 3 m (10 ft) apart) to approximate the appearance of a solid line received several opposing comments from the Metropolitan Planning Organization of Cincinnati, Ohio, the City of Phoenix, Arizona, traffic engineering consultants, and private citizens. In particular opposition, the bicycle community stated that raised pavement markers cause steering difficulties for bicyclists. The NCUTCD and the City of Tucson, Arizona, supported the proposed changes, however these commenters expressed that more information was needed on the proper spacing of raised pavement markers. Accordingly, the FHWA does not adopt the proposed revision to Item B1 of the GUIDANCE statement. In the future, the FHWA may engage in rulemaking to address the use of raised pavement markers on edge lines in locations where bicycles are not permitted.

In item B.2 of the GUIDANCE statement, the FHWA revises the recommended spacing to be used between raised pavement markers supplementing broken line markings from 2N to "no greater than 3N" because this is an acceptable spacing for most applications. There were no comments regarding this change. (See also the discussion in Section 3B.12 Raised Pavement Markers as Vehicle Positioning Guides with Other Longitudinal Markings regarding Ohio's testing of raised pavement marker spacing.)

Additionally, in item B.5 of the GUIDANCE statement, the FHWA revises the recommended spacing to be used between raised pavement markers that supplement edge line extensions through freeway interchanges from N/2 to "no greater than N" because this is an acceptable spacing for most applications. There were no comments regarding this change.

157. In Section 3B.14 Raised Pavement Markers Substituting for Pavement Markings, there were several comments from the Washington and Ohio DOTs and the City of Plano, Texas, opposing the FHWA's proposal to revise the required spacing between raised pavement markers, while the NCUTCD supported the proposed change. The FHWA modifies the first paragraph of the STANDARD statement to clarify raised pavement marker spacing when used to substitute for broken line markings. The FHWA adds language to clarify spacing for 4 and 5 marker installations, as well as to clarify placement of retroreflective or internally illuminated markers. The FHWA

²⁸ A copy of the FHWA's Official interpretation #3-156 is available for downloading from the American Traffic Safety Services Association the following URL: <http://www.atsssa.com/pubinfo/downloads/10-16-02a.pdf>.

²⁹ Traffic Control Devices Handbook," Institute of Transportation Engineers (ITE), 2001 is available for purchase from the ITE Bookstore at the following URL: <http://www.ite.org/bookstore/index.asp>.

³⁰ "A Field Demonstration and Accident Study of 120-Foot Spacing of Raised Pavement Markers on Ohio Freeways," January 2, 1997, by Whit W. Wardell and Mohammad M. Khan, is available from the Ohio DOT Office of Traffic Engineering, 1980 West Broad Street, Columbus, Ohio 43223, telephone number (614) 466-3601.