

Comments on the Notice of Proposed Amendments to the MUTCD by Jonathan Upchurch

The following comments are being made by me as an individual and not speaking as a representative of any organization with which I may be a member.

Subsequent to publication of the NPA on December 14, 2020, the National Committee on Uniform Traffic Control Devices has spent countless hours reviewing the 647 NPA proposals for changes to the MUTCD and crafting recommendations for submittal to the Docket. The sheer volume of the NPA presented a daunting challenge to the National Committee. In its deliberative processes, the Council of the National Committee alone – not to mention Technical Committees and task forces - met virtually for over 35 hours to discuss, debate and vote on the National Committee's recommendations. All of this effort was accomplished on a volunteer basis.

The National Committee's ability to respond to an NPA of such volume is remarkable. The National Committee has worked tirelessly to craft the best possible MUTCD language to communicate Standard, Guidance, Option and Support statements. Even with the Committee's best efforts, the number of NPA items and limited time to respond to the Docket did not allow the Committee to achieve complete perfection.

The Chair of the National Committee – Gene Hawkins – has invited all members to comment directly to the Docket on any editorial corrections or technical inaccuracies they might find in the recommended language submitted by the Committee. He has also encouraged members of the National Committee to submit their personal comment to the docket.

With that as the context, I state that I support the recommendations of the National Committee.

I offer the following comments in response to: 1) the NPA; and 2) the recommended language submitted by the National Committee. My suggestions do not change the intent of the National Committee's recommendation; my suggestions offer an improved way of presenting the language in the Manual.

Pagination by Part (in case, in the future, MUTCD updates are done by Part, rather than the whole)

One scenario is that future updates of the MUTCD might be done one Part (or a few Parts) at a time, rather than updating the entire document at one time. FHWA should consider doing page numbering of the 11th edition by Part, rather than numbering the entire document from beginning to end. In other words, page numbering in Part 1 would begin with page 1-1 and run through page 1-X, page numbering in Part 2 would begin with page 2-1 and run through page 1-Y, etc. This approach would allow individual Parts to be updating without affecting the page numbering for the remainder of the document.

The HTML version of the 2009 Manual contains hotlinks where the Manual text refers to other Sections, Figures, or Tables. The hotlinks are a useful tool to jump directly to those other locations.

FHWA should consider creating the pdf version of the 11th edition with this type of internal links in the document.

FHWA should also consider annotating the Manual to list – for a particular Section – other Sections of the Manual that refer to that Section. For example, an annotation at the beginning (or ending) of Section 2A.20 would read (for the NPA text mark-up), “This Section is referenced by Sections 2A.10, 2A.11, 2B.01, 2B.02, 2B.47, 2B.48, 2C.01, 2C.02 and 8D.14.” This type of referencing is commonly used in some legal codes and other code-like documents. Such annotation could provide some value to the Manual user in helping them understand the effects of a provision in a Section. This type of annotation could be made in both pdf and HTML versions of the Manual. Such annotation would also have utility when future changes to the Manual are considered. If a Section is being considered for revision, one could check the other Sections that refer to said Section, to determine if a change in said Section could have unintended consequences that would not be obvious looking at said Section alone.

Those who are well-versed in the MUTCD and its periodic revision know that any person or organization can request a change to the Manual at any time. Requests to change the Manual are not limited to periods of rulemaking when public comments can be submitted to a docket. And, in fact, a comment to the docket suggesting a change to the Manual that is outside the scope of the NPA cannot be acted on by FHWA as part of that particular rulemaking.

It has become apparent in recent months that many individuals and organizations do not understand that a request to change the Manual can be made at any time, by anyone. The FHWA MUTCD website describes the process in some detail. However, both the 2009 edition and the proposed NPA Part 1 text are very “light” on how to request a change. The Amendment Process flowchart that appears on FHWA’s website does not appear in Part 1 of the Manual. It is suggested that the Part 1 description of how to request a change should be beefed up and that the Amendment Process flowchart be included in Part 1.

Global comment about “practicable” vs “practical”.

The words “practicable” and “impracticable” appear 11 times in the NPA text mark-up. Although there is a subtle distinction between the meanings (the definitions) of practicable and practical, most users of the MUTCD likely do not know the difference between these two words. It is suggested that the word “practical” be used instead of “practicable” (and “impractical” instead of “impracticable”) to keep the Manual simpler and easier to use. The alternative is to include definitions of practicable and practical in the MUTCD. Section 2B.55 is one location where “practicable” is being inserted into the MUTCD by the NPA.

The Manual has a propensity to refer to devices or features in the plural form rather than the singular form. There are instances when the meaning of a passage would be easier to understand if the singular form was used instead of the plural form. Here are some examples:

Section 6N.04, page 595, lines 47 to 49: The proposed NPA language is: “On roadways which are not bikeways but where bicyclists (when present) typically share lanes with motor vehicle traffic,....” The language would be simpler and easier to understand if it read, “On a roadway which is not a bikeway but where where bicyclists (when present) typically share lanes with motor vehicle traffic,....”

Section 6N.04, page 595, lines 1 and 2: The proposed NPA language is: “In order to maintain room for bicycle lanes through the TTC zone on a multi-lane roadway, one or more travel lanes could be closed.” The language would be simpler and easier to understand if it read, “In order to maintain room for a bicycle lane through the TTC zone on a multi-lane roadway, one or more travel lanes could be closed.”

Section 9E.02, page 768, lines 46 to 48: The proposed NPA language is: “Bicycle lanes located on an intersection approach between contiguous lanes for motor vehicle movements shall be marked with at least one bicycle symbol and at least one arrow pavement markings as provided in Paragraph 9 of Section 9E.01.” The language would be simpler and easier to understand if it read, “A bicycle lane located on an intersection approach between contiguous lanes for motor vehicle movements shall be marked with at least one bicycle symbol pavement marking and at least one arrow pavement marking as provided in Paragraph 9 of Section 9E.01.”

Section 6N.06, page 597, lines 7 and 8: The MUTCD language is: “When paved shoulders having a width of 8 feet or more are closed, at least one advance warning sign shall be used.” The language would be simpler and easier to understand if it read, “When a paved shoulder having a width of 8 feet or more is closed, at least one advance warning sign shall be used.”

Section 9D.01, page 755, lines 6 to 8: The proposed NPA language, as recommended for revision by the National Committee, is: “The purpose of Bicycle Destination signs is to emphasize their messages to bicycle traffic when the direction(s) displayed provides access to routes or pathways where the use of motor vehicles is prohibited or discouraged.” The language would be simpler and easier to understand if it read, “The purpose of a Bicycle Destination sign is to emphasize its message(s) to bicycle traffic when the direction(s) displayed provides access to routes or pathways where the use of motor vehicles is prohibited or discouraged.”

The above set of examples is not exhaustive. There are many other locations in the Manual that could benefit from a change from a plural form to a singular form.

NPA Item No. 1

In NPA Item No. 1, “FHWA proposes a new format for each specific traffic control device that is consistent with the format currently used in Part 4 of the Manual, which uses all uppercase letters for each type of traffic signal indication.”

If FHWA is making the effort to change every traffic control device to this all caps format, FHWA should also ensure that every sign that is mentioned in the MUTCD also shows the sign number (designation) in the text. In other words, in conjunction with the task of changing each sign name to an all caps format, it would be easy to also make sure that the sign number is shown each time that a sign name appears in the text. The 2009 MUTCD is inconsistent in showing sign numbers (designations) in the text.

Section 1A.01 The first sentence of Part 1 in the 2009 MUTCD mentions safety (“...to promote highway safety and efficiency....”). Given the prominence of safety in the development of the Manual, it would be highly appropriate to list the “safety” objective first in the list of objectives in the first paragraph Support statement. In other words, move line D up to line A.

Section 1B.06, page 10, lines 37 and 38: Suggest replacing “experimenting” with “requesting and conducting experimentations”. This phrase mirrors the title of Figure 1B-1. This phrase also provides better emphasis that there are two major steps – making the request, and conducting the experiment. Add a sentence: “The entity requesting permission to experiment shall be known as the Requesting Jurisdiction.” This term is used throughout Figure 1B-1.

Section 1B.08, page 13, lines 23 to 28: There appears to be an inconsistency between the requirements in paragraphs A and B. In paragraph A, it states that a jurisdiction may simply indicate its intent to use a device jurisdiction-wide (as an alternative to a list of specific locations). In contrast, paragraph C states that a jurisdiction must continually update a list of locations where the device has been installed. If a statement that use of the device will be jurisdiction-wide is sufficient for paragraph A, then why does paragraph C require maintaining a list of specific locations?

Section 1C.02, page 16, line 40: Remove the word “symbol” because the National Committee is recommending a bicycle signal face that can include arrow indications.

Section 1C.02, page 24, lines 12 – 14, definition number 146 – Option Lane: This comment is submitted to clarify the National Committee’s recommendation for a different definition for “Option Lane”. It appears that the NPA attempted to craft a definition for “Option Lane” to allow the definition to apply to both conventional roadways and freeways (and expressways). That attempt resulted in language that is problematic. And, under the proposed language, the right hand lane approaching a single lane exit at any interchange would qualify as an Option Lane.

The National Committee has recommended a proposed definition that will serve the Manual well for freeways and expressways and will work well for the multiple Sections in Chapter 2E that deal with “Option Lanes” (such as Section 2E.40 – Design of Overhead Arrow-per-Lane Guide Signs for Option Lanes).

The National Committee recognized that the NPA introduced the term Option Lane in Section 2D.37 (page 175, line 11). The National Committee has recommended that “option lane” be replaced with the words “optional movement lane” at that location. “Optional movement lane” is the traditional vernacular to describe this type of lane on a conventional roadway.

The National Committee’s recommended definition for “option lane” is compatible with the term’s use in Sections 4F and 3B.22.

Chapter 2E covers signing for two different types of freeway “splits”, referring to them as “Option Lanes” and “Dedicated Lanes”. To serve as a companion to the definition of “Option Lane”, the National Committee has recommended a definition for the term “Dedicated Lane”.

Section 1C.02, page 28, lines 1 to 7, Definition 208 - “Serviceable”: I suggest that the definition can be improved by the following wordsmithing.

“Definition 208: Serviceable—~~the~~ a condition ~~of a traffic control device~~ in which ~~it~~ a traffic control device appears (day and night) and operates as intended, ~~until and beyond which~~ it requires replacement due to damage or wear. Whether a device is serviceable will depend on the type of device under consideration. In general.....”

Section 2A.07, page 47, line 4: The existing language (2009 MUTCD), which is the same as NPA proposed language, appears to have an extra word:

“The sizes shown in the Oversized columns in the various sign size tables in this Manual ~~size~~ should be”
Strike the word “size” (the third word from the end of the line).

Section 2A.20, page 57, lines 15 and 16: The National Committee has recommended that this paragraph be deleted. However, there are multiple reasons that this paragraph should remain.

1. The definition of LED-enhanced sign refers to Section 2A.20 and this paragraph would appear to be the most pertinent paragraph to which the definition would refer.
2. Paragraph 12 of Section 2A.20 is a Standard statement that makes reference to Paragraph 8.
3. In Section 2A.10 there is a Support statement that reads, “See Section 2A.20 regarding the use of light-emitting diode (LED) units within the border of a sign.” If Paragraph 8 is deleted, there isn’t much of anything in Section 2A.20 that specifically talks about using LED units within the border of a sign.
4. Section 2A.11 is entitled, “Enhanced Conspicuity for Standard Signs”. In letter K of Section 2A.11, reference is made to Section 2A.20. Letter K, notes that LEDs is one of many ways to enhance conspicuity: “K. Adding light-emitting diode (LED) units within the symbol, legend, or border of a standard regulatory, warning, or guide sign, as provided in Section 2A.20.” Again, if Paragraph 8 is deleted, there isn’t much of anything in Section 2A.20 that specifically talks about using LED units within the border of a sign.

For the above reasons, I believe it makes sense to retain Paragraph 8. But, in addition, Paragraph 8 needs to be revised to add the word “symbols”. Adding the word “symbols” will make Paragraph 8 compatible with the definition of LED-enhanced sign and with letter K in Section 2A.11.

Section 2G.23, page 277, line 50: The parenthetical references are incorrect. It should be Sections 2E.23 and 2E.25.

Section 2G.23, page 278, line 2: The reference to Section 2E.29 is incorrect. It should be Section 2E.28.

Section 2G.23, page 278, line 3: Suggest changing the parenthetical to read, “(see Figure 2G-32, Sheet 4)”.

Section 3D.04, page 375, lines 42 to 44: The proposed NPA language is: “A yield line (see Section 3B.19) shall be used at multilane roundabout entries to indicate the point in each entry lane behind which vehicles are required to yield to all circulating lanes at the entrance to a roundabout (see Figure 3D-2).” The National Committee has recommended that this Standard statement be deleted. If FHWA chooses to retain this Standard statement, I suggest that the language should be revised. The first part of the sentence is not clear because it is not clear whether it is intended to mean entries to roundabouts with multilane circulatory roadways, or to mean roundabouts with multiple lanes on the approach. The language could be improved to read either, “A yield line (see Section 3B.19) shall be used at the entries to multilane roundabouts to indicate the point in each entry lane behind which...” or “A yield line (see Section 3B.19) shall be used on entries to a roundabout that have multilane approaches to indicate the point in each entry lane behind which....”

The text makes reference to Figure 3D-2. In that figure the yield lines are marked as optional (contrary to the NPA proposed text in Section 3D.04 that requires the yield line on the two-lane approach). Figures 3D-3 through 3D-8 ALL have multiple lane approaches, yet none of them show yield lines. If the text requires yield lines for multiple lane approaches, the yield lines need to be shown on all the figures.

Figure 3D-7:

The southbound approach has a dual-right turn, but the pavement marking arrow for the left lane does not show a right turn is permitted from the left lane. This is contrary to the Guidance statement in Section 3D.06 which reads, “Lane-use arrows should be used on approaches to circular intersections with dual left or dual right turns.”

Figure 2B-5 and Section 3D.06, page 376, line 36:

Historically, Figure 2B-5 has used the term “fish-hook arrow” to illustrate one of the arrow options for use on intersection lane control signs approaching roundabouts. Figure 2B-5 in the NPA continues to use that term. In Section 3D.06, page 376, line 36 it appears that the NPA proposed text proposes to change the term from “fish hook arrow” to “elongated arrow” for use in pavement markings for roundabouts. This is an inconsistency that needs to be corrected for the Final Rule.

Section 4A.05, page 405, line 14: Remove the word “Symbol” from the Section title because the National Committee is recommending a bicycle signal face that can include arrow indications.

Section 4A.05, page 405: This Section deals with Meanings of Bicycle Signal Indications. There is something very basic missing from Chapter 4A. What is missing is that there is nothing that explicitly states the responsibilities of the bicyclist who is viewing a bicycle symbol signal indication.

This issue is complicated by the statement at the beginning of Section 4A.03 which reads, "The following meanings shall be given to steady highway traffic signal indications for vehicles..."

By the definition of "Vehicle", a bicycle is a vehicle. Section 4A.03 does not distinguish between a vehicle (bicycle) that is not in a designated bicycle lane versus a bicycle that IS in a designated bicycle lane. And, therefore, a bicycle in a designated bicycle lane could choose to follow the instructions of the vehicular traffic signal (at least a bicycle could, based on the language in Section 4A.03).

I believe that the intent is that bicyclists in a dedicated bicycle lane must comply with the bicycle signal indications and not the vehicular signal indications.

A statement something like the following is needed.

"Bicyclists in a designated bicycle lane or a separate bicycle facility controlled by a bicycle traffic signal shall comply with the indications of the bicycle traffic signal and shall not follow the indications of adjacent vehicular traffic signals that control general purpose lanes."

Maybe this sounds like something that should be in the UVC / Rules of the Road instead of in the Manual, but there is not yet such a provision in the Rules of the Road and we do not know when that could be accomplished. In the meantime, there is a void, unless the Manual addresses it.

My thought is that the above Standard statement would be inserted in Section 4A.05. If a Standard statement doesn't feel appropriate, it could be reformed into a Support statement, something like:

"It is intended that bicyclists in a designated bicycle lane or a separate bicycle facility controlled by a bicycle traffic signal comply with the indications of the bicycle traffic signal and not follow the indications of adjacent vehicular traffic signals that control general purpose lanes."

I acknowledge that the National Committee has recommended that the first line of the first Standard statement in Section 4A.05 be revised to read, "The following meanings shall be given to bicycle traffic signal indications for bicyclists and shall only be applicable to bicyclists in a designated bicycle lane or a separate facility, such as a shared use path:"

This suggested language basically says that a motor vehicle shall not follow the instructions of a bicycle signal head. But, that suggested language does not say that a bicyclist in a designated bicycle lane shall not follow the instructions of a vehicular signal head. Thus, I think there is still a need for a statement that explicitly says what is expected of the bicyclist in a designated bicycle lane.

Section 4A.05, page 405, line 32: Remove the word "symbol" because the National Committee is recommending a bicycle signal face that can include arrow indications.

Section 4E.01, page 431, line 5: Remove the word “symbol” because the National Committee is recommending a bicycle signal face that can include arrow indications.

Section 4H.01, page 463, line 20: Remove the word “symbol” because the National Committee is recommending a bicycle signal face that can include arrow indications.

Section 4H.05, page 465, lines 33 and 36: Remove the word “symbol” because the National Committee is recommending a bicycle signal face that can include arrow indications.

Section 4H.06, page 466, line 1: Remove the word “symbol” because the National Committee is recommending a bicycle signal face that can include arrow indications.

Section 4H.08: page 466, line 46: Remove the word “symbol” because the National Committee is recommending a bicycle signal face that can include arrow indications.

Proposed Section 5B.04, page 514, lines 32 to 35:

The following text is proposed in Section 5B.04 as a Standard statement, but in Section 6J.01 (page 562, lines 20 to 23) the NPA proposes to change the language from a Standard to Guidance.

For long-term stationary operations, pavement markings in the temporary traveled way that are no longer applicable shall be removed or obliterated as soon as practical. Pavement marking obliteration shall remove the non-applicable pavement marking material, and the obliteration method shall minimize pavement scarring.

Section 6C.03, page 534, line 8: The publication numbers need to be revised.

Section 9D.12, page 764, line 40: This Support statement is rather passive and as a result it is weak in communicating what is intended. The Support statement in the NPA is: "Chapter 2M contains information for symbol signs used for facilities, activities, and points of interest."

This would be better cast as an Option statement that would read, "Recreational and Cultural Interest Area symbol signs (see Chapter 2M) may be used on shared-use paths to guide pathway users to facilities, activities, and points of interest."

Recognition of the NCUTCD (as has been done in past editions) would be appreciated. The 2009 edition included the following Acknowledgments: “The Federal Highway Administration gratefully

acknowledges the valuable assistance that it received from the National Committee on Uniform Traffic Control Devices and its more than 250 voluntary members in the development of this Manual.”

COMMENTS ON CHAPTER 2E RECOMMENDATIONS OF THE NATIONAL COMMITTEE

The following comments on Chapter 2E are intended to clarify and expand the rationale behind many of the National Committee’s recommendations for Chapter 2E. I believe that this supporting information will help to inform FHWA as it reviews the recommendations of the National Committee.

The National Committee recommendations for Chapter 2E refer to two research reports to support the recommendations. Those two reports are attached to this docket submittal. The two reports support the National Committee’s recommendations for Sections 2E.12, 2E.41 and 2E.42. The files are:

NCHRP 20-7 (155) Final Report re Sections 2E41 and 2E42.pdf

TRB Arrow-per-Lane Guide Sign Research Revisited re Sections 2E12 and 2E41.pdf

The line numbering below refers to the line numbering in the document submitted by the National Committee on Uniform Traffic Control Devices presenting its recommendations for Chapter 2E.

The four following paragraphs serve as a general preamble regarding the National Committee recommendations for Chapter 2E,

FHWA, in its proposed NPA text, has proposed a major reorganization of Chapter 2E. FHWA has also proposed addition of 26 new figures in Chapter 2E. As a result, many Section numbers and Figure numbers have changed. In turn, that means that when the text cross-references a Section number or Figure number, that number must change (from the 2009 text) due to the reorganization or new figure. Although FHWA undoubtedly tried its best to catch all of these needed changes in cross referencing, some were overlooked.

Where an error has been found in the FHWA proposed text when it refers to a Section number or Figure number, the error has been corrected in the recommended text below. For economy of space and to reduce cluttering, individual explanatory notes for each correction are not embedded in the text.

There are also many instances in which the recommendations below include minor editorial changes. When these changes are purely editorial in nature, and do not change the meaning of the text, individual explanatory notes are not included.

For economy of space, recommendations for figures are handled as follows. There are 65 Chapter 2E figures in the NPA. All FHWA proposed figures are shown in the Part_2_Combined_Figures.pdf document included in the Federal Register Notice supporting materials on December 14, 2020. Of the 65 Chapter 2E figures, 26 figures are new and 36 figures have no changes. If a figure is proposed by FHWA to remain unchanged from the 2009 edition and the recommendation below makes no recommendation to change the figure and the figure is not shown below, it may be presumed that the

recommendation concurs with continued use of the figure in an unchanged form as presented in the above mentioned pdf.

Section 2E.01, lines 83 – 84: The National Committee recommended that all of the text on guide signing in tunnels be located in a separate Section that is titled “Guide Signing in Tunnels” so that this material will be easier to find, locating the new Section following Section 2E.44.

Section 2E.07, lines 392 – 393: The National Committee submittal contains an error. The figure title for Figure 2E-1 that the National Committee recommends is, “Destination Guide Signing for Opposing Directions of Travel”.

Section 2E.11, lines 469 – 470: The National Committee recommended deletion of this sentence in conjunction with its recommendation to delete an NPA proposal in Section 2E.12 that would have required numeral and letter sizes on overhead signs as shown in the “Overhead” columns of Tables 2E-2 and 2E-4.

Section 2E.12: Although not stated in the Preamble, FHWA is proposing several changes to Tables 2E-1 through 2E-5. It appears that FHWA is proposing changes to the height of Arrow-Per-Lane arrows in Table 2E-5. In Item # 647 FHWA proposes to add a new option in Appendix A1 to allow an alternative letter style for destination legends on freeway and expressway guide signs. For clarity in application, FHWA designates this letter style, commonly referred to as “Clearview 5-W,” as “Series E (modified)-Alternate.”

The changes which the National Committee has recommended include several changes to the FHWA proposal, including: 1) change the Section title; 2) to not concur with FHWA’s proposal regarding larger letter heights on overhead signs; 3) changes to both existing and proposed text; 4) revisions to FHWA proposed changes to the Tables; 5) revision to FHWA proposed changes in Arrow-Per-Lane arrow height; and 6) incorporation of “Clearview” font as an option in Section 2E.12 rather than being located in Appendix A1.

The changes which the National Committee has recommended for Section 2E.12 text are extensive. An annotated version of the National Committee’s recommendation is presented below which embeds the rationale for various recommendations within the National Committee’s recommended text.

Section 2E.12 Size of Signs and Size and Style of Letters and Signs [This title more clearly describes the two major contents of the Section.]

Standard:

Except as provided in Section ~~2A.11~~ 2A.07, the sizes of freeway and expressway guide signs that have standardized designs shall be as shown in Table 2E-1.

Support:

Section ~~2A.11~~ 2A.07 contains information regarding the applicability of the various columns in Table 2E-1.

Option:

Signs larger than those shown in Table 2E-1 may be used (see Section ~~2A.11~~ 2A.07).

Standard:

~~All names of places, streets, and highways on freeway and expressway guide signs shall be composed of lower-case letters with initial upper-case letters. The letters and the numerals used shall be FHWA Standard Alphabet Series E (modified) as provided in the “Standard Highway Signs” publication (see Section 1A.11). The nominal loop height of the lower-case letters shall be 3/4 of the height of the initial upper-case letter (see Paragraph 2 of Section 2D.05 for additional information on the specification of letter heights). Other word legends shall be composed of upper-case letters. Interline and edge spacing shall be as provided in Section 2E.13.~~ The NPA proposed that this paragraph be moved to this location. The Preamble does not give a justification for the relocation and there is, otherwise, no obvious reason for the relocation. Returning this paragraph to its original location allows the Section text to be presented in a more logical order (how to determine message dimensions first and then determine outside sign dimensions). The recommendation is that the paragraph be restored to its original location.

For all freeway and expressway signs that do not have a standardized design, the message dimensions shall be determined first, and the outside sign dimensions secondarily. ~~Word messages in the legend of expressway guide signs shall be in letters at least 8 inches high for words composed of all upper-case letters.~~ [This sentence is not needed because Tables 2E-2 through 2E-5 prescribe letter sizes and in all instances are 8 inches or greater.] ~~Larger lettering shall be used for major guide signs at or in advance of interchanges and for all overhead signs.~~ [What constitutes a “major guide sign” is not defined. This sentence is not needed because Tables 2E-2 through 2E-5 prescribe letter sizes by interchange type or sign classification.] Minimum numeral and letter sizes for expressway guide signs ~~according to interchange classification, type of sign, and component of sign legend~~ shall be as shown in Tables ~~2E-3~~ 2E-2 and ~~2E-4~~ 2E-3. Minimum numeral and letter sizes for freeway guide signs ~~according to interchange classification, type of sign, and component of sign legend~~ shall be as shown in Tables ~~2E-5~~ 2E-4 and ~~2E-6~~ 2E-5. [It is not clear what is meant by “component of sign legend”. Changes to the titles of tables have been recommended that will make it easier for the user to select the appropriate table to use depending upon sign type or interchange classification. The NPA text mark-up refers to Tables 2E-3 through 2E-6. By these proposed changes in Table numbers, FHWA appears to suggest that they intended to add a new Table 2E-2. However, no new table appears in the pdf of Part 2 tables.] ~~The minimum numeral and letter sizes for overhead-mounted expressway and freeway guide signs shall be those shown in the “Overhead” columns of Tables 2E-2 and 2E-4, respectively, except where a larger minimum numeral or letter height is provided in the columns for the applicable type of interchange (Major, Intermediate, or Minor).~~ [The recommendation is to not concur with this proposed Standard statement and to delete the associated footnotes in Tables 2E-2 and 2E-4. Is there any research that supports a need for the larger letter sizes for Overhead? Signs located overhead are more easily read by drivers because they are located closer to vehicles than post-mounted signs to the right. Larger letter sizes for overhead signs will lead to wider signs, perhaps too wide to fit over a single lane.]

All names of places, streets, and highways on freeway and expressway guide signs shall be composed of lower-case letters with initial upper-case letters. The letters and the numerals used shall be FHWA Standard Alphabet Series E (modified) as provided in the “Standard Highway Signs” publication (see Section 1A.11). ~~The nominal loop height of the lower-case letters shall be 3/4 of the height of the initial upper-case letter (see Paragraph 2 of Section 2D.05 for additional information on the specification of letter heights).~~ [This sentence recommended for removal so that there is no confusion about the nominal loop height ratio when Series E (modified)-Alternate font is used. Nominal loop height is also specified in the Standard Highway Signs publication.] ~~Other word legends, including cardinal directions, action messages, and special characters,~~ shall be composed of upper-case letters. [The first sentence specifies which types of legends shall be upper/lower case. This sentence was revised to more specifically identify what types of legends are included in “Other word legends”.] Interline and edge spacing shall be as provided in Section ~~2E.13~~ 2E.15.

The above paragraph has been restored to its former location and revised.

Lettering size on freeway and expressway signs shall be the same for both rural and urban conditions.

[Paragraphs 7 to 12 are the provisions which apply for use of Series E(modified)-Alternate font. These paragraphs are recommended as a substitute for the proposed NPA text in Appendix A1.]

Option:

[Par. 7] Series E(modified)-Alternate lettering may be used in place of Series E(modified) for the names of places, streets, and highways on freeway and expressway guide signs in accordance with the provisions of paragraphs 08 to 12. [This paragraph is essentially the same as the Option statement in Appendix A1.]

Standard:

[Par. 8] The use of Series E(modified)-Alternate shall be limited to the display of names of places, streets, and highways on freeway and expressway guide signs that would otherwise use Series E(modified) lettering. Words shall be composed of lower-case letters with initial upper-case letters. [Corresponds to provisions in Appendix A1.]

[Par. 9] The design, nominal loop height, and spacing of Series E(modified)-Alternate letters shall be as provided in the “Standard Highway Signs” publication (see Section 1A.05 of this Manual). [Corresponds to provisions in Appendix A1.]

Supplementing the National Committee’s recommended MUTCD text, the National Committee makes the following additional recommendations to FHWA.

- 1) That Series E(modified)-Alternate lettering be added to the Standard Highway Signs publication.
- 2) That the Standard Highway Signs publication provide design and spacing for both what are traditionally referred to as “Series 5-W” and “Series 5-W-R” (a condensed spacing of Series 5-W)
- 3) That the Standard Highway Signs publication specify the nominal loop height of the lower case letters compared to the height of the initial upper case letter and that this be the ratio recommended by the Clearview font designer. [Note that this recommendation was inadvertently not included in the National Committee’s submittal to the docket.]
- 4) That the Standard Highway Signs publication state that the Series 5-W-R spacing shall not be used except when replacing a sign on an existing sign structure that has structural constraints which preclude use of Series 5-W lettering, or when overlaying an existing sign panel that has width constraints which preclude use of Series 5-W lettering.

[Par.10] Series E(modified)-Alternate shall not be used for any application other than as provided in the three preceding paragraphs. [Corresponds to provisions in Appendix A1.]

[Par.11] Series E(modified)-Alternate shall not be used for negative contrast (black lettering on white or colored background) signs or portion of signs. [This provision included for emphasis.]

[Par. 12] Option:

When Series E(modified)-Alternate lettering is used, numerals in the name of a place, street, or highway may be composed of Series E(modified)-Alternate lettering. [A replacement for provisions in Appendix A1. The provision in Appendix A1 – to prohibit Series E(modified)-Alternate from being used for numbers – creates significant inefficiencies in sign design and manufacture.]

Support:

Sign size is determined primarily in terms of the length of the message and the size of the lettering necessary for proper legibility. Letter style and height, and arrow design have been standardized for freeway and expressway signs to assure uniform and effective application.

Designs for upper-case and lower-case FHWA Standard Alphabets, together with tables of recommended letter spacing, are shown in the “Standard Highway Signs” publication (see Section ~~1A.11~~ [1A.05](#)).

Guidance:

Freeway lettering sizes (see Tables 2E-4 and 2E-5) should be used when expressway geometric design is comparable to freeway standards.

Other sign letter size requirements not specifically identified elsewhere in this Manual should be guided by these specifications. Abbreviations should be kept to a minimum, except as provided in Section 2E.16.

Support:

A sign mounted over a particular roadway lane to which it applies might have to be limited in horizontal dimension to the width of the lane, so that another sign can be placed over an adjacent lane. The necessity to maintain proper vertical clearance might also place a further limitation on the size of the overhead sign and the legend that can be accommodated.

Regarding NPA Item number 647, the National Committee recommended that provisions for the Series E(modified)-Alternate font be included in Section 2E.12 and that Option and Standard statements proposed by the NPA for Appendix A1 be moved to Section 2E.12 and edited.

APPENDIX A1

CONGRESSIONAL ACTIONS

PUBLIC LAW 115-141-MAR. 23, 2018 (CONSOLIDATED APPROPRIATIONS ACT, 2018)

DIVISION L, TITLE I

Section 125 -- For this fiscal year, the Federal Highway Administration shall reinstate Interim Approval IA-5, relating to the provisional use of an alternative lettering style on certain highway guide signs, as it existed before its termination, as announced in the Federal Register on January 25, 2016 (81 Fed. Reg. 4083).

The following Option and Standard statements content moved to 2E.12 and edited.

~~**Option:**~~

~~Series E(modified)-Alternate may be used in place of Series E(modified) for the names of places, streets, and highways on freeway and expressway guide signs in accordance with the provisions of the following paragraph.~~ [Paragraph 7 in Section 2E.12 essentially corresponds to this Option statement.]

~~**Standard:**~~

~~The use of Series E(modified)-Alternate shall be limited to the display of names of places, streets, and highways on freeway and expressway guide signs. Words shall be composed of lower-case letters with initial upper-case letters.~~ [Corresponds to Paragraph 8 in Section 2E.12]

~~The design and spacing of the letters shall be as provided in the “Standard Highway Signs” publication (see Section 1A.11 of this Manual).~~ [Corresponds to Paragraph 9 in Section 2E.12]

~~The nominal loop height of the lower-case letters shall be 84 percent of the height of the initial upper-case letter.~~ [It is recommended that the nominal loop height be specified in the Standard Highway Signs publication.]

~~Interline spacing, measured from the baseline of the upper line of legend to the upper limit of the initial upper-case letter of the lower line of legend, shall be at least 96 percent of the initial upper-case letters (equivalent to 84 percent of the initial upper-case letter when measured from the baseline of the upper line of legend to the upper limit of the rising stems of the lower-case letters of the lower line of legend).~~

~~Edge spacing shall be as provided in Section 2E.13 of this Manual.~~ [Because edge spacing is covered in Section 2E.13, reference to it does not need to be repeated in Section 2E.12.]

~~The size of the sign shall be suitably enlarged to accommodate the larger lower-case letters and interline spacing.~~

~~When the name of a place, street, or highway contains numerals, the numerals shall be composed of the FHWA Standard Alphabet Series E(modified).~~ [Provisions for numerals are included in Paragraph 12 of Section 2E.12.]

~~Other lettering on the sign, such as for cardinal directions and distance or action messages, and all numerals or special characters, shall be composed of Series B, C, D, E, E(modified), or F of the FHWA Standard Alphabets as provided in this Manual.~~ [Provisions for other lettering are included in Paragraph 5 of Section 2E.12.]

~~Series E(modified) Alternate shall not be used for any application other than as provided in the two preceding paragraphs.~~ [Corresponds to Paragraph 10 in Section 2E.12]

To supplement the National Committee’s submittal to the docket regarding Table 2E-5, the following additional information is provided.

11. Table 2E-5, part L on Overhead Arrow-Per-Lane Signs, gives minimum heights for Overhead Arrow-Per-Lane arrows. The heights shown in the NPA pdf tables document are different from the heights shown in the Official Version of the 2009 MUTCD on the FHWA MUTCD website. Thus, it is concluded that FHWA is proposing a change to these arrow heights. The recommendation is to revise these arrow heights as shown in Table 2E-5 following below.

Overhead Arrow-per-Lane signs are larger than other forms of guide signing and this is a major issue for state departments of transportation. The sign must be wider because it must provide an arrow over each lane. In addition, the sign height is higher because the through arrows are required to be 72 inches tall. Increased sign width and height adds both weight and wind load to the support structure. For one new freeway facility in Florida, the state Department of Transportation estimated that the additional cost (for both sign and sign structure) for an Arrow-per-Lane sign, compared to a traditional sign design, would be \$500,000 per sign structure. For reconstructed freeway facilities, an existing overhead sign bridge would often need to be replaced due to the additional structural load.

To avoid the need to replace an existing sign structure when an Overhead Arrow-per-Lane sign was installed on an existing sign structure, the Missouri Department of Transportation designed an Overhead Arrow-per-Lane sign with through arrows that are 42 inches tall. This sign design placed a smaller load on the support structure, produced a lower wind load, and allowed an existing sign structure to be used. A reduction in the minimum size of arrows in Table 2E-5 would allow more flexibility in sign design.

A human factors experiment conducted in 2014 concluded that the height of arrows on Arrow-per-Lane signs is much larger than is needed. The experiment is documented in “Arrow-per-Lane Guide Sign Research, Revisited” presented at the 2015 Transportation Research Board Annual Meeting. This research supports the recommendation to reduce the height of overhead Arrow-Per-Lane arrows. A copy of the Transportation Research Board paper is being submitted to the docket to accompany these comments.

Section 2E.12, lines 729-732: The National Committee submittal to the docket includes inadvertent errors on these lines.

The line that reads, “Revise the arrowhead width from 12” to 21.625”.” should read, “from 21” to 21.625”.”

The line that reads, “Revise the through and option arrow heights from 66” to 42”.” should read, “Revise the through and Optional-Diverge arrow heights from 66” to 42”.”

The line that reads, “Revise the left, right, and split arrow heights from 45” to 36”.” should read, “Revise the left only and right only arrow heights from 45” to 36” and revise the Optional split arrow height from 55” to 36”.”

[conclusion of comments on Section 2E.12]

Section 2E.18, line 838: The Preamble for this NPA Item 195 states that FHWA proposes a new figure to illustrate the provisions. However, no new figure appears in the NPA figures document and a new figure is not referred to in the NPA text.

Section 2E.18, lines 846 - 848: Do not concur with the requirement imposed by the last sentence in the paragraph. For post-mounted Exit Direction signs, an arrow either on the side or below the legend would be functional and satisfactory. If the last sentence is deleted, the preceding sentence can be restored to its 2009 MUTCD form. To conform with the recommended text, it is also recommended that Figures 2E- 1, 14, 26, 27, 28, 30,31, 58 and 60 be revised to show the directional arrow to the side of the legend on all of the post-mounted Exit Direction signs.

Section 2E.20, lines 911 – 915: The NPA proposed language results in a sentence that says, “Where overhead sign supports cannot be placed...in a[n]...shielded site, they should be...adequately shielded....”. That is a contradiction in language. The National Committee’s substitute language is recommended.

Section 2E.21, Figure 2E-2: As illustrated in the NPA proposed figure, the figure could mislead a reader to believing that Specific Service signs must all be upstream from the 1 Mile Advance Guide sign.

Section 2E.22, lines 1024 – 1029: As the NPA guidance clarifies with suffixes, an interchange can have a different exit number in opposing directions; as such, the interchange would not have a unique number. To this end, it is recommended to eliminate the term “interchange number” and replace it with “interchange exit number” for clarity throughout this Section. Adding “departure point” is recommended to clarify the term “exit” as being the departure point from the mainline that is being numbered and not downstream ramp splits. 2E-9 is the correct figure to reference for exit plaques. Recommend deleting “EXIT or EXITS” as this could be misinterpreted to mean either could be used interchangeably, the use of the “(S)” with (EXIT) is the more commonly used/understood form to mean plural when required.

Section 2E.22, line 1032: “impractical” is used elsewhere in this Section, so use “impractical” here for consistency in this section.

Section 2E.22, lines 1047 – 1051: As proposed in the NPA, the first sentence would mean that a crossroad at milepost 15.6 would be signed as Exit 16. That contradicts the guidance that is offered in item 1. below. The National Committee’s recommended wording allows the guidance below and the figures to convey the intent more clearly.

Section 2E.22, lines 1070 – 1075: Due to the lack of clear guidance on exit numbering in the 2009 and past Manuals, many states have exits numbered in ways that do not comply with this new NPA proposed Standard statement which will result in those states not being in substantial conformance with a standard. Making it a Guidance statement gives states some latitude in this matter.

Section 2E.22, lines 1082 – 1083: Based on the “through E1-5eP”, it appears that FHWA intended to show additional versions of Exit Number plaques in Figure 2E-9. Only three versions are shown in the NPA figures. Changing the wording to “E1-5P Series” allows flexibility in what eventually will be placed in the figures. As written, the intended position could be misinterpreted. Some readers might interpret “directly” to mean “centered”. Recommend removing the word “directly” and then adding language referring to figures.

Section 2E.22, lines 1085 – 1089: The sign numbers (sign designations) for the Left Exit Number plaque need to be verified. FHWA did not to show additional versions of Exit Number plaques in Figure 2E-9.

Section 2E.23, lines 1252 – 1256, and Figure 2E-9: The sign numbers listed on these six lines suggest that FHWA intended to include additional versions of Exit Number plaques in NPA Figure 2E-9 that are not shown. Only three versions are shown in NPA Figure 2E-9. An additional NCUTCD recommendation is to add the additional versions so that Figure 2E-9 is consistent with the NPA text.

Section 2E.23, lines 1274 – 1279: It is recommended that the logical order of this Section would be improved if this paragraph was relocated to follow the Paragraph 3 Support statement.

Section 2E.25, line 1402: There is no place in the Manual that describes different signs that might exist as part of a Series. For example, Figures 2E-12 and 2E-13 do not identify any signs by sign number (sign designation). Thus, it is recommended that “(E4 Series)” be deleted.

Section 2E.26, Figure 2E-15, lines 1547, 1550, 1553, and 1569 – 1570: The FHWA proposed Section 2E.26 text refers to the E5-1c sign, but it is not shown in Figure 2E-15 of the NPA figures. The 2009 MUTCD text also refers to the E5-1c sign, but that sign is not shown in the 2009 Figure 2E-28 AND the missing E5-1c sign is not acknowledged in the List of Known Errors for the 2009 MUTCD. The NCUTCD recommendation is to add the E5-1c sign to Figure 2E-15.

Section 2E.27, lines 1597 – 1601: The 2009 Manual says nothing about what information is to be displayed on a Pull-Through sign. Thus, the user of the 2009 Manual relies only on figures for information on what legend to include. This is a shortcoming. The recommendation is to add these Standard and Option statements.

Section 2E.28, line 1633: The National Committee calls to FHWA's attention that the term "major guide signs" is used numerous times in the MUTCD, but it is not defined.

Section 2E.28, lines 1642 – 1651: Seldom does the Manual make reference to a figure and state that a sign shall have a design like in the figure. Figures 2E-18 and 2E-19 illustrate an Exit Direction sign design to use for a single lane drop. Those figures do not show the sign design to use for a double lane drop (two lanes are dropping at the exit). The revision to the text overcomes this problem. The text that remains adequately describes what the sign should look like (for any number of dropped lanes).

Section 2E.28, Figure 2E-23, lines 1737 – 1748: There are several problems with this NPA proposed figure. The difference between the "At Exit Ramp" example and the "Within Interchange" example appears to be the proximity of the lane termination to the exit ramp. More appropriate labels would be "Immediately after exit ramp" and "Farther downstream of exit ramp". The W9-2 sign should be removed from the right side of Figure 2E-23 and replaced with W9-1 sign, for consistency with NPA proposed changes to Section 2C. The overhead sign should be changed to read LANE ENDS 500 FEET. One of the Advance Guide signs at ½ mile has an arrow splitting the distance message. The arrow should be below the distance message. The figure on the right shows two exit direction signs and this could mislead the reader. The varying order in which overhead mounted and post-mounted alternatives are shown could cause confusion.

Section 2E.28, lines 1756 – 1761: A Right Lane Exit Only (W9-7) sign should also be used (see Section 2C.50). [Section 2C.50 provides guidance on use of the W9-7 sign. That guidance specifies one location for the sign – not multiple locations that alternate with Advance Guide signs.

Section 2E.29, Figure 2E-24, line 1792: The Preamble incorrectly refers to this figure as Figure 2E-15.

Section 2E.29, Figure 2E-25, line 1802: The Preamble incorrectly refers to this figure as Figure 2E-16.

Section 2E.30, Figure 2E-26, line 1826: The National Committee recommendation erroneously reads, "correct the section reference to 2D.17". It should read, "correct the note in the figure to read, "See Figure 2D-17..."

Section 2E.31, Figure 2E-27, lines 1860-1861: The National Committee recommendation erroneously reads, "correct the section reference to read "See Figures 2D.16 through 2D.18...". It should read, "correct the note in the figure to read, "See Figures 2D-16 through 2D-18..."

Section 2E.32, Figure 2E-28, line 1883: The National Committee recommendation erroneously reads, “correct the section reference to read “See Figures 2D.16 through 2D.18...”. It should read, “correct the note in the figure to read, “See Figures 2D-16 through 2D-18...”

Section 2E.32, Figure 2E-28, line 1883: The National Committee recommendation erroneously reads, “correct the section reference to read “See Figures 2D.16 through 2D.18...”. It should read, “correct the note in the figure to read, “See Figures 2D-16 through 2D-18...”

Section 2E.33, Figure 2E-29, lines 1916-1917: The National Committee recommendation erroneously reads, “correct the section reference to read “See Figure 2D.20...”. It should read, “correct the note in the figure to read, “See Figures 2D-20...”

Section 2E.34, Figure 2E-30, lines 1949-1950: The National Committee recommendation erroneously reads, “correct the section reference to read “See Figure 2D.20...”. It should read, “correct the note in the figure to read, “See Figures 2D-20...”

Section 2E.35, Figure 2E-31, lines 1973-1974: The National Committee recommendation erroneously reads, “correct the section reference to read “See Figure 2D.19...”. It should read, “correct the note in the figure to read, “See Figures 2D-19...”

Section 2E.36, lines 2005-2009: Section 2J.09 is the more appropriate location to specify General Services and Specific Services signing.

Section 2E.40, line 2147: The National Committee recommendation erroneously reads, “Revise the first Standard paragraph...”. It should read, “Revise the first Option paragraph....”

Section 2E.40, lines 2194-2198: The proposed language in the NPA text could be misinterpreted as follows by a reader: “the overhead Exit Direction sign... may be replaced on the existing sign support structure...using the Overhead Arrow-per-Lane guide sign design.” In other words, an Overhead Arrow-per-Lane sign would be placed on a sign structure at the theoretical gore (this is NOT where an Overhead APL should be located). The recommended re-wording clarifies the text and reduces the chances of misinterpretation.

Section 2E.40, lines 2207 – 2210: It is unclear what a “narrow lane marking taper” means. How can a taper be narrow? It does not describe the situation shown in Figure 2E-39. The re-wording more clearly articulates the situation and also specifies the location where the additional signs may be placed. The 800-foot dimension was selected because it is the minimum recommended distance between successive overhead guide signs as provided in Sec. 2E.21. If FHWA does not accept the NC’s recommendation to consolidate Figures 2E-39 and 2E-40, the parenthetical note at the end should read, “(See Figures 2E-39 and 2E-40)”.

Section 2E.40, lines 2219 – 2221: The NPA introduces partial width Overhead APL signs in Section 2E.42. The partial width signs do NOT have an arrow over each lane. “Upward pointing” could be interpreted by some readers to mean an arrow pointing straight up. The parenthetical reduces the chance of misinterpretation by using “vertical” and “curved”, which are used elsewhere in a similar fashion.

Section 2E.40, lines 2224-2227: Typically, there is very little curvature at the point of departure. The lane usually begins to curve somewhere downstream (as is implied by “curved alignment beyond the theoretical gore”. The text says that the arrows shall indicate “the approximate degree of curvature”.

All of the curved arrows in MUTCD figures show the same degree of curvature and Standard Highway Signs shows only one curvature for curved arrows. It is recommended that the last phrase be deleted.]

Section 2E.40, lines 2238-2241: The text says that the arrows shall indicate “the approximate degree of curvature”. All of the curved arrows in MUTCD figures show the same degree of curvature and Standard Highway Signs shows only one curvature for curved arrows. It is recommended that the last phrase be deleted.

Section 2E.40, Figure 2E-37, lines 2298-2301: Figure 2E-37 is a revised figure, proposed by FHWA in the NPA, which is different from the figure with the same title that appears in the 2009 MUTCD. There are several problems with this figure. The proposed Figure 2E-37 violates two Standard statements in Section 2E.40: 1) “Where the through lanes curve and the exit continues on a straight alignment, upward-pointing vertical arrows shall be used for the exiting movement and curved arrows for the through movement.”; 2) “Arrows for continuing through lanes shall be vertically upward pointing (see Figure 2E-36) unless those lanes are on a significantly curved alignment beyond the theoretical gore”. The use of curved arrows for a geometrically straight movement and straight arrows for a geometrically curved movement is extremely contradictory to driver expectations and violates guidance for arrows elsewhere in the MUTCD. In terms of communicating roadway alignment to the driver, proposed Figure 2E-37 is in marked contrast to proposed Figure 2E-43 (which signs for similar geometric conditions). The exit number on the exit gore sign (13) does not match the exit number on the Advance guide signs (11).

Section 2E.40, Figure 2E-37, lines 2306-2307: As a substitute for Figure 2E-37 as proposed by FHWA in the NPA, the NCUTCD recommendation is to revert to the 2009 MUTCD Figure 2E-5, but with the following improvements: 1) delete “to” panel on assembly, 2) delete “south” on panel assembly because that is an improper direction for an even numbered route.

Section 2E.40, Figure 2E-39, line 2357: The Advance Arrow Per Lane signs in Figure 2E-39 violate the Standard statement in Section 2E.40 which states that, “Arrows for continuing through lanes shall be vertically upward pointing unless those lanes are on a significantly curved alignment beyond the theoretical gore.” The NCUTCD recommended a substitute figure. In that substitute figure, the signing at the gore matches that shown in Figures 2E-33, 2E-42, and 2E-43. The recommended substitute figure is similar to Figure 2E-36. The major difference from Figure 2E-36 is that the recommended figure adds signing at the theoretical gore to provide positive guidance.

Section 2E.41, lines 2388 – 2392: Diagrammatic signs have not been shown to be less effective than conventional or Overhead Arrow-per-Lane guide signs. In NCHRP Project 20-7 (155) – “Signing for Two-Lane Exits with an Option Lane” four sign configurations for option lanes were tested in a human factors study. The sign configuration using diagrammatic signs performed best, based on 10 measures of effectiveness. In the NCHRP study the diagrammatic sign performed better than a partial width Overhead Arrow-per-Lane sign. A paper presented at the 2015 Transportation Research Board Annual Meeting (“Arrow-per-Lane Guide Sign Research, Revisited”) showed that in a human factors study a diagrammatic sign performed better than an Overhead Arrow-per-Lane sign when “correct lane choice” was the measure of effectiveness. Copies of the NCHRP study and the Transportation Research Board paper are being submitted to the docket to accompany these comments.

Section 2E.41, Figure 2E-44, line 2468: The leader line from the “EXIT ONLY” sign panel does not point to the overhead sign bridge in the plan view.

Section 2E.41, lines 2376-2381: A copy of that NCHRP study is being submitted to the docket to accompany these comments. An example of a diagrammatic sign with these larger dimensions is shown below.



Section 2E.42, lines 2501-2508: The first sentence, as proposed in the NPA, is easily subject to misinterpretation. Does it mean that a partial width APL is preferable to a full width APL or a diagrammatic sign? OR Does it mean that a partial width APL is preferable to the other alternatives described later in the Section (i.e., the alternatives shown in Figures 2E-48 and 2E-49)? The National Committee's recommended re-write better clarifies the intended meaning. "partial width" is the term used in the title of Figure 2E-45. For consistency, that is the term that should also be used in the text. "Upward pointing arrows" could easily be misinterpreted to mean "straight/through arrows" and that is not what the intent is here. "Upward pointing" is intended to distinguish from downward pointing arrows used on other types of guide signs. The insertion of "(vertical or curved)" and "(two-headed arrow)" helps to better convey the intended meaning.

Section 2E.42, lines 2510-2512: NCHRP Project No. 20-7 (155) (which evaluated alternative option lane signing in a driving simulator) showed that only 1 in 100 unnecessary lane changes was the result of this misunderstanding. A copy that NCHRP study is being submitted to the docket to accompany these comments. This phrase is really a Support statement buried in a Standard statement. It is recommended that this phrase be deleted so that – if the forthcoming Pooled Fund Study shows that through route and destination info can be added to the sign without causing driver confusion – it is not necessary to "undo" this phrase.

Section 2E.42, lines 2517-2520: The paragraphs preceding this paragraph state that the preferred way to sign this type of interchange is with a partial width Overhead APL sign. This paragraph states that there are two alternatives: full width overhead APL or conventional signing. This paragraph is needed so that the Section logically presents the alternatives.

Section 2E.42, lines 2521-2526: The introductory phrase is needed to indicate under what conditions the remainder of the statement applies. The remaining changes are identical to the changes recommended in Section 2E.40, which has an identical passage.

Section 2E.42, lines 2566-2568: The figure title shown in the NPA text mark-up is different from the figure title shown in the NPA pdf file of Figures. The National Committee submittal to the docket neglected to state its recommendation for the figure title. The NCUTCD recommendation is to use the figure title in the NPA pdf file of Figures, i.e., Example of Signing for a Two-Lane Intermediate or Minor

Interchange Exit with an Option Lane and a Dropped Lane using Partial-Width Overhead Arrow-Per-Lane signs.

Section 2E.42, Figure 2E-46, lines 2566 – 2568: The NCUTCD recommendation is to modify Figure 2E-46 to include the following aspects shown in Figure 2E-47: 1) include the same notes under the Exit Direction sign located at the beginning of the taper; 2) utilize a box and an inset to illustrate the alternative for the Exit Direction sign located at the theoretical gore; 3) include the note inside the box that reads, “Located at the theoretical gore”; 4) include the note under the inset box that reads, “Existing sign support structure retained”.

Section 2E.42, Figure 2E-47, lines 2574-2576: The figure title shown in the NPA text mark-up is different from the figure title shown in the NPA pdf file of Figures. The National Committee submittal to the docket neglected to state its recommendation for the figure title. The NCUTCD recommendation is to use the figure title in the NPA pdf file of Figures, i.e., Example of Signing for a Two-Lane Intermediate or Minor Interchange Exit with Option and Auxiliary Lanes using Partial-Width Overhead Arrow-Per-Lane signs.

Section 2E.42, Figure 2E-49, lines 2589-2592: This figure number and title is missing from the NPA text mark-up and clean text documents.

Section 2E.43, lines 2627-2630: The “Except as provided...” phrase was proposed to be added by FHWA. It is recommended that the phrase not be included in the MUTCD. An Option statement earlier in the Section provides that, “At overhead locations, more than one sign may be installed to advise of a multiple-exit condition at an interchange.” That Option statement covers the condition occurring at cloverleaf interchanges. The second sentence of the Option statement says, “If the roadway ramp or crossing roadway has complex or unusual geometrics, additional signs with confirming messages may be provided to properly guide the road user.” This sentence would allow for a Pull-Through sign. Thus, the situation for cloverleaf interchanges is already covered in the Option statement and adding the phrase proposed by FHWA would be redundant. Calling out only cloverleaf interchanges, while not calling out other types of interchange conditions that might also deserve an exception, would simply add confusion about how to sign those other types of interchange conditions.

Section 2E.43, Figure 2E-50, lines 2638-2639: The NCUTCD recommendation is to include the Figure 2E-50 in the MUTCD, but with the following changes: 1) reduce the width of the Exit Panels on the two Burnt Hills Exit Direction signs (they do not need to be full width of the sign); 2) in the After Sign-Spread Location 2 illustration, change the distance on the Burnt Hills Advance Guide sign to “3/4 MILE”.

The red and blue overlay corrections for this figure have improper registration in the National Committee’s submittal. Refer to the above text descriptions of the recommended changes for clarification.

Section 2E.XX (Guide Signing in Tunnels), lines 2686-2687: The phrase “the provisions for freeway and expressway guide signs in tunnels” could be read to mean that provisions for freeway and expressway guide signs in tunnels already exist. Recommend moving the words “in tunnels” as shown.]

Section 2E.XX (Guide Signing in Tunnels), Lines 2702-2704: The exit number plaque should be placed on the left edge of the sign only if it is a left exit. The plaque should be on the right edge if it is a right exit,

consistent with the typical placement of an exit number plaque on signs outside the tunnel. Drivers may be using exit number placement as a visual cue to where the exit will depart.

Section 2E.XX (Guide Signing in Tunnels), Lines 2726-2720: Signs in tunnels could be either externally or internally illuminated. As proposed by FHWA, the text is describing only the externally illuminated case. Recommend that the language be replaced as shown in National Committee submittal to docket.

Section 2E.XX (Guide Signing in Tunnels), Lines 2722-2723: The defined term in the MUTCD is “Sign Illumination”. Recommend revising the text to use the defined term.

Section 2E.XX (Guide Signing in Tunnels), Lines 2724-2726: The use of the word “exit” in “exit from the tunnel” may confuse some readers. Readers may equate the word “exit” with “exit ramp”.

Section 2E.47, lines 2783-2784: The first line of the Standard states that there are two versions of this sign – a two-line sign and a three-line sign. If there are only two versions, there can only be two signs, which means that there cannot be Series and that there cannot be more than two sign designations. The first line of the first Guidance statement says, “If a second line is used....”. That statement implies that there could be a one-line sign. It is recommended that these contradictions be resolved. Is there a need to have different sign designations for 2-line, 3-line, etc. signs? This question is pertinent not only for Post-Interchange Distance signs, but some other sign types as well.

Section 2E.48, lines 2829-2832: The order of the two lines is reversed so that they match the order in the Section 2E.49 text and the order in Figure 2E-54.]

Section 2E.50, line 2928: Although Table 2E-1 includes E3-1 and E3-2 sign designations, there is no mention of which signs receive these designations in the text and no use of these designations in the Figures. It is recommended that FHWA should link these sign designations to signs illustrated in the Manual, create additional sign designations if needed, and label signs in figures with their appropriate sign designations. Label Figures 2E-55 and 2E-56 appropriately and label the signs in the text.

Section 2E.50, lines 2939-2942: Contrary to the thesis that that most interchanges do not need Supplemental guide signs, it is quite common to have Supplemental guide signs. In many urban areas, almost all interchanges that have space available have Supplemental guide signs. Compliance with this guidance statement would be low.

Section 2E.50, lines 2962-2965: Preceding guidance statements say that a Supplemental guide sign should display no more than two destinations, and that no more than one Supplemental guide sign should be used on each interchange approach. Creating a Standard that allows four destinations makes it harder for agencies to push back when they would prefer to rely on the Guidance statement that says should be not more than two.

Section 2E.53, line 3141: The letter at the beginning of the line should be “D.” (not “A.”).

Section 2E.53, lines 3143-3144: Option statement added to provide flexibility to replace gore sign with overhead sign when there is very narrow gore and/or removal of the gore sign to allow oversized loads into the inspection site without routinely knocking down the gore sign.

Section 2E.53, lines 3147-3152: This option statement provides flexibility to adapt weigh station signing to a larger variety of other types of inspection that occur in many states and is consistent with recommendation 14B-GMI-09 approved by National Committee in 2014.

Section 2E.53, lines 3158-3160: Need to specify that the OPEN or CLOSED is with one of these signs rather than just anywhere in the signing sequence.

Section 2E.53, lines 3162-3164: Signs names have been corrected to conform with the names that are used in Section 2D.51. "within the sign border" is ambiguous. Some readers might interpret it to mean within the 1 ½ inch white stripe that is the border. In fact, "within the border" is used in Section 2A.04 to literally mean "inside the border itself". "on the sign" is less likely to be misinterpreted.

Section 2E.57, line 3305-3308: Several concerns were identified with this concept, as illustrated in the proposed figure. These very large signs on intersection approaches will block the view of the signal indications. Use of the word "EXIT" on exit number panels is inappropriate when they aren't exits, but intersections. Use of suffixes A & B for right and left turns is contrary to their standard use. This signing presents too much information for a dense urban area. How does one decide which intersecting streets get numbers and left exit panels?

Section 2E.57, Figure 2E-65, line 3312: Note that the Figure number is shown incorrectly in the NPA text mark-up.