



National Committee on Uniform Traffic Control Devices

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National Committee on Uniform Traffic Control Devices

RWSTC

RWSTC agenda item III.5, January 2014

TECHNICAL COMMITTEE: R&W Signs Technical Committee

DATE OF ACTION (TASK FORCE): 6-11-13, revised 12-22-13 following sponsor comments

RWSTC APPROVAL: 6-27-13

TRANSMITTAL TO SPONSORS: November 2013

RWSTC APPROVAL DATE: 1-

COUNCIL APPROVAL: 1-10-14

EV Task Force
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TOPIC: Electrical Vehicle (EV) Signs

AFFECTED SECTIONS OF MUTCD: Section 2B.46, 2B.47 and Figure 2B-24

SUMMARY:

29 Electric vehicle (EV) parking signs have been emerging throughout the country with little
30 uniformity, consistency, or any study of recognition of the best way to convey the
31 restrictions and regulations intended. FHWA provided interim approval of a symbol for
32 EV and there has been substantial activities by states in implement EV initiatives
33 including the provision of uniform signing. The task force objective was to find the best,
34 more consistent and uniform signs for reserving parking for charging EVs both on-street
35 and off-street.

37 **RESEARCH:**

38 The following publications have been reviewed relative to these added requirements:

- 40 • *Traffic Control Devices Pooled Fund Study: Design and Evaluation of Selected*
41 *Symbol Signs – Phase II Final Report*, FHWA, by SAIC, May 2008.
- 42 • “*Traffic Control Devices Pooled Fund Study: Design and Evaluation of Selected*
43 *Symbol Signs – Phase II Final Report*, FHWA, by SAIC, November 2010.
- 44 • *Interim Approval for Optional Use of an Alternative Electric Vehicle Charging*
45 *General Services Symbol Sign*, FHWA, HOTO-1, April 1, 2011.
- 46 • *Ready Set Charge – A Guide to EV-Ready Communities*, Association of Bay
47 Area Governments, 2011.
- 48 • *Lessons Learned – The EV Project EVSE Signage*, US Department of Energy,
49 by ECOTality, April 2012.
- 50 • *Zi-128 EV Internationally recognized Symbol Final Approval*, British Columbia
51 Ministry of Transportation and Infrastructure, November 2012.
- 52 • *Zero-Emissions Vehicle Signage Information*, redacted from the 2012 ZEV Action
53 Plan, State of California, Governor’s Office of Planning and Research, October
54 2012; as part of California Traffic Control Devices Committee meeting December
55 6, 2012.
- 56 • *Electric Vehicle Sign Comprehension*, CE454 Urban Transportation Studies
57 Group Project, Portland State University, December 2012.
- 58 • *Bill ESSB 5849*, Washington State House of Representatives Office of Program
59 Research, Transportation Committee, March 2013.
- 60 • *Evaluation of Electric Vehicle Signage*, Portland State University, June 2013.

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63 **DISCUSSION:** On April 1, 2011 FHWA issued interim approval for the use
64 of an Alternative Electric Vehicle Charging General Service Symbol Sign.
65 The content of that approval focuses on the D9-11 series type sign and
66 section 21.02. However, the appropriate application of the sign is wayfinding
67 not regulation of on-street and off-street parking spaces for sites open to
68 public travel. The use of a blue sign to regulate parking space designation is not
69 appropriate. This issue has been taken up by several western states, Canada and is
70 relevant given the emerging development of EVs. However, most of these efforts
71 represented individual or narrow committee recommendations without substantive
72 research to determine what is the most recognizable message for this task – similar to
73 the work done between 2008 and 2010 by FHWA as part of the pooled fund studies to
74 determine the general service sign.

75
76 Following discussion of this topic at RWTC meetings in June 2012 and January 2013,
77 the task force worked with Portland State University to conduct two human factors
78 evaluations to determine what sign had the best recognition through research, making
79 use of prior studies and sign messages. The first effort was undertaken by students to
80 independently assess (through a class project overseen by Dr. Chris Monsere) if there
81 was confusion in the messaging. It was found that there was confusion. This led to a



83 more detailed human factors survey effort conducted by students (through a class
84 project overseen by Dr. Kelly Clifton, led by Deanna George & Benjamin Stolt) that
85 emulated the pooled fund research effort to guide the development of the most
86 recognizable sign.

87
88 The December 2012 PSU studies were cursory human factors efforts but it provided the
89 following general findings:

- 90
- 91 1. More is less - no sign should have multiple plaques unless they are addressing
92 separate issues (like pay to park and EV). The two word reserved parking
93 seemed to fare well although several of the surveys compared it to conditions
94 that it was not intended to address.
 - 95 2. The EV symbol did well and had a 87% recognition that the symbol did NOT
96 include hybrids.
 - 97 3. If limits to parking are to be for charging activity - the word charging will need to
98 be included.
 - 99 4. No parking as a sign to indicate restricted parking for EV appears to be confusing
100 between surveys with ranging results - mixed messaging
 - 101 5. When it is not simply reserved EV parking (the MUTCD prototype from the
102 handicap parking example seems to work well there), how multiple components
103 are assembled for EV vs general parking, charging vs not charging, time limits,
104 pay to park needs more consideration

105
106 The June 2013 PSU Study was a more detailed effort focused on the EV parking sign
107 concepts for on-street and off-street parking, providing the following findings:

- 108
- 109 1. Use of no parking symbols to restrict parking for EVs confuses road users as to
110 the message to park or not park
 - 111 2. Use of the words "charging only" clarified the regulatory requirement that a
112 vehicle must be charging (not just an EV) to utilize the space
 - 113 3. The use multiple colored signs seemed to have higher recognition (green and
114 black on white) which may outweigh the costs/complexity of multiple color
115 production
 - 116 4. Use of arrows on these signs confused users
 - 117 5. The two signs below had the best recognition for addressing EV parking
118 restrictions for off-street and on-street conditions. Key findings include:



119
120 Optional idea --->



- 121
- 122 • The use of the black EV symbol outperformed the blue or green for the reserved parking

- 123 • Based upon recognition of other signs with CHARING ONLY
124 messaging, replacing the arrow that is shown on the comparable R7-8
125 disabled person parking sign
126 • While the two hour parking sign performed well, a further test or
127 consideration of an all green or replacing the blue EV symbol with a
128 black regulatory equivalent would be subject to RWSTC committee
129 consideration.

130
131 The Technical Committee recommended use of green for the symbols over
132 black for consistency in color and simplicity in sign preparation. Based upon
133 the available research and studies conducted the following text is
134 recommended for the MUTCD.

135
136 **RECOMMENDED WORDING**

137 **RECOMMENDED WORDING:**

138 Note: Proposed changes to the MUTCD are shown in **underline red** and removed text are shown in
139 **strikethrough red**. Changes shown following sponsor comments are shown in yellow below

140 **Insert the following new text shown in red to Section 2B.46 in paragraph 1 between signs**
141 **13 and 14:**

142
143 **Section 2B.46 Parking, Standing, and Stopping Signs (R7 and R8 Series)**

144 Support:

145 01 Signs governing the parking, stopping, and standing of vehicles cover a wide variety of
146 regulations, and only general guidance can be provided here. The word "standing" when used on
147 the R7 and R8 series of signs refers to the practice of a driver keeping the vehicle in a stationary
148 position while continuing to occupy the vehicle. Typical examples of parking, stopping, and
149 standing signs and plaques (see Figures 2B-24 and 2B-25) are as follows:

- 150 1. NO PARKING ANY TIME (R7-1);
- 151 2. NO PARKING X:XX AM TO X:XX PM (R7-2, R7-2a);
- 152 3. NO PARKING EXCEPT SUNDAYS AND HOLIDAYS (R7-3);
- 153 4. NO STANDING ANY TIME (R7-4);
- 154 5. XX HOUR PARKING X:XX AM – X:XX PM (R7-5);
- 155 6. NO PARKING LOADING ZONE (R7-6);
- 156 7. NO PARKING BUS STOP (R7-7, R7-107, R7-107a);
- 157 8. RESERVED PARKING for persons with disabilities (R7-8);
- 158 9. VAN ACCESSIBLE (R7-8P);
- 159 10. Pay Station (R7-20);
- 160 11. Pay Parking (R7-21, R7-21a, R7-22);
- 161 12. Parking Permitted X:XX AM TO X:XX PM (R7-23);
- 162 13. Parking Permitted XX HOUR(S) XX AM – XX PM (R7-23a);
- 163 14. **RESERVED PARKING for charging electric vehicles (R7-24)**

167 15. **XX HOUR Parking for charging electric vehicles (R7-25)**

168 Note: Renumber sequence below

- 169 16. XX HR PARKING X:XX AM TO X:XX PM (R7-108);
- 170 17. NO PARKING ANYTIME/XX HOUR PARKING X:XX AM – X:XX PM (R7-200, R7-200a);
- 171 18. TOW-AWAY ZONE (R7-201P, R7-201aP);
- 172 19. THIS SIDE OF SIGN (R7-202P);
- 173 20. EMERGENCY SNOW ROUTE NO PARKING IF OVER XX INCHES (R7-203);
- 174 21. NO PARKING ON PAVEMENT (R8-1);
- 175 22. NO PARKING EXCEPT ON SHOULDER (R8-2);
- 176 23. No Parking (R8-3, R8-3a);
- 177 24. EXCEPT SUNDAYS & HOLIDAYS (R8-3bP);
- 178 25. ON PAVEMENT (R8-3cP);
- 179 26. ON BRIDGE (R8-3dP);
- 180 27. ON TRACKS (R8-3eP);
- 181 28. EXCEPT ON SHOULDER (R8-3fP);
- 182 29. LOADING ZONE (R8-3gP);
- 183 30. X:XX AM TO X:XX PM (R8-3hP);
- 184 31. EMERGENCY PARKING ONLY (R8-4);
- 185 32. NO STOPPING ON PAVEMENT (R8-5);
- 186 33. NO STOPPING EXCEPT ON SHOULDER (R8-6); and
- 187 34. EMERGENCY STOPPING ONLY (R8-7).

188
189 Insert the following new text shown in red in Section 2B.47 between paragraphs 17 and 18
190 of the MUTCD:

191 **Section 2B.47 Design of Parking, Standing, and Stopping Signs**

192 Support:

193 01 Discussions of parking signs and parking regulations in this Section apply not only to parking,
194 but also to standing and stopping.

195 Standard:

196 02 The legend on parking signs shall state applicable regulations. Parking signs
197 (see Figures 2B-24 and 2B-25) shall comply with the standards of shape, color, and
198 location.

199 03 Where parking is prohibited at all times or at specific times, the basic design for
200 parking signs shall have a red legend and border on a white background (Parking
201 Prohibition signs), except that the R8-4 and R8-7 signs and the alternate design for
202 the R7-201aP plaque shall have a black legend and border on a white background, and
203 the R8-3 sign shall have a black legend and border and a red circle and slash on a
204 white background.

205 04 Where only limited-time parking or parking in a particular manner are permitted,
206 the signs shall have a green legend and border on a white background (Permissive
207 Parking signs).

- 208 *Guidance:*
209 05 Parking signs should display the following information from top to bottom of the sign, in the
210 order listed:
211 A. The restriction or prohibition;
212 B. The times of the day that it is applicable, if not at all hours; and
213 C. The days of the week that it is applicable, if not every day.
- 214 06 If the parking restriction applies to a limited area or zone, the limits of the restriction should
215 be shown by arrows or supplemental plaques. If arrows are used and if the sign is at the end of a
216 parking zone, there should be a single-headed arrow pointing in the direction that the regulation
217 is in effect. If the sign is at an intermediate point in a zone, there should be a double-headed
218 arrow pointing both ways. When a single sign is used at the transition point between two parking
219 zones, it should display a right and left arrow pointing in the direction that the respective
220 restrictions apply.
- 221 07 Where special parking restrictions are imposed during heavy snowfall, Emergency Snow Route
222 (R7-203) signs (see Figure 2B-24) should be installed. The legend will vary according to the
223 regulations, but the signs should be vertical rectangles, having a white background with the
224 upper part of the plate a red background.
- 225 **Standard:**
226 08 Where parking spaces that are reserved for persons with disabilities are designated
227 to accommodate wheelchair vans, a VAN ACCESSIBLE (R7-8P) plaque shall be mounted
228 below the R7-8 sign. The R7-8 sign (see Figure 2B-24) shall have a green legend and
229 border and a white wheelchair symbol on a blue square, all on a white background.
230 The R7-8P plaque (see Figure 2B-24) shall have a green legend and border on a white
231 background.
- 232 Option:
233 09 To minimize the number of parking signs, blanket regulations that apply to a given district
234 may, if legal, be posted at district boundary lines.
- 235 10 As an alternate to the use of arrows to show designated restriction zones, word messages
236 such as BEGIN, END, HERE TO CORNER, HERE TO ALLEY, THIS SIDE OF SIGN, or BETWEEN
237 SIGNS may be used.
- 238 11 Where parking is prohibited during certain hours and time-limited parking or parking in a
239 particular manner is permitted during certain other time periods, the red Parking Prohibition and
240 green Permissive Parking signs may be designed as follows:
241 A. Two 12 x 18-inch parking signs may be used with the red Parking Prohibition sign
242 installed above or to the left of the green Permissive Parking sign; or
243 B. The red Parking Prohibition sign and the green Permissive Parking sign may be combined
244 (see Figure 2B-24) to form an R7-200 sign on a single 24 x 18-inch sign, or an R7-200a
245 sign on a single 12 x 30-inch sign.
- 246 12 At the transition point between two parking zones, a single sign or two signs mounted side by
247 side may be used.
- 248 13 The words NO PARKING may be used as an alternative to the No Parking symbol. The
249 supplemental educational plaque, NO PARKING, with a red legend and border on a white
250 background, may be used above signs incorporating the No Parking symbol.

251 14 Alternate designs for the R7-107 sign may be developed such as the R7-107a sign (see [Figure 2B-24](#)). Alternate designs may include, on a single sign, a transit logo, an approved bus symbol, 252 a parking prohibition, the words BUS STOP, and an arrow. The preferred bus symbol color is 253 black, but other dark colors may be used. Additionally, the transit logo may be displayed on the 254 bus face in the appropriate colors instead of placing the logo separately. The reverse side of the 255 sign may contain bus routing information.

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257 15 To make the parking regulations more effective and to improve public relations by giving a 258 definite warning, a TOW-AWAY ZONE (R7-201P) plaque (see [Figure 2B-24](#)) may be appended to, 259 or incorporated in, any parking prohibition sign. The Tow-Away Zone (R7-201aP) symbol plaque 260 may be used instead of the R7-201P word message plaque. The R7-201aP plaque may have 261 either a black or red legend and border on a white background.

262 *Guidance:*
263 16 If a fee is charged for parking and a midblock pay station is used instead of individual parking 264 meters for each parking space, pay parking signs should be used. Pay Parking (R7-22) signs 265 (see [Figure 2B-24](#)) should be used to define the area where the pay station parking applies. Pay 266 Station (R7-20) signs (see [Figure 2B-24](#)) should be used at the pay station or to direct road 267 users to the pay station.

268 **Standard:**
269 17 If the pay parking is subject to a maximum time limit, the appropriate time limit 270 (number of hours or minutes) shall be displayed on the Pay Parking (R7-21 or R7-21a) 271 and Pay Station (R7-20) signs.

272 *Guidance:*
273 18 Where parking spaces are reserved for charging electric vehicles, a 274 RESERVED PARKING for charging electric vehicles-(R7-24) sign (see [Figure 2B-24](#)) should be installed adjacent to the designated space.

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276 19 Where on-street parking spaces are reserved for charging electric 277 vehicles and have time restrictions, XX HOUR Parking for charging electric 278 vehicle (R7-25) sign (see [Figure 2B-24](#)) should be installed adjacent to the 279 designated space.

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281 NOTE: Re-sequenced the paragraph numbering below

282 Option:
283 20¹⁸ In rural areas (see [Figure 2B-25](#)), the legends NO PARKING ON PAVEMENT (R8-1) or NO 284 STOPPING ON PAVEMENT (R8-5) are generally suitable and may be used. If a roadway has 285 paved shoulders, the NO PARKING EXCEPT ON SHOULDER sign (R8-2) or the NO STOPPING 286 EXCEPT ON SHOULDER sign (R8-6) may be used as these signs would be less likely to cause 287 confusion. The R8-3 symbol sign or the word message NO PARKING (R8-3a) sign may be used to 288 prohibit any parking along a given highway. Word message supplemental plaques may be 289 mounted below the R8-3 or R8-3a sign. These word message supplemental plaques may include 290 legends such as EXCEPT SUNDAYS & HOLIDAYS (R8-3bP), ON PAVEMENT (R8-3cP), ON BRIDGE 291 (R8-3dP), ON TRACKS (R8-3eP), EXCEPT ON SHOULDERS (R8-3fP), LOADING ZONE (with arrow) 292 (R8-3gP), and X: XX AM TO X: XX PM (with arrow) (R8-3hP).

293 21¹⁹ Colors that are in compliance with the provisions of [Section 2A.10](#) may be used for color 294 coding of parking time limits.

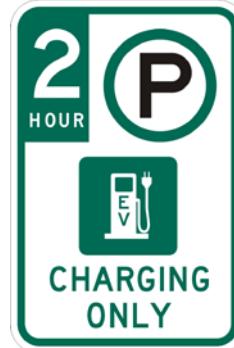
295 *Guidance:*
296 **2220** If colors are used for color coding of parking time limits, the colors green, red, and black
297 should be the only colors that are used.
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Add the following graphics to Figure 2B-24:



R7-24



R7-25

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The two following paragraphs are not intended for inclusion in the MUTCD. The two paragraphs are presented for information only as the National Committee and FHWA consider this Technical Committee Recommendation.

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R7-24 is shown as a vertical rectangular white sign with a green border and the words "RESERVED PARKING" in green on two lines above a green electric vehicle charging symbol with the words "CHARGING ONLY" below in green. The sign can be applied to individual spaces which are accompanied by a charging station for electric vehicles.

R7-25 is shown as a vertical rectangular white sign with a green border and a black letter "P" inside a green circle. The words "2 HOUR" (or alternatively the desired time restriction) in white on a green background as shown. A green electrical vehicle charging station symbol is below the time restriction. The words "CHARGING ONLY" are below in green. The sign can be applied to individual spaces which are accompanied by a charging station for electric vehicles.

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EV TASK FOR VOTE:

For: unanimous

Opposed:

Abstentions:

RWSTC Vote: 6-27-13

For: Unanimous

Opposed:

Abstensions:

RWSTC Vote: 1-8-14

For: Unanimous

334

335 **Council Vote: 1-10-14**

336 **For: Unanimous**

337 **Opposed:**

338 **Abstentions:**

339

340 C:NCUTCD/June 2013/McCourt/Electric Vehicle – EV signs revised 6-27-13, revised 12-
341 22-13 following sponsor comments formatted 1-2-14, approved by RWSTC 1-8-14
342 following sponsor comments, approved by COUNCIL 1-10-14