

**INDIANA VARIATIONS TO THE
2009 NATIONAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICE**

(Based on Revision 2 to the 2011 IMUTCD)

Variations							
VAR. NO	SECTION NO	NMUTCD PAGE #	NATURE OF CHANGE	VAR. NO	SECTION NO	NMUTCD PAGE #	NATURE OF CHANGE
1	Intro.	n/a	Add basis for IMUTCD	40	3B.23	395	Change a Option (Para. 12)
2	Intro.	I-2	Add a Standard	41	3D.02	417	Change Std (Para. 03)
3*	Intro.	n/a	Add Table I-3, Revision Summary	42	3I.03	430	Change Para. 03 to Option
4	1A.09	4	Add a Guidance	43	4C.02	437	Add Table 4C-2 - Change Support / Option
5	1A.13	10	Change a Standard (Para. 01)	44*	4C.03	439	Add an Option/Add Tables 4C-3 & 4C-4
6	1A.13	22	Add a Standard (definition)	45*	4C.04	439	Add an Option/Add Tables 4C-5 & 4C-6
7	2B.14	58	Change Section title & a Std (Par 01)	46	4C.05	442	Add an Option/Add Table 4C-7
8	2B.31	73	Change Section title & a Guid (Par 01)	47	4C.05	n/a	Add Table 4C-8
9	2B.33	74	Change Guidance (Para. 02)	48	4C.10	448	Add an Option/Add Tables 4C-12 & 4C-13
10	2B.39	77	Change an Option (Para. 04)	49**	4D.32	493	Change guidance and add Option and Standards
11	2B.46	89	Change an Option (Para.. 01)	50	6E.04 & 6E.06	567 & 571	Add a Standard to 6E.04/ Void 6E.06
12:**	2B.53	95	Change an Option (Para. 02) and	51*	n/a	580	Add Signs to Table 6F-1
13	2B.55	97	Add a Standard and a Support	52	6F.03	581	Change a Guidance (Para.11)
14	2B.60	99	Change a Guidance (Para. 01 & 02)	53*	6F.12	586	Add a Standard
15	2C.61	134	Add Support and a Standard	54	6F.18	591	Add an Option
16	2D.11	143	Change to Figure 2D-3	55**	6F.84	615	Add a Standard
17	2D.25.1	n/a	Add a Section	56	6H.01	n/a	Add Notes & Figure 6H-13AY
18	2D.29	n/a	Add a Figure (2D-6 sheet 5)	57	6H.01	n/a	Add Notes & Figure 6H-17AY
19	2D.43	161	Change a Guidance (Para. 01)	58	6H.01	n/a	Add Notes & Figure 6H-30AY
20	2D.49	172	Change an Option (Para. 04)	59	6H.01	n/a	Add Notes & Figure 6H-32AY
21	2E.35	218	Change a Guidance (Para. 02)	60	6H.01	n/a	Add Notes & Figure 6H-35AY
22	2E.35	219	Change a Guidance (Para. 04)	61	6H.01	718/719	Changed Figure 6H-43 Title
23	2E.38	222	Change a Guidance (Para. 01)	62	6H.01	n/a	Add Notes & Figure 6H-43AY
24	2H.02	292/293	Change to Table 2H-1 & Figure 2H-1	63	7B.13	742	Add Support, Option & Std / Change Table 7B-1)
25	2I.01	300	Change to Table 2I-1 (Sheet 1 & 2)	64	7B.15	743	Change Standard (Para 09)) / Change Table 7B-1)
26	2I.05	n/a	Add Figure 2I-5a	65	7D.02	745	Add (a Support
27	2I.05	308	Add an Option	66	7D.03	745	Change Guidance (Para. 02)
28	2I.08	309	Change an Option (Para. 09)	67	7D.06	n/a	Add Section 7D.06
29	2I.09	310	Change an Option (Para. 01)	68	7D.07	n/a	Add Section 7D.07
30	2I.12	n/a	Add 2I.12 and Figure 2I-9	69	7D.08	n/a	Add Section 7D.08
31	2J.01	312	Change Std P.01 Change Guidance P.08	70	8A.01	747	Add Support
	2J.02	313	Change a Standard (Para. 02)	71	8B.01	751	Add a Support
32	2J.01	312	Change an Option (Para. 03)	72	8B.04	757	Add a Support
33	2J.06	317	Change a Guidance (Para. 02)	73	8B.07	759	Delete 8B.07/ Add a Standard to that affect
34	2J.07	318	Change a Guidance (Para. 03)	74	8B.10	760/761	Add Standard, Support , & Option / Change Table 8B-1Fig 8B-4
35	2K.03	323	Change a Guidance (Para. 01) & Fig 2K-1	75	8B.24	764	Add Guid & Option/ Change Tab 8B-1 & Fig 8B-4
36	2K.04	323	Change a Guidance (Para. 02) & Fig.2K-2	76	8B.29	767	Change s Standard (Para. 03) & Add a Guidance
37	2L.01	325	Adding a Standard (Para. 06)	77	8C.04	772	Change a Standard (Para. 03)
38	2M.09	333	Change a Guidance (Para. 01)	78	8C.06	773	Change a Standard (Para. 04)
39	3B.20	389	Change a Option (Para. 02) Item C2	79*	App A2	A2-1	Change Table A2-4

* Variation affected by Revision 1 to the 2011 IMUCTD

** Variation affected by Revision 2 to the 2011 IMUCTD

Figures Affected	
Figure	NMUTCD PAGE #
2B-24 (sheet 2 of 2)	89
2B-30	99
2D-3	143
2D-4	145
2H-1	293
2I-8	310
2K-1	321
2K-2	322
6H-43	718/719
8B-4	759
New Figures	
2D-6 (5 of 5)	n/a
2I-6a	n/a
2I-9	n/a
6H-13AY	n/a
6H-17AY	n/a
6H-30AY	n/a
6H-32AY	n/a
6H-35AY	n/a
6H-43AY	n/a

Tables Affected	
Table	NMUTCD PAGE #
I-3	n/a
2B-1 (sheet 4 of 4)	49
2D-1	139
2H-1	292
2I-1 (sheet 1 of 2)	299
2I-1 (sheet 2 of 2)	300
4C-2 renamed to 4C-9	448
4C-3 renamed to 4C-10	448
4C-4 renamed to 4C-11	448
6F-1 (sheet 3 of 3)	580
6H-1	632
7B-1	733
8B-1	752
New Tables	
4C-2 through 4C-8	n/a
4C-12	n/a
4C-13	n/a

INTRODUCTION

~~(Variation 1: added the following to the beginning of the Introduction)~~

Introduction and General Provisions

This Edition of the Indiana Manual on Uniform Traffic Control Devices (IMUTCD), has been established and the contents contained herein shall be used by state and local officials in determining the necessity for any traffic control device in their respective jurisdictions. It also applies to private roadways and parking areas open to the public where the use of traffic control devices are needed.

The principal purpose of this IMUTCD is to give the size, shape, color, etc. of the signs, markings, and devices, which may be used under varying circumstances.

One of the primary purposes of this Manual is to promote uniformity in the type of devices used throughout the State. The devices suggested and their applications are to be used in conjunction with field investigation and engineering judgment; however, these devices are not a substitute for the exercise of reasonable care on the part of the highway user. This Manual shall not be construed as an instrument to mandate the use of any of the control devices or procedures at a particular location.

Legal Authority

It is the intent, in the adoption of the IMUCTD, to meet the various requirements of the statutes of the State of Indiana. In particular, the following statutes are considered to be enabling legislation which allows for the promulgation of the Indiana Manual on Uniform Traffic Control Devices for Streets and Highways: Indiana Code 4-22-2, 9-21-2, 9-21-3, and 9-21-4, and specifically in sections:

IC 9-21-2-1

Sec. 1. "The Indiana department of transportation shall adopt rules under IC 4-22-2 to create the Indiana Manual on Uniform Traffic Control Devices for Streets and Highways."

IC 9-21-2-2

Sec. 2. "The Indiana Manual on Uniform Traffic Control Devices for Streets and Highways must substantially conform with the Manual on Uniform Traffic Control Devices for Streets and Highways, 1961 Edition, and the Manual for Signing and Pavement Marking for the National System for Interstate and Defense Highways, 1962 Edition, and all other manuals and revisions to the manuals that have the approval of the Federal Highway Administrator."

IC 9-21-2-3

Sec. 3. "All manuals (including revisions to the manuals) described in section 2 of this chapter may be considered to become a part of the Indiana Manual on Uniform Traffic Control Devices for Streets and Highways if the following conditions exist:

- (1) The Indiana Department of Transportation concurs in the revisions.
- (2) The Indiana Department of Transportation adopts the manuals (including revisions) by order of the commissioner of the Indiana department of transportation

IC 9-21-2-4

Sec. 4. "The Indiana Department of Transportation may add control devices to the state manual in those areas where the federal standards are silent."

INTRODUCTION (continued)

IC 9-21-4-1

Sec. 1. "A governmental agency in Indiana that is responsible for the signing, marking, and erection of traffic control devices on streets and highways within Indiana shall follow the Indiana Manual on Uniform Traffic Control Devices for Streets and Highways."

Revisions

Revisions to the IMUTCD will be accomplished as specified in Indiana Code 9-21-2-3. Generally any change to the IMUTCD need not be implemented immediately unless specifically so stated in the newly adopted IMUTCD. The policies and practices of the governmental agencies involved will determine the reasonableness in time in making any changes or additions as required by regulations in the use of traffic control devices as set forth in the IMUTCD.

Not all of the traffic control devices that appear in later revisions to the National MUTCD will appear in the IMUTCD; however, local jurisdictions, at their own discretion, may utilize portions of the revised National MUTCD providing such use is in substantial conformance to the National MUTCD and does not conflict with Indiana State law.

Reasonable time periods for changing existing installations to conform to the IMUTCD should normally be updated at the end of normal service life or as published, by the Federal Highway Administration, for the "Phase-in Compliance Periods".

(Variation 2: added this Standard on page I-2)

Standard:

¹⁴ **All minimum and maximum values noted in a Standard shall be construed as referring to the English System of Units.**

(Variation 3: added this table on pages I-7 thru I-9)

Table I-3. Revision Summary (Sheet 1 of 3)

Revision #	Part	Section/ Figure/ Table	Page No.	Revision
1	Introduction	Table I-2	I-6	Target Compliance Dates Re-established by the FHWA revised Dates revised for sections 2A.08, 2A.19, 4D.26, 4E.06, and 8B.03 Dates Deleted for sections 2A.08, 2B.03, 2B.09, 2B.10, 2B.11, 2B.13, 2B .26, 2B .55, 2C.04, 2C .20, 2C.30, 2C .38, 2C.40 to 2C.42, 2C.46, 2C.49, 2C.50, 2C .61, 2C.63, 2D.43 to 2D.45, 2G.01 to 2G.07, 2G.11 to 2G.15, 2H.02 & .03, 2I.07, 2I.08, 2J.05, 2N.03, 3B.04 & 05, 3B.18, 4D.31, 4E.07, 5C.05, 7B.11, 7B.12, 7B16, 8B.19 and 8C.02 to .05, 8C.09, 9B.18 Reference for Grade Crossing (Crossbuck) Sign and Supports changed from Section 8B.03 to 8B.03 and 8B.04
1	Introduction	Table I-3	I-7 thru I-9	Added table to document revisions
1	Part 1	Section 1A.14	23	"LRT-light rail transit" added as a new item 27
1	Part 1	Table 1A-1	24	In the Row for "US Numbered Route", the "US" in the second column changed to "See Table 1A-2"
1	Part 1	Table 1A-2	25	In the Row for "State, county, or other non-US or non-Interstate numbered Route" the double asterisk in the second column is replaced with a single asterisk. And a double asterisk is added after "Number" in the fourth column
1	Part 1	Table 1A-2	25	A new Row is added between the rows for "Upper" and "Vehicle(s)" that has "US Numbered Route" in the first column, "US*" in the second column, a dash in the third column, and "Number**" in the fourth column.
1	Part 2	Section 2A.18	42	Paragraph 12, the reference to "Section 2D.31" changed to "Section 2D.12"
1	Part 2	Table 2B-1 (Sheet 2 of 4)	47	The Asterisk associated with the message to Table 9B-1 for minimum sign size for bicycle facilities shown next to signs R4-1, R4-2, R4-3, R4-7, R4-7a, R4-7b, R4-16,, and R5-6
1	Part 2	Table 2B-1 (Sheet 2 of 4)	47	The size of the Van Assessable (R7-8P) plaque changed to 12"x6" from 18"x9" in both of the Conventional Road columns.
1	Part 2	Table 2B-1 (Sheet 3 of 4)	48	In the Sign or Plaque column, the name of the R9-3 sign changed from "No Pedestrian Crossing (symbol)" changed to "No Pedestrians"
1	Part 2	Table 2B-1 (Sheet 3 of 4)	48	STOP HERE FOR FLASHING RED (R10-14b) sign added
1	Part 2	Figure 2B-27	96	STOP HERE ON FLASHING RED (R10-14b) sign added
1	Part 2	Table 2C-2 (Sheet 1 of 3)	105	In the Sign or Plaque column, the name of the W3-1,2,3 signs changed from "Advanced Traffic Control" to "Stop, Yield, or Signal Ahead" to be more descriptive and to be consistent with Table 9B-1
1	Part 2	Table 2C-2 (Sheet 1 of 3)	105	In the Sign or Plaque column, the name of the W4-1 sign changed from "Merge" to "Merging Traffic" to be more descriptive and to be consistent with Table 6F-1.
1	Part 2	Section 2C.65	136	Paragraph 3, the word "appurtances" changed to "appurtenances"
1	Part 2	Table 2D-1	139	In the Conventional Road column, the asterisk deleted from the sizes for the 2-lines and 3-line D3-2 signs.
1	Part 2	Table 2D-1	139	Size of the 4-line D3-2 sign changed to "Varies x 54" from "Varies x 60**".
1	Part 2	Table 2E-1 (Sheet 2 of 2)	189	The minimum sizes of the following signs are changed: D1-1 and D1-1a changed to "Varies x 24" from "Varies x 30" D1-2 and D1-2a changed to "Varies x 42" from "Varies x 54" D1-3 and D1-3a changed to "Varies x 60" from "Varies x 72" D2-1 changed to "Varies x 24" from "Varies x 30" D2-2 changed to "Varies x 36" from "Varies x 54" D2-3 changed to "Varies x 48" from "Varies x 72" 2-line D3-2 sign changed to "Varies x 36" from "Varies x42**" 3-line D3-2 sign changed to "Varies x 48" from "Varies x66**" 4-line D3-2 sign changed to "Varies x 66" from "Varies x84**"

Table I-3. Revision Summary (Sheet 2 of 3)

Revision #	Part	Section/ Figure/ Table	Page No.	Revision
1	Part 2	Section 2F.10	244	Paragraph 1. the reference to "section 2E.30 and 2E.33" changed to "Section 2E.33 and 2E.36"
1	Part 2	Figure 2G-27	291	Note number 5 changed to 3
1	Part 2	Table 2I-1	302	The size of the D12-5 sign changed to "48 x 60" from "42 x 60" in the Conventional Road column, and "66 x 72" from "66 x 78" in the Freeway or Expressway column.
1	Part 2	Section 2I.02	304	Paragraph 19 at the end of the first line and beginning of the second the word "sign" changed to "plaque"
1	Part 2	Section 2I.02	304	Paragraph 19 the designation "D9-13a", "D9-13b", "D9-13c", and "D9-13d" changed to "D19-13aP", "D9-13bP", "D19-13cP", and "D19-13dP" respectively
1	Part 2	Figure 2I-8	312	In the note the reference to "Section 2I.08" changed to "Section 2I.10"
1	Part 2	Figure 2J-2	318	Replaced ½ Mile Advance Guide Sign with an Exit Direction Sign.
1	Part 2	Section 2J.06	320	Changed paragraph 01 so that limitations on specific service sign placement are based on Exit Direction sign location.
1	Part 2	Table 2M.1	335	The Radiator Water (RS-124) sign has been added to the "Services" portion of the table
1	Part 2	Figure 2M-7	342	Designation of the Radiator Water sign changed from RS-114 to RS-124
1	Part 3	Figure 3B-8 (Sheet 2 of 2)	363	The label for the "Theoretical gore" deleted
1	Part 3	Figure 3C-1	403	The "optional" label near the bottom of the figure that point to the edges lines along the approach roadway deleted
1	Part 3	Figure 3C-13	415	The note "Optional diagonal yellow crosshatch markings" added
1	Part 4	Table 4C-3	446	In first column "Major" street changed to "Minor" street, and in second column "Minor" street changed to "Major" street
1	Part 4	Table 4C-4	446	In first column "Major" street changed to "Minor" street, and in second column "Minor" street changed to "Major" street
1	Part 4	Table 4C-5	448	In first column "Major" street changed to "Minor" street, and in second column "Minor" street changed to "Major" street
1	Part 4	Table 4C-6	448	In first column "Major" street changed to "Minor" street, and in second column "Minor" street changed to "Major" street
1	Part 4	Section 4E.11	516	Paragraph 15, the reference to "section 4D.13" changed to "Section 4E.13"
1	Part 4	Figure 4F-3	521	In step 5 the phrase "Pedestrian Clearance Interval " changed to "Pedestrian Change Interval"
1	Part 4	Section 4F.03	521 & 522	Paragraphs 2 and 3 the phrase "pedestrian clearance interval" changed to "pedestrian change interval"
1	Part 6	Section 6E.06	581 & 583	Paragraphs 2 to 10 added back in as INFORMATION ONLY
1	Part 6	Table 6F-1 (Sheet 1 of 3)	588	Name of the sign R3-7 changed from "Mandatory Movement (text) to "Right (Left) lane Must Turn Right (Left)"
1	Part 6	Table 6F-1 (Sheet 1 of 3)	588	Name of the W1-8 sign changed from "Chevron" to "Chevron alignment"
1	Part 6	Table 6F-1 (Sheet 3 of 3)	590	G20-5aP "Work Zone" plaque deleted and XG20-5P "Worksite" plaque added

Table I-3. Revision Summary (Sheet 3 of 3)

Revision #	Part	Section/ Figure/ Table	Page No.	Revision
1	Part 6	Table 6F-1 (Sheet 3 of 3)	590	Name of the signs "XR2-6", "XR2-6a", and "XR2-6b" changed to "XW2-6", "XW2-6a", and "XW2-6b"
1	Part 6	Figure 6F-3 (Sheet 1 of 2)	594	G20-5aP "Work Zone" plaque deleted and XG20-5P "Worksite" plaque added
1	Part 6	Section 6F.12	596	Paragraph 1 changed plaque from "Work Zone" G20-5aP to "Worksite" XG20-5P. Paragraph 6 name of the signs "XR2-6", "XR2-6a", and "XR2-6b" changed to "XW2-6", "XW2-6a", and "XW2-6b"
1	Part 6	Figure 6F-4 (Sheet 3 of 3)	600	Image of W20-5 sign corrected
1	Part 7	Table 7B-1	755	Size for "Watch for School Bus" sign (S3-Y3) changed for Conventional Road from 30"x30" to 36" x 36", and for minimum from 36" x 36' to 30" x 30"
1	Part 9	Table 9B-1 (Sheet 1 of 2)	817	In the sign or Plaque column, the name of of the W1-1,2,3,4,5 changed from "Turn and Curve Warning" to "Horizontal Alignment"
1	Part 9	Table 9B-1 (Sheet 2 of 2)	818	In the sign or Plaque column, the numbers of the digits for the D10-1a, D10-2a, and D10-3a signs changed to 2, 3, and 4 respectively
1	Appendix	Table A2-4	A2-1	The "010" in the mph column changed to "10". The conversion for 65 mph to 110 km/h deleted and a conversion for 70 mph to 115 km/h added.

Part 1- GENERAL

(Variation 4: added the following guidance and statement statements)

Section 1A.09 Engineering Study and Engineering Judgment

Guidance:

- ⁰³ *The decision to use a particular device at a particular location should be made on the basis of either an engineering study or the application of engineering judgment. Thus, while providing Standards, Guidance, and Options for design and application of traffic control devices, this Manual should not be considered a substitute for engineering judgment.*

Option

- ⁰⁴ When an engineering study or application of engineering judgment determines that unusual site-specific conditions at a particular location or others with same condition make compliance with a Standard statement in this Manual impossible or impractical, an agency may deviate from that standard statement at that location or others with the same condition.

(Variation 5: changed the definition of “Standard” in Paragraph 01 to the following)

Section 1A.13 Definitions of Headings, Words, and Phrases in this Manual

Standard:

- ⁰¹ When used in this Manual, the text headings of Standard, Guidance, Option, and Support shall be defined as follows:
- A. **Standard**—a statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device. All Standard statements are labeled, and the text appears in bold type. The verb “shall” is typically used. The verbs “should” and “may” are not used in Standard statements. Standard statements are sometimes modified by Options. The text for the titles of figures, tables and illustrations appear in bold large type; however, such text is not necessarily a Standard and the user needs to refer to the appropriate text to classify the nature of the figure, table, or note contained therein.

(Variation 6: added this definition of “Typical”)

Section 1A.13 Definitions of Headings, Words, and Phrases in this Manual

- ²⁴⁴ **Typical** – general examples of the conditions being considered. All Figures, Tables, Illustrations, Examples and Applications are considered “Typical”, unless specifically denoted as a part of a Standard. Typical Figures, Tables, Illustrations and Applications designate situations for normal conditions and shall not be construed as a Standard. All minimum and maximum dimensions, or distances, and locations are for normal conditions and can be varied if there are physical constraints, or local preferences complying with the standards of this manual, which require a modification to the normal conditions.

PART 2 SIGNS

Variations 7 & 8

Table 2B-1. Regulatory Sign and Plaque Sizes (Sheet 4 of 4)

Sign or Plaque	Sign Designation	Section	Conventional Road		Expressway	Freeway	Minimum	Oversized
			Single Lane	Multi-Lane				
Weigh Station	R13-4 R13-Y2	2B.60	72 x 54	72 x 54	96 x 72	120 x 90	—	—
Truck Speed Limit Sign	R2-Y2	2B.14	—	—	—	48 x 60	—	—
Trucks And Vehicles With Trailers Use Right Lane	R4-Y9	2B.31	—	—	—	120 x 48	—	—
Trucks And Vehicles With Trailers Use Right Two Lanes	R4-Y10	2B.31	—	—	—	120 x 48	—	—
No Pedestrians Bicycles Motorized Bicycles Non-Motorized Traffic	R5-Y10d	2B.39	—	—	—	72 x 36	—	—
No Stopping Standing Or Parking	R8-Y9	2B.46	—	30 x 36	—	48 x 60	—	—
Left On Arrow Only	R10-Y5a	2B.53	30 x 36	30 x 36	48 x 60	—	24 x 30	48 x 60
Wait Delayed Signal	R10-Y14	2B.53	30 x 36	30 x 36	48 x 60	—	24 x 30	48 x 60

(Variation 7: changed title of Section and language in Paragraph 01 to the following; added sign to Table 2B-1):

Section 2B.14 Truck Speed Limit Sign or Plaque (R2-Y2 or R2-2P)

Standard:

- 01 Where a special speed limit applies to trucks or other vehicles, the legend **TRUCKS XX** or such similar legend shall be displayed below the legend **Speed Limit XX** on the same sign, on a separate (R2-Y2) sign (See Figure 2B-3) installed adjacent to the **Speed Limit (R2-1)** sign, or on a separate R2-2P plaque (see Figure 2B-3) below the standard legend.

(Variation 8: changed title of Section and language in Paragraph 01 to the following; added signs to Table 2B-1):

Section 2B.31 TRUCKS USE RIGHT LANE Sign (R4-5) AND TRUCKS AND VEHICLES WITH TRAILERS USE RIGHT LANE OR RIGHT TWO LANES SIGNS (R4-Y9 AND R4-Y10)

Guidance:

- 01 If an extra lane has been provided for trucks and other slow-moving traffic, a *SLOWER TRAFFIC KEEP RIGHT (R4-3)* sign (see Figure 2B-10), *TRUCKS USE RIGHT LANE (R4-5)* sign (see Figure 2B-10), or other appropriate sign should be installed at the beginning of the lane. The *Trucks And Vehicles With Trailers Use Right Lane sign (R4-Y9)* should be used on interstate routes with two lanes in the direction of travel and the *Trucks And Vehicles With Trailers Use Right Two Lanes sign (R4-Y10)* should be used on interstate routes with three or more lanes in the direction of travel.

(Variation 9: changed wording of guidance in Paragraph 02 to the following)

Section 2B.33 STAY IN LANE Sign (R4-9)

Guidance:

- 02 If a *STAY IN LANE* sign is used, it should be accompanied by either a wide single white lane line or double solid white lane lines to prohibit lane changing.

PART 2 SIGNS (continued)

(Variation 10: changed wording of option in Paragraph 04 to the following to add R5-Y10d)

Section 2B.39 Selective Exclusion Signs

Option:

- 04 Appropriate combinations or groupings of these legends into a single sign, such as NO PEDESTRIANS BICYCLES MOTOR-DRIVEN CYCLES (R5-10a), or NO PEDESTRIANS OR BICYCLES (R5-10b) or PEDESTRIANS BICYCLES MOTORIZED BICYCLES NON-MOTORIZED TRAFFIC PROHIBITED (R5-Y10d) may be used.

(Variation 11: added R8-Y9 to Paragraph 01, to list of typical examples of R7/R8 series signs, and to figure 2B-24 sheet 2 of 2)

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

Support:

- 01 Signs governing the parking, stopping, and standing of vehicles cover a wide variety of regulations, and only general guidance can be provided here. The word “standing” when used on the R7 and R8 series of signs refers to the practice of a driver keeping the vehicle in a stationary position while continuing to occupy the vehicle. Typical examples of parking, stopping, and standing signs and plaques (see Figures 2B-24 and 2B-25) are as follows:
NO STOPPING STANDING OR PARKING (R8-Y9).

Figure 2B-24. Parking and Standing Signs and Plaques (R7 Series) (Sheet 2 of 2)



R 8-Y9

(Variation 12: changed wording of option in Paragraph 02 and guidance in Paragraph 03 to the following to add reference to add the R10-Y14 sign)

Section 2B.53 Traffic Signal Signs (R10-5 through R10-30)

Option:

- 02 Traffic Signal signs (see Figure 2B-27) may be installed at certain locations to clarify signal control. Among the legends that may be used for this purpose are LEFT ON GREEN ARROW ONLY (R10-5), STOP HERE ON RED (R10-6 or R10-6a) for observance of stop lines, DO NOT BLOCK INTERSECTION (R10-7) for avoidance of traffic obstructions, USE LANE(S) WITH GREEN ARROW (R10-8) for obedience to lane-use control signals (see Chapter 4M), LEFT TURN YIELD ON GREEN (symbolic circular green) (R10-12), and LEFT TURN, WAIT DELAYED SIGNAL (R10-Y14), YIELD ON FLASHING RED ARROW AFTER STOP (R10-27).

Guidance:

- 03 *If used, the LEFT ON GREEN ARROW ONLY (R10-5) the LEFT TURN YIELD ON GREEN (symbolic circular green) (R10-12) sign, or the LEFT TURN YIELD ON FLASHING RED ARROW AFTER STOP (R10-27) sign should be located adjacent to the left-turn signal face.*

PART 2 SIGNS (continued)

(Variation 13: added Paragraphs 01 and 02)

Section 2B.55 Photo Enforced Signs and Plaques (R10-18, R10-19P, R10-19aP)

Support:

01 Until such time that Indiana statutes allow use of photo enforcement, this Section is for information only.

Standard:

02 **Photo enforcement signs shall not be used until permitted by statute.**

(Variation 14: changed wording in Paragraphs 01 and 02 to reference R13-Y2 sign; added sign to Figure 2B-30)

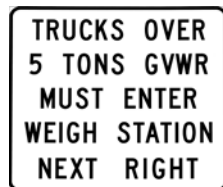
Section 2B.60 Weigh Station Signs (R13 Series)

Guidance:

01 *An R13-Y2 sign with the legend TRUCKS OVER 5 TONS GVWR MUST ENTER WEIGH STATION NEXT RIGHT (see Figure 2B-30) should be used to direct appropriate traffic into a weigh station.*

02 *The R13-Y2 sign should be supplemented by the D8 series of guide signs (see Section 2D.49)*

Figure 2B-30. Truck Signs



*The R13-Y2 sign may be black-on-white or white-on-black

(Variation 15: added Paragraphs 01 and 02)

Section 2C.61 Photo Enforced Plaque (W16 10P)

Support:

02 Until such time that Indiana statutes allow use of photo enforcement, this Section is for information only

Standard:

02 **Photo enforcement plaques shall not be used until permitted by statute.**

PART 2 SIGNS (continued)

(Variation 16: added Indiana route marker to Figure 2D-3)

Figure 2D-3. Route Signs



State Route Sign
M1-5

(Variation 17: Added Section 2D.25.1 and signs M4-Y15 and M4-Y16 to Table 2D-1 and Figure 2D-4)

Section 2D.25.1 Local Traffic and Frontage Road Signs (M4-Y15, M4-Y16)

Option:

- 01 The Local Traffic sign (M4-Y15) may be used at the entrance to a road or street which has been closed by a Limited Access Highway, but which serves several entrances or other local streets or roads which have no outlet. The Frontage Road sign (M4-Y16) may be installed at the entrance to a Frontage Road where such a road might be mistaken for a freeway ramp.

Figure 2D-4. Route Sign Auxiliaries



M4-Y15



M4-Y16

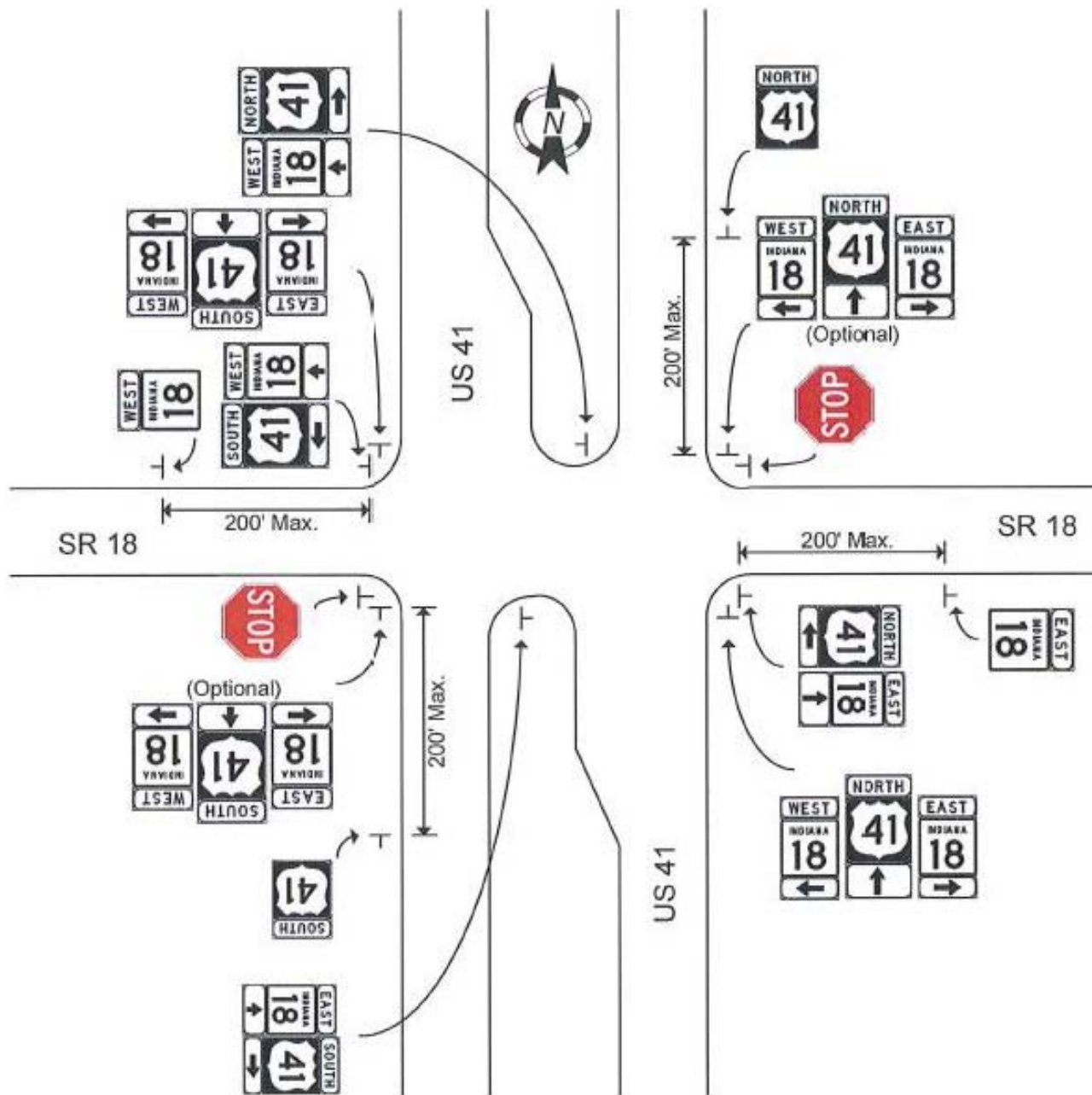
Table 2D-1. Conventional Road Guide Sign Sizes

Sign	Sign Designation	Section	Conventional Road	Minimum	Oversized
Local Traffic	M4-Y15	2D.25	24 x 20	24 x 20	—
Frontage Road	M4-Y16	2D.25	40 x 20	40 x 20	—

PART 2 SIGNS (continued)

(Variation 18: added sheet 5 of 5 to Figure 2D-6)

Figure 2D-6. Illustration of Directional Assemblies and Other Route Signs (Typical Route Markings at a Divided Highway Intersection) (Sheet 5 of 5)



PART 2 SIGNS (continued)

(Variation 19: changed wording in Paragraph 01 to the following)

Section 2D.43 Street Name Signs (D3-1 or D3-1a)

Guidance:

- 01 *Street Name (D3-1 or D3-1a) signs (see Figure 2D-10) should be installed in urban areas at all street intersections regardless of other route signs that might be present and should be installed in rural areas to identify important roads that are not otherwise signed. Ground mounted street and county road name signs should be erected and maintained in compliance with the current edition of the IMUTCD by the city, town, and/or county of jurisdiction. These signs are authorized to be placed at all street and road intersections regardless of other route markings that may be present.*
-

(Variation 20: changed wording in Paragraph 04 as follows)

Section 2D.49 Weigh Station Signing (D8 Series)

Option:

- 04 *Where State law requires a regulatory sign (R13-Y2) in advance of the Weigh Station, a fourth sign (see Section 2B .60) may be located following the Advance sign.*
-

(Variation 21: changed wording in Paragraph 02 as follows)

Section 2E.35 Other Supplemental Guide Signs

Guidance:

- 02 *No more than one Supplemental Guide sign should be used on each interchange approach. Supplemental guide signs should not be used at freeway to freeway interchanges.*
-

(Variation 22: changed wording in Paragraph 02 as follows)

Section 2E.35 Other Supplemental Guide Signs

Guidance:

- 04 *Where two or more Advance Guide signs are used, the Supplemental Guide sign should be installed approximately 1600 ft in advance of the beginning of the deceleration lane, where possible. Otherwise, the Supplemental Guide sign should be installed approximately midway between two of the Advance Guide signs. If only one Advance Guide sign is used, the Supplemental Guide sign should follow it by at least 800 feet. If the interchanges are numbered, the interchange number should be used for the action message. See Figure 2J-2.*
-

(Variation 23: changed wording in Paragraph 01 as follows re: 500 ft spacing)

Section 2E.38 Post-Interchange Signs

Guidance:

- 01 *If space between interchanges permits, as in rural areas, and where undue repetition of messages will not occur, a fixed sequence of signs should be displayed beginning 500 feet beyond the downstream end of the acceleration lane. At this point a Route sign assembly should be installed followed by a Speed Limit sign and a Distance sign, each at a spacing of 500 feet.*

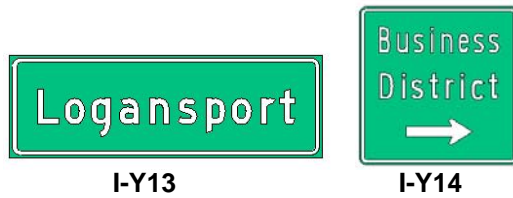
PART 2 SIGNS (continued)

(Variation 24: added I-Y13 and I-Y14 signs to Table 2H-1 and Figure 2H-1)

Table 2H-1. General Information Sign Sizes

Sign	Sign Designation	Section	Conventional Road	Freeway or Expressway
Jurisdictional Boundary	I-Y13	2H.02	40 X 20	-
Business District	I-Y14	2H.02	24 x 24	-

Figure 2H-1. General Information and Miscellaneous Information Signs



(Variation 25: added signs D5-Y9, D5-Y17, D5-Y18, D12-1a & b, and D12-6 to Table 2I-1.)

Table 2I-1. General Service Sign and Plaque Sizes (Sheet 1 of 2)

Sign or Plaque	Sign Designation	Section	Conventional Road	Freeway or Expressway
Rest Area Vending Machines Plaque	D5-Y9	2I.05	-	96 x 24
Point of Interest XX Miles	D5-Y17	2I.08	36 x 24	-
Historical Marker XX Miles	D5-Y18	2I.08	36 x 24	-

Table 2I-1. General Service Sign and Plaque Sizes (Sheet 2 of 2)

Sign or Plaque	Sign Designation	Section	Conventional Road	Freeway or Expressway
Traffic Information	D12-1a, 1b	2I.09	84 x 48	132 x 84
Travel Time	D12-6	2I.12	-	Varies

PART 2 SIGNS (continued)

(Variation 26: added new Figure 2I-5a to show signs)

**Figure 2I-5a. Indiana Rest Area and Other
Roadside Area Signs**



D5-Y9



D5-Y17



D5-Y18

(Variation 27: added the following option statement for D5-Y9)

Section 2I.05 Rest Area and Other Roadside Area Signs

Option:

- 15 If the rest area has vending machines a supplemental plaque may be used as shown in Figure 2I-5a (D5-Y9).

(Variation 28: changed the following option statement to reference D5-Y17 sign)

Section 2I.08 Tourist Information and Welcome Center Signs

Option:

- 09 As an alternative, the Tourist Information (D9-10) sign (see Figure 2I-1) may be appended to the guide signs for the exit that provides access to the tourist information center. As a second alternative, the Tourist Information sign may be combined with General Service signing. Advance signage for points of interest and historical markers may also be utilized as conditions permit.

PART 2 SIGNS (continued)

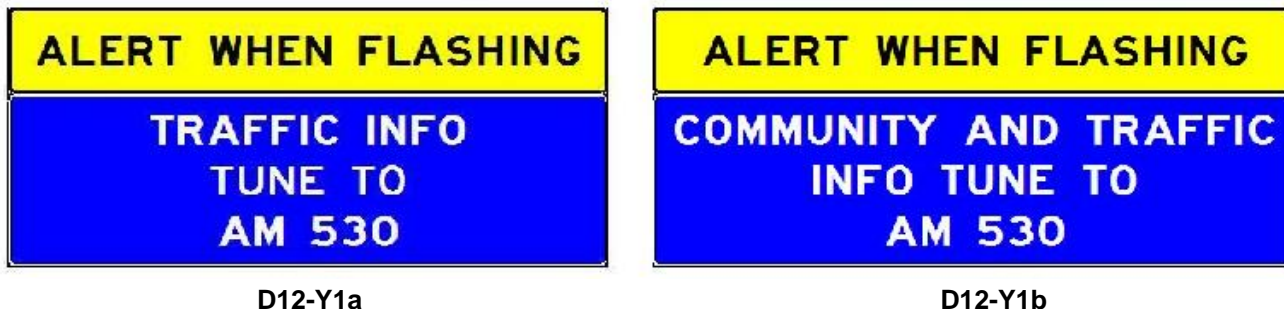
(Variation 29: changed the following option statement to include D12-Y1a and D12-Y1b signs and added signs to Figure 2I-8)

Section 2I.09 Radio Information Signing

Option:

- 01 Radio-Weather Information (D12-1, D12-Y1a, D12-Y1b) signs (see Figure 2I-8) may be used in areas where difficult driving conditions commonly result from weather systems. Radio-Traffic Information signs may be used in conjunction with traffic management systems.

Figure 2I-8. Radio, Telephone, and Carpool Information Signs



(Variation 30: added Section 2I.12 with Figure 2I-9) to describe real time travel info signs (D12-6)

Section 2I.12 Travel Time Signs

Support:

- 01 Travel time signs inform motorists of current travel times to major interchanges. Travel time signs are intended for urban areas as part of an intelligent transportation system to reduce vehicle delays during peak hour periods. An example travel time sign is shown in Figure 2I-9.

Figure 2I-9. Travel Time Sign Example



D12-6

PART 2 SIGNS (continued)

(Variation 31: In Section 2J.01 changed Paragraphs 01 and 08, and deleted Paragraphs 07, 09, and 11 and in Section 2J.02 changed Paragraph 02 to remove references to 24 hour pharmacies as they are not an eligible specific service category)

Section 2J.01 Eligibility

Standard:

01 **Specific Service signs shall be defined as guide signs that provide road users with business identification and directional information for services and for eligible attractions. Eligible service categories shall be limited to gas, food, lodging, camping, and attractions.**

07 ~~**Distances to eligible 24-hour pharmacies shall not exceed 3 miles in any direction of an interchange on the Federal-aid system.**~~

Guidance:

08 *Distances to eligible services should not exceed 3 miles in any direction. Distances to camping and attractions should not exceed 15 miles in either direction. Distances to lodging facilities should not exceed 4 miles in either direction.*

Option:

09 ~~If, within the 3-mile limit, facilities for the services being considered other than pharmacies are not available or choose not to participate in the program, the limit of eligibility may be extended in 3-mile increments until one or more facilities for the services being considered chooses to participate, or until 15 miles is reached, whichever comes first.~~

Standard:

11 ~~**If State or local agencies elect to provide Specific Service signing for pharmacies, both of the following criteria shall be met for a pharmacy to qualify for signing:**~~

~~**A.—The pharmacy shall be continuously operated 24 hours per day, 7 days per week, and shall have a State-licensed pharmacist present and on duty at all times; and**~~

~~**B.—The pharmacy shall be located within 3 miles of an interchange on the Federal-aid system.**~~

Section 2J.02 Application

02 **A Specific Service sign shall display the word message GAS, FOOD, LODGING, CAMPING, or ATTRACTION, an appropriate directional legend such as the word message EXIT XX, NEXT RIGHT, SECOND RIGHT, or directional arrows, and the related logo sign panels.**

(Variation 32: changes wording in Paragraph 03 to note that eligibility is per state code)

Section 2J.01 Eligibility

Option:

03 **Where an engineering study determines a need, Specific Service signs may be used on any class of highways, if permitted by statute.**

PART 2 SIGNS (continued)

(Variation 33: changed wording in Paragraphs 02 regarding placement of Specific Service signs)

Section 2J.06 Signs at Interchanges

Guidance:

- 02 *When spacing permits, all Specific Service signs should be installed before the Exit One (1) Mile Advance Guide sign. There should be at least an 800-foot spacing between the Specific Service signs, except for Specific Service ramp signs. However, excessive spacing is not desirable. Specific Service ramp signs should be spaced at least 100 feet from the Exit Gore sign, from each other, and from the ramp terminal.*
-

(Variation 34: changed wording in Paragraphs 03 regarding inclusion of distances on sign legend)

Section 2J.07 Single-Exit Interchanges

Guidance:

- 03 *Specific Service ramp signs should include distances to the service facilities, if the distance is 1 mile or greater*
-

(Variation 35: changed wording in Paragraphs 01 to reference upper case/lower case lettering; changed Figures 2K-1 and 2K-2 to show same)

Section 2K.03 Style and Size of Lettering

Guidance:

- 01 *All letters and numbers on tourist-oriented directional signs, except on the logo sign panels, should be a combination of 6 inches in height for upper-case and 4.5 inches in height for lower-case letters, as shown in Figure 2K-1. Any legend on a logo should be proportional to the size of the logo.*
-

(Variation 36: changed wording in Paragraphs 02 on maximum number of panels per sign; changed Figures 2K-1 and 2K-2 to show same - see next page)

Section 2K.04 Arrangement and Size of Signs

Guidance:

- 03 *The number of intersection approach signs (one sign for tourist-oriented destinations to the left, one for destinations to the right, and one for destinations straight ahead) installed in advance of an intersection should not exceed two. The number of sign panels installed on each sign should not exceed three. The sign panels for right-turn, left-turn, and straight-through destinations should be on separate signs. The left-turn destination sign should be located farthest from the intersection, then the right-turn destination sign, with the straight-through destination sign located closest to the intersection (see Figure 2K-2). Signs for facilities in the straight-through direction should be considered only when there are signs for destinations in either the left or right direction.*
-

(Variation 37: added standard (Paragraphs 06) on blank out signs when not activated)

Section 2L.01 Description of Changeable Message Signs

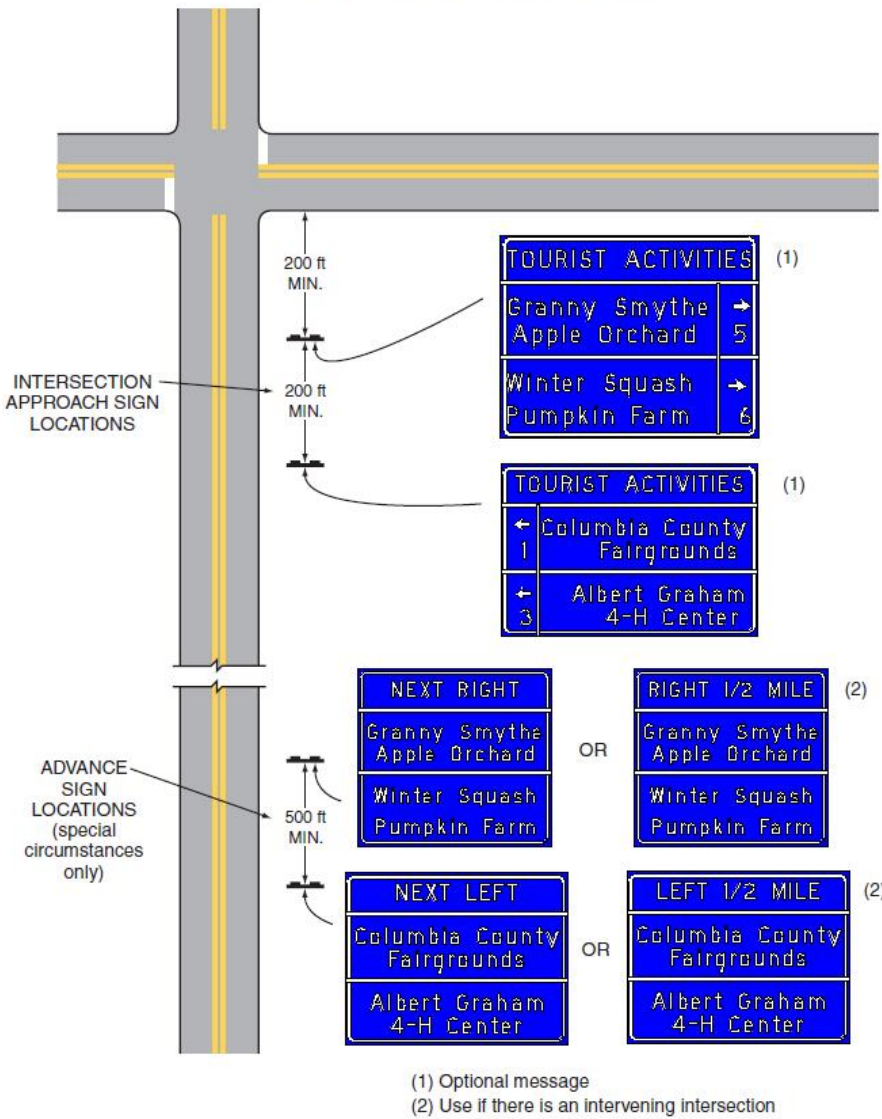
Standard:

- 06 **No message or part of the message shall be visible when the blank out sign is not activated.**

PART 2 SIGNS (continued)

(Variations 35 & 36 continued)

Figure 2K-2. Examples of Intersection Approach Signs and Advance Signs for Tourist-Oriented Directional Signs



(Variation 38: changed wording in Paragraphs 01 to note that brown is the primary color for recreational signs)

Section 2M.09 Destination Guide Signs

Guidance:

- 01 When recreational or cultural interest area destinations are displayed on supplemental guide signs, the sign should be rectangular or trapezoidal in shape. The order of preference for use of shapes and colors should be as follows: (1) rectangular with a white legend and border on a brown background; (2) rectangular with a white legend and border on a green background; or (3) trapezoidal with a white legend and border on a brown background.

PART MARKINGS

(Variation 39: changed wording in Paragraphs 02, item C2 to note that allows "SR" to be used rather than "STATE ROUTE")

Section 3B.20 Pavement Word, Symbol, and Arrow Markings

Option:

02 Word, symbol, and arrow markings, including those contained in the "Standard Highway Signs and Markings" book (see Section 1A.11), may be used as determined by engineering judgment to supplement signs and/or to provide additional emphasis for regulatory, warning, or guidance messages. Among the word, symbol, and arrow markings that may be used are the following:

C. Guide:

1. Route numbers (route shield pavement marking symbols and/or words such as I-65, US 40, SR 135, or ROUTE 10)
2. Cardinal directions (NORTH, SOUTH, EAST, or WEST)
3. TO
4. Destination names or abbreviations thereof

(Variation 40: changed wording in Paragraphs 12, to refer to "curb noses")

Section 3B.23 Curb Markings

Option:

12 Retroreflective or internally illuminated raised pavement markers of the appropriate color may be placed on the pavement in front of the curb and/or on the top of curbed noses of raised medians and curbs of islands, as a supplement to or substitute for retroreflective curb markings used for delineation.

(Variation 41: changed wording in Paragraphs 03, item E3 to refer to "broken" single white line)

Section 3D.02 Preferential Lane Longitudinal Markings for Motor Vehicles

Standard:

03 **Longitudinal pavement markings for preferential lanes shall be as follows (these same requirements are presented in tabular form in Table 3D-1):**

- E. Contiguous (left-hand side) preferential lane—the longitudinal pavement markings for a full-time or part-time preferential lane on the left-hand side of and contiguous to the other travel lanes shall consist of a normal solid single yellow line at the left-hand edge of the preferential travel lane(s) and one of the following at the right-hand edge of the preferential travel lane(s):**
1. **A wide solid double white lane line where crossing is prohibited (see Drawing A in Figure 3D-3).**
 2. **A wide solid single white lane line where crossing is discouraged (see Drawing B in Figure 3D 3).**
 3. **A wide broken single white lane line where crossing is permitted (see Drawing C in Figure 3D-3).**

(Variation 42: changed title of Paragraph 03 to an Option statement- statement content remained unchanged)

Section 3I.03 Island Marking Application

Option:

02 Pavement markings as described in Section 3B.10 for the approach to an obstruction may be omitted on the approach to a particular island based on engineering judgment.

PART 4- HIGHWAY TRAFFIC SIGNALS

(Variation 43: added Table 4C-2 as a method of analyzing Warrant 1 based on predicted traffic volumes changed language in Paragraphs 01, 02, and 03 to reference optional method; added options/Paragraphs 05 through 11 to describe application of optional method)

Section 4C.02 Warrant 1, Eight-Hour Vehicular Volume

Support:

- 01 The Minimum Vehicular Volume, Condition A or A1, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.
- 02 The Interruption of Continuous Traffic, Condition B or B1, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.
- 03 It is intended that Warrant 1 be treated as a single warrant. If Condition A or A1 is satisfied, then Warrant 1 is not satisfied and analyses of Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B or B1 is satisfied, then Warrant 1 is satisfied and an analysis of the combination of Conditions A and B is not needed.

Option:

- 05 When comparing vehicular volume of both approaches of the major street against the volume of the side street approaches, each side street approach may independently be evaluated against the criteria listed in Condition A and Condition B of TABLE 4C- 1.
- 06 Temporary traffic signals may be installed at new intersections on predicted hourly vehicular volumes, providing the predicted volumes meet the prescribed minimum vehicular volume levels as noted in Condition A or Condition B of TABLE 4C-1.
- 07 Temporary traffic signals may be installed at new intersections on predicted average daily traffic volumes, providing the predicted volumes meet prescribed minimum levels as noted in Condition A1 or Condition B 1 of TABLE 4C-2. The temporary traffic signals may be placed in signal operation until proper traffic data and experience can be obtained. No downward adjustments are to be made to the ADT required volumes.
- 08 The basis for use of TABLE 4C-2 are:
1. The traffic volumes used shall be assigned current volumes.
 2. Conditions A1 or B 1 lists the minimum Average Daily Traffic volumes which may justify consideration of signalization, and which are considered to be equivalent to the hourly traffic volume stipulations denoted by Condition A and Condition B respectively.
 3. Surveillance should be maintained on the temporary traffic signal to assure that the signal operation is not creating any undue problems.
 4. An engineering study should be conducted, normally, after six months of operation and before one year of operation as a temporary traffic signal control, to determine if the traffic signal is needed and should become a permanent installation.
 5. If the temporary traffic signal is not justified by an engineering study, it may be removed immediately and the appropriate traffic control devices, commensurate to justification revealed by the engineering study, may be installed.
 6. If the engineering study indicates that the traffic signal is justified, it shall remain in place and have the status of a permanent traffic signal installation.
- 09 Temporary traffic signals installed under this procedure must conform to the design requirements for traffic signals as stipulated in this manual.
- 10 Temporary traffic signals may become permanent traffic signals only after the completion of a traffic engineering investigation that verifies that permanent traffic signals are justified.
- 11 Conditions A1 or B 1 lists the minimum Average Daily Traffic volumes which may justify consideration of signalization, and which are considered to be equivalent to the hourly traffic volume stipulations denoted by Condition A and Condition B respectively.

PART 4- HIGHWAY TRAFFIC SIGNALS (continued)

Table 4C-2, Eight-Hour Vehicular Volume (ADT Equivalent)

Condition A1—Minimum Vehicular Volume (ADT Equivalent)

Number of lanes for moving traffic on each approach		Equivalent Average Daily Traffic Volumes Approaching From Both Directions On:	
Major Street	Minor Street	Major Street	Minor Street
1	1	8,300	4,600
2 or more	1	10,000	4,600
2 or more	2 or more	10,000	6,000
1	2 or more	8,300	6,000

Condition B1—Interruption of Continuous Traffic (ADT Equivalent)

Number of lanes for moving traffic on each approach		Equivalent Average Daily Traffic Volumes Approaching From Both Directions On:	
Major Street	Minor Street	Major Street	Minor Street
1	1	12,500	2,300
2 or more	1	15,000	2,300
2 or more	2 or more	15,000	3,100
1	2 or more	12,500	3,100

(Variation 44: added Tables 4C-3 and 4C-4 as an alternative method of analyzing Warrant 2; added option/Paragraph 03 and changed wording in Paragraph 04 to reference tables)

Section 4C.03 Warrant 2, Four-Hour Vehicular Volume

Option:

- 03 When comparing vehicular volumes depicted in Figure 4C-1, the appropriate equations, as listed in Table 4C-3, may be used.
- 04 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 or Table 4C-4 may be used in place of Figure 4C-1.

Table 4C-3, Warrant 2, Four Hour Volume Mathematical Equation Equivalency to Figure 4C-1

X = sum of both major street approach volumes		
Y = volume of a) single minor street approach or b) minor street high volume approach		
Number of lanes for moving traffic on each approach		Equation
Minor Street	Major Street	
2 or more	2 or more	If $X \Rightarrow 1295$, $Y = 115$ or $Y = 879.232228 - 1.011380233X + 0.0003253082X^2$
2 or more	1	If $X \Rightarrow 1118$, $Y = 115$ or $Y = 651.50622395 - 0.7483745392X + 0.000240228X^2$
1	2 or more	If $X \Rightarrow 1340$, $Y = 80$ or $Y = 651.50622395 - 0.7483745392X + 0.000240228X^2$
1	1	If $X \Rightarrow 1092$, $Y = 80$ or $Y = 550.22697349 - 0.6996410769X + 0.0002462697X^2$

PART 4- HIGHWAY TRAFFIC SIGNALS (continued)

**Table 4C-4, Warrant 2, Four Hour Volume (70% Factor)
Mathematical Equation Equivalency to Figure 4C-2**

X = sum of both major street approach volumes		
Y = volume of a)single minor street approach or b) minor street high volume approach		
Numbe Number of lanes for moving traffic on each approach		Equation
Minor Street	Major Street	
2 or more	2 or more	If X => 890, Y = 80 or Y = 613.77772474-0.9893678281X +0.0004377428X ²
2 or more	1	If X => 797, Y = 80 or Y = 460.53837044-0.7635806818X+0.0003591016X ²
1	2 or more	If X => 940, Y = 60 or Y = 460.53837044-0.7635806818X+0.0003591016X ²
1	1	If X => 782, Y = 60 or Y = 377.22710663-0.6793503652X+0.0003501046X ²

(Variation 45: added Tables 4C-5 and 4C-6 as an alternative method of analyzing Warrant 3; added option /Paragraph 04 and changed wording in Paragraph 05 to reference tables)

Section 4C.04 Warrant 3, Peak Hour

Option:

- 04 When comparing vehicular volumes depicted in Figure 4C-3, the appropriate equations, as listed in Table 4C-5 may be used
- 05 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 or Table 4C-6 may be used in place of Figure 4C-3 to evaluate the criteria in the second category of the Standard.

**Table 4C-5, Warrant 3, Peak Hour Volume
Mathematical Equation Equivalency to Figure 4C-3**

X = sum of both major street approach volumes		
Y = volume of a)single minor street approach or b) minor street high volume approach		
Numbe Number of lanes for moving traffic on each approach		Equation
Minor Street	Major Street	
2 or more	2 or more	If X => 1672, Y = 150 or Y =1060.5405451-0.889969286X+0.0002059999X ²
2 or more	1	If X => 1461, Y = 150 or Y =837.59424427-0.7219511908X+0.0001720248X ²
1	2 or more	If X => 1759, Y = 100 or Y =837.59424427-0.7219511908X+0.0001720248X ²
1	1	If X => 1516, Y = 100 or Y =745.652000052-0.7548866636X+0.00021703X ²

**Table 4C-6, Warrant 3, Peak Hour Volume (70% Factor)
Mathematical Equation Equivalency to Figure 4C-4**

X = sum of both major street approach volumes		
Y = volume of a)single minor street approach or b) minor street high volume approach		
Numbe Number of lanes for moving traffic on each approach		Equation
Minor Street	Major Street	
2 or more	2 or more	If X => 1183, Y = 100 or Y =771.842673-0.9817221615X+0.0003498922X ²
2 or more	1	If X => 1040, Y = 100 or Y =593.38729059-0.7471500045X+0.000262383X ²
1	2 or more	If X => 1196, Y = 75 or Y =593.38729059-0.7471500045X+0.000262383X ²
1	1	If X => 1054, Y = 75 or Y =520.0 1 155026-0.7647561999X+0.0003250549X ²

PART 4- HIGHWAY TRAFFIC SIGNALS (continued)

(Variation 46: added Table 4C-7 as an alternative method of analyzing Warrant 4; added option/Paragraph 04 to reference tables)

Section 4C.05 Warrant 4, Pedestrian Volume

⁰⁴ When comparing vehicular volumes depicted in Figures 4C-5, 4C-6, 4C-7, or 4C-8, the appropriate equations, as listed in Table 4C-7, may be used

**Table 4C-7, Warrant 4, Pedestrian Volume
Mathematical Equation Equivalency to Figures 4C-5 thru 4C-8**

X = sum of (both) major street approach volume (MSAV)		
Y = volume of pedestrians crossing the major street		
Figure	Min. Ped Value	Equations (Required Peds with MSAV)
Fig 4C-5	X=> 1100, Y=> 107	$Y = 760.62 - 1.02098 X + 0.0003875 X^2$
Fig 4C-6	X => 780, Y=> 75	$Y = 491.334 - 0.86656 X + 0.0004214 X^2$
Fig 4C-7	X => 1500, Y => 133	$Y = 1005.61 - 1.0188 X + 0.0002889 X^2$
Fig 4C-8	X => 1044, Y => 93	$Y = 669.187 - 0.96162 X + 0.0003915 X^2$

(Variation 47: added Table 4C-8 to support the analysis of Warrant 5)

**Table 4C-8; Warrant 5, School Crossing
Vehicular Volume Equivalency Gaps In Vehicular Flow**

Average Number of Children Per Minute	Width of Street Vehicular Volume (v.p.h.)			
	30'	40'	50'	60'
1 - 5	645	610	570	530
6 - 10	620	580	545	505
11 - 15	590	555	515	480
16 - 20	565	530	490	450
21 - 25	540	500	465	425
26 - 30	510	475	435	400
31 - 35	485	450	410	370

PART 4- HIGHWAY TRAFFIC SIGNALS (continued)

(Variation 48: added Tables 4C-12 and 4C-13 as an alternative method of analyzing Warrant 9; added option/ Paragraph 05 to reference tables)

Section 4C.10 Warrant 9, Intersection Near a Grade Crossing

Option:

05 When comparing vehicular volumes depicted in Figures 4C-9, or 4C-10, the appropriate equations, as listed in Table 4C-12, or 4C-13, may be used

**Table 4C-12, Warrant 9, Intersection Near a Grade Crossing
(One Approach Lane at the Track Crossing)
Mathematical Equation Equivalency to Figure 4C-9**

X = Major Street Volume (Both Directions)		
Y = Minor Street Approach Volume that crosses the RR Tracks		
Distance From Intersection To RR Crossing (Feet)	Major Street Volume Both App's	Equation
21 – 40	X <= 100	Y = -0.64 X + 99
21 – 40	100 < x < 150	Y = -0.2 X + 55
21 – 40	X => 150	Y = 25
41 – 60	X <= 100	Y = 25 = -0.7 X + 115
41 – 60	100 < x < 150	Y = -0.4 X + 85
41 – 60	X => 150	Y = 25
61 – 80	X <= 200	Y = -0.467 X + 163
61 – 80	200 < X <= 350	Y = -0.24 X + 118
61 – 80	350 < X <= 400	Y = -0.06 X + 55
61 – 80	400 < X < 450	Y = -0.12 X + 79
61 – 80	X => 450	Y = 25
81 – 100	X <= 200	Y = -0.4 X + 185
81 – 100	200 < X <= 300	Y = -0.48 X + 201
81 – 100	300 < X <= 350	Y = -0.14 X + 99
81 – 100	350 < X < 450	Y = -0.25 X + 138
81 – 100	X => 450	Y = 25
101 – 120	X <= 250	Y = -0.5 X + 215
101 – 120	250 < X <= 300	Y = -0.58 X + 235
101 – 120	300 < X <= 350	Y = -0.18 X + 115
101 – 120	350 < X < 450	Y = -0.27 X + 147
101 – 120	X => 450	Y = 25
121 – 140	X <= 300	Y = -0.632 X + 257
121 – 140	300 < X <= 350	Y = -0.2 X + 127
121 – 140	350 < X < 450	Y = -0.32 X + 169
121 – 140	X => 450	Y = 25

PART 4- HIGHWAY TRAFFIC SIGNALS (continued)

**Table 4C-13, Warrant 9, Intersection Near a Grade Crossing
(Two or More Approach Lanes at the Track Crossing)
Mathematical Equation Equivalency to Figure 4C-10**

X = Major Street Volume (Both Directions)		
Y = Minor Street Approach Volume that crosses the RR Tracks		
Distance From Intersection To RR Crossing (Feet)	Major Street Volume Both App's	Equation
21 – 40	$X \leq 100$	$Y = -0.62 X + 96$
21 – 40	$100 < X < 150$	$Y = -0.18 X + 52$
21 – 40	$X \geq 150$	$Y = 25$
21 – 40	$X \leq 100$	$Y = -0.7 X + 115$
41 – 60	$100 < X < 150$	$Y = -0.4 X + 85$
41 – 60	$X \geq 150$	$Y = 25$
41 – 60	$X \leq 150$	$Y = -1.2 X + 310$
61 – 80	$150 < X \leq 200$	$Y = -1.0 X + 280$
61 – 80	$200 < X \leq 350$	$Y = -0.28 X + 136$
61 – 80	$350 < X < 450$	$Y = -0.13 X + 84$
61 – 80	$X \geq 450$	$Y = 25$
81 – 100	$X \leq 144$	$Y = -0.682 X + 298$
Page 27	$144 < X \leq 250$	$Y = -0.849 X + 322$
81 – 100	$250 < X \leq 350$	$Y = -0.5 X + 235$
81 – 100	$350 < X \leq 400$	$Y = -0.3 X + 165$
81 – 100	$400 < X < 450$	$Y = -0.4 X + 205$
81 – 100	$X \geq 450$	$Y = 25$
101 – 120	$X \leq 350$	$Y = -0.68 X + 333$
101 – 120	$350 < X \leq 400$	$Y = -0.9 X + 410$
101 – 120	$400 < X \leq 450$	$Y = -0.4 X + 210$
101 – 120	$450 < X < 600$	$Y = -0.033 X + 45$
101 – 120	$X \geq 600$	$Y = 25$
121 – 140	$X \leq 150$	$Y = -1.32 X + 452$
121 – 140	$150 < X \leq 350$	$Y = -0.75 X + 366$
121 – 140	$350 < X \leq 400$	$Y = -1.0 X + 454$
121 – 140	$400 < X \leq 450$	$Y = -0.38 X + 206$
121 – 140	$450 < X \leq 500$	$Y = -0.133 X + 95$
121 – 140	$500 < X < 600$	$Y = -0.033 X + 45$
121 – 140	$X \geq 600$	$Y = 25$

PART 4- HIGHWAY TRAFFIC SIGNALS (continued)

(Variation 49: changed terminology in paragraph 04, added option statement as paragraph 05, added standard statements 09 through 12 to define portable traffic signals and their appropriate application)

Section 4D.32 Temporary and Portable Traffic Control Signals

Guidance:

04 *A temporary traffic control signal should be used only if engineering study indicates that installing the signal will improve the overall safety and/or operation of the location.*

Option

05 The engineering study may consist of a temporary traffic control (TTC) plan that has been approved by an Engineer. See Section 6C.01 for information on TTC plans.

Standard:

09 **A portable traffic control signal shall be defined as a temporary traffic control signal that is designed so that it can be easily transported and reused at different locations. A portable traffic control signal shall be used only for one of the following purposes:**

A. To maintain one-lane, two-way traffic in a temporary traffic control zone that is of a long term stationary, intermediate term stationary, or short term stationary work duration (see Section 6G.02).

B. To temporarily function for a permanent signal where

1. Power has been lost.

2. A structural support or the controller has been damaged so that the permanent faces or signal is not functional.

C. To provide access to a site that will have a permanent signal in the near future, provided that the permanent signal has been approved by the agency or official having jurisdiction.

10 **When a portable signal is functioning for a permanent signal and is operational to avoid conflicts between the permanent and the portable signal face either:**

1. the permanent signal faces shall be covered or

2. the permanent controller shall be deactivated, or

3. the permanent controller shall operate the portable signals faces.

11 **The portable traffic signal shall be deactivated and removed immediately upon the permanent signal becoming operational.**

12 **Only portable traffic control signal models that have been tested and approved by the Indiana Department of Transportation shall be used upon the roadway.**

PART 5 TRAFFIC CONTROL DEVICES FOR LOW-VOLUME ROADS

No changes from the National MUTCD

PART 6 TEMPORARY TRAFFIC CONTROL

(Variation 50: added Standard/ Paragraph 01 to Section 6E.04 and Standard/Paragraph 01 to Section 6E.06 to prohibit Red/Yellow Lens AFAD's). The remainder of Section 6E.06 had been voided).

Section 6E.04 Automated Flagger Assistance Devices

Standard:

01 Red/Yellow Lens AFADs as described in Paragraph 3, item B and section 6E.06 shall not be permitted.

Section 6E.06 Red/Yellow Lens Automated Flagger Assistance Devices

Standard:

01 Until such time as Red/Yellow Lens AFAD's are permitted this section is for information only.

(Variation 51: added the following signs to Table 6F-1.

Table 6F-1. Temporary Traffic Control Zone Sign and Plaque Sizes (Sheet 3 of 3)

Sign or Plaque	Sign Designation	Section	Conventional Road	Freeway or Expressway	Minimum
Speeding Max \$1000 Reckless Driving Max 8 yrs	XW2-6	6F.12	78 x 42	78 x 42	60 x 36
Speeding Max \$1000	XW2-6a	6F.12	36 x 36	48 x 48	30 x 30
Reckless Driving Max 8 Yrs	XW2-6b	6F.12	36 x 36	48 x 48	30 x 30
Watch For Stopped Traffic	XW3-4a	6F.16	36 x 36	48 x 48	30 x 30
Overhead Sign Installation	XW3-4s	6F.16	60 x 24	60 x 24	60 x 24
Road Construction Ahead	XW20-1a	6F.18	36 x 36	48 x 48	30 x 30
Exit Open	XE5-2	6F.28	36 x 36	48 x 48	30 x 30
Exit Closed	XE5-2a	6F.28	36 x 36	48 x 48	30 x 30
Right Lane Exit Only	XE5-3	6F.29	36 x 36	48 x 48	30 x 30

(Variation 52: changed the Guidance in Paragraph 11 to allow portable supports for up to 7 days).

Section 6F.03 Sign Placement

Guidance:

11 Except as provided in Paragraph 12, signs mounted on portable sign supports that do not meet the minimum mounting heights provided in Paragraphs 4 through 6 should not be used for a duration of more than 7 days.

PART 6 TEMPORARY TRAFFIC CONTROL (continued)

(Variation 53: added Standards in Paragraphs 06 - 08 to describe worksite added penalty signs which are required per state code)

Section 6F.12 Work Zone and Higher Fines Signs and Plaques

Standard:

- 06 **Sign XW2-6, or signs XW2-6a and XW2-6b shall be posted on a highway work zone by:**
- A. the Indiana Department of Transportation;**
 - B. a political subdivision; or**
 - C. a contractor of:**
 - 1. the Indiana Department of Transportation; or**
 - 2. a political subdivision;**
- that is working at the highway work zone ahead of the first Road Work/Construction warning sign distance C (see Table 6H-3).**
- 07 **Signs XW2-6a and XW2-6b are only for use in series where the right-of-way does not accommodate the larger signs or for moving operations where construction signs are set and removed daily for changing work locations.**
- 08 **Signs XW2-6, XW2-6a, and XW2-6b are not required for work zones of a short duration.**
-

(Variation 54: added an Option/paragraph 04)

Option:

- 04 **The words, or word, ROAD CONSTRUCTION, or CONSTRUCTION, may be substituted for the words ROAD WORK on any temporary traffic control sign.**
-

(Variation 55: added Standard/Paragraph 07 to define appropriate application of portable traffic signals in work zones 02)

Section 6F.84 Temporary Traffic Control Signals

Standard:

- 07 **Portable traffic control signals shall not be used for work zones that are mobile or of a short duration.**

PART 6 TEMPORARY TRAFFIC CONTROL (continued)

(Variation 56: added Notes and Typical Application Figure for Roundabouts)

**Notes for Figure 6H-13AY --Typical Application 13AY
Short Term or Short Duration Work in a Roundabout**

Option:

1. Flashing warning lights and/or flags may be used to call attention to the advance warning signs. A BE PREPARED TO STOP sign may be added to the sign series.
2. If the closure continues overnight warning lights may be used on the channelizing devices.

Standard:

3. **A flagger or uniformed law enforcement officer shall be used for this application. The flagger, if used for this application, shall follow the procedures noted in Sections 6E.05 and 6E.07.**
4. **Where a quadrant of the roundabout is closed as shown in Figure 6H-13AY, only one direction of approach traffic shall be released at a time.**
5. **At night, flagger stations shall be illuminated, except in emergencies.**
6. **WRONG WAY signs shall be covered.**

Guidance:

7. *When used, the BE PREPARED TO STOP sign should be located between the Flagger sign and the ONE LANE ROAD sign.*
8. *YIELD, ONE WAY, and Directional arrow signs should be covered or removed.*
9. *Confusing or misleading guide or lane use control signs should be covered.*

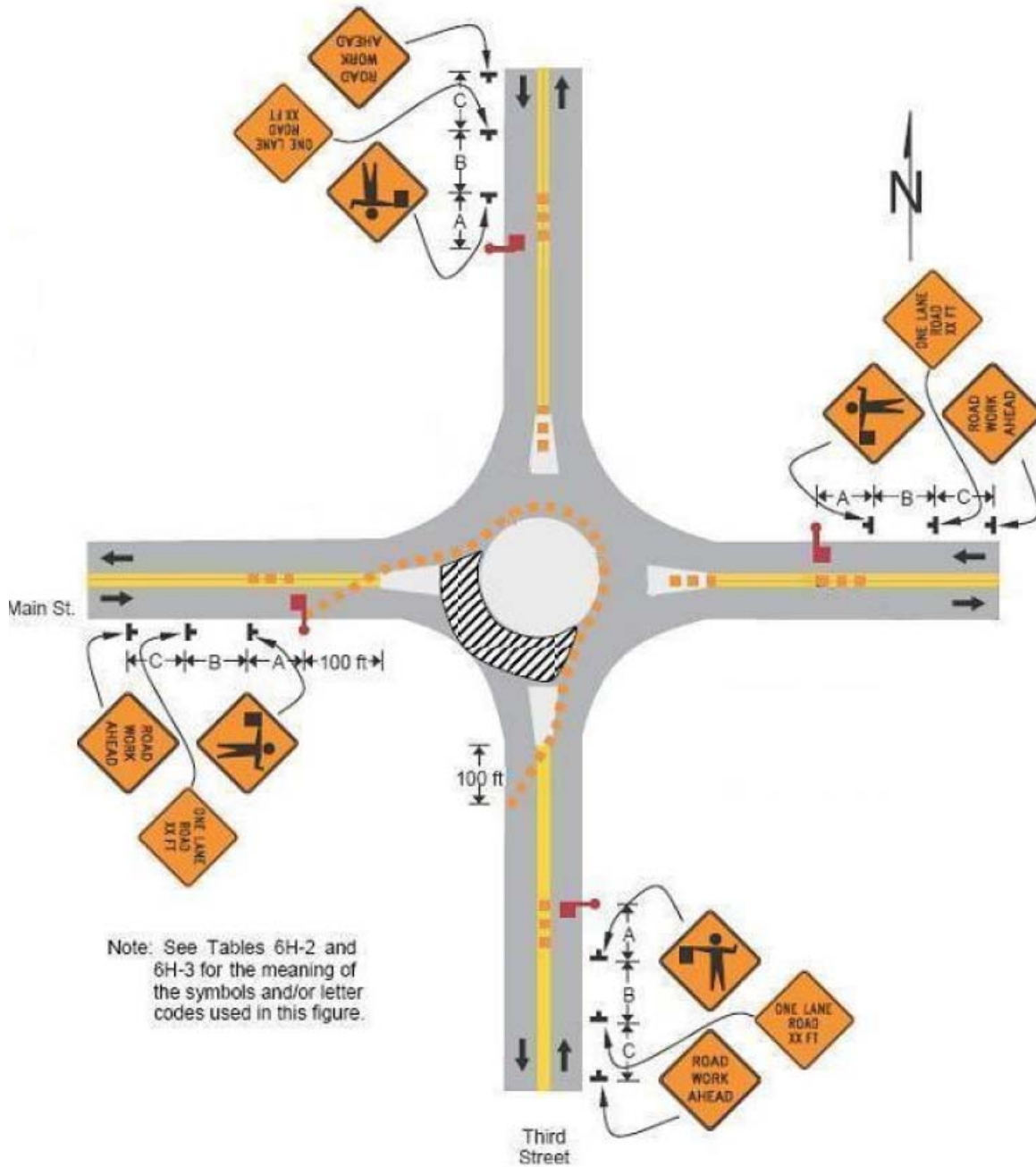
Option:

10. Crosswalks may be closed
11. An alternative to closing crosswalks is to add warning signs informing pedestrians that there is traffic coming from the left.

Guidance:

12. *Each roundabout location is unique and the traffic control must be developed to meet the specific conditions of the location and the work operation.*
13. *Since the geometrics of the roundabout will temporarily be altered, consideration should be given to establishing a truck detour for the duration of the project.*
14. *For multi-lane roundabouts, the work should be restricted to one lane within the roundabout so that the normal counterclockwise flow is maintained. If it is not possible to restrict work to one lane, then the advance signing and channelizing shown on this TA should be followed.*
15. *For intermediate or long term work the roundabout should be closed and traffic detoured with appropriate detour signing provided.*

Figure 6H-13AY. Short Term or Short Duration Work in a Roundabout (TA-13AY)



Typical Application 13AY

PART 6 TEMPORARY TRAFFIC CONTROL (continued)

(Variation 57: added Notes and Typical Application 6H-17AY)

Notes for Figure 6H-17AY—Typical Application 17AY
Mobile Operation on a Two-Lane Road Using Flaggers

Option:

1. The ROAD WORK AHEAD signs may be omitted for short-duration operations.
2. Flashing warning lights and/or flags may be used to call attention to the advance warning signs. A BE PREPARED TO STOP sign may be added to the sign series.

Guidance:

3. *The buffer space should be extended so that the flagger is placed before a horizontal (or crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped vehicles.*

Standard:

4. **At night flagger stations shall be illuminated, except in emergencies.**
5. **The distance between the leading signs shall not exceed 2 miles.**

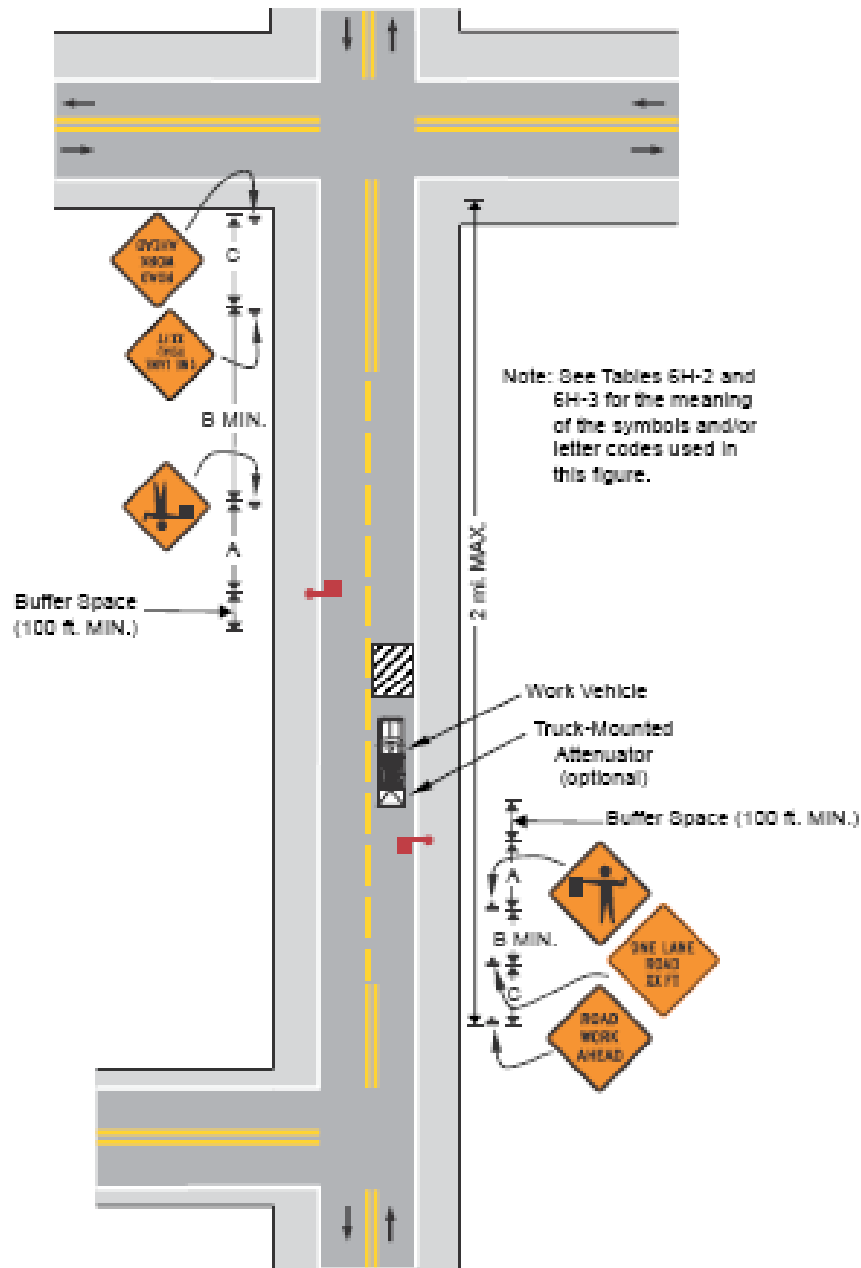
Guidance:

6. *Where used, the BE PREPARED TO STOP sign should be located between the Flagger sign and the ONE LANE ROAD sign.*
7. *Where a grade crossing exists within or upstream of the transition area and it is anticipated that queues resulting from the lane closure might extend through the grade crossing the TTC zone should be extended so that the transition area precedes the grade crossings.*
8. *When a grade crossing equipped with active warning devices exists within the activity area, provisions should be made for keeping flaggers informed as to the activation status of these warning devices.*
9. *When a grade crossing exists within the activity area, drivers operating on the left-hand side of the normal centerline should be provided with comparable warning devices as for drivers operating on the right-hand side of the normal centerline.*
10. *Early coordination with the railroad company or light rail transit agency should occur before work starts.*

Option:

11. A flagger or a uniformed law enforcement officer may be used at the grade crossing to minimize the probability that vehicles are stopped within 15 ft of the grade crossing, measured from both sides of the outside rails.

Figure 6H-17AY Mobile Operations on a Two-Lane Road Using Flaggers (TA-17AY)



Typical Application 17AY

PART 6 TEMPORARY TRAFFIC CONTROL (continued)

(Variation 58: added Notes and Typical Application 6H-30AY)

**Notes for Figure 6H-30AY—Typical Application 30AY
Work in a Dual Left-Turn Lane**

Option:

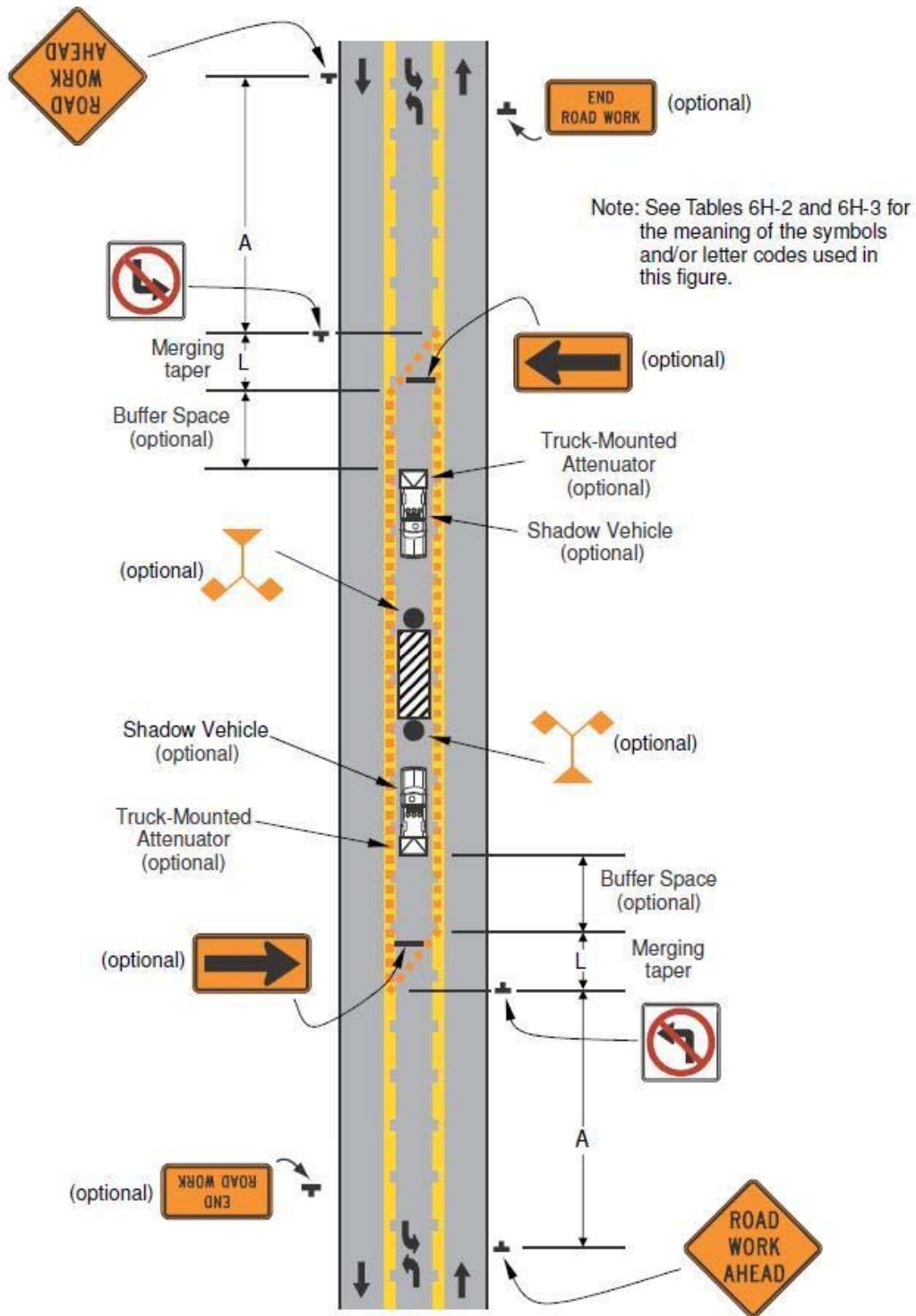
1. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
2. If the closure continues overnight, warning lights may be used on the channelizing devices,
3. A LARGE ARROW sign may be used at the beginning of the taper for added visibility.
4. The ENF ROAD WORK signs may be omitted for short-duration operations.
5. Shadow vehicles may be omitted for operations with a duration longer than short-term stationary.
6. A truck-mounted attenuator may be used on the shadow vehicles.
7. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.
8. High-level warning devices may be used.

Standard

9. **Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.**
10. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating flashing, oscillating, or strobe lights.**

PART 6 TEMPORARY TRAFFIC CONTROL (continued)

Figure 6H-30AY. Work in a Dual Left-Turn Lane (TA-30AY)



Typical Application 30AY

PART 6 TEMPORARY TRAFFIC CONTROL (continued)

(Variation 59: added Notes and Typical Application 6H-32AY)

Notes for Figure 6H-32AY—Typical Application 32AY
Lane Shift on a Road with a Dual Left-Turn Lane

Option:

1. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
2. If the closure continues overnight, warning lights may be used in the channelizing devices.
3. The END ROAD WORK signs may be omitted for short-duration operations.
4. Shadow vehicles may be omitted for operations with duration longer than short-term stationary.
5. A work vehicle or a shadow vehicle may be equipped with a truck-mounted attenuator.
6. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights
7. High-level warning devices may be used.

Standard:

8. **Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.**
9. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Guidance:

10. *Conflicting pavement markings should be removed for long-term projects per Figure 6H-34. For short-term and intermediate projects where this is not practical, the channelizing devices in the area where the pavement markings conflict should be placed at a minimum spacing of $1/2 S$ ft where S is the speed in mph. Temporary markings should be installed where needed per Figure 6H-34*
11. *If the lane shift has curves with recommended speeds of 30 mph or less, reverse Turn signs should be used.*
12. *Where the shifted section is long, a Reverse Curve sign should be used to show the initial shift and a second sign should be used to show the return to the normal alignment.*
13. *If the tangent distance along the temporary diversion is less than 600 ft, the Double Reverse Curve sign should be used at the location of the first Two Lane Reverse Curve sign. The second Two Lane Reverse Curve sign should be omitted.*

Standard:

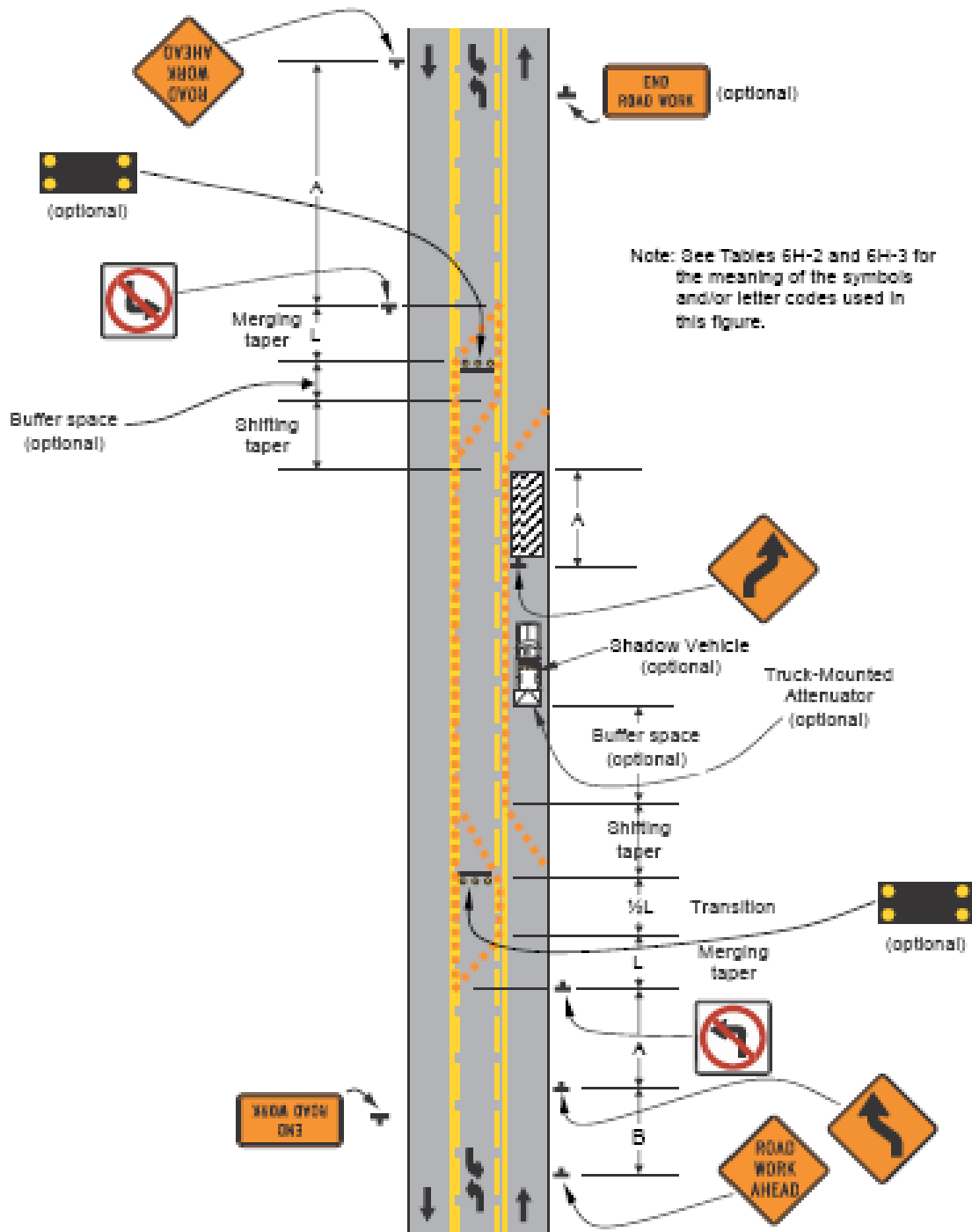
14. **The number of lanes illustrated in the Reverse Curve or Double Reverse Curve signs shall be the same as the number of through lanes available to road users. The direction of the of the reverse curves shall be appropriately illustrated.**

Option

15. Where two or more lanes are being shifted, a W1-4 (or W1-3) sign with an ALL LANES (W24-1cP) plaque (see Figure 6F-4) may be used instead of a sign that illustrates the number of lanes,
16. Where more than three lanes are being shifted, the Reverse Curve (or Turn) sign may be rectangular.

PART 6 TEMPORARY TRAFFIC CONTROL (continued)

Figure 6H-32AY. Lane Shift on a Road with a Dual Left-Turn Lane (TA 32AY)



Typical Application 32-AY

PART 6 TEMPORARY TRAFFIC CONTROL (continued)

(Variation 60: added Notes and Typical Application 6H-35AY)

Notes for Figure 6H-35AY—Typical Application 35AY
Mobile Operation on Multiple Lanes of a Multi-Lane Divided Road

Standard:

1. **Arrow boards shall, as a minimum, be Type B, with a size of 60 x 30 inches.**
2. **Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.**
3. **Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.**
4. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

Guidance:

5. *Vehicles used for these operations should be made highly visible with appropriate equipment, such as flags, signs, or arrow boards.*
6. *Shadow Vehicles 1 and 2 should be equipped with an arrow board and truck-mounted attenuator.*
7. *Shadow vehicle 4, if used, should be equipped with an arrow board.*
8. *Shadow Vehicle 3 should be equipped with an arrow board. An appropriate lane closure sign should be placed on Shadow Vehicle 3 so as not to obscure the arrow board.*
9. *Shadow Vehicle 3 should travel at a varying distance from the work operation so as to provide adequate sight distance for vehicular traffic approaching from the rear.*
10. *The spacing between the work vehicles and the shadow vehicles, and between each shadow vehicle should be minimized to deter road users from driving in between.*
11. *Work should normally be accomplished during off-peak hours.*
12. *When the work vehicle occupies an interior lane (a lane other than the far right or far left) of a directional roadway having a right-hand shoulder 10 feet or more in width, Shadow Vehicle 3 should drive the right-hand shoulder with a sign indicating that work is taking place in the interior lane.*
13. *On painting operations the shadow vehicles should not straddle the left-edge-line.*

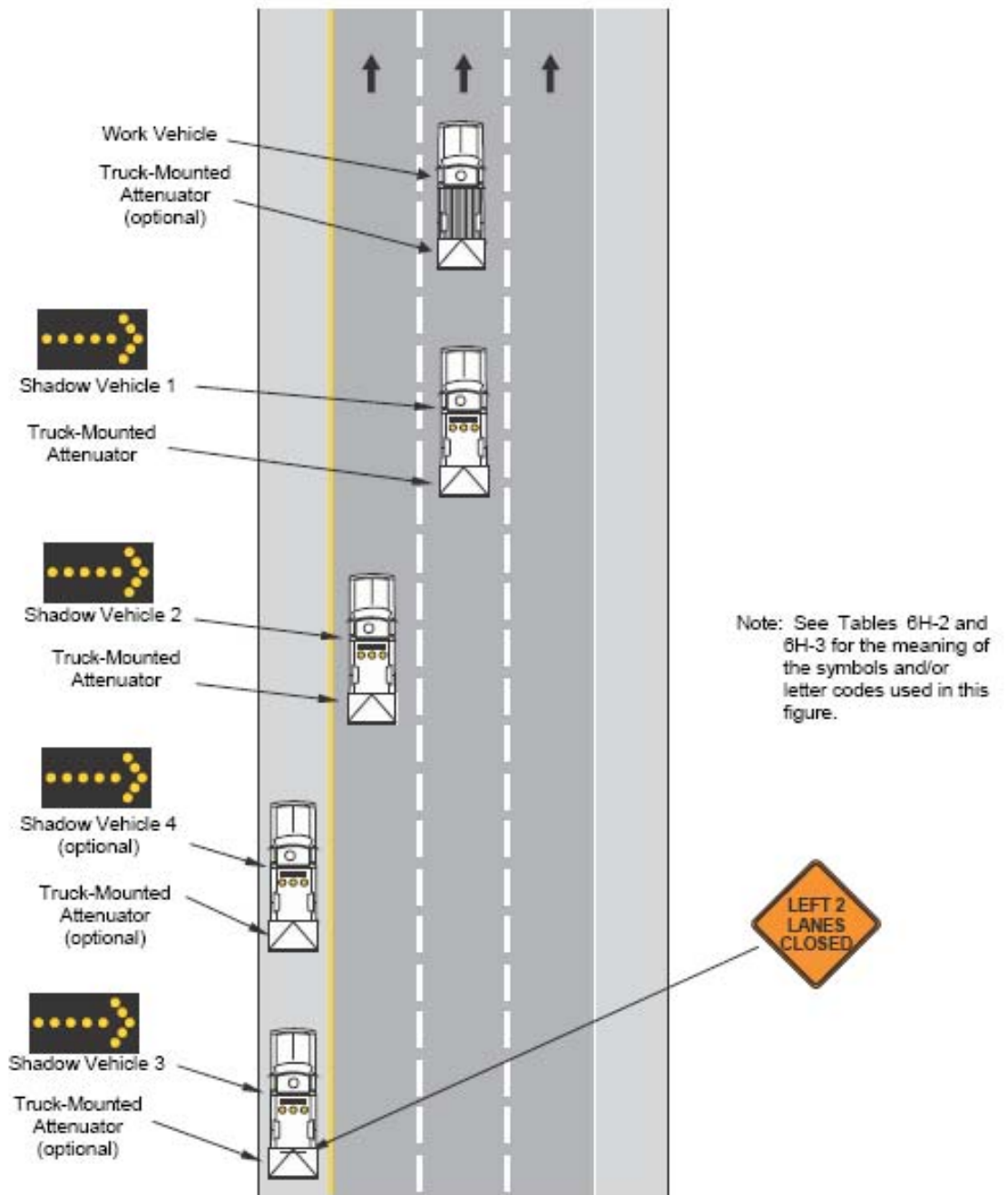
Option:

14. A truck-mounted attenuator may be used on Shadow Vehicles 3 and 4.
15. On high-speed roadways, Shadow Vehicle 2 may be used with Shadow Vehicle 1 in the closed lane, Shadow Vehicle 4 in the first closed lane, and Shadow Vehicle 3 completely on the shoulder.
16. Where adequate shoulder width is not available, Shadow Vehicle 3 may drive fully in the lane..

Support:

17. Straddling the edge line has been found to be hazardous for motorists and the driver of the shadow vehicle straddling the line. For this reason, straddling the edge line is not recommended.
18. Straddling the left edge line during painting operations can lead to shadow vehicles driving over paint that is not completely dry when approaching bridges.

Figure 6H-35AY. Mobile Operation on Multiple Lanes of a Multi-Lane Divided Road (TA-35AY)



Typical Application 35AY

PART 6 TEMPORARY TRAFFIC CONTROL (continued)

(Variation 61: changed title of Notes and Typical Application 6H-43 to the following)

Partial Exit Ramp Closure on the Right-Hand Side

(Variation 62: added Notes and Typical Application 6H-43AY)

Notes for Figure 6H-43AY—Typical Application 43AY Partial Exit Ramp Closure with Work in the Gore Area

Option:

1. An alternative procedure that may be used is to channelize exiting vehicular traffic onto the right shoulder and close the lane as necessary.
2. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
3. If the work continues overnight, warning lights may be used on channelizing devices.
4. The END ROAD WORK signs may be omitted for short-duration operations.
5. Shadow vehicles may be omitted for operations with a duration longer than short-term stationary or when roll ahead distance cannot be met.
6. A work vehicle or a shadow vehicle may be equipped with a truck mounted attenuator.
7. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

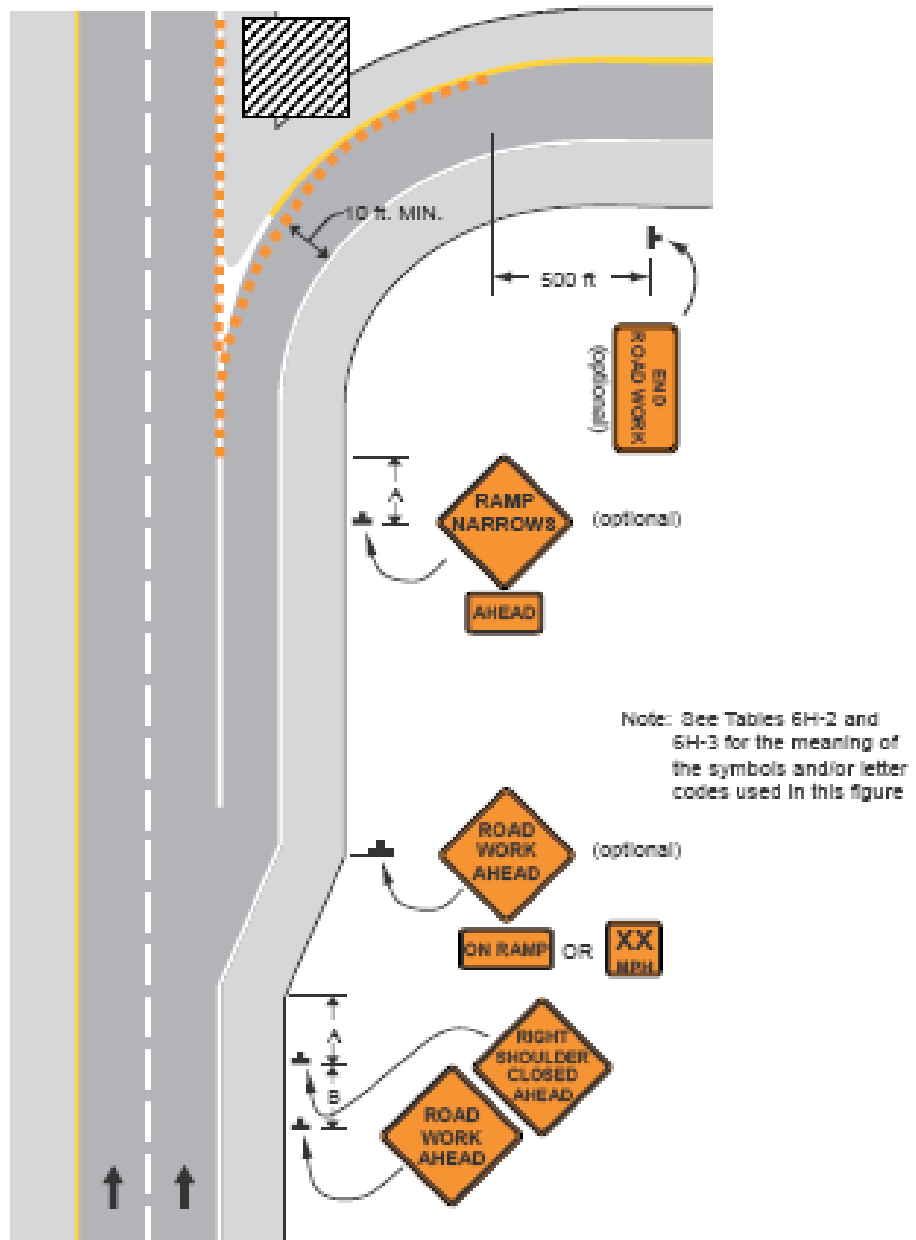
Standard:

8. **Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.**
9. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Guidance:

10. *Truck off-tracking should be considered when determining whether the minimum lane width of 10 feet is adequate (see Section 6G.08).*
11. *If used, advisory speed plaques should indicate a speed 10 mph lower than the posted speed limit.*

Figure 6H-43AY. Partial Exit Ramp Closure with Work in Gore Area (TA-43AY)



Typical Application 43AY

PART 7 TRAFFIC CONTROL FOR SCHOOL AREAS

(Variation 63: added Paragraphs 02 - 06 to detail S3-Y3, SR5-Y1, and SR5-Y2 signs. Added signs to Table 7B-1)

Section 7B.13 School Bus Stop Ahead Sign (S3-1)

Option:

02 The WATCH FOR SCHOOL BUS (S3-Y3) sign (see Figure 7B-1) may be installed if the bus stops at individual residences to pick up or discharge passengers, rather than at a single location where numerous passengers are picked up or discharged.

Support:

03 It is not intended that that these signs be used everywhere a school bus stops to pick up or discharge passengers but for use only where terrain and roadway features limit the approach sight distance and where there is no opportunity to relocate the stop to another location with adequate visibility. The need for these signs should be determined by a field investigation and engineering judgment.

Option:

04 The STOP WHEN SCHOOL BUS STOPS (SR5-Y1) sign may be used at a location where motorists have been observed to regularly ignore the extended arm signal device displayed on a stopped school bus.

05 The ALL LANES STOP WHEN SCHOOL BUS STOPS (SR5-Y2) sign may be used on a non-divided highway at a location where motorists heading in the opposite direction of a stopped school bus have been observed to regularly ignore the extended arm signal device when displayed.

Standard:

06 **The ALL LANES STOP WHEN SCHOOL BUS STOPS (SR5-Y2) sign shall not be used on a divided highway.**

(Variation 64: changed language in Paragraphs 09 to include S4-Y8P, sign. Added sign to Table 7B-1)

Section 7B.15 School Speed Limit Assembly (S4-1P, S4-2P, S4-3P, S4-4P, S4-6P, S5-1) and END SCHOOL SPEED LIMIT Sign (S5-3)

Standard:

09 **The fixed-message School Speed Limit assembly shall consist of a top plaque (S4-3P) with the legend SCHOOL, a Speed Limit (R2-1) sign, and a bottom plaque (S4-1P, S4-2P, S4-4P, S4-6P or S4-Y8P) indicating the specific periods of the day, days of the week or days of the year that the special school speed limit is in effect (see Figure 7B-1).**

(Variations 63 and 64: signs added to Table 7B-1)

Table 7B-1. School Area Sign and Plaque Sizes

Sign	Sign Designation	Section	Conventional Road	Minimum	Oversized
Watch for School Bus	S3-Y3	7B.13	36 x 36	30 x 30	48 x 48
Stop When School Bus Stops	SR5-Y1	7B.13	24 x 24	24 x 24	24 x 24
All Lanes Stop When School Bus Stops	SR5-Y2	7B.13	36 x 36	36 x 36	36 x 36
School Days Only	S4-Y8P	7B.15	24 x 10	-	36 x 18

PART 7 TRAFFIC CONTROL FOR SCHOOL AREAS (continued)

(Variation 65: added Paragraph 02 to emphasize preference for adult crossing guards)

Section 7D.02 Adult Crossing Guards

Support:

- 02 Normally, adult guards are preferred over traffic signals only for protection of school crossings. Adult guards provide positive guidance to the school pedestrian.
-

(Variation 66: changed guidance in Paragraph 02 to the following:)

Section 7D.03 Qualifications of Adult Crossing Guards

Guidance:

- 02 *Adult crossing guards should possess the following minimum qualifications:*
- A. *Good physical condition, including sight, hearing, and ability to move and maneuver quickly in order to avoid danger from errant vehicles;*
 - B. *Ability to control a STOP paddle effectively to provide approaching road users with a clear, fully direct view of the paddles STOP message during the entire crossing movement;*
 - C. *Ability to communicate specific instructions clearly, firmly, and courteously;*
 - D. *Ability to recognize potentially dangerous traffic situations and warn and manage students in sufficient time to avoid injury.*
 - E. *Dependability; and*
 - F. *An overall sense of responsibility for the safety of students.*
-

(Variation 67: added Section 7D.06)

Section 7D.06 Student Patrols

Option:

- 01 Students patrols may be used to direct and control pedestrians at crossings near schools where adequate gaps in traffic occur frequently enough so that gaps do not need to be created.
- 02 Student patrols may be used to direct and control pedestrians at signalized intersections where turning movements are not a significant problem, and may be used to assist adult crossing guards in the control of pedestrians at crossing locations used by large numbers of pedestrians.

Guidance:

- 03 Student patrols should not be responsible for directing vehicular traffic. They should not function as uniformed law enforcement officers or adult crossing guards.
- 04 Student patrols should be authorized by the local school board. School authorities should be responsible for organizing, instructing, and supervising patrols with the assistance of the local police.

PART 7 TRAFFIC CONTROL FOR SCHOOL AREAS (continued)

(Variation 68: added Section 7D.07)

Section 7D.07 Choice of Student Patrols

Guidance:

- 01 Student patrols should be carefully selected. They should be students from the fifth grade or higher. Leadership and reliability should be determining qualities for patrol membership.
 - 02 Parental approval should be obtained in writing before a student is used as a member of a student patrol.
-

(Variation 69: added Section 7D.08)

Section 7D.08 Operating Procedures for Student Patrols

Guidance:

- 01 Student patrols should use a flagging device to stop pedestrians behind the curb or edge of the roadway, and should allow them to cross only when there is an adequate gap in traffic.

Standard:

- 02 **Flagging devices used during periods of twilight or darkness shall be retroreflective or illuminated. Because they are not authorized to direct vehicular traffic, student patrols shall not use a STOP paddle.**

(Variation 70: added Paragraph 07)

Section 8A.01 Introduction

Support:

- 07 The Indiana Department of Transportation (INDOT) has the regulatory authority (by Indiana Code) to order installation of active warning devices at any crossing. However, local agencies also have the authority (by Indiana Code) to install or upgrade the traffic control devices at crossings by entering into agreements with railroads by mutual consent without INDOT intervention or regulatory approval. While highway agencies are typically responsible for determining the need and type of warning devices at highway-rail crossings, nothing precludes a railroad from initiating a request for such a study. Further, railroad input may be needed to complete such a study, and their cooperation and participation is needed for any installation beyond standard crossbucks.
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(Variation 71: added Paragraph 03)

Section 8B .01 Purpose

Support:

- 03 Indiana Code requires the railroad company to install and maintain the Highway-Rail Grade Crossing (Crossbuck) Signs and Number of Tracks Signs.
-

(Variation 72: added Paragraph 09)

Section 8B.04 Crossbuck Assemblies with YIELD or STOP Signs at Passive Grade Crossings

Support:

- 09 Before installing a separate post on railroad property, permission from the railroad is needed.
-

(Variation 73: deleted entire NMUTCD Section 8B.07 and replaced with Standard prohibiting use of "EXEMPT" plaques; deleted sign)

Section 8B.07 EXEMPT Crossing Plaques (R15-3P, W10-1aP)

Standard:

- 08 The "EXEMPT" sign shall not be used in Indiana unless specifically permitted by statute.

Option:

- 01 When authorized by law or regulation, a supplemental EXEMPT (R15-3P) plaque (see Figure 8B-1) with a white background may be used below the Crossbuck sign or Number of Tracks plaque, if present, at the grade crossing, and a supplemental EXEMPT (W10-1aP) plaque (see Figure 8B-4) with a yellow background may be used below the Grade Crossing Advance Warning (W10 series) sign.
- 02 Where neither the Crossbuck sign nor the advance warning signs exist for a particular highway-LRT grade crossing, an EXEMPT (R15-3P) plaque with a white background may be placed on its own post on the near right hand side of the approach to the crossing.

Support:

- 03 These supplemental plaques inform drivers of highway vehicles carrying passengers for hire, school buses carrying students, or highway vehicles carrying hazardous materials that a stop is not required at certain designated grade crossings, except when rail traffic is approaching or occupying the grade crossing, or the driver's view is blocked.

PART 8 TRAFFIC CONTROL FOR RAILROAD AND LIGHT RAIL TRANSIT GRADE CROSSINGS (cont)

(Variation 74: changed section title added Paragraphs 01, 02, and 03 to describe use of “TRAIN TRAFFIC RESUMED” sign; added sign to Table 8B-1 and Figure 8B-4)

Section 8B.10 TRACKS OUT OF SERVICE Sign (R8-9) and TRAIN TRAFFIC RESUMED- TRACKS IN SERVICE Sign (W10-Y12a)

Support:

- 01 Indiana Statute (Indiana Code-Title 8, Article 6, Chapter 15) stipulates that the Indiana Department of Transportation (INDOT) shall determine if a railroad grade crossing is abandoned or unused after receiving a request from the railroad or the road authority that has jurisdiction over the roadway. After the railroad grade crossing has been designated as an abandoned or unused railroad grade crossing, the crossing must be marked with TRACKS OUT OF SERVICE (R8 – 9) signs. These signs are to be installed by the road authority that has jurisdiction of the roadway over which the abandoned or unused railroad grade crossing exists. Thirty days prior to resuming operation over an abandoned or unused railroad grade crossing, the railroad is to provide INDOT and the road authority, having jurisdiction over the roadway, with written notification and request the TRACKS OUT OF SERVICE (R8 – 9) signs be removed. The railroad shall mark the railroad grade crossing, for six months, with the TRAIN TRAFFIC RESUMED – TRACKS IN SERVICE (W10 – Y12a) signs.

Standard:

- 02 **If a highway – rail grade crossing is returned to service, the railroad shall mark the railroad grade crossing with the W10 – Y12a sign for a 6-month period. This sign shall be installed on the post used for mounting the Crossbuck signs, within 1 inch below the Crossbuck signs (R15–1, R15–2), or on a separate post such that the W10 – Y12a sign does not block, or is not blocked by, the visual elements of any other railroad warning device or other traffic sign or device.**

Option:

- 03 The governmental agency that has jurisdiction over the roadway that had an abandoned or unused railroad grade crossing and the railroad has resumed operation of the railroad grade crossing, may install an additional W10-Y12a sign, as a primary sign, beneath any of the other Highway-Rail Grade Crossing Advance Warning Signs (W10 Series), as deemed appropriate.

(Variation 75: added Paragraphs 04 through 07 to describe use of storage space sign; added sign to Table 8B-1 and Figure 8B-4)

Section 8B.24 Storage Space Signs (W10-11, W10-11a, W10-11b) W10-Y11c, W10-Y11d, and W10-Y11e)

Guidance:

- 04 *A Tracks Storage Space (W10-Y11c) sign supplemented by a word message tracks storage distance*
 05 *(W10-Y11d) sign should be used where there is a highway-rail grade crossing in close proximity to the highway-rail grade crossing and an engineering study determines that adequate space is not available to store a design vehicle(s) between the train dynamic envelopes.*
 06 *The Tracks Storage Space (W10-Y11c and W10-Y11d) signs should be mounted in advance of the first highway-rail grade crossing at an appropriate location to advise drivers of the space available for vehicle storage between the second set of tracks and the highway-rail first grade crossing.*

Option:

- 06 The Tracks Storage Space sign, W10-Y11e, may be mounted beyond the first highway-rail grade crossing just prior to the second set of tracks to remind drivers of the storage space between the tracks.

(Variation 76: changed standard in Paragraph 03 to allow 6 inch white line and added Paragraph 04)

Section 8B.29 Dynamic Envelope Markings

Standard:

- 03 **If used, pavement markings for indicating the dynamic envelope shall comply with the provisions of Part 3 and shall be a 4 or 6-inch normal solid white line or contrasting pavement color and/or contrasting pavement texture.**

Guidance:

- 04 *The dynamic envelope line is normally a white line. However, if the light rail transit is between lanes of opposing traffic, the line should be yellow to replace the left edge line.*
-

(Variation 77: changed standard in Paragraph 03 to require min 20 seconds activation lag between detection and gate arm activation)

Section 8C.04 Automatic Gates

Standard:

- 03 **In the normal sequence of operation, unless constant warning time detection or other advanced system requires otherwise, the flashing-light signals and the lights on the gate arm (in its normal upright position) shall be activated not less than 20 seconds before arrival of the train. Additional time may be needed where there are multiple tracks, skewed tracks, approach roadways that are not flat, or design vehicles with unusual length or acceleration characteristics. The gate arm shall start its downward motion not less than 3 seconds after the flashing-light signals start to operate, shall reach its horizontal position at least 5 seconds before the arrival of the rail traffic, and shall remain in the down position as long as the rail traffic occupies the grade crossing.**
-

(Variation 78: changed standard in Paragraph 04 to require min 20 seconds activation lag between detection and gate arm activation)

Section 8C.06 Four-Quadrant Gate Systems

Standard:

- 04 **In the normal sequence of operation, unless constant warning time detection or other advanced system requires otherwise, the flashing-light signals and the lights on the gate arms (in their normal upright positions) shall be activated not less than 20 seconds before the arrival of the train. Additional time may be needed where there are multiple tracks, skewed tracks, approach roadways that are not flat, or for design vehicles with unusual length or acceleration characteristics. The gate arms for the entrance lanes of traffic shall start their downward motion not less than 3 seconds after the flashing-light signals start to operate and shall reach their horizontal position at least 5 seconds before the arrival of the rail traffic. Exit gate arm activation and downward motion shall be based on detection or timing requirements established by an engineering study of the individual site. The gate arms shall remain in the down position as long as the rail traffic occupies the grade crossing.**

PART 9 TRAFFIC CONTROL FOR BICYCLE FACILITIES

No changes from the National MUTCD

APPENDIX A2

(Variation 79: added 70 mph conversion to this table)

Table A2-4. Conversion of Miles per Hour to Kilometers/Hour

Note: 1 mile per hour = 1.609 kilometers/hour; 1 kilometer/hour = 0.621 miles per hour

mph	km/h
3	5
10	16
15	20
20	30

mph	km/h
25	40
30	50
35	60
40	60

mph	km/h
45	70
50	80
55	90
60	100

mph	km/h
65	105
70	115
80	130