

# National Committee on Uniform Traffic Control Devices

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Item No.: 15B-RW-02

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

TECHNICAL COMMITTEE: ITEM NUMBER: TOPIC: Regulatory & Warning Signs

<b>ITEM NUMBER:</b>	15B-RW-02
TOPIC:	Selecting Type of Traffic Control for Unsignalized
	Intersections
<b>ORIGIN OF REQUEST:</b>	RW Task Force: Tom Heydel (chair), Bob Seyfried, Robert
	Weber, Jim Pline, Fred Ranck, Lee Roadifer, Paul Carlson
	Results from NCHRP Web-Only Document 213, Potential
	MUTCD Criteria for Selecting the Type of Control at
	Unsignalized Intersections
AFFECTED SECTIONS	Sections 2B.04, 2B.06, 2B.07, 2B.09
OF MUTCH	

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### **DEVELOPMENT HISTORY:**

**OF MUTCD:** 

- Approved by Technical Committee: 06/17/2015
- Approved by NCUTCD Council: 00/00/0000
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This is a proposal for recommended changes to the MUTCD that has been developed by a technical committee of the NCUTCD. The NCUTCD is distributing it to its sponsoring organizations for review and comment. Sponsor comments will be considered in revising the proposal prior to NCUTCD Council consideration. This proposal does not represent a revision of the MUTCD and does not constitute official MUTCD standards, guidance, or options. If approved by the NCUTCD Council, the recommended changes will be submitted to FHWA for consideration for inclusion in a future MUTCD revision. The MUTCD can be revised only through the federal rulemaking process.

#### 20 SUMMARY:

21 The MUTCD related to selection of traffic control in Part 2B has seen only minor changes since 22 1971. The volume and crash numbers contained within Section 2B.04, 2B.06, 2B.07 and 2B.09 23 have not been evaluated based on research since that time. Research was needed to look at the 24 warrants (criteria) for determining whether an intersection should have no control, yield control or stop control. Signal control warrants are already provided for in Part 4. Accordingly, an 25 NCHRP research project was awarded. This research project results was used to develop this 26 language. Research: NCHRP Project 03-109, Criteria for selecting type of control for 27 28 unsignalized intersections 29

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#### 31 **DISCUSSION**

- 32 Updating or developing new warrants (criteria) is the focus of the NCHRP 03-109 report. The
- report has been finalized and is dated March 2015. Prior to this there was much discussion
- 34 regarding whether or not to go directly to Council under the exception in June or go out to
- 35 sponsors. RWSTC voted to go to sponsors in the fall 2014 to then take action at the January
- 36 2015 meeting in Arlington, Virginia. The following is the recommended language as presented
- 37 by the report and includes changes made as a result of sponsor comments in the fall of 2014 and
- as approved by RWSTC January 7, 2015. <u>Council tabled the proposal on January 9, 2015.</u>
- 39 This proposal makes significant changes to 2B.04, 2B.06, 2B.07 and 2B.09. Therefore, rather
- 40 than showing changes with crossouts and new text to the impacted sections, it was decided to
- 41 show only the new text and existing retained 2009 MUTCD text in the proposal. We did this in
- 42 hopes that it would provide less confusion by starting with a clean slate for these 4 sections of43 the existing MUTCD given the almost complete rewrite.
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- 44
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- 49 2015 meeting in Arlington, Virginia. The following is the recommended language as presented
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- 53 than showing changes with strikeout and new text to the impacted sections, it was decided to
- 54 show only the new text and existing retained 2009 MUTCD text in the proposal. We did this in
- 55 hopes that it would provide less confusion by starting with a clean slate for these 4 sections of
- 56 the existing MUTCD given the almost complete rewrite.
- 57

# At the end of the proposal, we have included the present language from sections 2B.04, 2B.06, 2B.07 and 2B.09 to show what portions we retained and what is not retained by red strikethrough.

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## 62 **RECOMMENDED MUTCD CHANGES**

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64 The following present the proposed changes to the current MUTCD within the context of the 65 current MUTCD language. Proposed additions to the MUTCD are shown in <u>blue underline</u> and 66 proposed deletions from the MUTCD are shown in <u>red strikethrough</u>. Changes previously

- 50 proposed deletions from the MUTCD are shown in <del>red strikethrough</del>. Changes previously 57 approved by NCUTCD Council (but not yet adopted by FHWA) are shown in group double
- 67 approved by NCUTCD Council (but not yet adopted by FHWA) are shown in <u>green double</u>
- 68 <u>underline</u> for additions and <del>green double strikethrough</del> for deletions. In some cases, background
- comments may be provided with the MUTCD text. These comments are indicated by[highlighted light blue in brackets].
- 71
- 72 Note: Existing MUTCD text is shown in black text. 2009 MUTCD deleted text is not shown
- 73 for sections 2B.04, 2B.06, 2B.07 and 2B.09 within the new clean sections (2B.X1 to 2B.X14)
- 74 proposal but rather for clarity is shown at the end of the proposal. We are deleting these
- 75 sections and replacing them with the following:
- 76

	PART 2. SIGNS
	CHAPTER 2B. REGULATORY SIGNS, BARRICADES, AND GATES
The sec the cur alone c Section	ction numbers shown are for the structure of the 2009 Chapter 2B. If FHWA splits rent regulatory sign chapter into multiple chapters, this proposal would be a stand- hapter. s 2B.04, 2B.06, 2B.07 and 2B.09 are deleted and replaced with the following:
NOTE:	Sections 2B.05 (STOP sign and ALL WAY plaque) and 2B.08 (YIELD sign) and STOP sign and VIELD sign placement) in the existing 2009 manual do not change
They w	ould be inserted either before, after or somewhere between these proposed sections
as deen	red appropriate by FHWA.
<b>Section</b>	2B.04 General Considerations
Support	<u>:</u>
<u>01 Un</u>	signalized intersections represent the most common form of intersection right-of-way
<u>control.</u>	Selection of unsignalized control type might be affected by specific requirements of
state lav	v or local ordinances.
02 <b>RO</b>	undabouts, and traffic circles other circular intersections are intersection designs and are
not tran	the control devices. The YIELD sign at the roundabout is the traffic control device. The
<u>uecisioi</u>	ring design desigion and not a traffic control device traffic desigion. As such, criteria for
convers	ion from a traditional intersection to a roundabout are not included in the MUTCD
<u>Guidan</u>	<i>ce</i> :
03 The	e type of traffic control used at an unsignalized intersection should be the least restrictive
that pro	wides appropriate levels of safety and efficiency.
Support	
04 The	e types of right-of-way control that can exist at an unsignalized intersection are listed
below i	n order from the least restrictive to the most restrictive.
Α.	No intersection control: There are no right-of-way traffic control devices on any of the
	approaches to the intersection.
В.	Yield control: YIELD signs are placed on all approaches (for a roundabout), on
	opposing approaches (for a 4-leg intersection), on a single approach (for a 3-leg
	intersection), or in the median of a divided highway. The YIELD signs are typically
	placed on the minor road. (See Section 2B.X3 for guidance on selecting the minor
C	road.)
C.	Minor road stop control: STOP signs are typically placed on opposing approaches (for
	4-leg intersection) of on a single approach (for a 5-leg intersection). The STOP signs
	are typically placed on the finitor foad. (See Section 2B.A.5 for guidance on selecting the minor road.)
Л	All-way stop control: STOP signs are placed on all approaches to the intersection
Guidan	<i>minuty</i> stop control. 51 of signs are placed on an approaches to the intersection.
05 Wh	en selecting a form of intersection control, the following factors should be considered:
<u>,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, </u>	in second a joint of increasion control, inc jouowing juctors should be considered.

122	Α.	Vehicular, bicycle, and pedestrian traffic volumes on all approaches. (From 2009
123		MUTCD Section 2B.04 Paragraph 02) Where the term units/day or units/hour is
124		indicated, it should be the total of vehicular, bicycle, and pedestrian volume
125	<i>B</i> .	Driver yielding behavior with regard to all modes of conflicting traffic including
126		bicyclists and pedestrians.
127	С.	Number and angle of approaches.
128	<i>D</i> .	Approach speeds.
129	Е.	Sight distance available on each approach.
130	F.	Reported crash experience. [From 2009 MUTCD Section 2B.04 Paragraph 02]
131	G.	Evaluate and consider the presence of a rail crossing near the intersection of a local
132		street with a collector street
133	06 Yie	ld or Stop signs should not be used for speed control. <b>From 2009 MUTCD Section</b>
134	2B.04 P	aragraph 05]
135	Standa	rd:
136	07 Bec	cause the potential for conflicting commands could create driver confusion, Yield or
137	Stop sig	gns shall not be used in conjunction with any traffic control signal operation, except
138	in the f	ollowing cases:
139	А.	If the signal indication for an approach is a flashing red at all times;
140	B.	If a minor street or driveway is located within or adjacent to the area controlled by
141		the traffic control signal, but does not require separate traffic signal control
142		because an extremely low potential for conflict exists; or
143	C.	If a channelized turn lane is separated from the adjacent travel lanes by an island
144		and the channelized turn lane is not controlled by a traffic control signal. [From
145		2009 MUTCD Section 2B.04, paragraph 10]
146	08 Ex	cept as provided in Section 2B.X6, Stop signs and Yield signs shall not be installed
147	on diffe	erent approaches to the same unsignalized intersection if those approaches conflict
148	with or	oppose each other. [From 2009 MUTCD Section 2B.04, paragraph 11]
149	09 Poi	table or part-time Stop or Yield signs shall not be used except for emergency and
150	tempor	ary traffic control zone purposes. [From 2009 MUTCD Section 2B.04, paragraph 12]
151	10 A p	oortable or part-time (folding) Stop sign that is manually placed into view and
152	manual	ly removed from view shall not be used during a power outage to control a
153	signaliz	ed approach unless the maintaining agency establishes that the signal indication
154	that wi	ll first be displayed to that approach upon restoration of power is a flashing red
155	signal i	ndication and that the portable Stop sign will be manually removed from view prior
156	to stop-	and-go operation of the traffic control signal. [From 2009 MUTCD Section 2B.04,
157	paragra	<u>ph 13]</u>
158	Option:	
159	11 A p	ortable or part-time (folding) Stop sign that is electrically or mechanically operated such
160	that it of	nly displays the Stop message during a power outage and ceases to display the Stop
161	message	e upon restoration of power may be used during a power outage to control a signalized
162	approac	h. [From 2009 MUTCD Section 2B.04, paragraph 14]
163		
164	<b>Section</b>	2B.04a Determining the Minor Road for Unsignalized Intersections
165	<u>Guidan</u>	<u>ce:</u>
166	<u>01 The</u>	e selection of the minor road to be controlled by Yield or Stop signs should be based on
167	one or r	nore of the following criteria:

168	А.	<u>A roadway intersecting a designated through or numbered highway.</u>		
169	<i>B</i> .	<u>A roadway with the lower functional classification.</u>		
170	С.	<u>A roadway with the lower traffic volume.</u>		
171	<i>D</i> .	D. <u>A roadway with the lower speed limit.</u>		
172	<u>02 Wh</u>	en two roadways that have relatively equal volumes, speeds, and/or other characteristics		
173	<u>intersec</u>	t, the following factors should be considered in selecting the minor road for installation		
174	of YIEL	D or STOP signs:		
175	(similar	thought to 2009 MUTCD Section 2B.04, paragraph 09)		
176	А.	Controlling the direction that conflicts the most with established pedestrian crossing		
177		activity or school walking routes;		
178	В.	Controlling the direction that has obscured vision, dips, or bumps that already require		
179		drivers to use lower operating speeds; and		
180	С.	Controlling the direction that has the best sight distance from a controlled position to		
181		observe conflicting traffic. [From 2009 MUTCD Section 2B.04 Paragraph 09]		
182	Add de	finition to Section 1A.13 for "Through Highway or Through Street". Refer to Edit		
183	Commi	ttee for action.		
184				
185	<b>Section</b>	2B.04b Alternatives to Changing Intersection Right-of-Way Control		
186	<u>Guidan</u>	<u>ce:</u>		
187	<u>01 Bef</u>	ore converting to a more restrictive form of right-of-way control at an unsignalized		
188	<u>intersec</u>	tion, consideration should be given to alternative treatments that address safety,		
189	<u>operatic</u>	onal, or other concerns.		
190	Option:			
191	<u>02 Alt</u>	ernatives that may be considered include, but are not limited to, the following:		
192	А.	Where Yield or Stop controlled, installing STOP AHEAD or YIELD AHEAD signs on		
193	P	the appropriate approaches to the intersection.		
194	В.	<u>Removing parking on one or more approaches.</u>		
195	C.	Removing sight distance restrictions.		
196	D.	Installing warning signs along the major street to warn road users approaching the		
197	Б	intersection;		
198	E.	Relocating the stop line(s) and making other changes to improve the sight distance at		
199	Б	the intersection;		
200	F.	Installing measures designed to reduce speeds on the approaches.		
201	U.	Installing vallow flashing become on warning signs in advance of a Ston sign		
202	п.	instanting yellow flashing beacons of warning signs in advance of a Stop sign		
205	т	<u>Controlled intersection on major- and/or inmor-street approaches,</u>		
204	1.	Adding one of those names on a minor-street approach to reduce the number of venicles		
205	т	Provising the geometrics at the intersection to channelize vehicular movements and		
200	J.	reduce the time required for a vehicle to complete a movement, which could also assist		
207		reduce the time required for a venicle to complete a movement, which could also assist		
208	K	Production the geometrics at the intersection to add nedestrian median refuge islands		
210	1.	and/or curb extensions:		
210	т	Installing roadway lighting if a disproportionate number of crashes occur at night		
212	M	Restricting one or more turning movements, perhaps on a time-of-day basis, if alternate		
213	171.	routes are available:		

214	N.	Installing a pedestrian hybrid beacon (see Chapter 4F) or In-Roadway Warning Lights
215		(see Chapter 4N) if pedestrian safety is the major concern;
216	О.	Converting to <u>a roundabout; and</u>
217	Р.	Employing other alternatives, depending on conditions at the intersection.
218	NOTE:	Items D-P noted above were taken from Part 4B.04
219		
220	Section	2B.04c No Intersection Control
221	Guidan	ce:
222	01 The	$\overline{\frac{1}{2}}$ decision to use no intersection control should be based on engineering judgment.
223	<b>Option</b> :	
224	02 The	e following factors may be considered:
225	<i>A</i> .	Intersection sight distance is adequate on all approaches.
226	<i>B</i> .	All approaches to the intersection are a single lane and there are no separate turn
227		lanes.
228	С.	The combined vehicular, bicycle, and pedestrian volume (existing or projected) entering
229		the intersection from all approaches averages less than 1,000 units per day or 80 units
230		in the peak hour.
231	[No	ote: Value selected because (a) 1983 study in rural Michigan found no statistical
232	diff	ference for stop-controlled and no-control intersections with major street volumes less
233	tha	n 1000 vpd and (b) less than the value selected for Yield control.]
234	D.	There are no pedestrian or bicycle traffic control devices on any approach.
235	<i>E</i> .	None of the approaches to the intersection are for a through highway, or higher
236		functional classification roadway.
237	<i>F</i> .	The angle of intersection is between 90 and 75 degrees.
238	[No	ote: the Handbook for Designing Roadways for the Aging Population includes the
239	rec	ommendation that the angle not be less than 75 degrees; therefore, we added it to this list
240	of v	when a Stop should not be replaced with no intersection control.]
241	<i>G</i> .	The functional classification of the intersecting streets is either the intersection of two
242		local streets or the intersection of a local street with a collector street.
243		
244	<b>Section</b>	2B.04d Yield Control
245	<u>Guidan</u>	<u>ce:</u>
246	01 At i	intersections where a full stop is not necessary at all times, consideration should first be
247	given to	using less restrictive measures such as Yield signs. [From 2009 MUTCD Section 2B.06,
248	Paragra	ph 01]
249	<u>02 Yie</u>	ld control should be considered when engineering judgment indicates that all of the
250	followin	ig conditions apply:
251	А.	Intersection sight distance is adequate on the approaches to be controlled by YIELD
252		<u>signs.</u>
253	<i>B</i> .	The approach to be controlled is a single lane.
254	С.	One of the following crash-related criteria applies:
255		a. For changing from no intersection control to yield control, there have been two or
256		more reported crashes that are susceptible to correction by installation of a YIELD
257		sign in the previous 12 months.
258		b. <u>For changing from minor road stop control to yield control, there have been two or</u>
259		fewer reported crashes in the previous 12 months.

260	1	D.	Entering intersection volume of less than 1800 units per day or 140 units in the peak
261		ът	
262	ļ	No	te: the 1800 units/day value was based on NCHRP 320 recommendation.]
263		5.	The angle of intersection is between 90 and 75 degrees.
264	l	No	te: the Handbook for Designing Roadways for the Aging Population includes the
265	r	ecc	ommendation that the angle not be less than 75 degrees; therefore, we added it to this list
266	C	of w	when a Stop should not be replaced with a Yield.].
267	1	4.	The functional classification of the intersecting streets is either the intersection of two
268	<b>.</b> .		local streets or the intersection of a local street with a collector street.
269	Optic	<u>on:</u>	
270	03	<u>Y 1e</u>	Id signs may be installed at an intersection when any of the following conditions apply:
271	A	4.	At the second crossroad of a divided highway, where the median width at the
272			intersection is 30 feet or greater. (see Figure 2B-15) In this case, a YIELD sign may be
273			installed at the entrance to the second roadway. [From 2009 MUTCD Section 2B.09,
274	-	-	Paragraph 1, item B]
275	1	3.	For a channelized turn lane that is separated from the adjacent travel lanes by an island,
276			even if the adjacent lanes at the intersection are controlled by a highway traffic control
277		~	signal or by a STOP sign. [From 2009 MUTCD Section 2B.09, Paragraph 1, item C]
278	(	<b>.</b>	At an intersection where a special problem exists and where engineering judgment
279			indicates the problem to be susceptible to correction by the use of the YIELD sign.
280	-	_	[From 2009 MUTCD Section 2B.09, Paragraph 1, item D]
281	I	).	Facing the entering and exiting roadway for a merge-type movement if engineering
282			judgment indicates that control is needed because acceleration or deceleration geometry
283			and/or sight distance is not adequate for merging traffic operation. [From 2009 MUTCD]
284	a		Section 2B.09, Paragraph 01, item EJ
285	Guid	<u>anc</u>	
286	04	<u>l he</u>	<u>Yield signs should be installed on opposing minor- road approaches (for a 4-leg</u>
287	<u>inters</u>	sect	tion) or on the minor-road approach (for a 3-leg intersection). (See Section 2B-X3) for
288	<u>infori</u>	<u>mat</u>	tion to identify the minor road. When two roadways have relatively equal volumes,
289	speed	ts a	nd other characteristics intersect, yield control should be established on the approach
290	that c	<u>conj</u>	flicts most with established pedestrian crossing activity or school walking routes.
291	Stan	dar	
292	05 A	A Y	ield sign shall be used to assign right-of-way at the entrance to a roundabout. Yield
293	signs	at	roundabouts shall be used to control the approach roadways and shall not be used
294	to co	ntr	of the circulatory roadway. [From 2009 MUTCD Section 2B.09, Paragraph 02]
295	06	<del>Jth</del>	ter than for all of the approaches to a roundabout, Yield signs shall not be placed on
296			e approaches to an intersection, <u>except at roundabouts.</u> [From 2009 MUTCD Section]
297	2 <b>B</b> .05	9, P	aragraph 03
298	<b>C</b> - 4		AD 04. Minor Dood Store Control
299	Secti	on	2B.04e Minor Road Stop Control
201	Guide	unc	<u>V.</u>
202	<u>01 S</u>	<u>nop</u> dar	o control on the minor road approach or approaches to an intersection should be
302 202	<u>consi</u>	<u>aer</u>	ea when engineering juagment indicates that one or more of the following conditions
303	<u>exist:</u>	_	

304	Α.	A restricted view exists that requires road users to stop in order to adequately observe
305		conflicting traffic on the through street or highway. <i>[From 2009 MUTCD Section 2B.06</i> ]
306		Paragraph 2B]
307	<i>B</i> .	Crash records indicate:
308		1. For a four-leg intersection, there are three or more reported crashes in a 12-month
309		period or six or more reported crashes in a 36-month period. The crashes are of a
310		type susceptible to correction by installation of minor- road stop control.
311		2. For a three-leg intersection, there are three or more reported crashes in a 12-
312		month period or five or more reported crashes in a 36-month period. The crashes
313		are of a type suscentible to correction by installation of minor- road stop control
314	С	The intersection of a lower functional classification road with a higher functional
315	С.	classification road. [similar thought as in 2009 MUTCD Section 28.04 Paragraph
316		$\frac{1}{100} \frac{1}{100} \frac{1}{1000} \frac{1}{1000} \frac{1}{10000} \frac{1}{10000000000000000000000000000000000$
217	מ	Conditions that proviously supported installation of an all way stop control under all
210	D.	<u>Conditions that previously supported installation of an all-way stop control under all-</u>
210		way stop control warrants no longer exist.
319	<b>G</b>	
320	Section	<u>ZB.041 All-Way Stop Control</u>
321	[Note:	we recommend the use of the term all-way rather than multi-way because all-way is
322	the terr	n used in the supplemental all-way plaque.]
323	<u>Guidan</u>	<u>ce:</u>
324	01 The	e decision to install all-way stop control at an unsignalized intersection should be based
325	on an ei	ngineering study. [From 2009 MUTCD Section 2B.07 Paragraph 03] accounting for the
326	<u>advanta</u>	ages and disadvantages of the control treatment.
327	02 <u>The</u>	e evaluation of the need for all-way stop control should include an analysis of factors
328	<u>related</u>	to the existing operation and safety at the study intersection and the potential to improve
329	<u>these co</u>	onditions and the applicable factors contained in the following all-way stop control
330	<u>criteria</u>	
331	А.	<u>All-Way Stop Control Criteria A: Crash Experience (Section 2B.X9)</u>
332	<i>B</i> .	All-Way Stop Control Criteria B: Sight Distance (Section 2B.X10)
333	С.	All-Way Stop Control Criteria C: Transition to Signal Control (Section 2B.X11)
334	<i>D</i> .	All-Way Stop Control Criteria D: Peak Hour Delay (Section 2B.X12)
335	<i>E</i> .	All-Way Stop Control Criteria E: 8-Hour Volume (Vehicle, Pedestrians, Bicycles)
336		Section 2B.X13
337	<i>F</i> .	All-Way Stop Control Criteria F: Other Factors (Section 2B.X14)
338	Standa	rd:
339	03 Th	e satisfaction of an all-way stop control criteria shall not in itself require the
340	installa	tion of all-way stop control at an unsignalized intersection.
341	motunu	and of an way stop control at an ansignatized intersection.
342		
3/3		
343		
244 245		
343 246		
340 247		
347		
348		
349		

#### 350 The following table from NCHRP Web-Only Document 213, "Potential MUTCD Criteria

- 351 for Selecting the Type of Control at Unsignalized Intersections," is shown for information
- only and is not part of the MUTCD proposal. It is shown to recap what is in the MUTCD
   proposed text.
- 354

#### Table 51. Recommended criteria for unsignalized intersection control.

<b>Criteria</b>	No Control	Yield Control	Minor-Road Stop	All-Way Stop	
Number of	No crash	Two or fewer	4-leg: 3 or more	4-leg: 5 or more within 12 months, 6 or more	
Crashes	criteria	reported crashes	within 12 months,	within 36 months <sup>2</sup>	
susceptible to		in a year <sup>1</sup>	6 or more within	3-leg: 4 or more within 12 months 5 or more	
correction by		in a year	$36 \text{ months}^2$	3-leg. 4 of more writing 12 months, 5 of more	
intersection			3-leg: 3 or more	within 36 months <sup>2</sup>	
control			within 12 months.		
			5 or more within		
			36 months		
Peak Hour	Max1mum 80	Max1mum 140	No volume criteria	No volume criteria	
Entering	units/hr <sup>3</sup>	units/hr <sup>3</sup>			
Volume		M : 1000			
Entering Wolumo nor	Maximum		No volume criteria	No volume criteria	
dov		units / day <sup>3</sup>			
day	day <sup>4</sup>				
<mark>8-hrs</mark>	No volume	No volume	No volume criteria	1. The vehicular volume entering the	
	criteria and a second	criteria		intersection from the major street approaches	
				(total of both approaches) averages at least 300	
				units per hour for any 8 hours of an average	
				day; and	
				2. The combined vehicular, pedestrian, and	
				bicycle volume entering the intersection from	
				the minor street approaches (total of both	
				approaches) averages at least	
				200 units per hour for the same 8 hours; but	
				3. If the 85th-percentile approach speed of the	
				major-street traffic exceeds 40 mph, the	
				normal of the values provided in Items 1 and 2	
				6	
Delay	No delav	No delav	No delay criteria	7	
Delay	criteria	criteria	i to delay efficita	35 sec/veh '	
Other	Adequate sight	Adequate sight	Sight distance	Sight distance	
other	distance	distance	orgine distance	Engineering study	
	One-lane	One-lane			
	approaches	approaches			
	Angle of	Angle of			
	intersection <sup>8</sup>	intersection 8			
1 Moreland N	AUTCD Table 2D	10 (10) provides	dolinos for conversion for	om stop to viold control	
$\frac{2}{2}$		(10) provides gui	defines for conversion in		
$\frac{2}{2}$ Selected with consideration of the proposed crash warrant criteria for signals, NCHRP Project 07-18 (48).					
3	<sup>3</sup> Rounded calculation from the 1000 and 1800 units/day value using 7.8 percent which is the peak hour factor used in the				
<sup>3</sup> Rounded ca	liculation from the	1000 and 1000 units	stay value using 7.0 per		
$\frac{3}{4}$ Rounded ca economic ana	alculation from the alysis.	1000 and 1800 units	stary value using 7.6 per		
<sup>3</sup> Rounded ca economic ana <sup>4</sup> Value selec	alysis. eted because (a) 19	1000 and 1800 units	chigan (40) found no stat	istical difference for stop-controlled and no-	
<sup>3</sup> Rounded ca economic ana <sup>4</sup> Value selec control inters	alculation from the alysis. Sted because (a) 19 ections with major	183 study in rural Mic	chigan (40) found no stat than 1000 vpd and (b) the	istical difference for stop-controlled and no- e 1000 value is less than the value selected for	
<sup>3</sup> Rounded ca economic ana <sup>4</sup> Value selec control inters YIELD sign of	alculation from the alysis. Sted because (a) 19 ections with major control (1800).	83 study in rural Mic	chigan (40) found no stat than 1000 vpd and (b) the	istical difference for stop-controlled and no- e 1000 value is less than the value selected for	
<sup>3</sup> Rounded ca economic ana <sup>4</sup> Value selec control inters YIELD sign of From NCH	alculation from the alysis. Eted because (a) 19 ections with major control (1800). RP Report 320 ( <i>35</i> )	183 study in rural Mic street volumes less	chigan ( $40$ ) found no stat than 1000 vpd and (b) the	istical difference for stop-controlled and no- e 1000 value is less than the value selected for	
<ul> <li><sup>3</sup> Rounded ca</li> <li>economic ana</li> <li><sup>4</sup> Value selection</li> <li>control interstructure</li> <li>YIELD sign of</li> <li><sup>5</sup> From NCH</li> <li><sup>6</sup> Values current</li> </ul>	alculation from the alysis. Eted because (a) 19 ections with major control (1800). RP Report 320 (35 rently in 2009 MU	183 study in rural Mic street volumes less 5). TCD with changes o	chigan (40) found no stat than 1000 vpd and (b) the f vehicular volume to uni	istical difference for stop-controlled and no- e 1000 value is less than the value selected for its.	
<ul> <li><sup>3</sup> Rounded ca</li> <li>economic ana</li> <li><sup>4</sup> Value selection</li> <li>control interstructure</li> <li>YIELD sign of</li> <li>From NCH</li> <li><sup>6</sup> Values curra</li> <li>Selected ba</li> </ul>	acculation from the alysis. eted because (a) 19 ections with major control (1800). RP Report 320 (35 rently in 2009 MU used on <i>Highway C</i>	83 study in rural Mic street volumes less 5). TCD with changes o <i>Capacity Manual</i> (22)	chigan (40) found no stat than 1000 vpd and (b) the f vehicular volume to uni ) Exhibit 19-1, lowest con	istical difference for stop-controlled and no- e 1000 value is less than the value selected for its. ntrol delay (sec/veh) for Level of	
<ul> <li><sup>3</sup> Rounded ca</li> <li>economic ana</li> <li><sup>4</sup> Value select</li> <li>control interst</li> <li>YIELD sign of</li> <li>From NCH</li> <li><sup>6</sup> Values curr</li> <li><sup>7</sup> Selected ba</li> <li>Service E (where the select of the</li></ul>	alculation from the alysis. Eted because (a) 19 ections with major control (1800). RP Report 320 (35 rently in 2009 MU used on <i>Highway C</i> hen v/c <=1.0).	83 study in rural Mic street volumes less 5). TCD with changes o <i>Capacity Manual (22)</i>	chigan ( <i>40</i> ) found no stat than 1000 vpd and (b) the f vehicular volume to uni ) Exhibit 19-1, lowest con	istical difference for stop-controlled and no- e 1000 value is less than the value selected for its. ntrol delay (sec/veh) for Level of	

Option:	
<u>oi</u> All	-way stop control may be established-at an intersection where an engineering study
indicate	es that:
A.	For a four-leg intersection, there are five or more reported crashes in a 12-month peri
	or six or more reported crashes in a 36-month period. The crashes should be suscept
	to correction by installation of all-way stop control.
В.	For a three-leg intersection, there are four or more reported crashes in a 12-month
	period or five or more reported crashes in a 36-month period. The crashes should be
	susceptible to correction by installation of all-way stop control
[No	ote: crash numbers are a reflection of the proposed signal crash experience warrant –
NC	CHRP Project 07-18 (49)]
<b>a</b>	
Section	<b>2B.04h</b> All-Way Stop Control Criteria B: Sight Distance
Option:	
01 All	-way stop control may be established at an intersection where an engineering study
indicate	s that signt distance on the minor road approaches controlled by a STOP sign is not
adequat	te for a venicle to turn onto or cross the major (uncontrolled) road. At such a location,
road us	er, after stopping, cannot see conflicting traffic and is not able to negotiate the
intersec	tion unless conflicting cross traffic is also required to stop. From 2009 MUTCD Sect
<u>20.07 r</u>	Paragraph 05C
2D.07 r	Paragraph 05C
Section	<b>2aragraph 05C</b>
Section Option:	<b><u>Paragraph 05C</u></b> <u>2B.04i All-Way Stop Control Criteria C: Transition to Signal Control</u> way stop control may be established at locations where all-way stop control is an inte
Section Option: 01 All	<b><u>Paragraph 05C</u></b> <u><b>2B.04i</b> All-Way Stop Control Criteria C: Transition to Signal Control</u> <u>-way stop control may be established at locations where all-way stop control is an inte</u> <u>- that can be installed to control traffic while arrangements are being made for the</u>
Section Option: 01 All measure installat	<b><u>2B.04i</u></b> <u>All-Way Stop Control Criteria C: Transition to Signal Control</u> -way stop control may be established at locations where all-way stop control is an intege that can be installed to control traffic while arrangements are being made for the traffic control signals at the intersection [similar to 2009 MUTCD Section]
Section Option: 01 All measure installat	<b>2B.04i</b> All-Way Stop Control Criteria C: Transition to Signal Control -way stop control may be established at locations where all-way stop control is an intege that can be installed to control traffic while arrangements are being made for the tion of the traffic control signals at the intersection. [similar to 2009 MUTCD Section Paragraph 04A]
Section Option: 01 All measure installat 2B.07 F	Paragraph 05C 2B.04i All-Way Stop Control Criteria C: Transition to Signal Control -way stop control may be established at locations where all-way stop control is an inter- te that can be installed to control traffic while arrangements are being made for the tion of the traffic control signals at the intersection. [similar to 2009 MUTCD Section Paragraph 04A]
Section Option: 01 All measure installat 2B.07 F	Paragraph 05C         2B.04i       All-Way Stop Control Criteria C: Transition to Signal Control         -way stop control may be established at locations where all-way stop control is an intege that can be installed to control traffic while arrangements are being made for the tion of the traffic control signals at the intersection.         [similar to 2009 MUTCD Section         Paragraph 04A]
Section Option: 01 All measure installat 2B.07 F Section	Paragraph 05C]         2B.04i       All-Way Stop Control Criteria C: Transition to Signal Control         -way stop control may be established at locations where all-way stop control is an intege that can be installed to control traffic while arrangements are being made for the tion of the traffic control signals at the intersection. [similar to 2009 MUTCD Section Paragraph 04A]         2B.04j       All-Way Stop Control Criteria D: Peak Hour Delay
Section Option: 01 All measure installat 2B.07 F Section Option: 01 All	Paragraph 05C         2B.04i       All-Way Stop Control Criteria C: Transition to Signal Control         -way stop control may be established at locations where all-way stop control is an intege that can be installed to control traffic while arrangements are being made for the traffic control signals at the intersection. [similar to 2009 MUTCD Section Paragraph 04A]         2B.04j       All-Way Stop Control Criteria D: Peak Hour Delay         -way stop control may be established at an intersection where an engineering study
Section Option: 01 All measure installat 2B.07 F Section Option: 01 All indicate	<ul> <li><u>2B.04i All-Way Stop Control Criteria C: Transition to Signal Control</u></li> <li>-way stop control may be established at locations where all-way stop control is an intege that can be installed to control traffic while arrangements are being made for the tion of the traffic control signals at the intersection. [similar to 2009 MUTCD Section Paragraph 04A]</li> <li><u>2B.04j All-Way Stop Control Criteria D: Peak Hour Delay</u></li> <li>-way stop control may be established at an intersection where an engineering study as that the peak- hour delay (vehicle, bicycle, and pedestrian) on an average day on the</li> </ul>
Section Option: 01 All measure installar 2B.07 F Section Option: 01 All indicate minor r	<ul> <li><u>2B.04i</u> <u>All-Way Stop Control Criteria C: Transition to Signal Control</u></li> <li><u>-way stop control may be established at locations where all-way stop control is an intege that can be installed to control traffic while arrangements are being made for the tion of the traffic control signals at the intersection. [similar to 2009 MUTCD Section Paragraph 04A]</u></li> <li><u>2B.04j</u> <u>All-Way Stop Control Criteria D: Peak Hour Delay</u></li> <li>-way stop control may be established at an intersection where an engineering study as that the peak- hour delay (vehicle, bicycle, and pedestrian) on an average day on the poad(s) is greater than 35 sec/road users</li> </ul>
Section Option: 01 All measure installat 2B.07 F Section Option: 01 All indicate minor r	<ul> <li><u>2B.04i</u> All-Way Stop Control Criteria C: Transition to Signal Control</li> <li><u>-way stop control may be established at locations where all-way stop control is an intege that can be installed to control traffic while arrangements are being made for the traffic control signals at the intersection. [similar to 2009 MUTCD Section Paragraph 04A]</u></li> <li><u>2B.04j</u> All-Way Stop Control Criteria D: Peak Hour Delay</li> <li>-way stop control may be established at an intersection where an engineering study as that the peak- hour delay (vehicle, bicycle, and pedestrian) on an average day on the oad(s) is greater than 35 sec/road users</li> </ul>
Section Option: 01 All measure installat 2B.07 F Section Option: 01 All indicate minor r	<ul> <li>2B.04i All-Way Stop Control Criteria C: Transition to Signal Control</li> <li>-way stop control may be established at locations where all-way stop control is an intege that can be installed to control traffic while arrangements are being made for the traffic control signals at the intersection. [similar to 2009 MUTCD Section Paragraph 04A]</li> <li>2B.04j All-Way Stop Control Criteria D: Peak Hour Delay</li> <li>-way stop control may be established at an intersection where an engineering study est that the peak- hour delay (vehicle, bicycle, and pedestrian) on an average day on the oad(s) is greater than 35 sec/road users</li> <li>2B.04k All-Way Stop Control Criteria E: 8 Hour Volume-(Vehicle, Pedestrian)</li> </ul>
Section Option: 01 All measura installar 2B.07 F Section Option: 01 All indicate minor r Section Bjcycle	<ul> <li><u>2B.04i</u> <u>All-Way Stop Control Criteria C: Transition to Signal Control</u></li> <li><u>-way stop control may be established at locations where all-way stop control is an intege that can be installed to control traffic while arrangements are being made for the tion of the traffic control signals at the intersection. [similar to 2009 MUTCD Section Paragraph 04A]</u></li> <li><u>2B.04j</u> <u>All-Way Stop Control Criteria D: Peak Hour Delay</u></li> <li><u>-way stop control may be established at an intersection where an engineering study as that the peak- hour delay (vehicle, bicycle, and pedestrian) on an average day on the oad(s) is greater than 35 sec/road users</u></li> </ul>
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Section Option: 01 All measure installan 2B.07 F Section 01 All indicate minor r Section Bicycle Option: 01 All	<ul> <li>2B.04i All-Way Stop Control Criteria C: Transition to Signal Control</li> <li>-way stop control may be established at locations where all-way stop control is an intege that can be installed to control traffic while arrangements are being made for the tion of the traffic control signals at the intersection. [similar to 2009 MUTCD Section Paragraph 04A]</li> <li>2B.04j All-Way Stop Control Criteria D: Peak Hour Delay</li> <li>-way stop control may be established at an intersection where an engineering study as that the peak- hour delay (vehicle, bicycle, and pedestrian) on an average day on the oad(s) is greater than 35 sec/road users</li> <li>2B.04k All-Way Stop Control Criteria E: 8 Hour Volume-(Vehicle, Pedestrians s)</li> <li>-way stop control may be established at an intersection where an engineering study</li> </ul>
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Section Option: 01 All measure installat 2B.07 F Section Option: 01 All indicate Option: 01 All indicate Option: 01 All indicate A.	<ul> <li><u>2B.04i</u> <u>All-Way Stop Control Criteria C: Transition to Signal Control</u></li> <li>-way stop control may be established at locations where all-way stop control is an intege that can be installed to control traffic while arrangements are being made for the tion of the traffic control signals at the intersection. [similar to 2009 MUTCD Section Paragraph 04A]</li> <li><u>2B.04j</u> <u>All-Way Stop Control Criteria D: Peak Hour Delay</u></li> <li>-way stop control may be established at an intersection where an engineering study as that the peak- hour delay (vehicle, bicycle, and pedestrian) on an average day on the boad(s) is greater than 35 sec/road users</li> <li><u>2B.04k</u> <u>All-Way Stop Control Criteria E: 8 Hour Volume-(Vehicle, Pedestrians s)</u></li> <li>-way stop control may be established at an intersection where an engineering study as the boad(s) is greater than 35 sec/road users</li> <li><u>2B.04k</u> <u>All-Way Stop Control Criteria E: 8 Hour Volume-(Vehicle, Pedestrians s)</u></li> <li>-way stop control may be established at an intersection where an engineering study as the boad(s) is greater than 35 sec/road users</li> <li><u>2B.04k</u> <u>All-Way Stop Control Criteria E: 8 Hour Volume-(Vehicle, Pedestrians s)</u></li> <li><u>-way stop control may be established at an intersection where an engineering study (s)</u></li> <li><u>The volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 units per hour for any 8 hours of an average day or an average</u></li></ul>
Section Option: 01 All measura installar 2B.07 F Section Option: 01 All indicate Minor r Section Bicycle Option: 01 All indicate A.	<ul> <li><u>2B.04i</u> All-Way Stop Control Criteria C: Transition to Signal Control</li> <li>-way stop control may be established at locations where all-way stop control is an interest that can be installed to control traffic while arrangements are being made for the tion of the traffic control signals at the intersection. [similar to 2009 MUTCD Section Paragraph 04A]</li> <li>2B.04j All-Way Stop Control Criteria D: Peak Hour Delay</li> <li>-way stop control may be established at an intersection where an engineering study as that the peak- hour delay (vehicle, bicycle, and pedestrian) on an average day on the oad(s) is greater than 35 sec/road users</li> <li>2B.04k All-Way Stop Control Criteria E: 8 Hour Volume-(Vehicle, Pedestrians s)</li> <li>-way stop control may be established at an intersection where an engineering study as the the peak- hour delay (vehicle, bicycle, and pedestrian) on an average day on the oad(s) is greater than 35 sec/road users</li> <li>2B.04k All-Way Stop Control Criteria E: 8 Hour Volume-(Vehicle, Pedestrians s)</li> <li>-way stop control may be established at an intersection where an engineering study (s)</li> <li>The volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 units per hour for any 8 hours of an average day: a The volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 units per hour for any 8 hours of an average day: a The volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 units per hour for any 8 hours of an average day: a The volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 units per hour for any 8 hours of an average day: a The volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 units per hour for any 8 hours of an average day: a first volume entering the intersect</li></ul>

	If the 85 <sup>th</sup> percentile approach speed of the major-street traffic exceeds 40 mph, the
	minimum vehicular volume warrants are 70 percent of the values provided in Items A
( <b>3 -</b>	and B.
(Note:	similar to 2009 MUTCD Section 2B.07, Paragraph 04C)
Section	2B.041 All-Way Stop Control Criteria F: Other Factors
Option	
01 If	- no other warrant criteria is met, an all-way stop control may be established at an
interse	ction where an engineering study indicates that all-way stop control is needed due to other
hut one	not addressed in the other an-way stop control warrants. Such other factors may include,
<u>but are</u>	The used to southed before an fligter (From 2000 MUTCD Souther 2D 07 Demonstrate
A.	OSA]
В.	An intersection of two residential neighborhood collector (through) streets of similar
	design and operating characteristics where all-way stop control would improve traffic
	operational characteristics of the intersection. [From 2009 MUTCD Section 2B.07
	Paragraph 05D
C.	Where pedestrian and/or bicycle movements justify the installation of all-way stop
	control, if other warrant criteria is met.
(si	milar to 2009 MUTCD section 2B.07 Paragraph 05B)
<b>~~</b> -	
NOTE	: Sections 2B.05 (STOP sign and ALL WAY plaque) and 2B.08 (YIELD sign) and
NOTE 2B.10	: Sections 2B.05 (STOP sign and ALL WAY plaque) and 2B.08 (YIELD sign) and STOP sign and YIELD sign placement) in the existing 2009 manual do not change.
NOTE 2B.10 They y	: Sections 2B.05 (STOP sign and ALL WAY plaque) and 2B.08 (YIELD sign) and STOP sign and YIELD sign placement) in the existing 2009 manual do not change.
NOTE 2B.10 They v	: Sections 2B.05 (STOP sign and ALL WAY plaque) and 2B.08 (YIELD sign) and STOP sign and YIELD sign placement) in the existing 2009 manual do not change. would be inserted either before , after or somewhere between these sections as
NOTE 2B.10 They v deeme	: Sections 2B.05 (STOP sign and ALL WAY plaque) and 2B.08 (YIELD sign) and STOP sign and YIELD sign placement) in the existing 2009 manual do not change. yould be inserted either before , after or somewhere between these sections as d appropriate by FHWA.
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NOTE 2B.10 ( They v deeme Section	: Sections 2B.05 (STOP sign and ALL WAY plaque) and 2B.08 (YIELD sign) and STOP sign and YIELD sign placement) in the existing 2009 manual do not change. Yould be inserted either before , after or somewhere between these sections as d appropriate by FHWA.
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447	such that the driver of a vehicle approaching an intersection must yield the right of way to any
448	vehicle or pedestrian already in the intersection. When two vehicles approach an intersection
449	from different streets or highways at approximately the same time, the right of way rule requires
450	the driver of the vehicle on the left to yield the right-of-way to the vehicle on the right. The right-
451	of-way can be modified at through streets or highways by placing YIELD (R1-2) signs (see
452	Sections 2B.08 and 2B.09) or STOP (R1-1) signs (see Sections 2B.05 through 2B.07) on one or
453	more approaches.
454	
455	Guidance: (Moved to Section 2B.X1)
456	<sup>02</sup> Engineering judgment should be used to establish intersection control. The following factors
457	should be considered:
458	A. Vehicular, bicycle, and pedestrian traffic volumes on all approaches;
459	B. Number and angle of approaches:
460	C. Approach speeds:
461	D. Sight distance available on each approach: and
462	E Reported crash experience [Moved to Section 2B X1]
463	<u>YIFLD or STOP signs should be used at an intersection if one or more of the following</u>
464	conditions evist:
465	$\Delta$ An intersection of a lass important road with a main road where application of the
465	normal right of way rule would not be expected to provide reasonable compliance with
467	the law: [similar thought was included in 2B X7]
468	B A street entering a designated through highway or street: and/or (similar thought in
-00 /60	<b>D.</b> A succe entering a designated unough ingrivity of succet, and of (similar mought in OR X7)
409	C An unsignalized intersection in a signalized area
470	L. An unsignatized intersection in a signatized area.
4/1	<sup>04</sup> In addition, the use of TIELD of STOP signs should be considered at the intersection of two minor streats or local roads where the intersection has more than three approaches and where one
472	or more of the following conditions exist:
473	A The combined vehicular biovels and redestries volume entering the intersection from
474	A. The combined venicular, dicycle, and pedestman volume entering the intersection from all approaches averages more than 2 000 units per day:
476	B. The ability to see conflicting traffic on an approach is not sufficient to allow a road user
477	to stop or yield in compliance with the normal right of way rule if such stopping or
478 1178	vielding is necessary: and/or
470 179	C Crash records indicate that five or more crashes that involve the failure to yield the
480	right of way at the intersection under the normal right of way rule have been reported
480	within a 3-year period, or that three or more such crashes have been reported within a 2-
482	vear period
402	year period. VIELD or STOP signs should not be used for speed control (Moved to section 2P V1)
405	Support:
404	Support.
405	on intersection
400	dir intersection.
40/	Once the decision has been made to control on interpretion, the decision recording the
400	W Once the decision has been made to control an intersection, the decision regarding the
409 400	appropriate roadway to control should be based on engineering judgment. In most cases, the
490	Hoadway carrying the lowest volume of traffic should be controlled.
491	08 A THELD OF STOP SIGN SHOULD NOT DE INSTAILED ON THE MIGNER VOLUME FOADWAY UNLESS
492	Justified by an engineering study.

493 Support: 494 The following are considerations that might influence the decision regarding the appropriate 495 roadway upon which to install a YIELD or STOP sign where two roadways with relatively equal 496 volumes and/or characteristics intersect: 497 A. Controlling the direction that conflicts the most with established pedestrian crossing 498 activity or school walking routes; (moved to section 2B.X3) 499 B. Controlling the direction that has obscured vision, dips, or bumps that already require 500 drivers to use lower operating speeds; and (moved to section 2B.X3) 501 C. Controlling the direction that has the best sight distance from a controlled position to 502 observe conflicting traffic. [moved to section 2B.X3] 503 **Standard:** 504 Because the potential for conflicting commands could create driver confusion, YIELD 505 or STOP signs shall not be used in conjunction with any traffic control signal operation, 506 except in the following cases: (Moved to section 2B.X1) 507 A. If the signal indication for an approach is a flashing red at all times; (moved to 508 section 2B.X1) 509 B. If a minor street or driveway is located within or adjacent to the area controlled by the traffic control signal, but does not require separate traffic signal control 510 511 because an extremely low potential for conflict exists; or (moved to section 2B.X1) 512 C. If a channelized turn lane is separated from the adjacent travel lanes by an island and the channelized turn lane is not controlled by a traffic control signal. [moved] 513 514 to section 2B.X1] 515 Except as provided in Section 2B.09, STOP signs and YIELD signs shall not be 11 installed on different approaches to the same unsignalized intersection if those approaches 516 conflict with or oppose each other. [moved to Section 2B.X1] 517 518 Portable or part-time STOP or YIELD signs shall not be used except for emergency 12 519 and temporary traffic control zone purposes. [moved to Section 2B.X1] 520 A portable or part-time (folding) STOP sign that is manually placed into view and 13 521 manually removed from view shall not be used during a power outage to control a 522 signalized approach unless the maintaining agency establishes that the signal indication 523 that will first be displayed to that approach upon restoration of power is a flashing red 524 signal indication and that the portable STOP sign will be manually removed from view prior to stop-and-go operation of the traffic control signal. [Moved to Section 2B.X1] 525 526 **Option**: 527 A portable or part-time (folding) STOP sign that is electrically or mechanically operated 14 such that it only displays the STOP message during a power outage and ceases to display the 528 529 STOP message upon restoration of power may be used during a power outage to control a 530 signalized approach. [moved to Section 2B.X1] Support: 531 532 15 Section 9B.03 contains provisions regarding the assignment of priority at a shared-use 533 path/roadway intersection. 534 535 Section 2B.06 STOP Sign Applications 536 Guidance: 537 At intersections where a full stop is not necessary at all times, consideration should first be 01 given to using less restrictive measures such as YIELD signs (moved to section 2B.X6) 538

539	<sup>02</sup> The use of STOP signs on the minor street approaches should be considered if engineering
540	judgment indicates that a stop is always required because of one or more of the following
541	conditions:
542	A. The vehicular traffic volumes on the through street or highway exceed 6,000 vehicles
543	<del>per day;</del>
544	B. B. A restricted view exists that requires road users to stop in order to adequately
545	observe conflicting traffic on the through street or highway; and/or [moved to Section]
546	2B.X7]
547	C. Crash records indicate that three or more crashes that are susceptible to correction by
548	the installation of a STOP sign have been reported within a 12-month period, or that
549	five or more such crashes have been reported within a 2-year period. Such crashes
550	include right angle collisions involving road users on the minor street approach failing
551	to yield the right of way to traffic on the through street or highway.
552	Support:
553	<sup>11</sup> The use of STOP signs at grade crossings is described in Sections 8B.04 and 8B.05.
554	Section 2B.07 Multi-Way Stop Applications
555	Support:
556	Multi-way stop control can be useful as a safety measure at intersections if certain traffic
557	conditions exist. Safety concerns associated with multi-way stops include pedestrians, bicyclists,
558	and all road users expecting other road users to stop. Multi-way stop control is used where the
559	volume of traffic on the intersecting roads is approximately equal
560	<sup>02</sup> The restrictions on the use of STOP signs described in Section2B.04 also apply to multi-way
561	stop applications.
562	Guidance:
563	<sup>03</sup> The decision to install multi-way stop control should be based on an engineering study.
564	[Moved to Section 2B.X8]
565	<sup>94</sup> —The following criteria should be considered in the engineering study for a multi-way STOP
566	sign installation:
567	A. Where traffic control signals are justified, the multi-way stop is an interim measure that
568	can be installed quickly to control traffic while arrangements are being made for the
569	installation of the traffic control signal. (Moved to Section 2B.X11)
570	B. Five or more reported crashes in a 12-month period that are susceptible to correction by
571	a multi-way stop installation. Such crashes include right-turn and left-turn collisions as
572	well as right-angle collisions.
573	C. Minimum volumes: (Moved to Section 2B.X13 with some changes)
574	1. The vehicular volume entering the intersection from the major street approaches
575	(total of both approaches) averages at least 300 vehicles per hour for any 8 hours
576	of an average day; and
577	2. The combined vehicular, pedestrian, and bicycle volume entering the intersection
578	from the minor street approaches (total of both approaches) averages at least 200
579	units per hour for the same 8 hours, with an average delay to minor-street
580	vehicular traffic of at least 30 seconds per vehicle during the highest hour; but
581	3. If the $85^{m}$ -percentile approach speed of the major-street traffic exceeds 40 mph,
582	the minimum vehicular volume warrants are 70 percent of the values provided in
583	Items 1 and 2.

584		<del>D.</del>	Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied
585			to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.
586	Option:		
587	05	Oth	er criteria that may be considered in an engineering study include:
588		A.	The need to control left-turn conflicts; [Section 2B.X14]
589		B.	The need to control vehicle/pedestrian conflicts near locations that generate high
590			pedestrian volumes; (similar to section 2B.X14)
591		C.	Locations where a road user, after stopping, cannot see conflicting traffic and is not able
592			to negotiate the intersection unless conflicting cross traffic is also required to stop; and
593			[moved to section 2B.X10]
594		D.	An intersection of two residential neighborhood collector (through) streets of similar
595			design and operating characteristics where multi-way stop control would improve
596			traffic operational characteristics of the intersection. [Moved to Section 2B.X14]
597			
598	Sect	ion	2B.09 YIELD Sign Applications
599	Opti	<del>on:</del>	
600	01	¥₽	ELD signs may be installed:
601		<u>A.</u>	On the approaches to a through street or highway where conditions are such that a full
602			stop is not always required.
603		B.	At the second crossroad of a divided highway, where the median width at the
604			intersection is 30 feet or greater. In this case, a STOP or YIELD sign may be installed at
605			the entrance to the first roadway of a divided highway, and a YIELD sign may be
606			installed at the entrance to the second roadway. [Moved to Section 2B.X6]
607		C.	For a channelized turn lane that is separated from the adjacent travel lanes by an island,
608			even if the adjacent lanes at the intersection are controlled by a highway traffic control
609			signal or by a STOP sign. [Moved to Section 2B.X6]
610		D.	At an intersection where a special problem exists and where engineering judgment
611			indicates the problem to be susceptible to correction by the use of the YIELD sign.
612			[Moved to Section 2B.X6]
613		E.	Facing the entering roadway for a merge-type movement if engineering judgment
614			indicates that control is needed because acceleration geometry and/or sight distance is
615			not adequate for merging traffic operation. [Moved to Section 2B.X6]
616	Standard:		
617	02	AY	<b>TELD</b> (R1-2) sign shall be used to assign right-of-way at the entrance to a
618	rour	ıda	bout. YIELD signs at roundabouts shall be used to control the approach roadways
619	and	sha	ll not be used to control the circulatory roadway. [Moved to Section 2B.X6]
620	03	Otł	ner than for all of the approaches to a roundabout, YIELD signs shall not be placed
621	on all of the approaches to an intersection. [Moved to Section 2B.X6]		
622	END	0	F PROPOSAL
623			
624	The	text	below from 2009 MUTCD is shown for information only for reviewers:
625			
626	Sect	ion	4C.01 Studies and Factors for Justifying Traffic Control Signals
627	Stan	ıdaı	rd:

- 628 01 An engineering study of traffic conditions, pedestrian characteristics, and physical
- 629 characteristics of the location shall be performed to determine whether installation of a
- 630 traffic control signal is justified at a particular location.
- 631 02 The investigation of the need for a traffic control signal shall include an analysis of
- 632 factors related to the existing operation and safety at the study location and the potential to
- 633 improve these conditions, and the applicable factors contained in the following traffic
   634 signal warrants:
- 635 Warrant 1, Eight-Hour Vehicular Volume
- 636 Warrant 2, Four-Hour Vehicular Volume
- 637 Warrant 3, Peak Hour
- 638 Warrant 4, Pedestrian Volume
- 639 Warrant 5, School Crossing
- 640 Warrant 6, Coordinated Signal System
- 641 Warrant 7, Crash Experience
- 642 Warrant 8, Roadway Network
- 643 Warrant 9, Intersection Near a Grade Crossing
- 644 **03** The satisfaction of a traffic signal warrant or warrants shall not in itself require the
- 645 installation of a traffic control signal.