

VIRGINIA DEPARTMENT OF TRANSPORTATION
TRAFFIC ENGINEERING DIVISION
INSTRUCTIONAL & INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: Pavement Markings Signs Pedestrians		NUMBER: IIM-TE-384.0
		SUPERSEDES: None
SPECIFIC SUBJECT: Pedestrian Crossing Accommodations at Unsignalized Locations		DATE: July 18, 2016
		SUNSET DATE: None
DIRECTED TO: District Location & Design Engineers Regional Operations Engineers/Directors Regional Traffic Engineers District Transportation & Land Use Directors Regional Operations Maintenance Managers Regional Traffic Operations Managers	APPROVAL: <div style="text-align: center;"> /original signed by/ Raymond J. Khoury, P.E. State Traffic Engineer Richmond, VA July 21, 2016 </div>	

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PURPOSE AND NEED

The Commonwealth Transportation Board (CTB) adopted the Virginia Department of Transportation (VDOT) [Policy for Integrating Bicycle and Pedestrian Accommodations](#) in March 2004. That policy establishes that, “Bicycling and walking are fundamental travel modes and integral components of an efficient transportation network.” As such, the CTB’s adopted policy

31 requires that all VDOT highway construction projects shall be initiated with the presumption that
32 the facilities “will include accommodations for pedestrians, including pedestrians with
33 disabilities, along with motorized transportation modes in the planning, funding, design,
34 construction, operation, and maintenance of Virginia’s transportation network to achieve a safe,
35 effective, and balanced multimodal transportation system.”

36
37 Currently there is significant variation in how crosswalks are utilized in different locations
38 throughout Virginia. This Memorandum provides consistent, uniform guidance to designers for
39 determining when to install marked crosswalks, what type of crosswalk to install, and what other
40 traffic control devices or geometric improvements should potentially be considered in
41 conjunction with the marked crosswalk at unsignalized locations.

42
43 Pedestrians typically account for 10 - 15 percent of total highway fatalities in Virginia each year.
44 An assessment of 2012-2014 Virginia pedestrian crashes determined that **86%** of pedestrian
45 fatalities occurred at locations without a marked crosswalk¹. Additionally, about half of Virginia’s
46 pedestrian fatalities occur on Primary system roadways. Some of Virginia’s road segments lack
47 adequate pedestrian accommodations for crossing the road, despite being located in areas
48 where the surrounding land use generates (or has the potential to generate) crossing pedestrian
49 traffic. Pedestrian accommodations include marked crosswalks as well as any facility, design
50 feature, operational change, or maintenance activity that improves the environment in which
51 bicycles and pedestrians travel. Marked crosswalks, by themselves or in conjunction with other
52 traffic control devices and pedestrian accommodations, can provide important safety benefits for
53 crossing pedestrians.

54
55 However, studies² have demonstrated that marked crosswalks placed alone at uncontrolled
56 locations, and not in conjunction with geometric pedestrian safety improvements or other traffic
57 control devices, are not always recommended. High-visibility crosswalks (crosswalks marked
58 using longitudinal lines or bar pairs) perform better than standard crosswalks, but often are not
59 used in every situation due to higher installation and maintenance costs.

60
61 This Memorandum and the attached Standards replace the previous 2005 *Guidelines for the*
62 *Installation for Marked Crosswalks* document and the companion 2005 *Guidelines for the*
63 *Installation of In-Roadway Warning Lights* document, both of which were developed by the
64 Virginia Transportation Research Council (VTRC) for use by VDOT. It provides additional
65 guidance beyond what is in the [2009 Manual on Uniform Traffic Control Devices](#) (MUTCD) and
66 the [2011 Virginia Supplement to the MUTCD, latest version](#).

67
68 This document focuses on pedestrian crossing guidance for unsignalized intersection crossings
69 and mid-block crossings, and should be used in conjunction with a separate I&IM (currently
70 under development) which will establish guidance for pedestrian accommodations at signalized
71 intersections.

72
73

¹ Cole, Mark A., et. al. *Virginia Pedestrian Crash Assessment* (VDOT: 2015).

² Zegeer, Charles V., et. al. *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations* (FHWA: 2009), <http://www.fhwa.dot.gov/publications/research/safety/04100/>

74 **EFFECTIVE DATE**

75

76 Future contracts: This Memorandum shall be effective for all contracts with an advertisement on
77 or after December 1, 2016. The designer may also elect to apply this Memorandum to projects
78 with an advertisement before that date.

79 Existing contracts: This Memorandum may be applied to projects constructed under existing
80 contracts if the change is approved by the Project Engineer.

81 Land use permit for private developments: This Memorandum shall be effective for all projects
82 where the final permit plans have not yet been submitted to VDOT. If agreed to by the permittee
83 and VDOT, this Memorandum may also be applied to a previously-approved permit or to a
84 permit currently under review.

85

86 Design-Build or PPTA projects: This Memorandum shall be effective for projects in which the
87 design criteria package has not been completed for advertisement as of December 1, 2016. For
88 current Design-Build or PPTA projects, this Memorandum should be implemented where
89 feasible.

90

91 Existing marked crosswalks: Existing crosswalks may remain until the end of their useful service
92 life. This Memorandum should be consulted when planning is underway for the roadway's next
93 resurfacing or reconstruction. This Memorandum should also be used when there is a need to
94 prepare a safety evaluation of existing marked crosswalks.

95

96 Existing locations without marked crosswalks: Regions should conduct a review of pedestrian
97 accommodations and determine whether new marked crosswalks are needed in accordance
98 with this Memorandum in conjunction with resurfacing or reconstruction projects. This
99 Memorandum should also be used if the need arises to prepare a safety evaluation of a location
100 not scheduled for resurfacing.

101

102 **CC:**

103

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ATTACHMENT A

Unsignalized Marked Crosswalk Standards

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Unsignalized Marked Crosswalk Standards

1.0 SUMMARY OF REVISIONS

The list below summarizes the major changes to the previous 2005 *Guidelines for the Installation for Marked Crosswalks* document and the companion 2005 *Guidelines for the Installation of In-Roadway Warning Lights* document.

- Establishes additional guidance on when marked crosswalks should or shall be installed at controlled or uncontrolled approaches (e.g. not controlled by a stop sign, yield sign, pedestrian hybrid beacon, or traffic signal) to unsignalized intersections, and at mid-block locations.
 - A separate I&M (currently under development) details when pedestrian accommodations should be provided at signalized intersections.
- Establishes guidance/standards on when standard or high-visibility crosswalks (longitudinal lines or bar pairs) should be installed.
- Provides guidance on allowable high-visibility crosswalk marking styles.
- Establishes recommended crosswalk widths.
- Removes most guidance for In-Roadway Warning Lights due to their limited use by VDOT.
- Adds discussions on use of Rectangular Rapid Flashing Beacons (RRFBs) and Pedestrian Hybrid Beacons (PHBs).

2.0 BACKGROUND

A crosswalk is generally defined as the portion of roadway designated for pedestrians to use in crossing the street. Crosswalks may be marked or unmarked, as defined in the [Code of Virginia § 46.2-100](#). At intersections, a sidewalk or pedestrian walkway extension across a street can define a crosswalk in addition to crosswalks defined by marked lines in the roadway.

A “pedestrian facility” is a general term denoting locations made to accommodate or encourage pedestrian travel outside the vehicle travelway between road crossings. It typically refers to sidewalks, shared use paths, and curb cuts. It can also refer to wide paved shoulders, or unpaved traversable areas adjacent to the road with a prepared surface, that can be used by pedestrians. An unpaved shoulder with worn-out path in the grass/soil due to pedestrian activity is generally considered a “pedestrian facility”.

There are both advantages and disadvantages of marking crosswalks. Potential advantages of properly marked crosswalks include:

- Helping pedestrians find their way across complex intersections,
- Providing a visible reminder to motorists that pedestrians may be present,
- Directing pedestrians to the location of the recommended crossing path,
- Establishing the legal crosswalk where an unmarked crosswalk does not already exist,
- Reducing the likelihood that drivers will encroach the intersection or block pedestrian traffic when stopping for a STOP or YIELD sign, and/or
- Designating the location of approved school crossings or crossings along recommended school routes.

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209 A potential disadvantage of marked crosswalks is that they may create a “false sense of
210 security” for pedestrians (cause the pedestrian to assume that the motorist can and will stop in
211 all cases).

212
213 If unnecessary and unwarranted marked crosswalks are installed, drivers may not expect them
214 and may ignore or disregard them, which diminishes the effectiveness of marked crosswalks.
215 Excessive marked crosswalk installation can also lead to increased installation and
216 maintenance costs.

217 218 **3.0 RELATIONSHIP TO AMERICANS WITH DISABILITIES ACT** 219 **REQUIREMENTS**

220 221 *3.1 Guidance*

222 The 1990 federal Americans with Disabilities Act (ADA) requires that pedestrians with
223 disabilities be accommodated in the design, planning, and maintenance of pedestrian facilities.
224 The ADA requirements are based on the understanding that a wide range of people, including
225 people with disabilities, will be using the pedestrian facilities and relying on them for their daily
226 travel.

227
228 The need for ADA improvements to be programmed or constructed in conjunction with marked
229 crosswalk improvements depends on whether the action is a **maintenance activity** or an
230 **alteration**, as defined in the latest effective version of [IIM-TE-376](#).

231 *3.2 Maintenance Activities*

232 Examples of maintenance activities related to crosswalks include:

- 233 • Striping a marked crosswalk at an unsignalized intersection if the crossing is already a
- 234 crosswalk (albeit an unmarked one) as defined by the Code of Virginia,
- 235 • Changing the striping pattern of an existing marked crosswalk, and
- 236 • Signing improvements.

237
238 **There is no requirement for ADA assessments or improvements when maintenance**
239 **activities are performed.**

240
241 When an existing unmarked crosswalk is converted to a marked crosswalk, it is recommended
242 that the Region or District assess and functionally rate the existing curb ramps (if present) in
243 accordance with IIM-TE-376. At locations where curb ramps are not present (Grade D) or are
244 not fully functional (Grades B or C), future upgrades should be considered based on funding
245 availability in accordance with the latest effective version of [IIM-TE-377](#).

246 *3.3 Alterations*

247 Examples of alterations related to crosswalks at unsignalized locations include:

- 248 • Rectangular Rapid Flashing Beacon (RRFB) or Pedestrian Hybrid Beacon (PHB)
- 249 installation,
- 250 • Resurfacing of the crosswalk area, and

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- Establishing marked crosswalks at a location that would not currently be considered an unmarked crosswalk, such as at a midblock location.

When an alteration is being performed, the procedures required by IIM-TE-376 shall be followed.

4.0 APPLICABLE SECTIONS OF THE CODE OF VIRGINIA

[Section §46.2-100](#) of the Code of Virginia defines a crosswalk as “*that part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or, in the absence of curbs, from the edges of the traversable roadway; or any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface.*”

Note that the definition of “crosswalk” encompasses both marked and unmarked crosswalks. At locations where an unmarked crosswalk would not otherwise exist, and a crosswalk is present as a result of markings, the crosswalk only exists when the markings “distinctly indicate” the location of such crosswalk. This means that when such a marked crosswalk has degraded to the point where it is not sufficiently visible to the approaching motorist, it would no longer be considered a legal crosswalk. Moreover, marked crosswalks must meet the minimum requirements of the MUTCD (e.g., crosswalk width, line thickness, color) in order to be considered a marked crosswalk in Virginia.

[Section §46.2-904](#) states that bicyclists have all of the same rights and responsibilities as pedestrians within crosswalks.

[Section §46.2-923](#) states that pedestrians shall cross, wherever possible, only at intersections or marked crosswalks and shall not “carelessly or maliciously interfere” with traffic. If no marked crosswalks are available at an intersection, then pedestrians are not negligent if they cross by the most direct route at such an intersection.

[Section §46.2-924A](#) states that drivers must yield the right-of-way to pedestrians at:

- Any “clearly” marked crosswalks,
- Any unmarked crosswalks at “the prolongation of the lateral boundary lines of the adjacent sidewalk at the end of the block,” or
- Any intersection where the approach has a speed limit of 35 mph or below.

[Section §46.2-924B](#) sets forth the responsibilities of drivers and pedestrians. Pedestrians have the responsibility to avoid entering or crossing an intersection “in disregard of approaching traffic,” however they have the right-of-way over vehicles making turns. Drivers are required to “change their course, slow down, or stop” if necessary to permit pedestrians to cross.

[Section §46.2-924C](#) allows certain localities in Northern Virginia to establish ordinances imposing fines on drivers who fail to yield the right-of-way to pedestrians at locations where signs are installed and requires VDOT to establish criteria for this required signage in order to establish those fines. VDOT’s signing criteria is included as **Attachment B** to this Memorandum.

299 **5.0 WHEN TO INSTALL MARKED CROSSWALKS AT UNSIGNALIZED**
300 **INTERSECTIONS**

301
302 **5.1 General Guidance**

303
304 As with any installation of traffic control devices, engineering judgment should be used for
305 determining when installation of a crosswalk is justified. When considering whether to mark a
306 crosswalk, the land uses adjacent to the roadway provide invaluable information to help indicate
307 if the crosswalk is needed. Pedestrian-oriented land uses and transit stops will generate
308 pedestrian crossings regardless of whether a marked crosswalk exists or not. When pedestrian-
309 generating land uses exist adjacent to roadways where pedestrian crossings are legal, it is
310 VDOT’s responsibility to provide adequate safe pedestrian crossing opportunities and to direct
311 pedestrians to those locations.

312
313 The presence of shared use paths can justify the installation of a marked crosswalk even if the
314 adjacent land uses are not pedestrian-oriented.

315
316 Marked crosswalks should not be installed at the intersection of two low-speed roadways
317 functionally classified as “local”, such as at the intersection of two subdivision streets.

318
319 In addition, marked crosswalks should not be installed where neither “pedestrian facilities”
320 (defined previously) nor pedestrian-oriented attractors/generators are present on both sides of
321 the crossing. Examples of pedestrian attractors/generators include schools, university
322 campuses, libraries, hospitals, senior centers, major shopping centers, recreational areas, large
323 employment centers, rail stations, bus transfer centers, hotels, residential developments of at
324 least moderate density, parking garages or large parking lots, etc. Pedestrian
325 attractors/generators should be considered as a factor if they are within reasonable walking
326 distance of the crossing.

327
328 If neither pedestrian facilities nor pedestrian-oriented land uses currently exist on both sides of
329 the crossing, the designer should consult with the District Planner or locality to assess whether
330 there is a potential for pedestrian activity in the near future, and if so design the location to allow
331 for future crosswalk installation to the extent possible (such as by setting the marked stop line or
332 yield line, if present, at a location where it won’t conflict with a future marked crosswalk).
333 Installing marked crosswalks in areas where there is minimal likelihood of existing or future
334 pedestrian activity (based on adjacent land uses) is not recommended.

335
336 To the extent possible, marked crosswalks should match pedestrian desire lines by connecting
337 pedestrian generators and attractors. In some rare circumstances, an unusually heavily used
338 unsignalized crosswalk can adversely impact a roadway’s vehicular capacity. In these rare
339 cases, engineering judgment should be used to balance locating the crosswalk along pedestrian
340 desire lines while avoiding a substantial impact to roadway vehicular capacity.

341
342 A flow chart illustrating the general decision-making process for installation of crosswalks at
343 unsignalized locations is shown in Figure C1 of Attachment C.

344
345 Note that if there is a STOP sign or YIELD sign immediately downstream of the crossing (for
346 example, where a Shared Use Path (SUP) runs parallel to the main road and crosses the side

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347 road such that drivers on the side road have the stop sign immediately downstream of the SUP),
348 the approach is considered a controlled approach for the purposes of this IIM.

349

350 5.2 – When to Install Marked Crosswalks Across Stop-Controlled or Yield- 351 Controlled Approaches

352

353 Marked crosswalks should be installed if pedestrian facilities or pedestrian-oriented
354 attractors/generators exist on both sides of the crossing and any of the following statements are
355 true, unless precluded by the recommendations in Section 5.1 or the Regional Traffic Engineer
356 approves an exception to this recommendation:

357

- 358 • The crossing is part of a walking route approximately ¼ mile or less between a
359 residential development of moderate or heavy density and a school or recreational area,
- 360 • The crossing is connected by pedestrian facilities to a rail transit stop or major bus
361 transfer station within walking distance of approximately ¼ mile or less,
- 362 • The crossing is part of a shared use path or trail,
- 363 • The crossing is across a yield-controlled approach at an off-ramp junction or channelized
364 right turn lane, or
- 365 • The crossing is within a downtown Central Business District area, and/or is in an area of
366 known pedestrian activity and pedestrian-oriented land-use.

367

368 A flow chart illustrating the decision-making process for crosswalks at stop or yield-controlled
369 locations is shown in Figure C2 of Attachment C.

370

371 5.3 – When to Install Mid-Block Marked Crosswalks or Marked Crosswalks 372 Across Uncontrolled Approaches

373

374 An engineering study shall be performed before crosswalk markings are installed across
375 uncontrolled locations (which includes both crosswalks at mid-block locations and crosswalks
376 across uncontrolled intersection approaches). Data collection templates to facilitate crosswalk
377 engineering studies are provided in Attachment D of this memorandum.

378

379 **The satisfaction of the criteria within this section does not in and of itself require the**
380 **installation of a marked crosswalk across an uncontrolled location.**

381

382 Crossings of uncontrolled roadway approaches shall not be marked unless all of the following
383 are met:

384

- 385 1) The crossing is on a direct route between significant pedestrian generator(s) and
386 attractor(s), where engineering judgment determines that the crosswalk would likely see
387 a minimum of 20 pedestrians/bicyclists using the crosswalk in an hour. That threshold
388 may be reduced to 10 pedestrians per hour if the crossing is expected to be used by a
389 high number of vulnerable pedestrians (pedestrians who are disabled, age 65 and over,
390 or age 15 and under), or if the reduced volume is met for three consecutive hours.
- 391 2) The location is 300 feet or more from another marked crosswalk across the same road,
392 or engineering judgment determines that sufficient demand and pedestrian desire lines
393 exist to justify both crosswalks.

394

395

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Unsignalized Marked Crosswalk Standards

- 396 3) Drivers will have an unrestricted view of the entire length of the crosswalk, including the
 397 waiting areas at either end of the crosswalk. If possible, this unrestricted view should be
 398 equal to or exceeding the Stopping Sight Distance (SSD) requirements shown in **Table 1**
 399 and as per the latest effective version of VDOT’s Road Design Manual. If the SSD
 400 requirements cannot be met and the crosswalk cannot be relocated to a place where
 401 SSD requirements will be met, warning signs shall be used. (Warning signs may be
 402 omitted on downtown urban streets with speed limit < 35 mph if justified by documented
 403 engineering judgment.)
 404
- 405 4) The required engineering study determines that the introduction of a marked crosswalk
 406 will not produce an unacceptable safety hazard.
 407

408 A flow chart illustrating the decision-making process for crosswalks at uncontrolled locations is
 409 shown in Figure C3 of Attachment C.
 410

411 Marked crosswalks across uncontrolled approaches should be avoided at locations that are unlit
 412 (roadway lighting not present) and higher speed (40 mph or greater) unless a high visibility
 413 crosswalk marking style and appropriate advance warning devices are utilized.
 414

415 **Table 1 – Stopping Sight Distance Requirements Approaching Mid-Block Crosswalks or**
 416 **Crosswalks at Uncontrolled Intersection Approaches (feet)**

Operating Speed *	Level Grade	Downgrades			Upgrades		
		-3%	-6%	-9%	+3%	+6%	+9%
25 mph	155	158	165	173	147	143	140
30 mph	200	205	215	227	200	184	179
35 mph	250	257	271	287	237	229	222
40 mph	305	315	333	354	289	278	269
45 mph	360	378	400	427	344	331	320
50 mph	425	446	474	507	405	388	375
55 mph	<i>Crosswalks should not be marked across uncontrolled approaches with operating speed of 55 mph or greater.</i>						

417 (Source: VDOT Road Design Manual, Chapter 2D. This table is provided for convenience and is current
 418 as of June 2016. Any subsequent revisions to the Road Design Manual override the values provided in
 419 this table.)
 420

421 *Operating speed can refer to actual 85th percentile speed, if speed data is available. Otherwise,
 422 operating speed can be estimated as the posted speed limit plus 7 mph, or based on documented
 423 engineering judgment. For operating speeds not in 5 mph increments, users should interpolate from this
 424 table to find the minimum SSD requirements.
 425

426 As per Section 3B.18 of the 2009 MUTCD, if a marked crosswalk is installed, pedestrian
 427 crossing warning signs should be installed in advance of non-intersection crosswalks and on-
 428 street parking should be prohibited where it will impede adequate visibility of the crosswalk and
 429 waiting areas.
 430

431 The R1-5 “Yield Here to Pedestrians” sign may be used in advance of a marked mid-block
 432 crosswalk across a multi-lane (i.e. two or more travel lanes per direction) uncontrolled approach
 433 to direct vehicles to yield in advance of the crosswalk. This is done to minimize the risk of a
 434 vehicle in one lane from blocking the view of a crossing pedestrian from a vehicle approaching
 435 in the other lane. If used, the R1-5 sign should be placed 20 to 50 feet in advance of the

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436 crosswalk as per Section 2B.11 of the 2009 MUTCD and FHWA's [Official Interpretation 2\(09\)-](#)
437 [86I](#). Yield line ("shark's teeth") pavement markings may be used in conjunction with the R1-5
438 sign, as per Section 3B.16 of the 2009 MUTCD.

439
440 If a marked crosswalk is to be installed across an uncontrolled approach, **Table 2** should be
441 used to determine if additional enhancements may be necessary to facilitate safe crossing at
442 uncontrolled locations. A flow chart illustrating the use of Table 2 is shown in Figure C4 of
443 Attachment C.

444
445 Treatments to inhibit pedestrian crossings (such as landscaping or fences) should only be
446 considered where existing crosswalks are located within 300 feet and an additional crossing
447 would create an unsafe condition, or where pedestrian demand exists but the natural pedestrian
448 desire line results in unsafe crossings, such as locations where visibility (for pedestrians or
449 motorists) is obstructed and the obstruction cannot be reasonably removed.

450
451

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452 **Table 2. Recommendations for Considering Marked Crosswalks and Other Needed**
 453 **Pedestrian Improvements Across Uncontrolled Approaches**

Roadway Configuration	Roadway ADT and Speed Limit															
	1,500 to 9,000 VPD				9,000 to 12,000 VPD				12,000 to 15,000 VPD				More than 15,000 VPD			
	≤ 30 MPH	35 MPH	40 MPH	≥ 45 MPH	≤ 30 MPH	35 MPH	40 MPH	≥ 45 MPH	≤ 30 MPH	35 MPH	40 MPH	≥ 45 MPH	≤ 30 MPH	35 MPH	40 MPH	≥ 45 MPH
2 Lanes (undivided two-way street or two-lane one-way street)	A	A	B	B	A	A	B	B	A	A	B	B	B	B	B	C
3 Lanes with refuge island OR 2 Lanes with raised median*	A	A	B	B	A	B	B	B	A	A	B	B	B	B	B	C
3 Lanes (center turn lane)	A	A	B	B	A	B	B	B	A	B	B	C	B	C	C	C
4 Lanes (two-way street with no median)	A	B	C	C	B	B	C	C	B	C	C	D	C	C	C	D
5 Lanes with refuge island OR 4 lanes with raised median*	A	A	B	B	A	B	B	C	B	B	C	C	B	B	C	D
5 Lanes (center turn lane)	A	B	C	C	B	B	C	C	C	C	C	D	C	C	C	D
6 Lanes (two-way street with* or without median)	A	B	D	D	B	B	D	D	D	D	D	D	D	D	D	D

454 *Source: Guidance for Installation of Pedestrian Crosswalks on Michigan State Trunkline Highways (Michigan Department of*
 455 *Transportation, 2014)*
 456

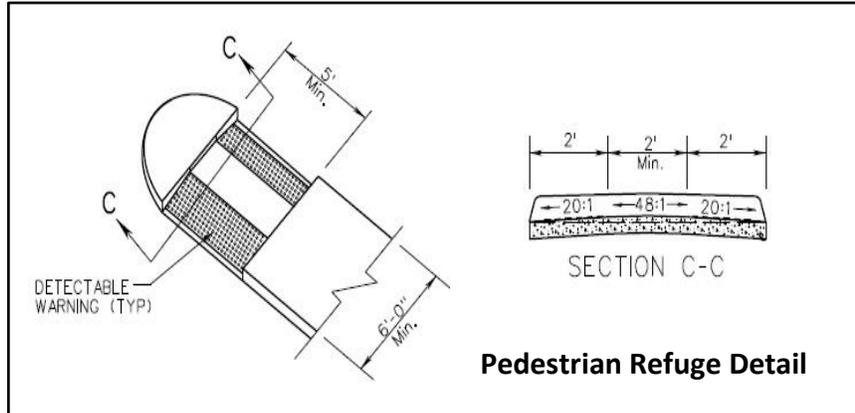
Condition A	Candidate site for marked crosswalk alone (standard if speed limit is 30 MPH or less, high-visibility if speed limit is 35 MPH or greater). Evaluate need for advance signing
Condition B	Potential candidate site for marked crosswalk. Location should be monitored & consideration given to providing a high-visibility crosswalk and/or warning signs (see Section 7.2)
Condition C	Marked crosswalks alone are insufficient. The crosswalk shall use a high-visibility pattern and other improvements (warning signs and/or geometric/ traffic calming improvements) (see Section 7.2) <u>will likely be necessary.</u>
Condition D	Marked crosswalks <u>shall not</u> be installed

457

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Unsignalized Marked Crosswalk Standards

458 * The pedestrian walkway
459 through a refuge island shall be
460 at least 5 feet wide (6 feet width
461 or greater is preferred) and at
462 least 6 feet long to be considered
463 a safe refuge area (see detail on
464 the bottom right from VDOT
465 Standard Drawing CG-12). A
466 raised median generally provides
467 greater pedestrian-vehicle crash
468 reduction benefit than a flush
469 (painted) median, however the
470 presence of a painted median
471 can also provide advantages to
472 the crossing pedestrian over an
473 undivided road.



6.0 CROSSWALK DESIGN

6.1 – Crosswalk Width and Location

479 In general, crosswalks should be the same width as the pedestrian facility on either side of the
480 roadway, subject to the following requirements:

- 481 • Crosswalks shall be at least six feet wide as per the MUTCD, and
- 482 • Crosswalks should be at least seven feet wide in order to allow two wheelchairs, parents
483 with strollers, etc. to pass each other.

484
485
486 Wider crosswalks than described above should be provided at locations with heavy pedestrian
487 volumes during peak periods, to avoid creating situations where pedestrians are “crowded out”
488 of the crosswalk. The width should not exceed 10 feet except when necessary to accommodate
489 peak pedestrian periods at locations with exceptionally high pedestrian activity. Crosswalks that
490 are part of a shared use path should be at least as wide as the path (ten feet recommended) to
491 accommodate bicyclists passing in both directions.

492
493 Unnecessarily wide crosswalks can result in the stop lines having to be placed further back from
494 the intersection which in turn can have an adverse impact on driver’s sight distance.

495
496 Crosswalks shall start and end at curb ramps where curb is present. Crosswalks shall be
497 straight and not kinked, except that crosswalks may change direction from within a refuge
498 island. If existing curb ramps are present on a project involving alterations, then it might be
499 necessary to reconstruct/relocate existing curb ramps and/or modify existing raised medians in
500 order to provide crosswalks at a logical location.

6.2 – Crosswalk Marking Patterns

501
502
503
504 Marked crosswalk patterns can be divided into two basic categories: standard and high-visibility.
505 Standard crosswalks use the transverse lines (two parallel lines) pattern. High-visibility
506 crosswalks have bar-pairs, ladder, longitudinal lines, or zebra patterns. Permissible crosswalk
507 marking patterns that may be used on VDOT-maintained roadways are shown in **Table 3**.

IIM-TE-384 – Attachment A Unsignalized Marked Crosswalk Standards

509 According to [an FHWA study](#)³, high-visibility crosswalks can have up to double the detection
510 distance (for drivers approaching the crosswalk) compared to standard crosswalks - an 8
511 second increase in detection distance for a 30 mph approach. However, high-visibility
512 crosswalks are also more expensive (as much as five times the cost) - both for initial installation
513 and future maintenance. Some high-visibility crosswalk marking materials can also become slick
514 when wet, potentially resulting in a loss of traction for vehicles (particularly motorcyclists and
515 bicyclists) in the travel lanes as well as for pedestrians crossing the crosswalk. High-visibility
516 crosswalks can lose some of their enhanced effectiveness if they are used too often.

517

518 **Standard crosswalks should be used for all marked crosswalks except at locations**
519 **meeting the below criteria.**

520

521 A high-visibility crosswalk pattern shall be utilized where any of the following conditions exist:

- 522 • The crossing is at an uncontrolled roadway approach and meets Condition C (orange
523 area) of the selection chart in **Table 2**,
- 524 • The crossing is located across a multilane roundabout approach or exit from a multi-lane
525 roundabout,
- 526 • The crossing is part of a shared use path and crosses an uncontrolled roadway
527 approach with a speed limit > 25 mph, or
- 528 • The crosswalk is part of a Pedestrian Hybrid Beacon (PHB) crossing.

529

530 High-visibility marked crosswalks should be installed at locations where all of the following
531 conditions exist:

- 532 • The speed limit is > 25 mph,
- 533 • The crossing is across an uncontrolled roadway approach, and
- 534 • One or more of the following special conditions apply:
 - 535 ○ The crossing meets Condition B (yellow area) of the selection chart in **Table 2**,
 - 536 ○ The crossing is not illuminated by nearby roadway lighting,
 - 537 ○ Engineering judgment determines that the pedestrian crossing volume is
538 expected to be very high⁴,
 - 539 ○ The crossing is part of a walking route approximately ¼ mile or less between a
540 residential development of moderate or heavy density and a school or
541 recreational area,
 - 542 ○ The crossing is connected by pedestrian facilities to a rail transit stop or major
543 bus transfer station within walking distance of approximately ¼ mile or less,
 - 544 ○ The crosswalk is within a downtown Central Business District area, or
 - 545 ○ The crosswalk is in a location where the surrounding land use is indicative of
546 walking as a transportation mode.

547

548

549

³ Fitzpatrick, K., et al. *Crosswalk Marking Field Visibility Study (FHWA: 2010)*,
<http://www.fhwa.dot.gov/publications/research/safety/pedbike/10067/10067.pdf>

⁴ The designer should use local knowledge and site context to determine if current or anticipated pedestrian crossing volume could be considered “very high.” A crossing with very high pedestrian volume usually is expected to have pedestrian activity during most 15-minute daytime periods when weather conditions are conducive to walking. [EXPLANATION FOR MY EDIT: even in areas with tons of pedestrian movements like, say, right in front of the Metro stop, you probably have fairly light pedestrian volumes at certain hours. For example, 7:15 on a Sunday morning]

IIM-TE-384 – Attachment A Unsignalized Marked Crosswalk Standards

550 In addition, marked crosswalks across single-lane roundabout approaches and exits should use
551 a high-visibility marking pattern.

552
553 High-visibility crosswalks may also be installed where engineering judgment determines that
554 they are necessary to increase driver recognition distance to help compensate for other factors
555 such as roadway geometry, visual clutter in the surrounding environment, crash history, and/or
556 traffic and pedestrian volume patterns.

557
558 **Table 3 –Permissible Crosswalk Types on VDOT-maintained Roadways**

Type	Class	Design details	Sketch
Transverse Lines (two parallel lines)	Standard	<ul style="list-style-type: none"> The transverse lines shall be between 6" and 12" in width. Typically, VDOT uses 6" width, however 8", 10", or 12" widths can be used to increase the visibility of the lines as they become worn over time. 	
Longitudinal Lines ("continental")	High-Visibility	<ul style="list-style-type: none"> Refer to PM-3 standards for details of longitudinal line widths and placement. Longitudinal lines should be spaced to avoid the wheel paths of through vehicles. 	
Bar Pairs	High-Visibility	<ul style="list-style-type: none"> Identical to Longitudinal Lines crosswalk, but uses pairs of 8" lines with 8" gap (8/8/8 pattern) in lieu of a 24" longitudinal line. Spacing between the 8/8/8 bar pairs shall be the same as the requirements of PM-3 for spacing between Longitudinal Lines. The bar pairs should be spaced to avoid the wheel paths of through vehicles. 	

559 *Source: 2008 VDOT Road and Bridge Standards, Section 1330.33*

560
561

IIM-TE-384 – Attachment A Unsignalized Marked Crosswalk Standards

562 Other high-visibility marking patterns, such as “ladder” or “zebra” markings, should not be used
563 except when necessary to match the pattern of other adjacent marked crosswalks.
564

565 Bar Pairs crosswalks have several advantages over
566 Longitudinal Lines crosswalks:

- 567 • [An FHWA study](#) of the Bar Pairs pattern concluded
568 that it behaves comparably with the Longitudinal
569 Lines pattern in terms of driver recognition and
570 behavior,
- 571 • Similar cost as Longitudinal Lines crosswalks
572 (although installation is slightly more complicated,
573 the Bar Pairs crosswalk uses less marking
574 material),
- 575 • Easier for motorcyclist/bicyclist traffic to avoid
576 traveling over the pavement marking material,
577 which may be slick when wet, and
- 578 • Easier for pedestrians to avoid stepping directly on the pavement marking material,
579 which may be slick.



580
581 If an existing standard crosswalk is upgraded to a high-visibility crosswalk independent of a
582 roadway resurfacing project, the transverse lines may be retained to eliminate the need for
583 pavement marking eradication. The transverse lines should not be restored when the roadway
584 is resurfaced.
585

586 6.3 – Aesthetic Treatments Between Crosswalk Lines

587
588 Localities may request the use of aesthetic treatments, such as stamped concrete, brick pavers,
589 or thermoplastic patterned inlays, between the crosswalk lines. Such requests will be evaluated
590 as per the latest edition of L&D Instructional & Informational Memorandum [IIM-LD-218](#). Such
591 aesthetic treatments by themselves do not constitute a marked crosswalk; they must be edged
592 by transverse white lines to legally establish the marked crosswalk and also to provide visual
593 contrast between the pavement and the aesthetic treatment.
594

595 As per Section 3G.01 of the 2009 MUTCD, aesthetic or colored pavement between crosswalk
596 lines should not use colors or patterns that degrade the contrast of the white transverse
597 crosswalk lines or that might be mistaken by road users as a traffic control application.
598

600 7.0 OTHER PEDESTRIAN CROSSING SAFETY TREATMENTS

602 *7.1 Pedestrian or School Regulatory and Warning Signs*

603
604 Pedestrian/school regulatory and warning signs, when used, shall be located and installed in
605 accordance with the MUTCD and the Virginia Supplement to the MUTCD.
606
607

IIM-TE-384 – Attachment A Unsignalized Marked Crosswalk Standards

608 7.2 Geometric/Traffic Calming Improvements

609
610 There are many options available to designers to modify or construct new roadway geometry to
611 improve the safety of crossing pedestrians by achieving one or more of the following goals:

- 612 • Reducing the crossing distance length (which reduces the pedestrian's exposure to
- 613 traffic),
- 614 • Increasing the visibility of pedestrians who are crossing or waiting to cross, or
- 615 • Encouraging drivers to drive at slower speeds.

616
617 These options include:

- 618 • Installing corner or midblock bulb-outs,
- 619 • Installing median refuge islands and "choker" islands,
- 620 • Reducing corner radii,
- 621 • Increasing the intersecting angle of channelized turn lanes,
- 622 • Installing raised crosswalks, and/or
- 623 • Installing mini-roundabouts.

624
625 These design elements should be designed in accordance with Appendix B(2) of the latest
626 effective version of VDOT's [Road Design Manual](#) and DRPT's [Multimodal System Design](#)
627 [Guidelines](#).

628
629 Traffic calming improvements on residential streets, such as raised crosswalks or choker
630 islands, should be planned and designed in accordance with the latest effective version of
631 VDOT's [Traffic Calming Guide for Local Residential Streets](#).

632
633

634 7.3 Midblock Pedestrian Signals and Pedestrian Hybrid Beacons

635
636 Vehicular traffic signals may be used to control a midblock pedestrian crossing if the traffic
637 signal is warranted based on the Pedestrian Volume
638 Warrant in Section 4C.05 of the 2009 MUTCD.

639
640 Pedestrian Hybrid Beacons (PHBs) may be used to
641 control a midblock pedestrian crossing if warranted,
642 designed, and operated as per Chapter 4F of the 2009
643 MUTCD. As per [Official Interpretation 4\(09\)-14\(I\)](#), a
644 red clearance interval is permissible and should be
645 considered between the start of the steady red phase
646 and the start of the pedestrian walk interval, and then
647 again between the end of the pedestrian walk interval
648 and the end of the alternating flashing red interval. The
649 duration of the flashing yellow interval should be as per [Official Interpretation 4\(09\)-32\(I\)](#).

650
651 PHBs shall not be installed where the crossing volume is less than 20 pedestrians per hour.

652
653



IIM-TE-384 – Attachment A Unsignalized Marked Crosswalk Standards

654 7.4 Rectangular Rapid Flashing Beacons (RRFBs)

655

656 If Condition B (yellow area) or C (orange area) is met in
657 **Table 2**, RRFBs may be considered as an appropriate
658 additional crossing treatment to supplement marked
659 crosswalks.

660

661 RRFBs, similar to In-Roadway Warning Lights (IRWLs),
662 rely on lights that flash upon pedestrian activation to
663 alert drivers to the likely presence of pedestrians within
664 or waiting to cross the crosswalk. However, RRFBs are
665 mounted on the sign posts (or, less often, overhead)
666 and therefore have lesser long-term maintenance costs
667 than the in-pavement IRWLs which are subjected to
668 vehicular wear, snowplows, and pavement resurfacing.

669

670 RRFBs are not currently included in the 2009 MUTCD
671 and may only be used per the requirements of FHWA's
672 Interim Approval. In 2011 VDOT received Interim
673 Approval from FHWA to operate RRFBs on VDOT
674 maintained roads. Localities that maintain their own
675 roads must separately apply for and receive Interim
676 Approval from FHWA prior to installing RRFBs.

677

678 FHWA's MUTCD [Interim Approval website](#) lists several
679 Official Interpretations that clarify and/or amend the initial RRFB approval. These interpretations
680 shall be followed when planning, designing, and operating RRFB installations. This website
681 should be monitored periodically for updated Interpretations. Note that existing installations do
682 require retrofits should new requirements come out after initial activation. As of the date of this
683 revised IIM, the following interpretation subjects include:

684

685 Overhead Mounting, 2009
686 Flash Pattern, 2010, 2012, 2014
687 Use with W11-15 Sign, 2010
688 Light Intensity, 2012
689 Dimming during Daytime Hours, 2012
690 Flashing Extensions and Delays, 2013
691 Placement of Units above Sign, 2016

692

693 RRFBs should not be used indiscriminately. Overuse of RRFBs in the roadway environment
694 could decrease not only the effectiveness of the RRFBs but those crossings without RRFBs.

695

696 7.4.1 Visibility

697

698 The sign and light components of the RRFBs should be prominently visible to approaching
699 vehicles, and the RRFBs should have side indication lights informing pedestrians when the
700 flashers are activated.

701



IIM-TE-384 – Attachment A Unsignalized Marked Crosswalk Standards

702 An RRFB assembly should be placed on the median or on an overhead mast arm at crossings
703 with obstructed visibility for side-mounted traffic control devices (e.g. near side transit stops,
704 trees, visual clutter, roadway geometry, large volume of heavy vehicles, and etc.).
705

706 If a median is present and the RRFBs are post-mounted, both right hand and median mounted
707 RRFBs should be installed.
708

709 Advance RRFBs should be considered for any crossings that have excessive surrounding visual
710 clutter, steep vertical and/or sharp horizontal roadway curvature.
711

712 *7.4.2 Speed*

713

714 There may be conditions that necessitate the installation of pedestrian crossings where speeds
715 are higher and special consideration is warranted (B and C Conditions in **Table 2** where speed
716 limit is > 35 mph). Consideration should also be given to installing advance RRFBs on higher
717 speed (> 35 mph) roadways even if there is adequate SSD on both approaches. See **Figures 1**
718 **and 2** for additional guidance on low speed (≤ 35 mph) and high speed (> 35 mph) roadways.
719

720 *Vehicle and Pedestrian/Bicycle Volume*

721

722 RRFBs should not be installed unless there are a minimum of 20 pedestrians/bicyclists using
723 the crosswalk in an hour. That threshold may be reduced to 10 pedestrians per hour if the
724 crossing is expected to be used by a high number of vulnerable pedestrians (pedestrians who
725 are disabled, aged 65 and over, or aged 15 and under), or if the reduced volume is met for three
726 consecutive hours.
727

728 RRFBs shall not be installed if pedestrian and vehicular volumes fall outside the limit lines
729 shown in **Figures 1 and 2**, unless approved by the Regional Traffic Engineer (RTE). RRFBs
730 may not be appropriate in locations where there is a combination of both high traffic volumes
731 and high pedestrian volumes (above the RRFB upper thresholds in the below figures). At such
732 locations there may be an increase in crashes and/or traffic delay that make the use of RRFBs
733 inappropriate. At such locations, PHBs, pedestrian traffic signals, or grade separated crossings
734 should be considered. The colored lines in Figures 1 and 2 depict the warrant requirements for
735 PHBs as per Section 4F.01 of the MUTCD.
736

737 Engineering judgement should take into account the proximity of adjacent signals.
738

739 If PHBs are considered, Section 4F of the 2009 MUTCD contains warranting guidelines that
740 utilize traffic, automobile speeds, and pedestrian crossing distance.
741

IIM-TE-384 – Attachment A Unsignalized Marked Crosswalk Standards

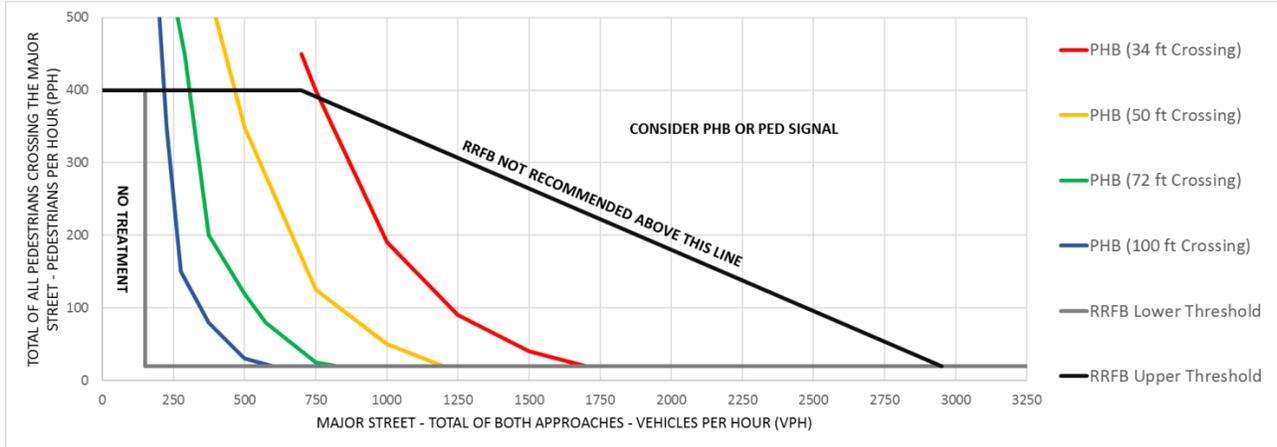


FIGURE 1 – Installation of RRFBs and PHBs on Low Speed Roadways (speed limit \leq 35 mph)

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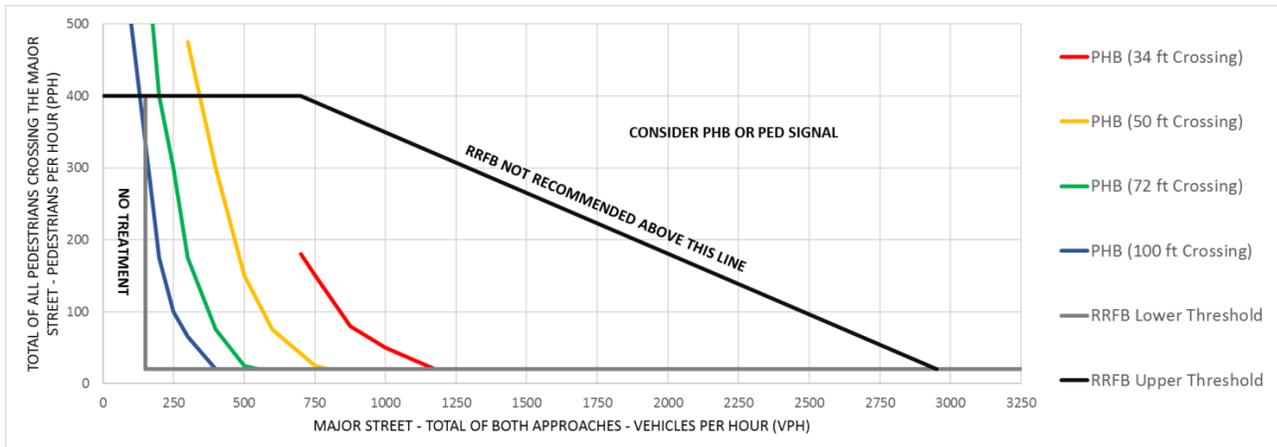


FIGURE 2 – Installation of RRFBs and PHBs on High Speed Roadways (> 35 mph)

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747
748
749
750

Source: 2009 MUTCD, Section 4F and Pedestrian Crossing Treatment Installation Guidelines, City of Boulder

7.5 In-Roadway Warning Lights (IRWLs)

IRWLs rely on lights embedded in the pavement that flash upon pedestrian activation or detection to alert drivers to the likely presence of pedestrians within or waiting to cross the crosswalk.

It is recommended that RRFBs or other treatments be considered in lieu of IRWLs due to their long-term maintenance costs.

751
752

8.0 UNCONVENTIONAL LOCATIONS

761

8.1 T and Offset Intersections

762

At closely spaced T and offset intersections, it might not be prudent or necessary to mark all legal crosswalks. At T intersections, it may be appropriate to only mark one of the two crossings

763
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766

IIM-TE-384 – Attachment A Unsignalized Marked Crosswalk Standards

767 across the through road. This decision should be based on pedestrian demand volumes and the
768 volume of left- and right-turning traffic from the stem of the T.

769

770 *8.2 Roundabouts*

771

772 Pedestrian crossings at roundabouts should be located and designed as per the latest effective
773 version of VDOT's [Road Design Manual](#), Chapter 2D, [Roundabouts: An Informational Guide, 2nd](#)
774 [Edition](#) (NCHRP Report 672), and the 2009 MUTCD, Section 3C.05.

775

776 The Code of Virginia's definition of where unmarked crosswalks exist at intersections does not
777 necessarily apply to roundabout intersections. In order to establish that a crosswalk exists, and
778 also for safety reasons, marked crosswalks shall be provided across all legs of a roundabout
779 (both entrances and exits) where there are adjacent pedestrian facilities on both sides of the
780 leg, unless the Regional Traffic Engineer or designee concurs that a significant operational or
781 safety concern prevents their use.

782

783 Marked crosswalks at single-lane roundabouts should use a high-visibility marking pattern.
784 Marked crosswalks across multilane roundabout approaches or exits shall use a high-visibility
785 marking pattern.

786

787 Note that neighborhood traffic circles that do not meet the design criteria for a modern
788 roundabout (e.g. lack of splitter islands) need not have marked crosswalks. Unmarked
789 crosswalks are typically sufficient for neighborhood traffic circles and other subdivision streets.

790

791 *8.3 Interchanges*

792

793 Due to high-speed merging and diverging traffic that may be present on the cross road at
794 interchanges, it may be desirable to limit the pedestrian pathway through the interchange to just
795 one side of the cross street. Pedestrian pathways through interchanges need to be carefully
796 planned to take into account conflicts from merging and diverging traffic. At free-flowing or
797 YIELD controlled ramps, the crosswalk should be installed perpendicular to the ramp at a
798 location where sight distance is optimal, even if this location is further away from the parallel
799 roadway.

800

801 For interchanges with multiple merging and diverging ramps, such as cloverleaf interchanges
802 and Diverging Diamond Interchanges (DDIs), it may be desirable to provide a pedestrian
803 pathway through the median of the cross road to minimize pedestrian-vehicle conflict if space
804 for a pedestrian facility in the median exists.

805

806

IIM-TE-384 – Attachment A Unsignalized Marked Crosswalk Standards

807 **9.0 REFERENCE**

- 808
- 809 • [VDOT Policy for Integrating Bicycle and Pedestrian Accommodations](#)
- 810 • [2009 MUTCD with Revisions](#)
- 811 • [2011 Virginia Supplement to the MUTCD With Revisions](#)
- 812 • [VDOT Road Design Manual \(latest effective version\)](#)
- 813 • [2008 VDOT Road and Bridge Standards](#)
- 814 • [DRPT Multimodal System Design Guidelines](#)
- 815 • [Instructional & Informational Memorandum IIM-LD-218, Latest Revision](#)
- 816 • [Roundabouts: An Informational Guide, 2nd Edition](#)
- 817 • [City of Boulder Pedestrian Crossing Treatment Installation Guidelines](#)
- 818 • [MDOT Guidance for Installation of Pedestrian Crosswalks on Michigan State Trunkline](#)
- 819 [Highways](#)
- 820 • [FHWA Crosswalk Marking Field Visibility Study](#)

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ATTACHMENT B

Complete Section

Virginia Code 46.2-924 Signing and Marking Criteria

IIM-TE Memo 384 – Attachment B Code 46.2-924 Signing and Marking Criteria

833
834

BACKGROUND:

- 835 • Virginia Code [Section §46.2-924](#) Part 3C states that certain localities in Northern Virginia
836 District may impose a fine for drivers who fail to yield the right-of-way to pedestrians
837 crossing or attempting to cross the highway, provided the following:
- 838 ○ The fine is enacted by ordinance and the crosswalk is marked
 - 839 ○ There are standard highway signs informing drivers of their duty to yield to pedestrians
840 at each and every crossing location covered by the higher fines ordinance
- 841 • This document provides VDOT’s “criteria for the design, location and installation of such
842 signs” as required by [§46.2-924](#).
- 843 • These criteria are based primarily on the FHWA Manual on Uniform Traffic Control Devices
844 ([MUTCD](#)), the [Virginia Supplement](#) to the MUTCD and traffic engineering best practices.
- 845 • Localities that maintain their own roads shall still abide by these criteria and by the MUTCD.
846 They may also choose to adopt the [Virginia Supplement](#) to the MUTCD.
- 847 • The current edition of the [MUTCD](#) and [Virginia Supplement](#) became effective January 1,
848 2012 and should be followed as outlined in both manuals.

849 **CRITERIA:**

- 850 • The crosswalk marking pattern and dimensions shall be as per this IIM, preferably with high-
851 visibility marking patterns.
- 852 • An R1-5 or R1-5A “Yield Here to Pedestrians” sign shall be placed approximately
853 20-50 feet upstream of the near crosswalk edge in both directions, as per
854 [Section 2B.11](#) of the MUTCD.
- 855 ○ Signs that read “Stop for Pedestrians” shall not be used, as the Code requires
856 drivers to “yield” to pedestrians.
- 857 • A R2-6P “Fines Higher” or R2-6bP “\$XXX Fine” sign shall be placed below the R1-
858 5/R1-5a signs, as required by [Section 2B.17](#) of the MUTCD.
- 859 • On multilane approaches, the R1-5/R1-5a sign should be coupled with yield line
860 markings (“shark’s teeth”) [MUTCD Markings Requirements](#) Section 3B.16,
861 Figures 3B-16 and 3B-17, or other approved markings.
- 862 • Alternatively, the locality may modify the R1-6 “State Law Yield to Pedestrians Within
863 Crosswalk” or overhead R1-9 “State Law Yield to Pedestrians” sign to add a “Fines Higher”
864 or “\$XXX fine” message, using black all-caps text on white background.
- 865 ○ As per [Section 2B.12](#) of the MUTCD, modified R1-6 signs shall not be post-mounted on
866 the left or right side of the highway.
- 867 Standard signs shall be erected and maintained by localities. On VDOT-maintained roads, the
868 VDOT Regional Traffic Engineer or designee shall approve these sign locations.



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ATTACHMENT C

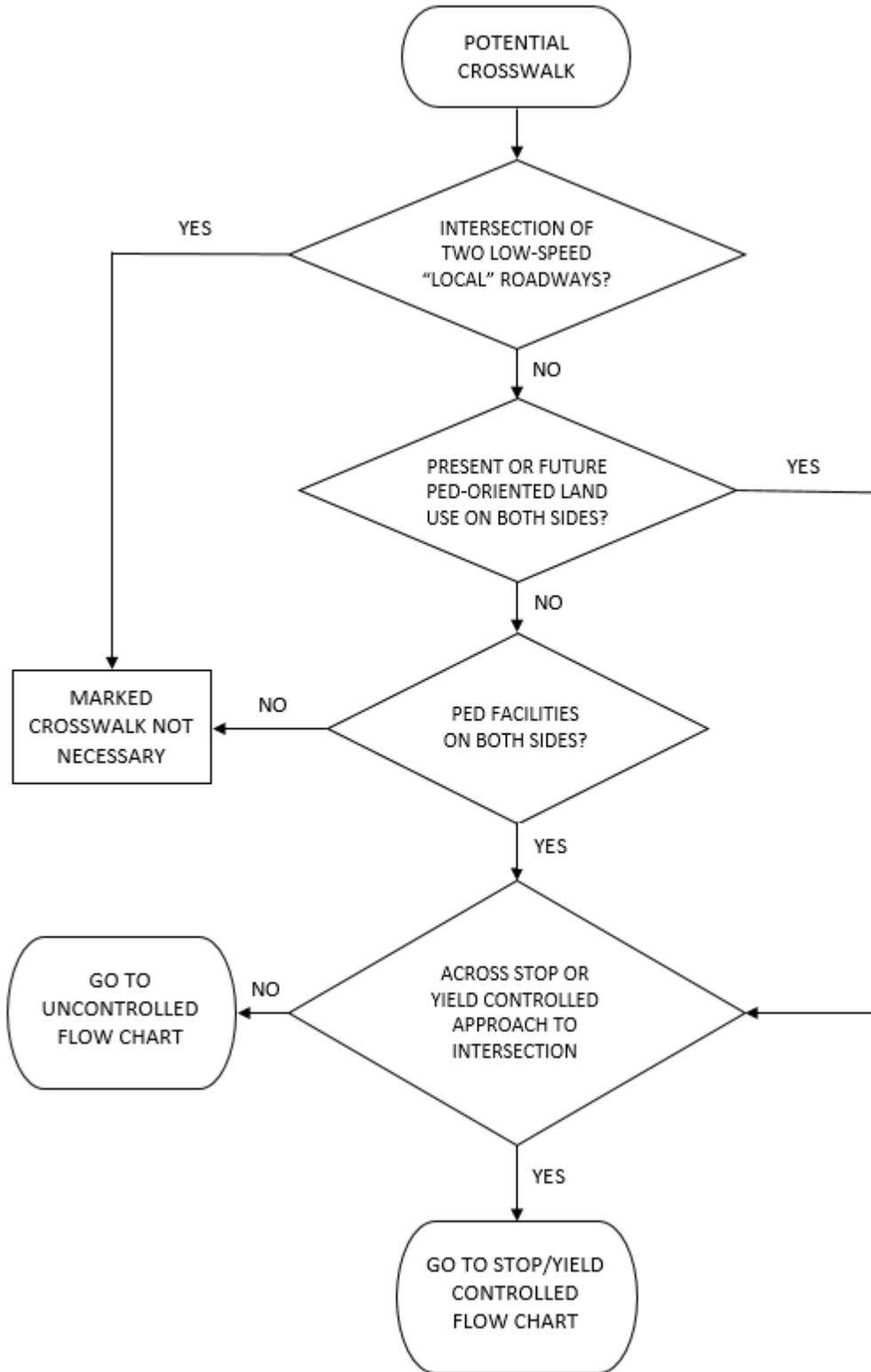
Process Flow Charts for Determining Appropriate Pedestrian Crossing Accommodations at Unsignalized Locations

ATTACHMENT CONTENTS

Figure C1. Potential Crosswalk Flow Chart	C1
Figure C2. Stop or Yield Controlled Flow Chart	C2
Figure C3. Uncontrolled Approach Flow Chart	C3
Figure C4. Table 2 Flow Chart	C4

IIM-TE-384 – Attachment C
Reference Flow Charts for Pedestrian Crossing Accommodations at
Unsignalized Locations

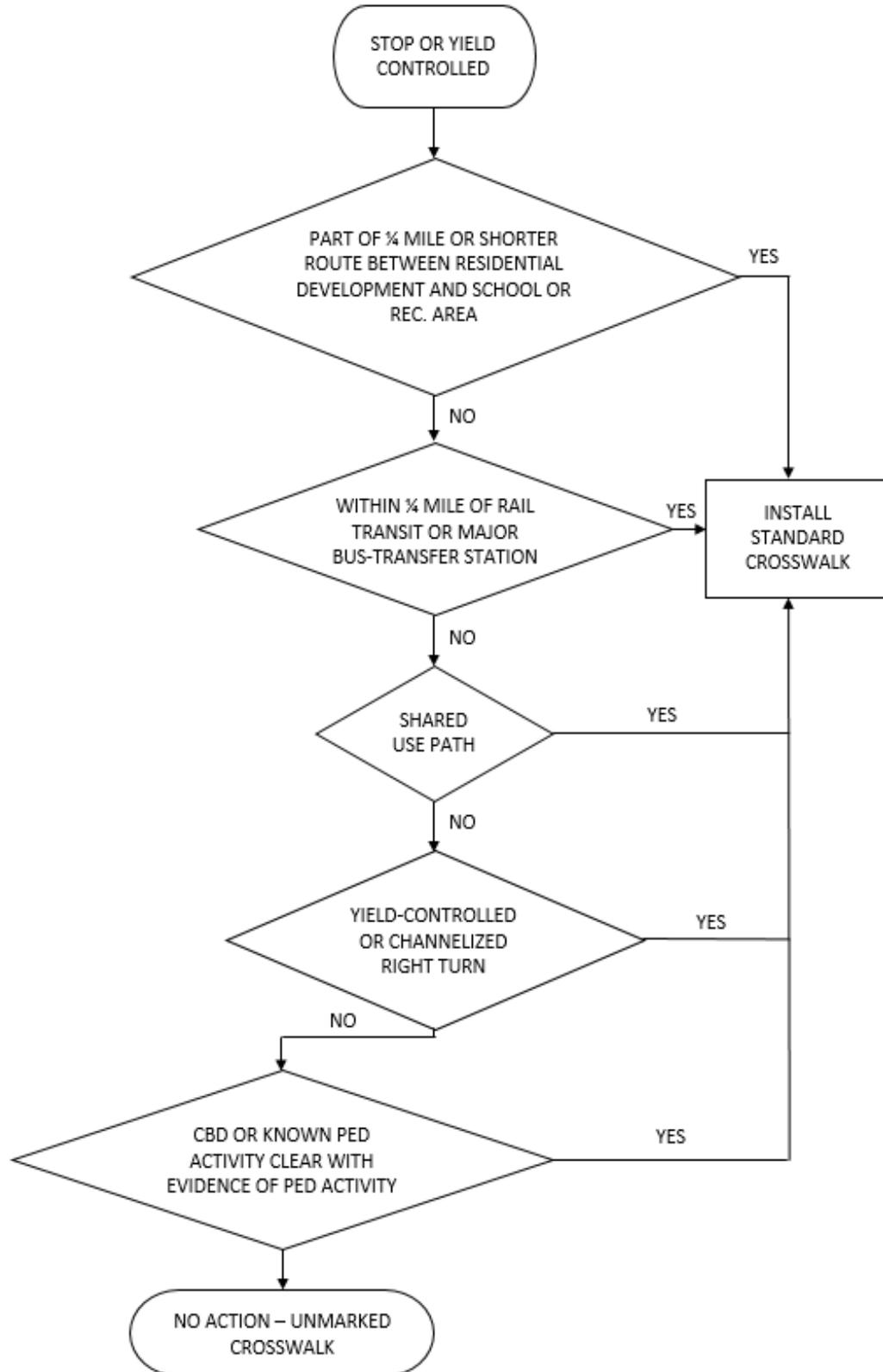
889 **Figure C1. Potential Crosswalk Flow Chart**



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IIM-TE-384 – Attachment C
Reference Flow Charts for Pedestrian Crossing Accommodations at
Unsignalized Locations

892 **Figure C2. Stop or Yield Controlled Flow Chart**

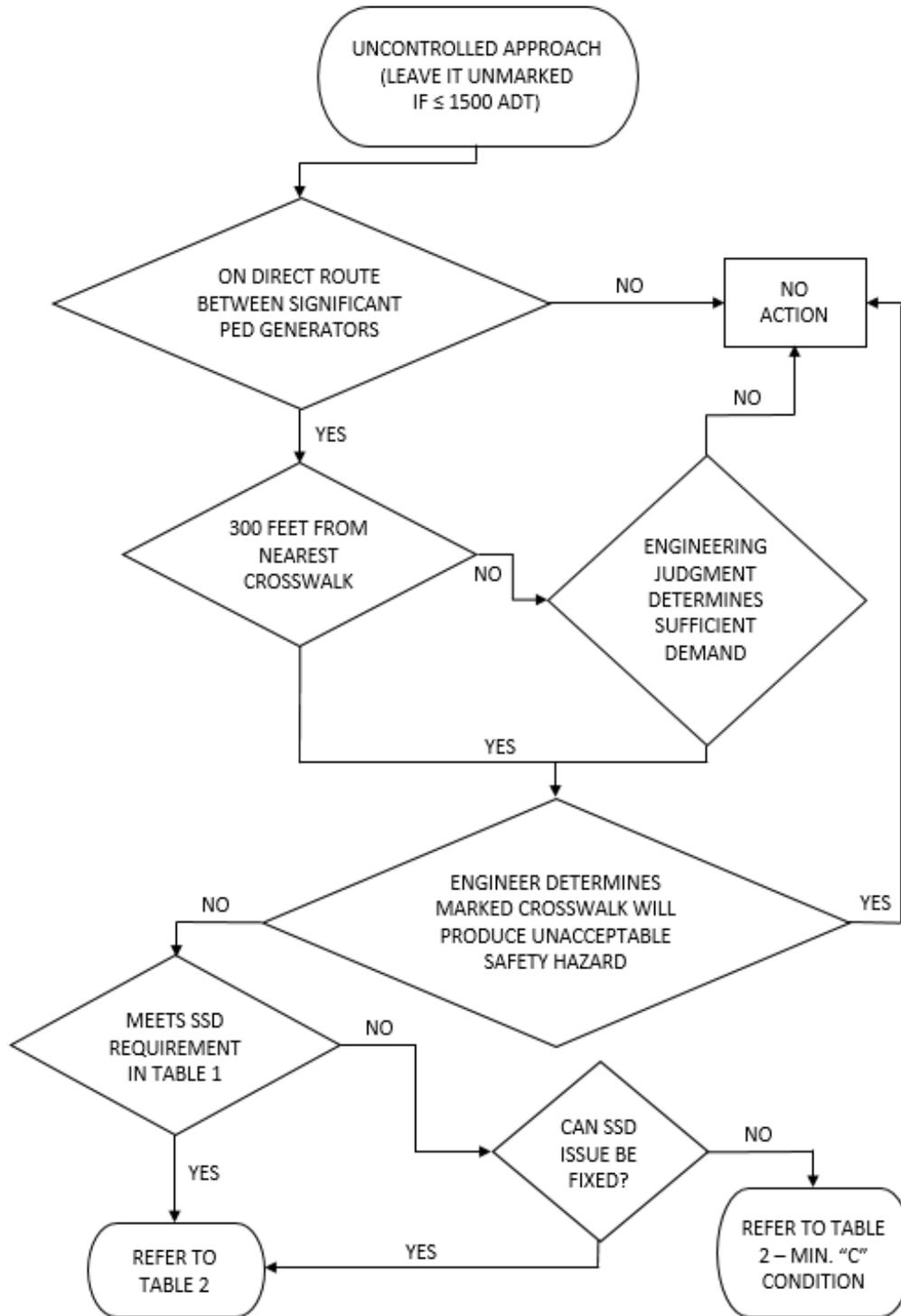


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IIM-TE-384 – Attachment C

Reference Flow Charts for Pedestrian Crossing Accommodations at Unsignalized Locations

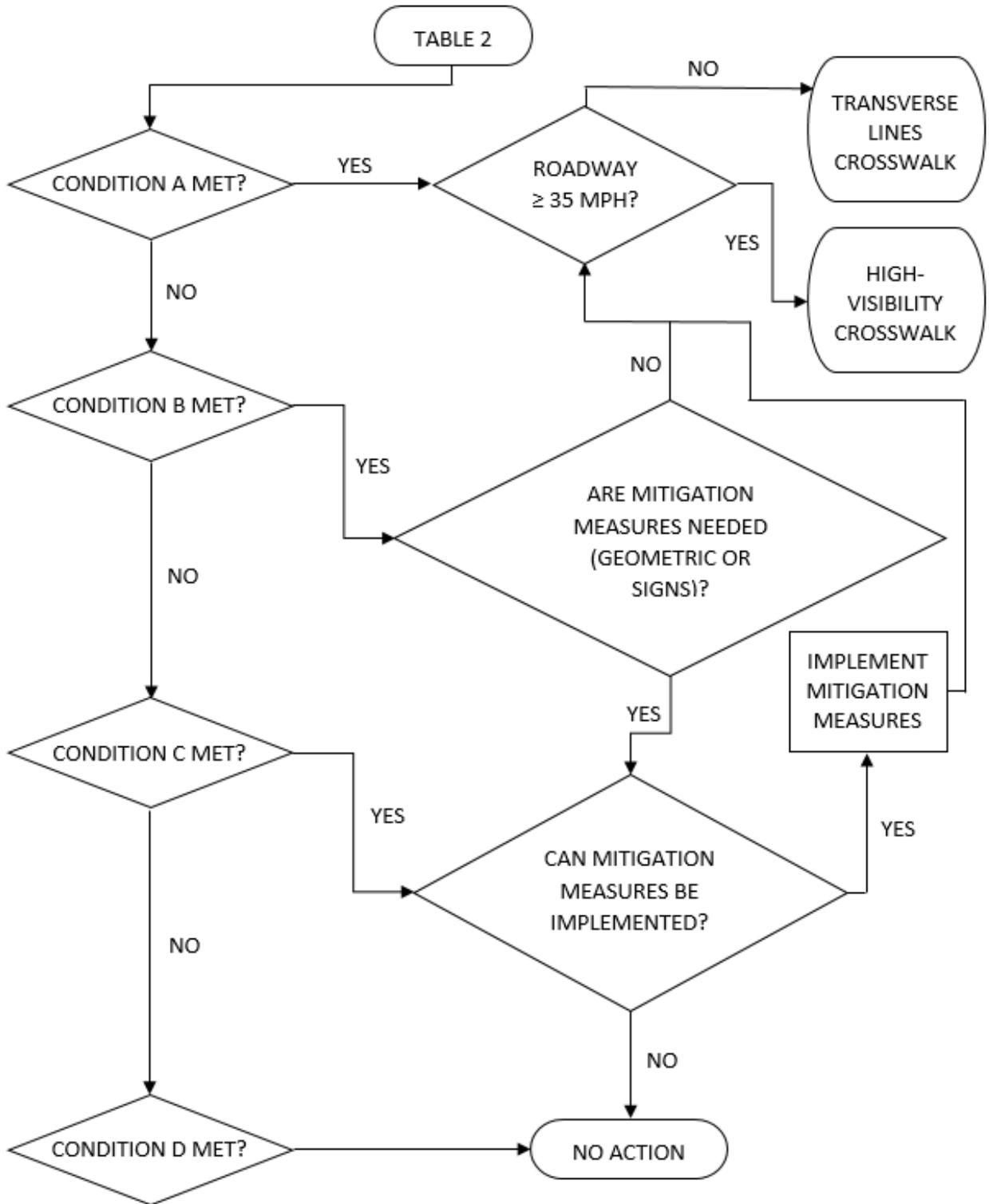
894 **Figure C3. Uncontrolled Approach Flow Chart**



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IIM-TE-384 – Attachment C
Reference Flow Charts for Pedestrian Crossing Accommodations at
Unsignalized Locations

897 **Figure C4. Table 2 Flow Chart**



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ATTACHMENT D

**Data Collection Sheets for Pedestrian Crossing Accommodation
Studies at Unsignalized Locations**

ATTACHMENT CONTENTS

Data Collection Sheet: Location Description Part 1	D1
Data Collection Sheet: Location Description Part 2	D2
Data Collection Sheet: Traffic Data	D3

IIM-TE-384 – Attachment D
Sample Data Collection Sheet for Pedestrian Crossing
Accommodations at Unsignalized Locations

LOCATION DESCRIPTION – PART 1	
Name of Data Collector: _____	
Date of Data Collection: _____	
Locality/District of Study Location: _____	
1) Crossing Location: <input type="checkbox"/> Unsignalized Intersection <input type="checkbox"/> Mid-block	
If crossing is (or will be) at unsignalized intersection location, define intersecting streets:	
Major Street	
Name: _____	Posted Speed Limit: _____ MPH
Functionality: <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local	
Minor Street	
Name: _____	Posted Speed Limit: _____ MPH
Functionality: <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local	
If crossing is (or will be) at mid-block location, define location on major street:	
Major Street	
Name: _____	Posted Speed Limit: _____ MPH
Functionality: <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local	
Location Description (e.g. 500 ft East of Main St.): _____	
2) Is this a shared-use path (e.g. bicycles) crossing? <input type="checkbox"/> Yes <input type="checkbox"/> No	
3) Existing Nearby Pedestrian Generators and Attractors (e.g. moderate density residential developments, schools, parks, commercial establishments, transit stops):	
North/East of crossing: _____	

South/West of crossing: _____	

4) Existing Traffic Control: <input type="checkbox"/> Stop/Yield Sign <input type="checkbox"/> Uncontrolled	
5) Is there Another Marked Crosswalk across the same roadway within 300 feet of the Crossing Location? <input type="checkbox"/> Yes <input type="checkbox"/> No	
6) Existing Crossing Treatments (if any) (e.g. standard crosswalk, curb ramps, and etc.):	

7) (for stop/yield controlled locations only) Is the Crossing Location Across a Yield-controlled Approach at an Off-ramp Junction or Channelized Right Turn Lane? <input type="checkbox"/> Yes <input type="checkbox"/> No	

IIM-TE-384 – Attachment D
Sample Data Collection Sheet for Pedestrian Crossing Accommodations at Unsignalized Locations

LOCATION DESCRIPTION – PART 2

8) Roadway Configuration:

- 2-Lanes (one-way street)
- 2-Lanes (two-way street with no median)
- 2-Lanes with raised median
- 3-Lanes with refuge island
- 3-Lanes (center turn lane)
- 4-Lanes (two-way street with no median)
- 4-Lanes with raised median
- 5-Lanes with refuge island
- 5-Lanes (center turn lane)
- 6-Lanes (two-way street with or without median)
- Other: _____

9) Crossing Distance by Direction:

Total: _____ ft
 (if applicable) From one end to the median: _____ ft, Direction: _____
 (if applicable) From other end to the median: _____ ft, Direction: _____

10) Nearest Marked or Protected Pedestrian Crossing: _____ Distance to: _____ ft

11) Could the Crossing Contain a Crosswalk of at Least 6 ft in Width? Yes No

12) *(for uncontrolled locations only)* Stopping Sight Distance (SSD):

_____ ft, Direction: _____
 _____ ft, Direction: _____

Can SSD be improved? Yes No Other: _____

13) Potential Safety Hazard within Crossing Location (if any):

14) Sketch/Photo of the Crossing Location:

IIM-TE-384 – Attachment D
Sample Data Collection Sheet for Pedestrian Crossing Accommodations at Unsignalized Locations

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STEP 3 – TRAFFIC DATA				
What are the peak period(s) for pedestrian activity? <input type="checkbox"/> AM <input type="checkbox"/> PM <input type="checkbox"/> Midday <input type="checkbox"/> Other: _____				
Major Street Vehicular Volume (ADT): _____ vehicles/day (if applicable) Minor Street Vehicular Volume (ADT): _____ vehicles/day				
(Complete where appropriate) Pedestrian Crossing Volumes / Bicycle Crossing Volumes:				
	AM	Mid-day	PM	Other
Time:	to	to	to	to
Date / Day of Week:	/	/	/	/
Major Street Vehicular Volume (Hourly):				
# of Bicyclists (if known)				
# of Pedestrians (if known)				
Is a significant proportion of the pedestrians at this location expected to be young (middle school students or below), elderly, or disabled? <input type="checkbox"/> Yes <input type="checkbox"/> No Describe: _____				

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