

<b>Crosswalk Study</b>	
<b>Street Name</b>	
<b>Crosswalk Location</b>	
<b>Municipality</b>	
<b>County</b>	
<b>Date</b>	
<b>Driver/Recorder</b>	
<b>Weather</b>	
<b>Pavement Condition</b>	
<b>Comments</b>	

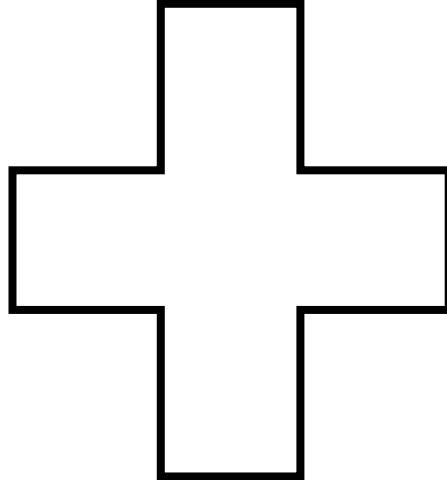
<b>Pedestrian Safety Study References</b>	
<ul style="list-style-type: none"> <li>• <b>Current edition of the 2009 Manual on Uniform Traffic Control Devices (MUTCD)</b></li> <li>• <b>PennDOT Publications 13M, 46, 111, 236, and 383</b></li> <li>• <b>Pennsylvania Title 67, Chapter 212, and Title 75</b></li> <li>• <b>Establishing Procedures and Guidelines for Pedestrian Treatments at Uncontrolled Locations, FHWA-ICT-17-016, 2017</b></li> <li>• <b>Guide to Improving Pedestrian Safety at Uncontrolled Crossing Locations, FHWA-SA-17-072, 2017</b></li> <li>• <b>Pedestrian Road Safety Audit Guidelines and Prompt Lists, FHWA SA-07-007, July 2007</b></li> <li>• <b>Improving Pedestrian Safety at Unsignalized Crossings, NCHRP Report 562, 2006</b></li> <li>• <b>Pedbikeinfo.org, website for the Pedestrian and Bicycling Information Center</b></li> <li>• <b>Small Town and Rural Area Multi-modal Guide, FHWA 2016</b> <a href="https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/">https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/</a></li> <li>• <b>PedSafe safety tool: <a href="http://www.pedbikesafe.org/pedsafe/">http://www.pedbikesafe.org/pedsafe/</a></b></li> <li>• <b>FHWA STEP program: <a href="https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/step2.cfm">https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/step2.cfm</a></b></li> </ul>	

<b>Crosswalk Study Field Examination</b>	
Type of Road	
Crossing distance (median present?)	
Number of Lanes (Multiple threats?)	
Sidewalk features	
Sidewalk condition	
Ramps/ADA Facilities	
Pedestrian generators (schools, parks, libraries, post office, bus stops, etc.)	
Pedestrian types (young, old, etc.)	
Multi-use Path or Trail	
Drainage issues	
Existing Pavement Markings	
Existing Traffic Control	
Existing Signs	
Distance to other crossings/types	
Area designation (rural, suburban, urban, business district, school, etc.)	
Pedestrian volumes	
Traffic volumes	
Gaps in traffic	
Speed (Posted, operating, 85 <sup>th</sup> percentile)	
Driveways/other conflict points	
Lighting	
On-street Parking	
Comments	

# **Crash Analysis/Diagram (PA Crash Information Tool)**

Draw sketch of the pedestrian crossing location and crash locations/types:

# Sight Distance Study



# Marking Recommendation

**Table 11. Recommendations for installing marked crosswalks and other needed pedestrian improvements at uncontrolled locations.\***

Roadway Type (Number of Travel Lanes and Median Type)	Vehicle ADT ≤ 9,000			Vehicle ADT >9,000 to 12,000			Vehicle ADT >12,000–15,000			Vehicle ADT > 15,000		
	Speed Limit**											
	≤ 48.3 km/h (30 mi/h)	56.4 km/h (35 mi/h)	64.4 km/h (40 mi/h)	≤ 48.3 km/h (30 mi/h)	56.4 km/h (35 mi/h)	64.4 km/h (40 mi/h)	≤ 48.3 km/h (30 mi/h)	56.4 km/h (35 mi/h)	64.4 km/h (40 mi/h)	≤ 48.3 km/h (30 mi/h)	56.4 km/h (35 mi/h)	64.4 km/h (40 mi/h)
Two lanes	C	C	P	C	C	P	C	C	N	C	P	N
Three lanes	C	C	P	C	P	P	P	P	N	P	N	N
Multilane (four or more lanes) with raised median***	C	C	P	C	P	N	P	P	N	N	N	N
Multilane (four or more lanes) without raised median	C	P	N	P	P	N	N	N	N	N	N	N

These guidelines include intersection and midblock locations with no traffic signals or stop signs on the approach to the crossing. They do not apply to school crossings. A two-way center turn lane is not considered a median. Crosswalks should not be installed at locations that could present an increased safety risk to pedestrians, such as where there is

poor sight distance, complex or confusing designs, a substantial volume of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices. Adding crosswalks alone will not make crossings safer, nor will they necessarily result in more vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g., raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic-calming measures, curb extensions), as needed, to improve the safety of the crossing. These are general recommendations; good engineering judgment should be used in individual cases for deciding where to install crosswalks.

\*\* Where the speed limit exceeds 64.4 km/h (40 mi/h), marked crosswalks alone should not be used at unsignalized locations.

\*\*\* The raised median or crossing island must be at least 1.2 m (4 ft) wide and 1.8 m (6 ft) long to serve adequately as a refuge area for pedestrians, in accordance with MUTCD and American Association of State Highway and Transportation Officials (AASHTO) guidelines.

**C = Candidate sites for marked crosswalks.** Marked crosswalks must be installed carefully and selectively. Before installing new marked crosswalks, an engineering study is needed to determine whether the location is suitable for a marked crosswalk. For an engineering study, a site review may be sufficient at some locations, while a more indepth study of pedestrian volume, vehicle speed, sight distance, vehicle mix, and other factors may be needed at other sites. It is recommended that a minimum utilization of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians) be confirmed at a location before placing a high priority on the installation of a marked crosswalk alone.

**P = Possible increase in pedestrian crash risk may occur if crosswalks are added without other pedestrian facility enhancements.** These locations should be closely monitored and enhanced with other pedestrian crossing improvements, if necessary, before adding a marked crosswalk.

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

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	B
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	B
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

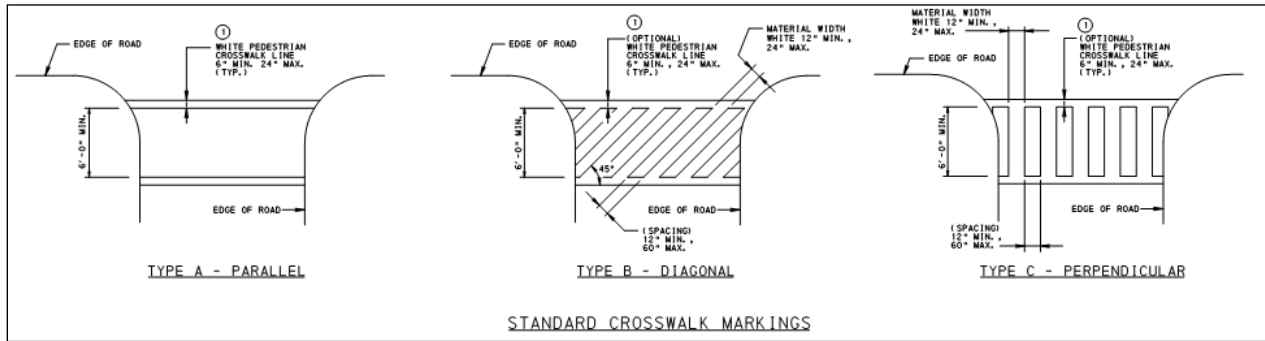
454 Source: Guidance for Installation of Pedestrian Crosswalks on Michigan State Trunkline Highways (Michigan Department of  
455 Transportation, 2014)

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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

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# Marking Type



# Signing Selection

At the crosswalk:

W11-2

S1-1

R1-6

In advance of the crosswalk

# Sign Enhancements

Channel post strips

Oversize

Double up

Flashing Lights

LEDs

RRFBs

Wig-wag lights

# Other Safety Features

Table 1. Application of pedestrian crash countermeasures by roadway feature.

Roadway Configuration	Speed Limit								
	≤30 mph			35 mph			≥40 mph		
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
2 lanes*	1 2 3 4 5 6	1 3 5 6 7	1 3 5 6 7	1 3 4 5 6	1 3 5 6 7	1 3 5 6 7	1 3 4 5 6 7	1 3 5 6 7	1 3 5 6 7
3 lanes with raised median*	1 2 3 4 5	1 3 5 7	1 3 5 7	1 3 4 5 7	1 3 5 7	1 3 5 7	1 3 4 5 7	1 3 5 7	1 3 5 7
3 lanes w/o raised median†	1 2 3 4 5 6 7	1 3 5 6 7	1 3 5 6 7	1 3 4 5 6 7	1 3 5 6 7	1 3 5 6 7	1 3 4 5 6 7	1 3 5 6 7	1 3 5 6 7
4+ lanes with raised median‡	1 3 5	1 3 5 7	1 3 5 7	1 3 5 7	1 3 5 7	1 3 5 7	1 3 5 7	1 3 5 7	1 3 5 7
4+ lanes w/o raised median‡	1 3 5 6 7 8	1 3 5 6 7 8	1 3 5 6 7 8	1 3 5 6 7 8	1 3 5 6 7 8	1 3 5 6 7 8	1 3 5 6 7 8	1 3 5 6 7 8	1 3 5 6 7 8

\*One lane in each direction    †One lane in each direction with two-way left-turn lane    ‡Two or more lanes in each direction

Given the set of conditions in a cell,

⊕ Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.

# Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

- 1 High-visibility crosswalk markings, parking restriction on crosswalk approach, adequate nighttime lighting levels
- 2 Raised crosswalk
- 3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
- 4 In-Street Pedestrian Crossing sign
- 5 Curb extension
- 6 Pedestrian refuge island
- 7 Pedestrian Hybrid Beacon
- 8 Road Diet

This table was developed using information from: Zegeer, C. V., Stewart, J. R., Huang, H. H., Lagerwey, P. A., Feaganes, J., & Campbell, B. J. (2005). Safety effects of marked versus unmarked crosswalks at uncontrolled locations: Final report and recommended guidelines (No. FHWA-HRT-04-100); Manual on Uniform Traffic Control Devices, 2009 Edition, Chapter 4F. Pedestrian Hybrid Beacons; the Crash Modification Factors (CMF) Clearinghouse website (<http://www.cmfclearinghouse.org/>); and the Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE) website (<http://www.pedbikesafe.org/PEDSAFE/>).

## Ped Safe Tool

## ADA



# Sign Placement

## Advance Warning Sign Placement Chart (MUTCD Table 2C-4)

Use condition B, speed 0 (stopping)

**Table 2C-4. Guidelines for Advance Placement of Warning Signs**

Posted or 85th-Percentile Speed	Advance Placement Distance <sup>1</sup>								
	Condition A: Speed reduction and lane changing in heavy traffic <sup>2</sup>	Condition B: Deceleration to the listed advisory speed (mph) for the condition							
		0 <sup>3</sup>	10 <sup>4</sup>	20 <sup>4</sup>	30 <sup>4</sup>	40 <sup>4</sup>	50 <sup>4</sup>	60 <sup>4</sup>	70 <sup>4</sup>
20 mph	225 ft	100 ft <sup>5</sup>	N/A <sup>6</sup>	—	—	—	—	—	—
25 mph	325 ft	100 ft <sup>5</sup>	N/A <sup>6</sup>	N/A <sup>6</sup>	—	—	—	—	—
30 mph	460 ft	100 ft <sup>5</sup>	N/A <sup>6</sup>	N/A <sup>6</sup>	—	—	—	—	—
35 mph	565 ft	100 ft <sup>5</sup>	N/A <sup>6</sup>	N/A <sup>6</sup>	N/A <sup>6</sup>	—	—	—	—
40 mph	670 ft	125 ft	100 ft <sup>5</sup>	100 ft <sup>5</sup>	N/A <sup>6</sup>	—	—	—	—
45 mph	775 ft	175 ft	125 ft	100 ft <sup>5</sup>	100 ft <sup>5</sup>	N/A <sup>6</sup>	—	—	—
50 mph	885 ft	250 ft	200 ft	175 ft	125 ft	100 ft <sup>5</sup>	—	—	—
55 mph	990 ft	325 ft	275 ft	225 ft	200 ft	125 ft	N/A <sup>6</sup>	—	—
60 mph	1,100 ft	400 ft	350 ft	325 ft	275 ft	200 ft	100 ft <sup>5</sup>	—	—
65 mph	1,200 ft	475 ft	450 ft	400 ft	350 ft	275 ft	200 ft	100 ft <sup>5</sup>	—
70 mph	1,250 ft	550 ft	525 ft	500 ft	450 ft	375 ft	275 ft	150 ft	—
75 mph	1,350 ft	650 ft	625 ft	600 ft	550 ft	475 ft	375 ft	250 ft	100 ft <sup>5</sup>

<sup>1</sup> The distances are adjusted for a sign legibility distance of 180 feet for Condition A. The distances for Condition B have been adjusted for a sign legibility distance of 250 feet, which is appropriate for an alignment warning symbol sign. For Conditions A and B, warning signs with less than 6-inch legend or more than four words, a minimum of 100 feet should be added to the advance placement distance to provide adequate legibility of the warning sign.

<sup>2</sup> Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge and Right Lane Ends. The distances are determined by providing the driver a PRT of 14.0 to 14.5 seconds for vehicle maneuvers (2005 AASHTO Policy, Exhibit 3-3, Decision Sight Distance, Avoidance Maneuver E) minus the legibility distance of 180 feet for the appropriate sign.

<sup>3</sup> Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, Signal Ahead, and Intersection Warning signs. The distances are based on the 2005 AASHTO Policy, Exhibit 3-1, Stopping Sight Distance, providing a PRT of 2.5 seconds, a deceleration rate of 11.2 feet/second<sup>2</sup>, minus the sign legibility distance of 180 feet.

<sup>4</sup> Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve. The distance is determined by providing a 2.5 second PRT, a vehicle deceleration rate of 10 feet/second<sup>2</sup>, minus the sign legibility distance of 250 feet.

<sup>5</sup> No suggested distances are provided for these speeds, as the placement location is dependent on site conditions and other signing. An alignment warning sign may be placed anywhere from the point of curvature up to 100 feet in advance of the curve. However, the alignment warning sign should be installed in advance of the curve and at least 100 feet from any other signs.

<sup>6</sup> The minimum advance placement distance is listed as 100 feet to provide adequate spacing between signs.