

# City of Madison

Traffic Engineering Division

Pedestrian Treatments, Practices and Considerations

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Ensuring that people can cross streets safely and conveniently to access destinations is essential to creating an effective transportation network. People who are traveling by other modes will also need to cross streets; those who arrive by transit or car may need to cross the street to access a destination after getting off at a bus stop or parking. People need to be able to cross streets at intersections and midblock locations, at controlled (signals, stop signs, etc.) and uncontrolled locations, on major streets and on minor streets.

The following provides information on some engineering treatments that can be used to improve pedestrian safety at street crossings:

## Crosswalks

Crosswalks may be marked or unmarked. At intersections a sidewalk extension across the street defines a crosswalk. A crosswalk does not need to be marked to be legally enforceable.

## Marked Crosswalks

Marked crosswalks serve to highlight the right-of-way where motorists can expect pedestrians to cross and designate a stopping or yield location. They can also indicate optimal or preferred locations for pedestrians to cross.

- Crosswalk locations should be convenient for pedestrian access.
- Crosswalks can be used in conjunction with other measures, such as advance warning signs, warning signs, stop bars, median crossing islands and curb extensions (where there is on-street parking), to improve the safety of a pedestrian crossing, particularly on higher volume multi-lane roads
- Marked crosswalks are important for pedestrians who are visually impaired.

Various crosswalk marking patterns are given in the Manual on Uniform Traffic Control Devices or the MUTCD. The City of Madison uses both standard crosswalk markings and the "international" or continental crosswalk. The continental markings are useful, particularly at uncontrolled locations, because they are far more visible, and are particularly useful at night or in low light conditions.

Marked crosswalks are often installed in conjunction with other enhancements that physically reinforce the crosswalk and reduce driver speeds, particularly at uncontrolled

locations and on more major roads. It can be useful to supplement the crosswalk markings with warning signs for motorists.

Crosswalk markings are defined in the MUTCD as solid white transverse, longitudinal, or diagonal lines. Additional materials or colors are sometimes used to supplement the markings, but they are not a substitute for quality roadway markings. It is important to ensure that crosswalk markings are visible to motorists, particularly at night. Crosswalks should not be slippery, create tripping hazards, or be difficult to traverse by those with diminished mobility or visual capabilities.

## **Marked Crosswalk Installation Criteria**

Marked crosswalks can be painted at intersections where there are stop signs or traffic signals. Crosswalks are automatically marked at most intersections with traffic signals.

Mid-block crosswalks are often not commonly used because they are not expected by motorists as pedestrian crossing locations. However where mid-block crossings are used-at special locations-they are often supplemented with median islands, warning signs and/or overhead flashers.

What are the major considerations/criteria for marking a crosswalk?

- 1) Frequent use of the intersection by pedestrians;
- 2) The crossing is a direct route to or from a major generator of ped traffic such as a school, park, library, transit stop, business district or community center;
- 3) There is little opportunity for peds to cross the street, comfortably and reasonably without feeling threatened by approaching motorists;
- 4) Engineering judgment considering the number of traffic lanes, ped exposure, ADT, posted speed limit, and geometry.

Marked crosswalks may be supplemented with other treatments when any of the following conditions exists

- 1) Where the speed limit exceeds 40 mi/hr
- 2) On a street with four or more lanes without a raised median or crossing island serving 12,000 ADT or greater
- 3) On a street with four or more lanes with a raised median or crossing island serving more than 18,000 ADT

There are currently approximately 5,000 marked crosswalks installed in the City of Madison.

Approximate installation costs are \$100 (\$400 for four legs of an intersection) for a marked crosswalk with two transverse line, \$800 (epoxy) (\$3200 for four legs of an intersection) for a continental crosswalk, Maintenance of the markings must also be considered.

## Other Measures to Assist Pedestrians

As noted earlier marking crosswalks by themselves cannot solve pedestrian crossing problems, the lack of compliance on the part of drivers should not be ignored. As the complexity of a crossing location increases as well as the volume of cross traffic the City will consider more substantial engineering and roadway treatments, including increased enforcement.

A variety of pedestrian facilities have been found to improve pedestrian safety and/or ability to cross the street under various conditions. Examples of pedestrian improvements include:

- Installing pedestrian crossing warning signs. Per the MUTCD, pedestrian crossing signs should only be used at locations that are unusually hazardous, where crossing activity is unexpected, or at locations where pedestrian crossing activity is not readily apparent, Est. cost \$150/std street side mounted sign (typically with 2 to 4 signs per crossing);
- Installing in-street Yield to Pedestrian signs—these are installed based on the attached criteria, they should be used only where there is a reasonable expectation of encountering pedestrians throughout the day. Because of the increased maintenance as a result of turning vehicles striking and launching the sign careful consideration will be made. Est. cost \$200;
- Providing adequate nighttime lighting for pedestrian. Adequate nighttime lighting should be provided at/near marked crosswalks and areas near significant pedestrian generators with nighttime pedestrian activity. Est cost \$1,500 and is a function of availability of electrical service;
- Using overhead STATE LAW YIELD TO PED SIGNS. Using various pedestrian warning signs, flashers (RRFBs), and other traffic control devices to supplement marked crosswalks. Per the MUTCD, pedestrian crossing signs should only be used at locations that are unusually hazardous, where there is a reasonable expectation of encountering pedestrians throughout the day and where crossing activity is unexpected, or at locations where pedestrian crossing activity is not readily apparent. Est. cost \$6,500+
- Providing raised medians or intersection crossing islands on multilane roads, which can significantly reduce the pedestrian crash rate and also facilitate street crossing. Also, raised medians may provide aesthetic improvement and may control access to prevent unsafe turns out of driveways. When built, the landscaping should be designed and maintained to provide good visibility between pedestrians and approaching motorists. Est. cost is a function of width, length and landscaping \$5,000-20,000 per island

- Pedestrian Hybrid Beacons aka the HAWK. A ped hybrid beacon is a special type of beacon used to warn and control traffic at an unsignalized location to assist peds in crossing a street at marked locations. MUTCD criteria attached. Est. cost \$60,000
- Installing traffic signals (with pedestrian signals), where warranted. Est cost \$100,000+ function of street and underground infrastructure;

Reducing the effective street crossing distance for pedestrians by narrowing the streets or by providing curb extensions and/or raised pedestrian islands at intersections. Est cost, generally done as part of larger CE street reconstruction projects. Cost vary due stormsewer modifications etc... Another option is to reduce four-lane undivided road sections to two through-lanes with dual left-turn lanes or left-turn bays. Reducing the width of the lanes may result in slower speeds in some situations, which can benefit pedestrians who are attempting to cross the street. This creates enough space to provide median islands. The removal of a travel lane may also allow enough space for sidewalks wider terraces and/or bike lanes.

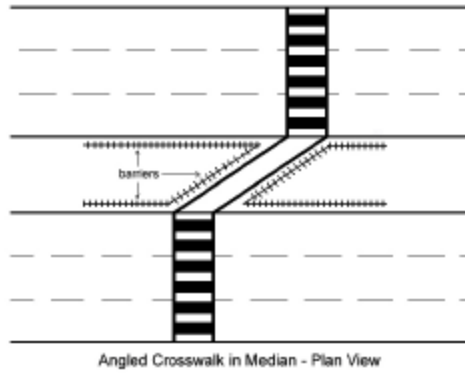
Installing traffic-calming measures may be appropriate on certain local and collector streets to slow vehicle speeds and/or reduce cut-through traffic.

Traffic-calming measures also include raised crossings (raised crosswalks, raised intersections) street narrowing measures "skinny street" designs, and intersection designs for example minicircles, diagonal diverters. Note that some of these traffic-calming measures may not be appropriate on major collector or arterial streets.

Ultimately when crossing becomes so complex and potentially hazardous the City will consider constructing grade-separated crossings. Grade-separated crossings are expensive and are considered in situations where pedestrian crossings are essential (e.g., school children need to cross a six-lane arterial street), street-crossing at-grade is not feasible for pedestrians, and no other measures are considered to be appropriate.

Grade-separated crossings must also conform to Americans with Disabilities Act (ADA) requirements

In some situations the City will provide guidance through a raised median of a multilane street that directs pedestrians to the right; this results in a two-stage crossing and increases the likelihood of pedestrians looking for vehicles coming from their right in the second half of the street



Proper planning and land use practices should be applied to benefit pedestrians. For example, busy arterial streets should be used as a boundary for school attendance or school busing. Major pedestrian destinations should not be separated from each other or from their parking facilities by a wide, busy street.

The spacing of marked crosswalks should also be considered so that they are not placed too close together. Overuse of marked crosswalks can breed driver disrespect for them, and a more conservative use of marked crosswalks generally is preferred. Thus, it is recommended that in situations where marked crosswalks alone are acceptable a higher priority be placed on their use at locations having a minimum of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians per peak hour). In all cases, good engineering judgment must be applied.