



Appendix G:

Pedestrian Facilities Toolbox

Introduction

Appropriate pedestrian facilities and safety treatments ensure that urban streets provide adequate comfort and accessibility for all users. The type of facility and/or treatment that may be constructed in a specific area depends on a number of factors, including roadway configuration, vehicular traffic levels, available right of way, existing safety concerns, and project budget.




Pedestrian facilities are now typically built along new roadways within the region. In the past, however, many roads were constructed without pedestrian facilities. The Pedestrian Facilities Toolbox can be used when attempting to retrofit facilities on corridors lacking facilities or in areas with safety concerns as well as when constructing new roadways. The Pedestrian Facilities Toolbox describes the different types of pedestrian facilities, articulates their benefits, and describes generally when to use the facilities. Project level analysis is required to determine the feasibility and appropriateness of a specific facility given the physical characteristics of the project area.

There are a number of excellent resources available that provide more detailed guidance on the planning and design of pedestrian facilities. These include [Guide for the Planning, Design, and Operation of Pedestrian Facilities](#) (AASHTO, 2010), [Guide to Pedestrian Best Practices](#) (WisDOT, 2010), [Urban Street Design Guide](#) (NACTO, 2013), [Designing Streets for Kids](#) (NACTO, 2020), [Designing Walkable Urban Thoroughfares](#) (ITE, 2010), [Manual on Uniform Traffic Control Devices](#) (FHWA), [Small Town and Rural Multimodal Networks](#) (FHWA, 2016), [Planning and Design for Alterations](#) (US Access Board 2007) [Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way](#) (US Access Board, 2011), [Designing for All Ages and Abilities: Contextual Guidance for High-Comfort Bicycle Facilities](#) (NACTO, 2017), [Don't Give Up at the Intersection](#) (NACTO, 2019), and [Noteworthy Local Policies that Support Safe and Complete Pedestrian and Bicycle Networks](#) (FHWA, 2016). FHWA issued a memorandum in 2013 expressing support for taking a flexible approach to pedestrian and bicycle facility design, citing the NACTO and ITE guides, which build upon the flexibilities provided in the AASHTO guides. The MPO's [Pedestrian/Bicycle Facilities, Policies, and Street Standards: Review of Community Requirements in the Greater Madison MPO Planning Area and Recommended Best Practices](#) (2021) and its October 2021 [addendum](#) compile current design requirements of area communities and national best practices for a number of the facilities in the toolbox, including curb radii and sidewalks, as well as block size, street network connectivity, snow removal, and other related standards that are not included in the toolbox.




Relative costs presume that the facility will be retrofit into an existing streetscape; the costs for some of these improvements will be negligible if they are integrated in original construction or planned reconstruction (e.g. Woonerfs, median refuge islands, curb bulb-outs, and reduced curb radii).









Pedestrian Facilities Toolbox




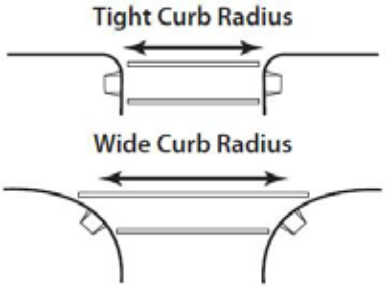
Treatment	Description	Benefits	Application / Consideration	Cost
<p>Sidewalk</p> 	<p>Paved pedestrian paths that are constructed along roadways in most residential neighborhoods and commercial areas.</p>	<p>Provide pedestrians with safety from motor vehicles, mobility, and support healthier communities.</p>	<p>Consider in all residential and commercial areas as well as areas in which pedestrian connectivity may be hindered by a lack of connecting facilities.</p>	<p>\$\$</p>
<p>Shared-Use Path</p> 	<p>Facilities designed for bicycle and pedestrian use that are fully separated from roadways.</p>	<p>Minimize conflicts between pedestrians and motor vehicles by complete separation of modes. Generally provide higher-level of comfort than sidewalks.</p>	<p>Consider in scenic or high-traffic areas where right-of-way is or has the potential to become available.</p>	<p>\$\$\$</p>
<p>Unmarked Crosswalk</p> 	<p>A legal crosswalk that is not identified by pavement markings; normally extends from sidewalk terminus at a right angle to road being crossed.¹</p>	<p>Reduced maintenance costs in comparison to marked crosswalks.</p>	<p>Appropriate in low traffic volume residential areas. Unmarked crosswalks generally exist at all intersections where a sidewalk enters the roadway</p>	<p>\$</p>




1 Wisconsin State Statutes 340.01(10)b, <https://docs.legis.wisconsin.gov/statutes/statutes/340/01/10/b>.


Treatment	Description	Benefits	Application / Consideration	Cost
<p>Marked Crosswalk</p> 	<p>A legal crosswalk identified by pavement markings.</p>	<p>Marked crosswalks provide a clear signal to both pedestrians and vehicles that an area is a pedestrian channel across a roadway.</p>	<p>Can be installed on any road; however, they should not be installed on multi-lane roads with more than 10,000 vehicles per day without additional safety features.</p>	<p>\$</p>
<p>Pedestrian Overpass / Underpass</p> 	<p>A grade-separated roadway crossing for use by pedestrians. Bicycles are normally also allowed.</p>	<p>Allows for the uninterrupted flow of pedestrian movement separate from vehicle traffic.</p>	<p>Consider only in areas where pedestrians must cross a high-speed, high-volume multilane arterial or freeway.</p>	<p>\$\$\$\$\$</p>
<p>Woonerf / Very Low Speed Street</p> 	<p>Streets at sidewalk level designed without curbs that provide full access to all modes. May incorporate urban furniture or plantings to reinforce low speeds and shared use.</p>	<p>Vehicles are forced to slowly meander through streets, leading to safety benefits without sacrificing vehicular accessibility and roadway connectivity.</p>	<p>Consider in areas where active transportation is prioritized and has high volumes in which it is not possible to completely restrict vehicular traffic. Treatment is costly and should be used sparingly as a retrofit.</p>	<p>\$\$\$\$\$</p>

Treatment	Description	Benefits	Application / Consideration	Cost
<p>Overhead Flashing Beacons</p> 	<p>Flashing amber lights that are installed with overhead signs ahead or at crosswalk to alert motorists of the crosswalk.</p>	<p>The blinking lights increase the number of drivers that yield to pedestrians, increasing pedestrian safety.</p>	<p>Consider in places with visibility issues or topographic limitations.</p>	<p>\$\$\$</p>
<p>Pedestrian Hybrid Beacon (HAWK)</p> 	<p>A pedestrian-actuated beacon that is part beacon flasher and part traffic control signal. Upon actuation, beacon displays a yellow warning indication followed by a red stop light. Driver sees a flashing red as the pedestrian crosses until the clearance interval has ended.</p>	<p>High compliance rate (80-90%) leads to great safety benefits.</p>	<p>Consider in places where it is difficult for pedestrians to find breaks in vehicular traffic, but where normal signal warrants are not met. Not appropriate for single lane roadways due to cost.</p>	<p>\$\$\$\$</p>
<p>Rapid Flashing Beacon (RRFB)</p> 	<p>Amber LED lights that rapidly flash when a pedestrian crosses at a marked crosswalk.</p>	<p>High motorist compliance rate (65-80%) leads to great safety benefits. Can be installed with solar panels in places that lack electricity.</p>	<p>Consider for single lane roadways. Can be used on multi-lane roadways; however, effectiveness decreases as the number of travel lanes increases.</p>	<p>\$\$</p>

Treatment	Description	Benefits	Application / Consideration	Cost
<p>Median Refuge Island</p> 	<p>This treatment involves creating a raised island in the center of a roadway with cutouts for accessibility along the pedestrian path, creating a refuge for people crossing a roadway.</p>	<p>Allows pedestrians to focus attention on each direction of traffic separately and reduces the length of time a pedestrian is exposed to oncoming traffic. Particularly effective on multilane roadways at accommodating ADA pedestrian traffic.</p>	<p>Recommended for busy multilane roads or high traffic two-lane arterials. Need to be large enough to accommodate expected bicycle and pedestrian traffic volumes.</p>	<p>\$\$\$</p>
<p>Staggered Median Refuge Island</p> 	<p>A variety of a pedestrian island in which pedestrians cross one direction of traffic to reach the median island and have to walk towards oncoming traffic to reach the second half of the crosswalk.</p>	<p>Two-stage crossing allows pedestrians to concentrate on only one direction of traffic at a time and reduces crossing distances; the staggered design forces pedestrians to face oncoming traffic before completing their crossing.</p>	<p>Consider on multi-lane roads with obstructed pedestrian visibility or those with off-set intersections. Must be large enough to accommodate expected bicycle and pedestrian traffic volumes and designed for accessibility.</p>	<p>\$\$\$</p>
<p>Pedestrian Bump-out / Curb Extension</p> 	<p>This roadway treatment increase the pedestrian space by providing a physical extension of the sidewalk into a roadway.</p>	<p>This treatment narrows the distance a pedestrian has to cross, reduces pedestrian exposure time, increases sidewalk space on corners, improves visibility of pedestrians, and lowers vehicle turning speeds.</p>	<p>Suitable for roadways that have parking lanes, so long as bump-out extends only as far as parking lane. May need to consider impact to transit, freight vehicles, and cyclists.</p>	<p>\$\$\$</p>

Treatment	Description	Benefits	Application / Consideration	Cost
<p>High Visibility Signs and Markings</p> 	<p>Brightly colored signs that are posted at pedestrian crossings to increase driver awareness of the crossing.</p>	<p>Can increase driver awareness in an areas where drivers need to exercise higher levels of caution based on potential conflicts with pedestrians.</p>	<p>Beneficial in areas where a pedestrian crossing might not be expected or where pedestrian conflicts have occurred at higher-than-average rates.</p>	<p>\$</p>
<p>Advanced Yield Lines</p> 	<p>A row of white yield lines that are placed before crosswalks at uncontrolled intersections or mid-block crossings.</p>	<p>The markings can increase a pedestrian’s visibility to motorists while reducing the number of motorists encroaching on a sidewalk by indicating where a driver should stop.</p>	<p>Beneficial in areas where pedestrian visibility is low or drivers are aggressive.</p>	<p>\$</p>
<p>In-street Pedestrian Crossing Signs</p> 	<p>Regulatory signage posted on road edge lines and road centerlines that remind drivers of laws regarding right of way at unsignalized pedestrian crossings.</p>	<p>The signs are highly visible to motorists and have been show to have a positive impact on pedestrian safety due to high drive compliance. However, compliance decreases on multilane roadways.</p>	<p>Potential applications include mid-block crosswalks, unsignalized intersections, and low-speed areas on two-lane roadways. These type of signs may need to be removed during winter months to facilitate snow removal.</p>	<p>\$</p>
<p>Reduced Curb Radii</p> 	<p>The radius of a curb is reduced to require motorists to make a tighter turn, thus slowing speeds.</p>	<p>Reducing the radii narrows the distance pedestrians have to cross, reduces vehicle speeds around corners, and increases driver awareness of pedestrians.</p>	<p>Consider on streets with high pedestrian activity or those with on-street parking. May need to consider the impact to transit, freight vehicles, and cyclists.</p>	<p>\$\$\$</p>

Treatment	Description	Benefits	Application / Consideration	Cost
<p>Raised Crosswalk</p> 	<p>Marked crosswalks that are raised above the normal street level to function as traffic calming devices.</p>	<p>Provide increased levels of safety in comparison to simple marked crosswalks and increase pedestrian comfort for those walking along busy corridors.</p>	<p>Consider on streets with moderate levels of traffic where highly trafficked pedestrian areas cross a roadway.</p>	<p>\$\$</p>
<p>In-Road Warning Lights</p>  <p>Source: tapconet.com</p>	<p>A treatment in which amber LED lights are imbedded into each side of a crosswalk that are activated by a push button or passive pedestrian detection.</p>	<p>Increases pedestrian safety in low light conditions.</p>	<p>Consider in locations which high night-time pedestrian traffic and low bicycle ridership, as the lights may present a hazard due to being raised from the roadway surface.</p>	<p>\$\$\$</p>
<p>Pedestrian Countdown signs</p> 	<p>A signal head that displays the amount of time remaining for a pedestrian to cross the road during the pedestrian clearance interval.</p>	<p>Reduces pedestrian/vehicle crashes by 25% and slows traffic speeds.</p>	<p>This treatment is required by the MUTCD for all signalized intersections with pedestrian signal heads. See APS Guide.</p>	<p>\$\$</p>

Treatment	Description	Benefits	Application / Consideration	Cost
<p>Accessible Pedestrian Signals (APS)</p>  <p>Source: APS Guide</p>	<p>An integrated device that communicates information about the WALK and DON'T WALK intervals at signalized intersections in non-visual formats (i.e., audible tones and vibrotactile surfaces).</p>	<p>Improves accessibility and safety for pedestrians who are visually impaired.</p>	<p>MUTCD requires APS to be both audible and vibrotactile. See APS Guide.</p>	<p>\$\$</p>