

Pedestrian Transportation

Introduction

Pedestrian travel is an important, yet often overlooked form of transportation. Walking is the second most common mode of transportation after the private motor vehicle. Walk trips accounted for 13.5% of all person trips in the City of Madison and almost 7% of trips in the rest of Dane County, according to a special county add-on sample of the 2001 National Household Transportation Survey (NHTS). Walking is also an essential part of all trips, whether they are made by car, bus, or bicycle (e.g., walking from the parking lot to the store or from home to the bus stop).

Pedestrian facilities are critical for providing access to neighborhood or commercial district destinations, including schools, parks, recreation, shopping, and work. Pedestrian facilities are also essential to a successful and accessible transit system. For children and persons without access to a motor vehicle or with a mobility limitation, provision of safe and convenient pedestrian facilities is essential. A convenient and safe system of pedestrian facilities also promotes other objectives such as improved health and fitness and decreased vehicular traffic congestion (e.g., around schools and other high activity areas).

An urban pedestrian transportation system—the physical infrastructure that allows for or promotes walking and other forms of pedestrian movement (e.g., wheelchairs)—involves three basic elements:

- Sidewalks, multi-use paths, or other walkways;
- Intersection corner or mid-block holding or queuing areas with facilities such as curb ramps, traffic controls (signals, signs), and bus stop boarding pads; and
- Pedestrian crossings of roads (e.g., crosswalks, refuge islands) or railway lines or other physical features of the transportation network (e.g., over/underpass).

Paved shoulders on roadways are not considered pedestrian facilities, but still can provide space for pedestrians away from motor vehicle traffic, particularly in rural areas.

Pedestrian Travel

Walking for transportation purposes as opposed to recreation/exercise accounts for a significant number of trips, particularly in denser mixed-use areas, but it has declined over time. The percentage of City of Madison and Dane County commuters (16 years and older) who walked to work has declined each decade from 1970 to 2000. In 2000, 11% of City of Madison commuters walked to work versus 17% in 1970. For all Dane County commuters, the walk trip percentage dropped from 13% to 6% during the same time period. Both the percentage and total number of City of Madison and Dane County commuters who walked to work declined from 1990 to 2000.

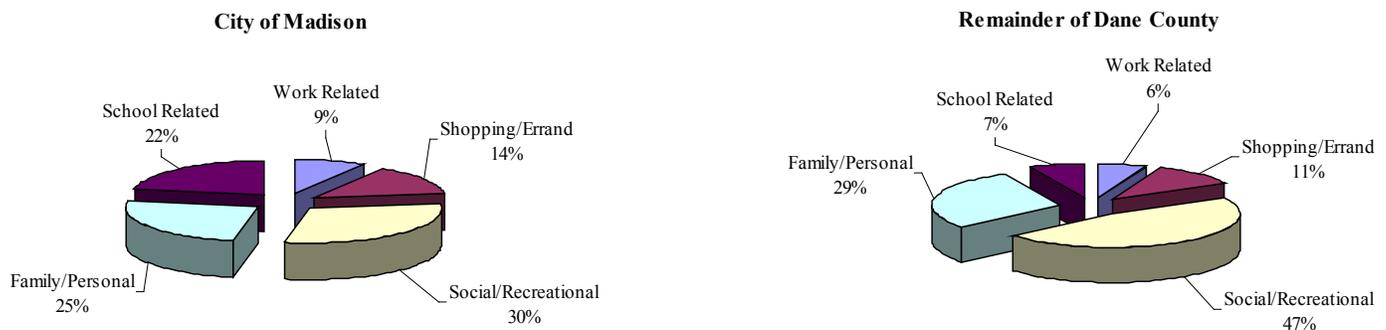
The decline in pedestrian travel for work and other transportation purposes is due in part to the design of neighborhoods and employment centers in many new developments, which provide few destinations within convenient walking distance of most residences and workplaces. The majority of pedestrian work trips in the region are made by persons living in the greater Isthmus area (including UW-Madison campus) where the higher densities and mixed land uses put workplaces as well as other destinations closer to where people live. In 2000, over one-quarter of the persons residing in the greater Isthmus area walked to work, accounting for 75% of pedestrian work trips in the City of Madison and 64% of those in Dane County, according to the U.S. Census.



The number of commuters residing in the greater Isthmus area walking to work decreased from 1990 to 2000, but not as much as for the city and county as a whole. The number dropped from 11,160 or 31.3% of commuters in 1990 to 10,760 or 27.5% in 2000.

Figure 27 below shows the distribution of trip purposes for walk trips in the City of Madison and for the rest of Dane County. School related trips make up a much higher percentage of walk trips than for all person trips in the City of Madison, accounting for 22% of walk trips compared to just 8% of all person trips. Social/recreational trips accounted for 30% of walk trips versus 20% of all person trips in the City. For the rest of the county, social/recreational trips made up 47% of walk trips compared to 18% of all person trips, according to the 2001 NHTS.

**FIGURE 27
DISTRIBUTION OF TRIP PURPOSES FOR WALK TRIPS**



The large percentage of school related walk trips in the City of Madison is due in part to the large number of UW-Madison students living in the downtown/campus area. The greater percentage of school, work and shopping/errand walk trips by City of Madison residents (particularly those residing in the greater Isthmus area) compared to other county residents can be attributed in part to the more compact development pattern, particularly in older neighborhoods, with schools and workplaces mixed into residential areas, making these walking trips more feasible. In addition, the city has a finer, more interconnected network of streets with sidewalks complemented by multi-use paths, providing more direct connections between destinations.

The average length for walk trips was 0.8 miles in Dane County and the City of Madison, according to the 2001 NHTS. However, this number is skewed by the inclusion of recreational/exercise trips. Excluding these trips, the average trip length would be shorter. One quarter of a mile is the distance typically used for planning purposes. Most walk trips not made solely for exercise/recreation are less than one-half mile.

Inventory of Sidewalks/Walkways Along the Regional Roadway System

Sidewalks and walkways accommodate pedestrians by providing an accessible space to travel within the public right-of-way that is separated from roadway vehicles. They also provide places for children to walk, skate, ride bicycles, and play. Sidewalks and walkways improve mobility and safety for all types of pedestrians. Because they run parallel to roadways, along which origins and destinations are located, they provide equivalent connections to the roadways themselves. Sidewalks or walkways on bridges are important for providing safe crossings over rivers or other roadways. Sidewalks within developments provide direct, safe connections from the roadway or parking lot to building entrances and between buildings.

Sidewalks and walkways are associated with significant reductions in pedestrian-motor vehicle crashes, according to Federal Highway Administration (FHWA) research. FHWA estimates that around 8% of all pedestrian crashes involve people walking along the road.

MPO staff compiled an inventory and mapped the existing sidewalk system along all regional collector and arterial roadways in the county, indicating those roadway segments with a sidewalk or a walkway/path along both sides of the roadway, one side, or neither side. While sidewalks should generally be provided along both sides of all streets in urban areas, they are particularly important along collector and arterial roadways because of their higher traffic volumes and speeds and the fact that most destinations and bus routes are located on these roadways.

As illustrated in Figure 28, on the next page, the sidewalk system along the regional roadways is fairly complete within the cities and villages in the county, particularly in the downtown areas and along other roadways with commercial land uses. The sidewalk system is less complete in residential areas. For example, the Cities of Monona and Verona don't have sidewalks on many collector streets in residential areas. There are quite a few roadway segments with sidewalk only on one side. Provision of sidewalk on only side of the street can in many cases reduce the convenience, safety, and accessibility of the pedestrian transportation system by requiring pedestrians to cross the street—sometimes more than once—and also creates problems at intersections and for access to bus stops.

Roadway segments in cities and villages with no sidewalk or sidewalk on only one side are often located on the fringe in developing areas where the roadway still has a rural cross-section and/or development has not occurred on one side. In some cases, areas were developed under town jurisdiction without the requirement of urban street standards and sidewalks and were later annexed. Some smaller cities and villages have also not required sidewalks on both sides of the street. Sidewalks have also typically not been provided along frontage roads of limited-access roadways such as USH 51 (Stoughton Rd.) and the Beltline (USH 12/18).



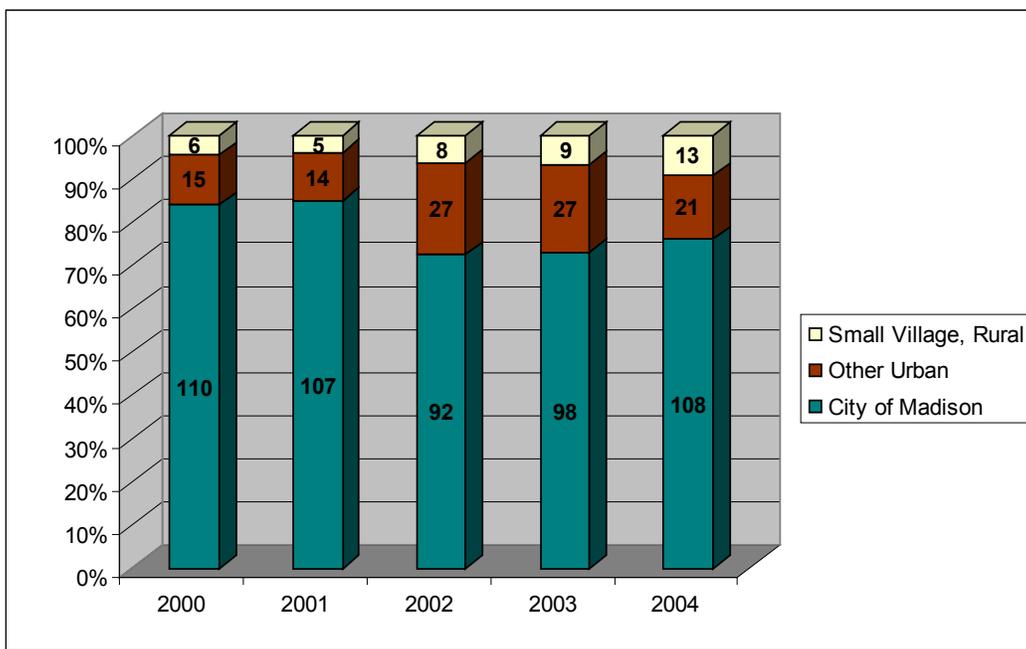
While the goal is to provide a continuous sidewalk/walkway system, retrofitting streets without them will usually occur in phases. In retrofitting streets that do not have a continuous, accessible sidewalk/walkway system, locations near schools, parks, public buildings, bus stops, shopping, and employment should be the highest priority. Local officials often encounter difficulty in getting sidewalk retrofit projects approved, particularly in residential areas, due to landowner opposition. This stems primarily from a reluctance to pay for them and to shovel them in the winter as well as the perceived reduction in the landowner's usable property area. This increases the importance of ensuring that sidewalks and other pedestrian facilities are installed at the time of initial development and street construction.

Pedestrian Safety Data and Education

From 2000-2004, there was an average of 132 pedestrian crashes annually in Dane County. Figure 29, on page 83, shows the number of crashes during that time in the City of Madison, other larger cities and villages, and small villages or towns. Statewide, the number of pedestrian injuries decreased 33% and the number of fatalities 54% from 1980 to 2003. However, in the City of Madison the number of injuries has fluctuated, but remained relatively unchanged.

Pedestrians are much more likely to be injured or killed in crashes than persons involved in non-pedestrian crashes. For example, in 2001 97% of pedestrian crashes resulted in an injury compared to 31% for all other types of crashes.

FIGURE 29
PEDESTRIAN/MOTORIST CRASHES IN DANE COUNTY: 2000-2004



Statewide data show children ages 5-14 are at greatest risk of being involved in and injured in a pedestrian crash. They are typically involved in crashes caused by darting out into traffic and/or motorists' use of excessive vehicular speed in neighborhoods and school zones. Pedestrians aged 75 and older have the highest rate of fatalities, according to both statewide and City of Madison data. Older pedestrians do not have the same ability to recover from their injuries and many take longer to cross the street or have difficulty seeing or hearing traffic clearly. Children aged 10-14 also have a high rate of fatalities, according to City of Madison data.

According to statewide data, pedestrian crashes occur most often on weekdays between 3-7 p.m. This is not surprising as this is when traffic volumes are highest, most children are returning home from school, and most commuters are returning home from work. According to City of Madison data, almost 60% of pedestrian fatalities have occurred in the evening after 6 p.m. with 33% occurring after 10 p.m. It is suspected that use of alcohol by the driver and/or pedestrian was a contributing factor in many of these crashes. In 2003, 24% of the City of Madison pedestrian crashes involved alcohol.

Street or road crossings are, by far, the most common types of pedestrian crashes, accounting for around 60% of pedestrian crashes statewide. Other types include: pedestrian not in road (e.g., in parking lot); pedestrian walking along the road; and backing vehicle. In 2003, over 50% of the City of Madison pedestrian crashes occurred while the pedestrian was in a crosswalk. Of those 48% occurred at signalized intersections, 42% at stop-controlled intersections, and 10% at non-controlled intersections.

By far the most common contributing factor by pedestrians in City of Madison pedestrian crashes was making a sudden movement into the street, involved in about 20% of the crashes in 2002-2003. Others included disregarding the traffic signal, facing or not facing traffic, and wearing dark clothing. By far the most common contributing factor by drivers in City of Madison pedestrian crashes was failing to yield the right of way and/or being inattentive, involved in around 33% of the crashes in 2002-2003.



Figure 30, on the next page, shows the location of street crossing pedestrian crashes in the City of Madison from 2002 to 2004.

Higher motor vehicle traffic volumes and speeds create a less desirable and less safe environment for pedestrians. At slower speeds (25 miles per hour or less), vehicles can stop relatively easily for pedestrians and the likelihood of severe injury or a fatality is low. However, from 25 to 35 m.p.h. the danger to pedestrians increases rapidly with speed. Figures 31 and 32, on page 86, show the relationship between travel speed and safe stopping distance as well as the likelihood the pedestrian will be killed. Since most pedestrian crashes occur on lower speed (25 to 30 m.p.h. speed limit) streets, reducing travel speeds on these roads would not only eliminate some crashes by reducing the distances drivers need to stop, but also would reduce the severity of some crashes.

Pedestrian Safety Education

The City of Madison has a pedestrian and bicycle safety program with a full-time Bicycle/Pedestrian Safety Educator who teaches basic safety skills to elementary children at the public schools and local agencies. The Madison Area MPO supports this position through an annual allocation of its Federal Surface Transportation Program (STP) – Urban funding. The City’s Bicycle/Pedestrian Coordinator advocates for pedestrians by working with the City of Madison and other area planning and transportation agencies to improve pedestrian facilities and increase their safety. As part of its work, the City of Madison’s Police Department’s Traffic Enforcement Safety Team (TEST) also educates the public about pedestrian safety and works closely with the City’s Traffic Engineering Department. To encourage more pedestrian travel, the City’s Fit City program is attempting to improve nutrition and increase physical activity among all Madison residents by offering monthly fitness events. The City is also in the process of developing Safe Walking Maps and Parent Drop-Off Maps for elementary schools.

The Wisconsin Department of Transportation (WisDOT) administers a pedestrian/bicycle education and enforcement reimbursement program and a Safety Community Coalition grant program aimed at injury prevention. WisDOT also distributes a variety of materials aimed at educating both motorists and pedestrians about their respective rights and responsibilities with much of the material aimed at children. WisDOT also plays an important role in educating drivers through its driver licensing responsibility, including publishing of the Motorist’s Handbook.



The Safe Community Coalition of Madison and Dane County, a local public/private partnership, conducts safety education and other collaborative activities, including numerous projects focused on walking and pedestrian safety. These include the Slow Down yard sign campaign, Walk to School Week, and the Flags over Dane County Adopt-A-Crosswalk Program. A new project being implemented in 2006 with funding from the National Highway Traffic Safety Administration is a walking promotion and pedestrian safety program aimed at older adults. The goals of the projects are to: (1) increase the number of motorists who yield to pedestrians in crosswalks; (2) reduce the number of injuries and fatalities among older adult pedestrians; (3) identify and reduce barriers to safe walking in particular areas in Madison and Stoughton; and (4) develop a project tool kit for use by other communities.

FIGURE 31

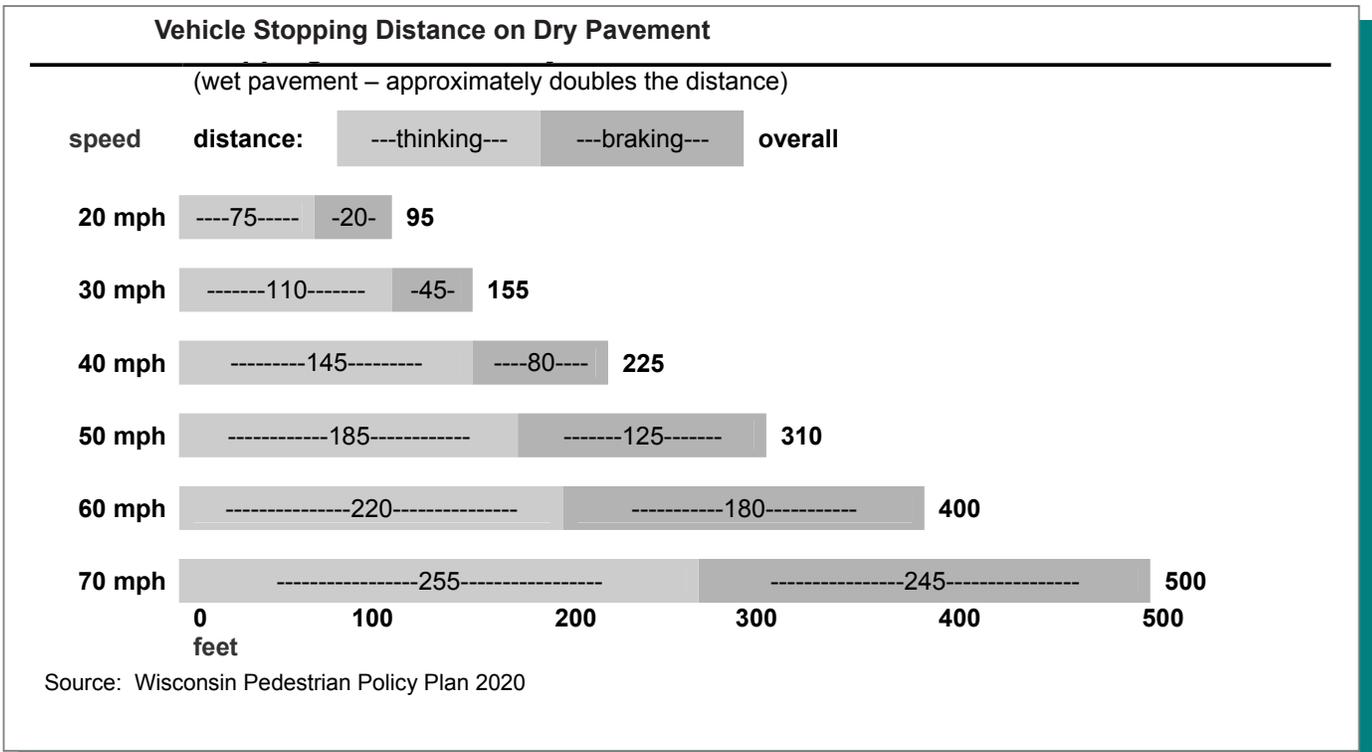


FIGURE 32

Likelihood of Pedestrian Fatality in Crash	
Motorist Speed (mph)	Chance of Pedestrian Fatality
20	5%
30	45%
40	85%

Existing Pedestrian-Related Policies, Standards, and Requirements

Local Policies and Requirements Regarding Pedestrian Facilities

The single most efficient and effective way for communities to ensure the needs of pedestrians are met is through adoption of subdivision and zoning ordinance standards that require: (a) installation of sidewalks and other pedestrian facilities on new streets; (b) an interconnected street and walkway system for new subdivisions; and (c) a convenient and continuous pedestrian circulation system for new commercial and multi-family residential developments. In addition, a zoning ordinance that maximizes opportunities for mixed-use development will ensure that persons have services within walking distance.

Table 20, on the next page, summarizes the pedestrian facility requirements and policies and street standards and sidewalk policies for cities and villages in the Madison Metropolitan Planning Area.

**TABLE 20
PEDESTRIAN FACILITY REQUIREMENTS AND POLICIES AND STREET STANDARDS
FOR CITIES AND VILLAGES IN THE MADISON AREA MPO PLANNING AREA**

City/Village	Sidewalks				Streets			Pedestrian Access / Circulation Standards
	Width	Requirements	Cost Sharing Policy	Maint., Snow Removal Ord.	Block Length	Street Width	Radius of Curvature	
Madison	5' minimum	Both sides of all new streets.	Developer pays 100% for new streets, including intersection area improvements. City pays 50%, landowners 50% for existing streets and reconstruction, repair.	Yes	No min., max., except in R2S Dist. where 500' max.; 10' wide mid-block pedestrian way required if >900' where essential for ped. access, circulation.	Proposed ordinance would require min. 32' width (from face of curb) for distributor collector and local streets, but only 28' for local streets if residential density <5.44 du/ac or 5.44-12.44 du/ac and conditions re: driveways, garages met and other factors considered. 36' min. if special on-street parking generators (parks, schools, churches, etc.). Up to 46' min. if street is bicycle route and parking on both sides.	150' for local streets, 300'-700' for 2-lane collectors depending upon speed limit (25-35 mph)	General requirement for conditional uses to provide internal circulation improvements, including those for pedestrians. Driveways, parking areas required to be separated from walkways by markings, curb, etc. in Admin. Office and Admin. Office R&D Districts.
Middleton	4' residential 5' comm./ industrial	Both sides of all collector streets. Requirement determined by Plan Commission for local streets.	Developer pays 100% for new streets. Landowners pay 100% for existing streets and for reconstruction, repair.	Yes	600' min.; 10' wide mid-block pedestrian way required if >900' or where essential for ped. access, circulation.	32' for local residential streets, 36' for collectors (from edge of pavement, not incl. gutter pan)	200' for local residential streets, 450' for collectors	Ped. circulation must prevent ped. use of vehicular ways, parking spaces and ped. access must be provided to public walkways in Planned Dev. Infill District.
Fitchburg	5' minimum	Both sides of all new streets. Program in place to prioritize and provide sidewalks on both sides of existing streets identified in Ped/Bike Plan that have higher traffic volumes and provide route to shopping, employment, parks, schools, and bus stops.	Developer pays 100% for new streets. City pays 100% for existing s/f residential streets (primarily collectors) outlined in Draft Ped/Bike Plan (Dec. 2000) while landowners pay 100% for those s/f residential streets not listed in the plan and m/f residential and commercial streets. City pays 50%, landowners 50% for reconstructions, repair in s/f residential areas while landowners pay 100% in m/f residential and commercial areas.	Yes	600' min., max. 1,200'; if >900', may require 10' wide mid-block pedestrian way.	32' for local residential streets, 36' for m/f resid., commercial areas, 40'-44' for collector streets (from face of curb), 30' width for local residential streets (w/60' vs. 66' ROW) allowed by exception.	150' for local streets, 250' for collectors	No. Ped. Improvements recommended during development reviews if not shown.

**TABLE 20 (CONTINUED)
PEDESTRIAN FACILITY REQUIREMENTS AND POLICIES AND STREET STANDARDS
FOR CITIES AND VILLAGES IN THE MADISON AREA MPO PLANNING AREA**

City/Village	Sidewalks			Maint., Snow Removal Ord.	Streets			Pedestrian Access / Circulation Standards
	Width	Requirements	Cost Sharing Policy		Block Length	Street Width	Radius of Curvature	
Sun Prairie	5' minimum	Both sides of all streets in new developments. At least one side for existing developments, but both sides for arterial streets	Developer pays 100% for new streets. City pays 100% for existing streets and reconstruction, repair w/ <5 du, while landowners pay 100% for m/f (5+ du's), commercial, and industrial properties	Yes	500' min., 1,200' max.; May require mid-block pedestrian way of >900' or where essential for ped. access, circulation.	33' for local, collector streets w/residential use (29' often used now at discretion of City Engineer); 39' for commercial/industrial areas (from face of curb)	150' for local, 250' for collector streets	Yes, for commercial developments > 25K sq. ft. 8' wide sidewalks required along street frontage, from public sidewalk to customer entrance(s) of buildings, and along building w/ customer entrance, abutting parking area.
Verona	5' minimum	Both sides of all new streets and on existing streets, which serve as major pedestrian access routes to/from ped. traffic generators such as business establishments, schools, parks m/f resid. developments, etc.	Developer pays 100% for new streets. City pays 100% for existing urban streets. Landowners pay 100% for streets reconstructed from rural to urban std. and for reconstruction, repair.	Yes	500' min., 1,200' max.; 10' wide mid-block pedestrian way w/ 5' sidewalk may be required for blocks >900 ft. if deemed essential for access, circulation	36' for local streets, 40' for collector streets (from face of curb)	175' for local, 300' for collector streets	No
Stoughton	4' minimum	Both sides of all new streets. Program in place to eventually provide on both sides of existing streets with commercial, industrial, or multi-family residential uses or that provide route to school and on at least one side on existing residential streets.	Developer pays 100% for new streets. City pays 50%, landowners 50% for existing streets and reconstruction, repair.	Yes	No min. or max. If >900', 10' wide mid-block pedestrian way required.	38' for local residential streets, 44' for collector streets (from face of curb)	100' for local, 300' for collector streets.	Yes, for commercial developments >20 K. sq. ft. Ped/bike connections required to existing and planned public ped/bike facilities and adjacent properties; walkways required from building entrances to public sidewalks.
Waunakee	5' minimum	Both sides of all new streets. Both sides of existing streets with commercial, industrial, or multi-family residential uses or that provide route to school. At least one side on existing residential streets. May require construction of multi-use paths in new developments.	Developer/landowners pay 100% for new sidewalks, except where construction of curb & gutter has changed grade, then 50% owners, 50% village. Cost split 50/50 for reconstruction, repair.	Yes	500' min. generally; 1,500' max. If >900', may require 10' wide mid-block pedestrian way.	32' for local residential streets, 36' for collector streets (from face of curb). 28' allowed for residential streets if less than 5 du/ac.	100' for local, 300' for collector streets.	No

**TABLE 20 (CONTINUED)
PEDESTRIAN FACILITY REQUIREMENTS AND POLICIES AND STREET STANDARDS
FOR CITIES AND VILLAGES IN THE MADISON AREA MPO PLANNING AREA**

City/Village	Sidewalks				Streets				Pedestrian Access / Circulation Standards
	Width	Requirements	Cost Sharing Policy	Maint., Snow Removal Ord.	Block Length	Street Width	Radius of Curvature		
Cottage Grove	4' min. local, 5' collector streets	Ordinance requires on both sides of all new collector streets and indicates they may be required on all new local streets if gross density of 4+ units per acre. Current policy is to require on both sides of all new streets.	Developer pays 100% for new streets. Village pays 50%, landowners 50% for existing streets and reconstruction, repair (except village pays 100% for curb ramps and driveway ramps if curb grade is changed by >6").	Yes	600' min., 1,500 max. generally. If >900', may require 10' wide mid-block pedestrian way.	28' to 36' for local streets, 32' to 40' (46' to 48' if parking + bike lanes included) for collector streets (from face of curb).	100' for local, 300' for collector streets	Yes, for "group developments" (5+ DUs, 2+ non-resid. Uses, bldg. 40K+ sq. ft. or larger). Require safe ped. access w/ development and connections to existing, planned ped/bike facilities and sidewalks to all building entrances from public streets.	
McFarland	5' minimum	Both sides of all new major and collector streets. May be required for other streets if plat will significantly increase traffic volume or deemed necessary for safe pedestrian circulation.	Developer pays 100% for new streets. Current policy is for village to pay 100% for existing streets and for reconstruction, repair.	Yes	400' minimum generally; 1,500' max.; If >900', may require 10' wide mid-block pedestrian way.	32' for local streets, 44' for collector streets (from face of curb).	100' for local, 200' for collector streets.	Ped. circulation must prevent ped. use of vehicular ways, parking spaces and ped. access must be provided to public walkways in Planned Dev. Infill District; General std. to provide for safe, convenient movement of pedestrians in Planned Dev. District	
Monona	No standard	No specific requirements	Landowners pay 60%, city pays 40% for new street construction. City pays 100% for reconstruction, repair in single- and two-family residential areas. Landowners pay 100% for reconstruction in m/f resid. and commercial areas.	Yes	Not applicable.	28' pavement width (33' curb to curb) for local streets.	Not applicable	General requirement for all uses that safe and efficient pedestrian circulation be assured.	

Sidewalk Requirements and Cost Sharing Policy

Most cities and villages in the Madison Metropolitan Planning Area require sidewalks on both sides of all new streets. The Village of Cottage Grove's subdivision ordinance requires sidewalks on both sides of collector streets only, indicating they may be required for local streets if the gross density is four or more units per acre. However, the Village Director of Public Works indicated that the Village now requires sidewalks on local streets as a matter of policy. The City of Middleton ordinance also doesn't require sidewalks on both sides of local streets, but the Planning Commission has typically required them. The Village of McFarland doesn't require sidewalks on minor or local streets, but they can be required if determined to be necessary for safe pedestrian circulation.

Most of the communities require that sidewalks have a minimum width of five (5) feet, as recommended by FHWA and the Institute of Transportation Engineers (ITE). This width allows two people to pass comfortably or walk side by side and also better accommodates wheelchairs and other users. The City of Stoughton allows a four (4) feet minimum width, while the City of Middleton allows four (4) feet on residential streets and the Village of Cottage Grove allows four (4) feet on local (vs. collector or arterial) streets. All of the communities have the authority to require a wider than minimum sidewalk width where deemed necessary, such as around schools or downtown commercial districts.

All of the communities have standard ordinances prohibiting obstruction of sidewalks and requiring maintenance and timely removal of snow from them.

All of the communities require developers or landowners to pay 100% of the cost of sidewalks along new streets built in conjunction with new development. For retrofitting sidewalks on existing streets in existing developed areas or reconstruction or repair of existing sidewalks, the cost sharing policies vary. Most commonly, the municipality pays 50% and requires the landowner to pay 50% of the cost. The Cities of Madison and Stoughton and Villages of Waunakee and Cottage Grove have such a policy. The City of Middleton requires landowners to pay 100% of such cost, while the Village of McFarland pays 100% of the cost. The City of Verona pays 100% of the cost for new sidewalks on existing streets, but requires landowners to pay 100% for streets reconstructed from a rural to urban standard and for sidewalk reconstruction and repair.



The Cities of Fitchburg and Sun Prairie distinguish between single-family (s/f) residential streets and others. Fitchburg pays 100% of the cost of new sidewalks on existing s/f residential streets outlined in its Pedestrian & Bicycle Plan, which are primarily collector streets and/or those near schools, shopping centers, parks, and other destinations. Landowners pay 100% for s/f residential streets not listed in the plan and multi-family (m/f) residential and commercial streets. For reconstruction and repair, the City splits the cost 50/50 for s/f residential properties and requires landowners to pay 100% of the cost for all other properties. In cases where a sidewalk already exists on one side of the street, the cost is still split evenly to property owners on both sides of the street if the land use is the same on both sides. The City of Sun Prairie has a similar policy, paying 100% of the cost of sidewalks on existing streets and for reconstruction and repair for residential properties with less than 5 units and requiring landowners of all other properties to pay 100% of the cost.

Street Requirements

The layout and design of streets has a significant impact on walkability of areas. Long blocks and cul-de-sacs require out-of-direction travel. Over-designed streets, with widths and curb radii at intersections that are wider or longer than necessary, encourage higher traffic speeds, reducing pedestrian safety and making pedestrians feel less comfortable.

Most of the cities and villages in the MPO planning area require street block lengths in new subdivisions to be a minimum of 500-600 feet and a maximum of 1,200-1,500 feet. The Cities of Madison and Stoughton do not have a required minimum or maximum block length, except Madison has a very short 500 feet maximum in its small lot single-family residential (R2S) district, which allows a minimum lot size of 4,000 sq. ft. and lot width of 40 feet. All of the communities have a standard provision allowing the requirement of a mid-block pedestrian way if a block is more than 900 feet long.

For local residential streets, the most common required minimum street width is 32-33 feet. Some communities measure the distance from the curb face while others measure it from the edge of the pavement. The Cities of Verona and Stoughton require a minimum of 36 and 38 feet respectively from the face of the curb. For two-lane collector streets, the required street width varies from 36 to 44 feet.

There is typically very little street parking in newer developments and wide streets without parked cars encourage speeding. Consequently, there has been interest in some communities in reducing required street widths to help improve safety and provide a more pedestrian-friendly environment. The City of Madison and Village of Waunakee allow a 28-foot width for local streets if the residential density is less than 5.44 and 5 dwelling units per acre (du/ac) respectively. The City of Sun Prairie is now often allowing a 29-foot width for local residential streets at the discretion of the City Engineer.



Following extensive study and discussion by the City's Long-Range Transportation Planning Commission, an ordinance amendment was passed in the City of Madison to allow a narrower 28-foot width for local streets in higher density (up to 12.44 du/ac) residential neighborhoods. Certain conditions would need to be met related to garages and off-street parking space to ensure that there will be gaps in on-street parking. Wider streets would still be required where there are special on-street parking generators (parks, schools, etc.) and/or the street is a designated bicycle route.

One of the common pedestrian crash types involves a pedestrian who is struck by a right-turning vehicle at an intersection. A wide curb radius typically results in motorists turning at a higher speed. Curb radii are often wider than necessary to safely accommodate maintenance and emergency vehicles and buses in residential areas. Where there is a parking and/or bicycle lane, curb radii can be even tighter, because vehicles have more room to negotiate the turn. The

radius of curvature required by cities and villages in the MPO area for local streets varies from 100 to 200 feet. For two-lane collectors, it varies from 200 to 450 feet. The City of Madison requires 300 to 700 feet depending upon the posted speed limit (25-35 m.p.h.).

Pedestrian Access/Circulation Standards

Even with sidewalks along public streets, pedestrians must still safely and conveniently travel from the street to the entrance of the building in commercial, institutional, and multi-family developments. Site planning standards in the zoning ordinance ensures that the needs of pedestrians are met. The zoning ordinances of cities and villages in the MPO planning area have specific requirements for provision of safe vehicular circulation and off-street parking, but some do not have any site planning standards for pedestrian access and circulation. Those communities that do have such standards don't include them in all of their non-s/f residential districts.

The Cities of Sun Prairie and Stoughton and the Village of Cottage Grove have the most detailed standards, which apply to larger commercial developments (greater than 20,000-40,000 sq. ft) and, in the case of Cottage Grove, other "group" developments (greater than five dwelling units or two or more non-residential uses). City of Sun Prairie requirements include: direct connections to adjacent land uses; weather-protected sidewalks from the public sidewalk to the principal customer entrance of buildings with adjoining landscaped areas; sidewalks along the full length of the building along any facade with a customer entrance; and use of materials for internal walkways to distinguish them from vehicular ways. Requirements in other ordinances include connections to existing or planned pedestrian/bicycle facilities and pedestrian furniture.

Federal Highway Administration (FHWA) and Wisconsin Department of Transportation (WisDOT) Sidewalk Guidelines

Table 21 outlines guidelines that FHWA has adopted for installing sidewalks as recommended by the Institute of Transportation Engineers (ITE) (See *Implementing Pedestrian Improvements at the Local Level*, Publication No. FHWA-98-138). WisDOT has also adopted these guidelines (See *Wisconsin Pedestrian Policy Plan 2020*, Appendix N (March 2002)). The guidelines suggest where sidewalks should be built based upon land use, functional classification of the roadway, and residential density. WisDOT also has guidelines for determination of the need for pedestrian facilities along state roadways, which include factors for consideration such as: land use type and density; presence of pedestrian traffic generators; opportunities to connect to pedestrian systems and transit stops; and the needs of special groups (See Appendix M of *Wisconsin Pedestrian Policy Plan 2020*).



U.S. Department of Transportation Policy and Programs for Accommodating Pedestrian and Bicycle Travel

Federal legislation and regulations require that the safe accommodation of non-motorized users be given due consideration in state and regional transportation plans and during the development and construction of all Federal-aid transportation projects. The special needs of the elderly and persons with a disability must be considered (e.g., use of audible signals, where appropriate) (See 23 U.S.C. Section 217 and 23 C.F.R. Section 652).

TABLE 21

Guidelines for Installing Sidewalks		
Land Use/ Roadway Class/Dwelling Units	New Urban & Suburban Streets	Existing Urban & Suburban Streets
Commercial & Industrial / All streets	Both sides.	Both sides. Every effort should be made to add sidewalks where they do not exist to complete missing links.
Residential / Major Arterials	Both sides.	Both sides.
Residential / Collectors	Both sides.	Multifamily-both sides. Single family-prefer both sides; require at least one side.
Residential / Local Streets / More than 4 units per acre	Both sides.	Prefer both sides; require at least one side.
Residential / Local Streets / 1 to 4 units per acre	Prefer both sides; require at least one side.	One side preferred; at least 4-ft. shoulder on both sides required.
Residential / Local Streets / Less than 1 unit per acre	One side preferred; shoulder on both sides required.	At least 4-ft. shoulder on both sides required.

Notes:

- 1) Any local street within two blocks of a school site that would be on a walking route to school – sidewalk and curb and gutter required.
- 2) Sidewalks may be omitted on one side of a new street where that side clearly cannot be developed and where there are no existing or anticipated uses that would generate pedestrian trips on that side.
- 3) Where there are service roads, the sidewalks adjacent to the main road may be eliminated and replaced by a sidewalk adjacent to the service road on the side away from the main road.
- 4) For rural roads not likely to serve development, a shoulder of at least 4 feet in width, preferably 8 feet on primary highways, should be provided. Surface material should provide a stable, mud-free walking surface.

Source: Design and Safety of Pedestrian Facilities, A Recommended Practice, 1998. Institute of Transportation Engineers.

TEA-21, the predecessor transportation legislation to SAFETEA-LU, required the Federal Highway Administration (FHWA) to develop guidance on the various approaches to accommodating pedestrian and bicycle travel. FHWA convened a task force and subsequently issued a Joint Statement on Integrating Bicycling and Walking into Transportation Infrastructure. The statement includes the following specific policy regarding the provision of pedestrian and bicycle facilities:

Bicycle and pedestrian ways shall be established in new construction and reconstruction projects [near] or within all urbanized areas unless one or more of three conditions is met:

- Bicyclists and pedestrians are prohibited by law from using the roadway. In this instance, a greater effort may be necessary to accommodate pedestrians and bicyclists elsewhere within the right of way or transportation corridor.
- The cost of establishing bikeways and walkways would be excessively disproportionate to the need or probable use. “Excessively disproportionate” is defined as exceeding 20% of the cost of the larger transportation project.
- Where sparsity of population or other factors indicate an absence of need.

Sidewalks, shared use paths, street crossings (including over and under crossings), pedestrian signals, signs, street furniture, transit stops and facilities, and all connecting pathways shall be designed, constructed, operated, and maintained so that all pedestrians, including people with disabilities, can travel safely and independently.

The statement also indicates that the potential future demand for walking and bicycling facilities should be anticipated and that the design and construction of new facilities should not preclude provision of future improvements. In addition, the need for pedestrians and bicyclists to cross corridors as well as travel along them is to be addressed through the design of intersections and interchanges.

ISTEA, the landmark federal transportation legislation adopted in 1991, established a Local Transportation Enhancements (TE) Program to fund projects or programs that “enhance” the transportation system. Subsequent reauthorization bills, TEA-21 and SAFETEA-LU, have continued the program. Among the categories of projects eligible for funding are provision of pedestrian and bicycle facilities, preservation of abandoned railway corridor (including conversion and use thereof for pedestrian/bicycle trails), and provision of safety education for bicyclists and pedestrians.

SAFETEA-LU, adopted in August 2005, provided funding to state departments of transportation to create and administer Safe Routes to School (SRTS) programs. The SRTS program is designed to encourage children ages K-8 to walk and bicycle to school by creating safer walking and bicycling routes and educating parents and children on pedestrian and bicycle safety. Potential projects include adding sidewalks or multi-use paths, traffic calming initiatives, and creating programs that encourage children to walk or bicycle such as a “walking school bus.” WisDOT has hired a SRTS Program Manager and is in the process of establishing a program. Educational and other materials will be developed for school districts and communities and an application process will be developed for programs and small-scale capital projects. Projects will be 100% federally funded.

Wisconsin Department of Transportation (WisDOT) and Dane County Highway and Transportation Department Cost Sharing Policies Regarding Sidewalks on Joint Projects

The Wisconsin Department of Transportation’s (WisDOT) cost sharing policy for sidewalks on urban non-freeway projects on state roadways is outlined in the department’s Program Management Manual along with its other facility investment and cost sharing policies. WisDOT will pay 100% of the cost of replacement sidewalks necessitated by road reconstruction if the local jurisdiction agrees to accept responsibility for sidewalk repair, maintenance, and replacement in the future (unless caused by a future road project). WisDOT will also pay 80% of the cost of new sidewalks and 100% of the

cost of purchasing right-of-way and grading for (re)construction and recondition projects. There is an exception for cases where real estate costs are prohibitive and/or the local jurisdiction does not anticipate the need for sidewalks. WisDOT will also pay 100% of curb ramps and median accommodations. WisDOT will participate in the cost of new sidewalks only if installed at the time of project construction. Reasonable sidewalk access over bridges (one side or two) will be provided when sidewalks exist on either end of the bridge.

The Dane County Highway and Transportation Department's cost sharing policy for sidewalks on joint projects with municipalities on county roadways states that where the municipality has a sidewalk assessment policy, the County will share in one-half of the costs of sidewalk construction for those sections of sidewalk not directly assessable to the adjacent property owner. The County will share in one-quarter of the cost for those sections of sidewalk that are directly assessable to the property owner. The amount assessed to the property owner is to be credited equally to the local share provided by the County and the municipality. For those municipalities that do not have a sidewalk assessment (and thus usually pay 100% of the cost), the County will not share in the costs of sidewalk construction. In all cases, the municipality must agree to be responsible for the future costs of the maintenance and repair of the sidewalk.

Issues

Roadway, Intersection Design and Street Crossings

Roadways designed primarily for motorists without safe access and accommodations for pedestrians and other users create unsafe conflicts for pedestrians with motorists and discourage walking. Even if sidewalks are provided, high-speed, high-volume roadways with long distances between controlled crossings and with large intersections create major barriers for pedestrians. Road design is a major factor in determining vehicle speed and the feasibility of pedestrian crossings. Lane width, overall street width, street curvature, turning radii, sight lines and distances, adjacent land use development and design, and traffic volumes (including turning and intersecting traffic) all contribute to the "design" speed for a given roadway. Speed limits are not effective if inconsistent with the design of the street.



In designing roadways and intersections, the needs of motorists must be balanced against the needs of pedestrians and other users. This balance is achieved differently in different locations depending upon the roadway classification and relationship to the rest of the system, whether it is a truck route, the area type, and other factors. However, the impact that the different transportation modes have on each other must still be carefully considered. Special consideration should be given to pedestrians in areas that generate significant pedestrian activity such as schools, commercial business districts, elderly housing areas, and bus stops.

An important aspect of traffic and pedestrian management is the issue of how much vehicles and pedestrians should be controlled as opposed to letting motorists and pedestrians use their own judgment. For example, crosswalks can be regulated with a traffic signal to protect pedestrians, but this requires pedestrians to wait longer than if motor vehicles yielded when pedestrians entered the crosswalk. An exclusive pedestrian traffic signal (all cars are stopped and pedestrians can cross in any direction) removes all conflicts between vehicles and pedestrians, but requires a longer wait for pedestrians than a concurrent signal (where vehicles can turn into the crosswalk).

Pedestrian levels of service based upon delay at intersections should be used in transportation planning similar to use of motorist levels of service. The issue is one of safety as well as convenience. When pedestrians are inconvenienced by long delays, limited crossing opportunities, or motorists that don't yield while they are in a crosswalk, there is the potential that they will ignore traffic signals and cross wherever they can.

Improved street crossing opportunities can be provided through the use of raised medians, refuge islands, curb extensions, and pedestrian signals, where appropriate. Mid-block crossings of major streets can be used in some cases where blocks are particularly long, but only if carefully designed. They can be signalized or unsignalized with markings, but should only be used when pedestrian volumes are high and should not be located less than 300 feet from an intersection. Grade-separated pedestrian over- or underpasses can be used in some cases to allow pedestrians to cross access-controlled or other major roadways without delay and get pedestrians out of the way of motorists. However, such facilities are costly, not feasible in many instances (e.g., there is insufficient space for ADA-compliant ramps), and not effective if using them requires significantly more time crossing the street.



Barriers and Connectivity

Barriers to pedestrian travel can include large parking lots, rivers and creeks, railroads, major roadways with limited controlled crossings and/or no sidewalks. Direct, safe, and convenient connections between areas divided by such barriers is challenging, and exacerbated by poor development practices. Pedestrians face obstacles and conflicts when roadways and developments are designed primarily for the automobile. Planning for and development of a well-connected “grid” street system helps distribute traffic and can reduce the need for multi-lane (particularly 6-lane) roadways with large intersections, which are major barriers to pedestrians and bicyclists.

Conducive Community and Site Development Patterns

Urban design plays a large factor in the viability and attractiveness of walking for trips other than for simply social/recreational purposes. Relatively compact and well-organized mixed-use development with relatively short street blocks and buildings located close to the street provides a wide range of services and other destinations within walking distance. Where possible, mixed-use development also allows motorists to park or transit users to get off the bus and walk between several uses in a single trip. Additionally, a pedestrian-scaled area with a diversity of uses balances activity between the different times of the day and week, creating a busier, safer and more exciting environment. The quality of the pedestrian experience is important to increasing walking as a transportation mode. While creating new pedestrian-friendly areas can be done more easily in new developments, they can also be retrofitted into established predominantly auto-oriented, single-use areas through neighborhood commercial or traditional neighborhood zoning and well-designed redevelopment.

Pedestrian Access to Private Developments, Interface With Transit

An important aspect of site design is pedestrian access from the sidewalk to a development and circulation within the development. Many commercial developments have been constructed with buildings located well off the street with no walkways to get pedestrians safely to building entrances. Also, numerous driveways can be a safety issue for pedestrians. Transit use is highly dependent on pedestrian access. Pedestrian-friendly development that provides short, direct access between bus stops and building entrances, locates stops in pleasant areas, and includes bus stop amenities such as shelters is very important to the success of transit. At a minimum, stops should include concrete bus pads to provide accessibility for mobility-impaired persons.

Consideration of the Needs of Persons with a Disability or Special Needs

The elderly, children, and persons with disabilities warrant special consideration in the design and maintenance of pedestrian facilities, including traffic control devices. Their physical and cognitive limitations and inexperience can put them at a disadvantage as pedestrians, while at the same time they are more likely to rely on walking to get around. According to the 2000 U.S. Census, around 12% of Dane County's population had some type of disability, including over 27,000 persons in the City of Madison. The percentage of persons with a disability is expected to increase significantly in the next twenty years. An estimated 85% of Americans living to full life expectancy will experience some sort of permanent disability sometime in their lifetime.



The 1990 Federal Americans with Disabilities Act (ADA) and implementing regulations require “accessible” design for new and altered buildings and facilities, including pedestrian facilities, in order to make them usable to persons who have disabilities. Under the ADA, the U.S. Architectural and Transportation Barriers Compliance Board (Access Board) is responsible for developing design guidelines for accessible buildings and facilities, known as the Americans with Disabilities Act Accessibility Guidelines (ADAAG). The Access Board's guidelines become legally enforceable when they are adopted as standards by the agencies responsible for overall implementation and enforcement. The U.S. Department of Justice (USDOJ) and U.S. Department of Transportation (USDOT) are responsible for the standards under the ADA.

The Access Board has developed ADA Accessibility Guidelines for building sites and facilities on those sites, which have been adopted by the USDOJ and USDOT as ADA standards, but the Board has not yet developed specific standards for public rights-of-way. The standards for building sites and facilities do contain provisions that are applicable to sidewalks and other pedestrian facilities and should be followed whenever possible. Most notably, curb ramps are specifically required wherever a new or altered pedestrian walkway crosses a curb or other barrier to a roadway, or similarly whenever a new or altered roadway intersects a pedestrian walkway. In addition, a 24-inch strip of truncated dome (detectable warning) material is required along the full width of the ramp so that vision impaired persons do not inadvertently travel into the street. Crosswalks need to must be at least six feet wide.

The ADA implementing regulations also require that local units of government develop a Sidewalk Transition Plan that includes an assessment of existing sidewalks requiring access improvements and a schedule for curb ramp installations. A Sidewalk Master Plan is also required that addresses and prioritizes the removal of barriers along sidewalks. Prioritization criteria might include an assessment of pedestrian travel demand and access to public schools and other public facilities. Despite the fact that Sidewalk Transition Plans were required to be developed by July 1992, many, if not most, communities have not developed them. In Dane County, the City of Madison is the only city or village that has one.

The Access Board published draft ADA Accessibility Guidelines for Public Rights-of-Way in November 2005 for public comment. The effort is the third attempt to issue the guidelines. Previous drafts were published in 1994 and 2002. Despite the lack of current comprehensive enforceable standards for public walkways, the ADA still requires that sidewalks and other pedestrian facilities be made accessible to and usable by persons with disabilities.

In conclusion, the pedestrian system should and is required by Federal law to serve all users, not just a standard user. Accessible designs can benefit able-bodied users, increasing pedestrian speed and decreasing the potential for pedestrian judgment error. An accessible pedestrian system is cost effective, because it promotes independence for persons with disabilities and reduced need for social services in many cases. It also reduces the cost of the public transit system by allowing persons to use the regular fixed-route system rather than the much more costly paratransit system.

Maintenance of Pedestrian Facilities

Continued maintenance efforts are needed to ensure that pedestrian areas, including bus stops, are in a usable state of repair. This includes keeping sidewalks free of impediments such as branches and roots as well as timely removal of snow and ice in the winter. It also means addressing pedestrians and their safety at construction sites. Regular maintenance and repair is especially important for the elderly and persons with a disability in order to maintain their mobility. For example, if sidewalks deteriorate to the point that panels are cracked or uneven, tripping hazards are created. Local communities should have a sidewalk maintenance program to ensure the timely repair and reconstruction of deteriorated sidewalks. While communities typically have ordinances requiring property owners to clear sidewalks of debris and snow, enforcement is an issue.

Traffic Calming

Traffic calming measures are intended to reduce vehicle speeds, reduce cut-through traffic on local streets, shorten pedestrian crossing distances, and/or draw attention to pedestrian crossings. They encourage drivers to be sensitive to pedestrians and other non-motorized street users. Specific designs include: (1) curb extensions, constructed at intersections, to slow vehicles as they approach the narrower passage and reduce to distance over which pedestrians are exposed to motor vehicle traffic; (2) refuge medians, which allow pedestrians to cross traffic in each direction of travel separately, reducing pedestrian delay and chances of conflict with motorists; (3) traffic circles, formed by curbs constructed at intersections, requiring motorists to slow and maneuver around them; and (4) speed humps, raised areas extending across the street, which slow traffic. The Cities of Madison, Middleton, and Fitchburg are among those that have developed neighborhood traffic management programs to install such devices in problem areas following a neighborhood planning process. The devices are also being incorporated more as part of new developments.



Safety, Public Education

As with bicyclists, pedestrians commonly experience a lack of understanding for their rights from motorists. Many motorists tend to focus only on other motor vehicles and are not attentive to the potential presence of pedestrians, resulting in crashes at intersections, driveways, and in parking lots. Education and outreach efforts focusing on both motorists and pedestrians are needed to promote pedestrian safety and awareness. Motorists need to be made aware of pedestrian rights. Pedestrians need to be taught to be safe, yet assertive (e.g., making eye contact with drivers) in attempting to get drivers to yield the right of way when crossing the street at a crosswalk.

Traffic Enforcement

Enforcement of motorist laws related to pedestrians is minimal due to staff and financial constraints and lack of support from the public and municipal leaders. Traffic enforcement needs to be focused on local streets where most pedestrian/motor vehicle crashes occur.

Institutional, Attitude Impediments

An important underlying problem that is related to all of the issues identified above is a lack of understanding among the general public, including drivers, and many public officials of pedestrian safety issues. Many motorists are unaware of the basic rules of the road regarding pedestrian right of way. Pedestrian transportation and safety concerns are typically a low priority in the allocation of resources for engineering countermeasures, education, and law enforcement. There tends to be a lack of awareness of pedestrian safety problems. Unlike bicycling, which has benefited from an organized and vocal constituency, particularly in the Madison area, walking has not had such a major organizing influence. Although there has been more public interest in and demand for pedestrian accommodations and rights since the landmark Federal transportation legislation, ISTEA, was passed in 1991, a concerted effort is still needed to change attitudes.

