

Bicycle Transportation Plan

Madison Urban Area and Dane County

September 2000



Bicycle Transportation Plan for the Madison Urban Area and Dane County, Wisconsin

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*The preparation of this plan has been aided by funds from the
Federal Highway Administration and the Wisconsin Department of Transportation.*

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Introduction

Bicycling is an important mode of transportation in the Madison urban area and countywide that is available to people of all ages and socioeconomic levels. Bicycling is a particularly efficient and convenient form of transportation in urban areas. Like the automobile, bicycling provides a high degree of independence, flexibility, and freedom of choice relative to schedule and destination.

Recreational bicycling also continues to be very popular. The Madison urban area has 50 miles of shared-use paths, which are popular for recreational bicyclists as well as commuters. Rural town roads and many county roadways provide excellent routes for bicycling in the county. Two major state bicycle trails—the Military Ridge Trail and Glacial Drumlin Trail—run through the county. The newly built Capital City Trail connects to the Military Ridge Trail and the John Nolen Drive/Isthmus Bicycle Paths.

Bicycle Plan Purposes

- ❑ Refine the Bicycle Plan Element of the adopted Vision 2020 *Dane County Land Use & Transportation Plan* (1997), which provides the overall policy framework for development and transportation improvements within the county.
- ❑ Serve as a blueprint for continuing to improve bicycling conditions and safety and increase bicycling levels.
- ❑ Identify desirable bicycle routes within Dane County, including routes into and out of the Madison area and connections between cities and villages.
- ❑ Serve as a framework for cooperation between state agencies, the county, and local governments in planning for and developing bicycle facilities.
- ❑ Educate citizens and policy makers on bicycle transportation and the needs of bicyclists.
- ❑ Provide guidelines for planning, designing, and maintaining bicycle facilities.

Bicycle Plan Scope and Planning Process

This plan serves to update and supersede the 1991 *Bicycle Transportation Plan for Madison and Dane County*. The plan follows the recommended comprehensive approach to bicycle transportation planning, covering the “Four Es” of engineering (facility improvements), education, encouragement, and enforcement.

The plan identifies on-street bicycle facility (generally bike lane/paved shoulder) needs and recommends off-street paths/trails and bicycle routes for the Madison urban area and Dane County. An analysis was done of the suitability for bicycling of existing roadways in the Madison urban area and rural Dane County. This information was used to identify on-street bicycle facility needs, and in particular, travel corridors that serve as barriers to bicyclist mobility due to their low compatibility for bicycling and the lack of reasonably direct alternative routes.

Existing land use, transportation and parks and open space plans have been integrated into the bicycle plan. Recommended bicycle facilities in these plans have been included in the bicycle plan to the extent they fit within the regional scope of the plan.

Along with facility improvements, education and encouragement are important elements in increasing bicycling while also improving safety. Together, they can improve the skills and confidence of bicyclists to ride safely in traffic, which is critical for increasing their effective mobility. The plan makes recommendations for building upon current education and encouragement activities.

Existing Bicycle Travel and Safety

The Madison urban area is recognized as one of the most “bicycle-friendly” in the U.S. due to its extensive network of bicycle facilities, relatively high levels of bicycling, and strong institutional and public support for bicycling. Recreational bicycling is very popular throughout the county. Bicyclist safety has improved since the 1980s. Turning, merging, and crossing movements at intersections, driveways, and other junctions continue to account for around 3/4s of all bicyclist-motorist crashes. Speed plays a major factor in the seriousness of crashes. Local and national studies on bicyclist-motorist crashes show that bicyclist training in how to properly ride in traffic and motorist education and training in riding with and being attentive to bicyclists are most important to efforts at continuing to improve bicyclist safety.

There are numerous existing bicycle safety and promotion activities and programs in the region. The Wisconsin Department of Transportation Bureau of Transportation Safety offers a variety of bicycle safety education courses and resources. The City of Madison Traffic Engineering Division employs a full-time Pedestrian/Bicycle Coordinator, partially funded by Dane County, and a Pedestrian/Bicycle Safety Coordinator, who works primarily with elementary schools. UW-Madison recently hired a full-time Pedestrian/Bicycle Coordinator. The Bicycle Federation of Wisconsin offers Effective Cycling™ courses and conducts promotional activities, including organization of the Bike-to-Work Week event. Numerous other bicycle organizations and clubs and agencies contribute to the wealth of available education and promotional activities and programs.

Making the Region an Even Better Place to Bicycle: Goals and Objectives and Recommended Actions

Overall, the bicycling environment in the Madison urban area and Dane County is excellent. However, there is room for improvement. Major gaps and barriers still exist in the Madison urban area and Dane County bicycle facility networks. Many newer neighborhoods, schools, and employment/commercial centers have been located and/or designed without consideration of safe and convenient bicyclist and pedestrian access. Adult participation in bicycle education and training programs is low, and motorists’ understanding of bicyclists’ rights needs to be improved.

The bicycle plan includes three broad goals and detailed objectives and recommended actions for continuing to improve the bicycling environment. The objectives and recommended actions are grouped according to the following categories: (1) bicycle facilities planning and development; (2) bicycle facilities maintenance; (3) bicycle parking and other end-of-trip facilities; (4) education and encouragement; and (5) enforcement.

Bicycling Vision for the Region

An interconnected bicycle way network with supportive development patterns will provide people with safe, convenient, and enjoyable access and mobility throughout the county. Bicycling will be encouraged and will become a common and even safer mode of transportation for everyday trips, contributing to the quality of life in Dane County communities and the health, safety, and welfare of all residents.

Goals

- ❑ Provide for the safe, convenient and enjoyable travel by bicyclists in the Madison urban area and throughout the county.
- ❑ Increase levels of bicycling throughout Dane County, doubling the number of trips made by bicycles.
- ❑ Reduce crashes involving bicyclists and motor vehicles by at least 10%.

Key Objectives

Bicycle Facilities Planning and Development

- ❑ Fully integrate the consideration of bicyclists’ needs into the community and neighborhood planning and site design processes and local and state agencies’ planning, design, and operation of transportation projects and programs.
- ❑ Consider the needs of all bicyclists—experienced and novice, commuter and recreational—when planning and designing bicycle facilities and programs.
- ❑ Accommodate bicyclists on roadways by providing appropriate on-street bicycle facilities on arterial and collector roadways, where possible.
- ❑ Create and improve continuous bicycle through routes on local connector streets that provide mobility alternatives in addition to use of arterial roadways.
- ❑ Eliminate bicycling barriers and hazards through the accommodation of bicyclists’ needs in the design of bridges and under/overpasses, street intersections, railroad crossings, and traffic control devices, where possible.

- ❑ Utilize opportunities for providing multi-use paths when planning for and developing parks and other recreational/open space areas, railroad rights-of-way, utility corridors, and other linear corridors.
- ❑ Fund on-street bicycle facility improvements in conjunction with roadway projects as a routine part of the cost of the project.

Bicycle Facilities Maintenance

- ❑ Maintain roadways and bicycle paths to a reasonable level of safety and rideability, giving consideration to pavement surface and clearance conditions in all seasons. Also maintain traffic control devices and bicycle parking facilities.
- ❑ Address the needs of bicyclists during roadway construction or resurfacing projects.
- ❑ Design new bicycle facilities so as to reduce potential long-term maintenance problems.



Support Facilities and Transit Connections

- ❑ Provide secure, appropriately designed, and conveniently located bicycle parking facilities in business districts and other public areas where needed (e.g., at public institutions, parks, etc.).
- ❑ Ensure the provision of adequate short- and long-term bicycle parking at employment and shopping centers and multi-family residential developments.
- ❑ Support the provision of showers and changing facilities for commuting bicyclists by developers, building owners, and employers.

- ❑ Improve bicycle connections and accessibility to the transit system.
- ❑ Provide adequate rest stop facilities, information, signing, parking, and lighting along shared-use paths and recreational bicycle trails.



Education, Encouragement, and Public Information

- ❑ Increase public awareness of bicycling facilities, resources, and programs.
- ❑ Provide and promote safety education and encouragement programs taught by qualified instructors and targeted to youth and adult bicyclists and motorists.
- ❑ Increase the participation of students and adult bicyclists in safety education programs and training courses.
- ❑ Improve the attitude and behavior of both motorists and bicyclists with respect to compliance with traffic laws, especially the responsibilities of each toward the other.
- ❑ Educate law enforcement personnel on bicycle safety.
- ❑ Support the provision of incentives for bicycling by public agencies, private employers, and other entities.

Enforcement

- ❑ Consistently enforce traffic laws that enhance bicyclist safety by citing violations (particularly those most likely to lead to crashes) by both bicyclists and motor vehicle operators.

Key Recommendations

Bicycle Facilities Planning and Development

- ❑ Prepare community bicycle transportation plans, and prioritize projects and programs.
- ❑ Strengthen the street design standards and bicycle/pedestrian facility requirements in local land use ordinances to ensure provision of a continuous bicycle/pedestrian “grid” of streets and paved paths.
- ❑ Continue to coordinate with other communities and agencies to ensure appropriate bicycle connections are planned, constructed, and maintained.
- ❑ Provide convenient bicycle/pedestrian access to and circulation within commercial and employment centers.
- ❑ Schools should work with local planning/engineering staff to develop and implement plans for safe bicycle access by students.
- ❑ Include appropriate provisions for bicyclists and pedestrians in the design of all transportation facility improvements, where feasible and desirable.
- ❑ WisDOT and the Dane County Highway & Transportation Department should develop and adopt detailed policies, procedures, and design guidelines related to the provision of wide paved shoulders on rural roadways.
- ❑ Develop a signed county bicycle route system that is integrated with the Madison area route system and other planned local community route systems.
- ❑ Consider lowering posted speed limits on some roadways, where appropriate, particularly at the developing fringes of urban areas and on roadways identified as important bicycle routes.



- ❑ Ensure that demand-actuated (vs. pre-timed) traffic signals have bicycle-sensitive loop detectors. Install detector loops in multi-use paths at signalized street crossings and in bicycle lanes on streets with signal detection.

Facilities Maintenance

- ❑ Budget for and provide regular maintenance on an established schedule of both off-street and on-street bicycle facilities, particularly sweeping and snow plowing in the winter.
- ❑ Encourage bicyclists to report maintenance problems and other bicycling hazards, and develop procedures to respond to such reports in a timely manner.



Parking and Other End-of-Trip Facilities

- ❑ Incorporate bicycle parking requirements into local zoning ordinances.
- ❑ Budget for and install parking in the public right-of-way, with priority to downtown and neighborhood business districts.
- ❑ Include bicycle parking and shower/locker room facilities in new public buildings, and encourage such facilities in private developments.

Education and Encouragement Programs

- ❑ Continue to cooperatively develop and distribute bicycle maps and other informational materials regarding bicycle facilities, safety/training programs, and contacts.
- ❑ Adopt governmental practices and policies that encourage employees to commute by bicycle, and work with private employers to promote bicycle commuting.

- ❑ Continue to support bicycle safety and training programs, such as the Effective Cycling™ course, and promote such programs to public schools, colleges/universities, law enforcement agencies, community organizations, employers, and others.
- ❑ Develop a public information and education campaign to encourage bicycling and improve the attitude and behavior of both bicyclists and motorists.
- ❑ Establish an information clearinghouse on programs aimed at bicycle safety and promotion.
- ❑ Provide regular workshops and make available other training opportunities for local planners, engineers, and parks/recreation professionals on bicycle transportation and facility design issues.

Enforcement

- ❑ Continue to educate and train law enforcement personnel in the enforcement of laws concerning bicyclists' rights and responsibilities through recruit training and in-service refresher courses.
- ❑ Encourage alternative enforcement programs such as police bicycle patrols, required training in lieu of fines, and positive reinforcement.
- ❑ Increase traffic law enforcement efforts by properly trained police officers, focusing selectively on those violations most likely to lead to bicycle-motor vehicle crashes.

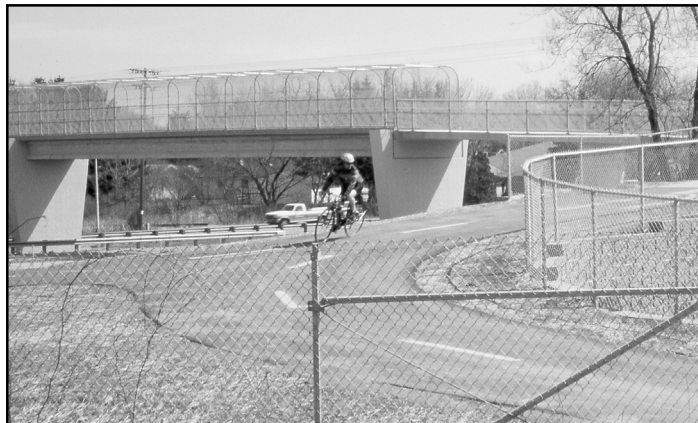
Madison Urban Area and Dane County Bicycle Facility and Route Plans

The attached Madison Area Bicycle Facilities Plan Map shows the Madison urban area roadways for which on-street bicycle facility improvements are needed and the proposed off-street bicycle facilities, while the Bicycle Route Plan Map illustrates the recommended bicycle route system. Only those roadway segments that fail to meet a minimum acceptable level of bicycle compatibility have been identified as needing facility improvements on the plan map. However, it is an objective of the plan to provide bicycle facilities on all arterial and collector roadways where feasible and desirable, given road conditions.

The recommended Madison urban area facilities are designed to:

- ❑ Improve bicyclists' mobility and access to important destinations such as employment centers, schools, government and public institutional centers, commercial areas, and recreational areas;

- ❑ Ensure a continuous bicycle facility network free of missing links or gaps and barriers; and
- ❑ Provide multi-use paths where necessary to cross barriers, provide more direct connections, and/or take advantage of available opportunities such as railway and environmental corridors.



The attached Dane County Bicycle Facilities Plan Map shows the rural roadways in Dane County for which on-street bicycle facility improvements are needed and the proposed off-street bicycle facilities, while the Bicycle Route Plan Map illustrates the recommended countywide bicycle route system. Rural roadway segments identified as in need of paved shoulders generally include all those with average daily traffic volumes greater than 1,000. This is consistent with current state and county policies.

The recommended countywide bicycle facility improvements are designed to:

- ❑ Facilitate longer distance trips between communities and to state and county parks, the two state bicycle trails, and other destinations;
- ❑ Provide a continuous network of suitable roadways for safe bicycling throughout the county; and
- ❑ Utilize linear corridors, such as railways and environmental corridors, to provide bicycle trails to enhance the bicycling environment.

With a couple of exceptions, bicycle paths parallel to rural roadways are not being recommended due to cost considerations and because of safety conflicts that occur at intersections of roadways and driveways.

Funding the Bicycle Plan

All transportation projects, including bicycle projects, are prioritized and scheduled for implementation through the multi-year capital improvement budgets of the various units of government and the five-year *Transportation Improvement Program (TIP) for the Dane County Area* prepared by the Madison Area Metropolitan Planning Organization (Madison Area MPO). Both are updated annually.

The principal sources of funding for stand-alone, off-street bicycle projects are the Wisconsin Department of Transportation's (WisDOT) Statewide Multi-Modal Improvement Program and several programs for recreational trails administered by Wisconsin Department of Natural Resources (WisDNR). Local communities and Dane County are also encouraged to establish budgets to annually implement projects identified in this plan.

Whenever possible, units of government should maximize local funding by securing matching funds from federal and state funding programs and private funding sources, such as developers, businesses, and non-profit organizations. Opportunities to implement bicycle projects can also be maximized by including them as a routine part of new development and roadway projects.



For more information and/or a copy of the complete bicycle plan, contact:
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Chapter 1

Introduction

Bicycling is an important mode of transportation and healthful recreational activity in the Madison area and countywide that is available to people of all ages and socioeconomic levels. For some people, the bicycle is their main or only mode of transportation. The City of Madison is recognized as one of the most “bicycle-friendly” communities in the U.S. due to its extensive network of bicycle facilities, relatively high levels of bicycling, and strong institutional and public support for bicycling.

Bicycling is a particularly efficient and convenient form of transportation in urban areas. Like the automobile, bicycling provides a high degree of independence, flexibility, and freedom of choice relative to schedule and destination. Unlike transit, “trip chains” or series of linked trips (e.g., running errands on the way to/from work) can be easily accomplished on bicycle. Door-to-door travel times for short trips of up to five miles are comparable to driving, particularly for downtown and university campus area destinations where automobile parking adjacent to buildings is limited. Bicycling levels are much higher during the warmer weather months. However, the development of hybrid and mountain bicycles and the availability of lightweight, waterproof clothing materials such as gortex have increased wet and cold weather bicycling.



Recreational bicycling continues to be very popular. Nationally, bicycling ranks as the second most popular recreational activity. The Madison area has 50 miles of shared-use paths, which are popular for recreational bicyclists as well as commuters. Rural farm-to-market roads and many county trunk highways with wide paved shoulders provide excellent routes for bicycling in the county. The Wisconsin Department of Natural Resources (WisDNR) has developed and operates two state bicycle trails: the Military Ridge Trail located on an abandoned railroad bed from Fitchburg west to Dodgeville; and the Glacial Drumlin Trail, which extends from Cottage Grove east all the way to Waukesha County. Construction was recently completed on the Nine Springs E-Way segment of the Capital City Trail, connecting the Military Ridge Trail to the John Nolen Drive and Isthmus Bike Paths. When the eastern portion is completed, the Capital City Trail will connect the Military Ridge and Glacial Drumlin State Trails.

A. Bicycle Plan Scope and Purposes

This Bicycle Transportation Plan serves to update and supersede the 1991 *Bicycle Transportation Plan for Madison and Dane County*. The 1991 plan was prepared by the staff of the Dane County Regional Planning Commission (Dane County RPC) and Madison Department of Transportation (Madison DOT) in cooperation with the former Pedestrian/Bicycle Sub-Committee of the Madison Transportation Commission (now divided into three separate commissions, including the Pedestrian/Bicycle/Motor Vehicle Commission). The 1991 plan was the first bicycle transportation plan for the county, but did not identify bicycle facility improvement needs nor recommended routes outside the Madison area. Bicycle planning efforts for the outer area of the county date back to the 1970s, however.

The 1991 plan updated the 1975 *Long-Range Bikeway Program*, the first comprehensive bicycle transportation plan for the Madison area. The City of Madison had adopted a *Long Range Master Plan-Bike Route System* in 1971, however it consisted only of a map of potential future bike routes. As part of development of the 1975 plan, an analysis was done and recommendations made regarding bicycle safety, registration, and enforcement issues. A Pedestrian/Bicycle Safety Plan was subsequently adopted by the Madison Common Council in 1982.

Plan Scope

The focus of this plan is on bicycling for transportation or “utilitarian” purposes as opposed to recreational bicycling. With utilitarian bicycle use, the trip origins and destinations and trip purpose (e.g., commuting to work or school, shopping, attending a social/recreational event, etc.) are of primary importance. The bicycle is simply the mode of transportation chosen for the trip. Recreational bicycle trips, on the other hand, are taken primarily for the enjoyment of the trip itself, often with no real destination. In reality, many trips and most facilities serve both purposes. For example, many off-street paths, which are popular for recreation, can be located in corridors that serve important community transportation needs.

In order to be eligible for funding under most Federal-aid programs, bicycle projects must be principally for transportation, rather than recreation, purposes. Federal guidelines consider any bicycle path or trail other than a closed loop trail as being principally for transportation and eligible for federal funding. To ensure coordination of all bicycle facilities, this plan incorporates major recreational trails included in local and county parks and open space plans.

The plan follows the recommended comprehensive approach to bicycle transportation planning, covering the “Four Es” of engineering (facility improvements), education, encouragement, and enforcement. Education and encouragement are important elements in increasing bicycling while also improving safety. Together, they can improve the skills and confidence of bicyclists to ride safely in traffic, which is critical for increasing their effective mobility. The impact of facility improvements on bicycling levels is increased when combined with training and promotion. In addition, studies have shown that the more bicycles in the traffic stream, the lower the accident rate for bicyclists. Education of motorists on safely sharing the road with bicyclists is also important. Education of public officials, planners, engineers and others involved in land use development will help ensure that bicyclists’ needs are considered when planning and designing new neighborhoods and the roadway system.

The plan includes facility recommendations for the Madison Urban Area and for the county. The Madison Urban Area facility recommendations are those viewed as necessary to

improve bicyclist safety, mobility, and access to important destinations such as employment centers, schools, government and public institutional centers, commercial areas, and recreational areas. The improvements are primarily designed to fill in gaps and eliminate the remaining barriers in the area’s already well-developed bicycle transportation system. Recommended county-wide bicycle facility improvements are designed to facilitate trips between communities and to major employment and shopping centers, schools, state and county parks, and bicycle trails. Special emphasis has been placed on identification of commuter routes from outlying communities into the Madison area, where over 80% of the county’s jobs are located.

Plan Purposes

The Bicycle Transportation Plan is intended to serve the following purposes:

- Refine the Bicycle Plan Element of the adopted Vision 2020 *Dane County Land Use & Transportation Plan* (1997).

The Vision 2020 *Dane County Land Use & Transportation Plan* (1997) provides the overall policy framework for development and transportation decisions within the county. The Dane County Regional Planning Commission (DCRPC), Dane County Board of Supervisors, and Madison Area MPO have adopted the plan. The City of Madison has accepted the goals and objectives of the plan as a policy framework. The transportation component of the plan is an overall systems plan, which includes goals and objectives and makes recommendations for all modes of transportation.

The Bicycle Transportation Plan is intended to further refine the bicycle element of the *Dane County Land Use & Transportation Plan* through the development of goals, detailed objectives, bicycle facility planning and design guidelines, and the identification of specific facility improvements, programs and policies, and actions to increase bicycling and improve bicycle safety. Identification and prioritization of bicycle facility improvements and programs will facilitate inclusion of bicycle transportation projects into the area’s five-year Transportation Improvement Program (TIP), updated annually by the Metropolitan Planning Organization (MPO)(formally the Dane County RPC and now the Madison Area MPO).

Identification of planning and design guidelines, policies, and other actions to improve bicycling conditions will assist local community bicycle planning efforts throughout the county.

- Fulfill the requirements of the Transportation Equity Act for the 21st Century (TEA-21), requiring MPOs to undertake bicycle transportation planning.

The recently passed Transportation Equity Act for the 21st Century (TEA-21) retained the transportation planning and funding framework established by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). TEA-21 includes a specific requirement that bicyclists and pedestrians be given due consideration in the MPO transportation planning process and in designing and constructing transportation facilities. Preparation of this plan will help in continuing to improve the integration of bicycle planning into regional and local land use and transportation planning and budgeting processes. This linking of transportation planning and budgeting with local community planning is one of the primary objectives of TEA-21 and the earlier ISTEA legislation.

- Serve as a blueprint for continuing to improve bicycling conditions and safety and increase bicycling levels in the Madison area and countywide.

The plan identifies and prioritizes bicycle facility project needs, and recommends specific policies and educational, promotional, and enforcement activities. This information will further enhance the ability of state agencies, the county, and local communities to invest in projects and programs to improve the practicality and safety of bicycling for everyday travel.

- Identify desirable bicycle routes within Dane County, including linkages between communities.

An important purpose of this plan is to identify for the first time a list of countywide bicycle facility improvement needs and recommended bicycle routes, including linkages with the Madison area system.

- Serve as a framework for cooperation between state agencies, the county, and local governments in planning for and developing bicycle facilities.

Identification of both a detailed Madison area bicycle facilities plan and a countywide plan will help ensure that appropriate connections are made between local, county, and state facilities.

- Provide information to citizens interested in bicycle transportation.

In addition to providing a framework for bicycle planning and programming, the plan is also designed to serve as an educational tool on bicycle transportation and bicyclists' needs for policymakers and the general public.

- Provide guidelines for planning, designing, and maintaining bicycle facilities.

Inclusion of such guidelines will promote the use of safe, effective, and consistent bicycle facility designs throughout the county.



B. Legislative and Planning Context

In 1991, Congress passed the landmark transportation legislation, the Intermodal Surface Transportation Efficiency Act (ISTEA), which established a new overall transportation policy and planning framework and new funding programs. ISTEA placed greater emphasis on facilitating access for people, enhancing communities, and moving goods versus simply moving vehicles. Recognizing the important role that bicycling and walking can play in creating a balanced, intermodal transportation system, ISTEA required bicycle transportation planning at the state and regional or metropolitan planning organization (MPO)

levels. The law also created new funding opportunities for bicycle and pedestrian projects, a stronger local role in transportation project selection, and greater public involvement in the planning and programming process.

In 1998, Congress passed the Transportation Equity Act for the 21st Century (TEA-21), the ISTEA reauthorization bill, which continues and improves upon the policy and planning framework and funding programs established under ISTEA. TEA-21 reaffirmed the need to consider bicyclists in the planning and design of roadway projects, and further enhanced bicycle facility and program funding opportunities. For example, it provided increased funding for the Transportation Enhancements Program—the primary federal funding source of independent bicycle facility projects—and expanded the list of “transportation enhancement activities” eligible for funding to include safety and educational activities. Bicycle and pedestrian safety projects were also added as part of the Hazard Elimination Program, which requires states to identify and correct locations that pose a danger to motorists, bicyclists, or pedestrians.

Relationship to Other Bicycle and Local Plans

The facilities component of this plan includes recommended on-street and off-street bicycle facilities for the Madison Urban Area and countywide. Recommended Madison area facility improvements are designed to serve intraregional trips to major employment centers and commercial areas, government and institutional centers, and other destinations. Where facilities providing neighborhood connections have already been identified in prior planning efforts, they are shown. However, identification of neighborhood connections within each community is generally beyond the scope of the plan. Local communities within the urban area are encouraged to address neighborhood-level facilities and other local issues as part of their community and neighborhood planning efforts.

The countywide bicycle transportation plan is intended to address trips between outer area communities and the Madison area, trips between outer area communities, and other longer distance trips. The comprehensive land use plans and/or park and open space plans of a number of outer area communities include recommended bicycle-ways. These plans have been considered in development of the countywide plan. Communities that have not identified local

bicycle-way systems should do so as part of local planning efforts.

The recommended goals, objectives, policies, and actions in the plan are intended to serve as a guide for the county and all local communities within the county. They are designed to identify strategies for improving local bicycling conditions and to guide local planning efforts.

In September 1998, the Wisconsin Department of Transportation (WisDOT) completed the *Wisconsin Bicycle Transportation Plan*, which establishes goals, objectives, and policies regarding the provision of bicycle accommodations, and identifies strategies for effective bicycle safety education and enforcement. The plan recommends intercity bicycle facility improvements for priority routes and key linkages between communities and other bicyclist destinations. It also recommends goals, policies, and actions to improve both intercity and intracity bicycling conditions. Specific local bicycle facility improvements are addressed through the incorporation of more detailed county and MPO plans, such as this one.

County and local community land use, transportation, and parks and open space plans have been integrated into this plan. Similarly, it is important for local communities to coordinate and ensure consistency of future plans they develop with this plan and the state bicycle transportation plan. Existing bicycle-related plans, policies, and programs are discussed in more detail in Chapter 4.



C. Public Participation

This plan was prepared under the guidance of a Technical Advisory Committee. The committee included staff from all of the Madison urban area communities, Dane County Transportation and Parks Departments, the Wisconsin Department of Transportation, and the University of Wisconsin, a representative from the City of Madison's Pedestrian-Bicycle-Motor Vehicle Commission (PBMVC), and representatives from area bicycling organizations. A list of the committee members is provided at the beginning of this report.

In addition to this advisory committee, additional input was solicited through presentations to the City of Madison's PBMVC, Long-Range Transportation Planning, and Plan Commissions, the Madison Area MPO Technical Coordinating Committee, Madison Area MPO, Dane County Transportation Committee, Dane County Parks Commission, DCRPC, and area bicycle clubs and organizations. A public meeting was held on July 19, 2000 and a public hearing before the Madison Area MPO was held on July 24. Public hearings were also held before the City of Madison Plan Commission on August 14, 2000 and the DCRPC on August 24, 2000. The meeting and public hearings provided an opportunity for citizens to provide input on the goals and objectives, address bicycle facility and program needs, and comment on the draft recommendations and recommended bicycle facility plans. The draft plan was also posted on the City of Madison's Web page, with links from the Dane County and bicycling community Web pages, to further facilitate public comments via e-mail.

D. Plan Organization

Part I of the plan provides background information. Following this introductory chapter, Chapter 2 outlines and illustrates the facility needs of bicyclists, addressing the various conditions and factors that impact bicycle use. The chapter also discusses land use and street designs that facilitate bicycle use. Chapter 3 presents information on current bicycling levels and existing bicycling conditions and facilities in the Madison urban area and Dane County. The bicycle compatibility of the major roadways is analyzed to identify current deficiencies in the level of service for bicycling. Chapter 4 summarizes current plans, policies,

programs, and ordinances related to bicycling, which have been adopted by the Wisconsin Department of Transportation, Dane County, Madison area communities, and the University of Wisconsin. Chapter 5 covers bicycle operation and safety considerations and education, encouragement, and enforcement activities and programs. Bicycle laws and bicycle crash data are reviewed, and the common factors related to crashes are discussed. Existing bicycle safety programs and encouragement policies and activities are covered. Enforcement of bicycle laws is also discussed.

Part II presents the bicycle transportation plan. Chapter 6 presents the vision, goals, and objectives, and identifies proposed actions and strategies to achieve them. Chapter 7 outlines and illustrates the recommended Madison area and countywide bicycle transportation plans, and provides information on costs, revenues, and the transportation budgeting process. Design and engineering guidelines for bicycle facilities are included in Appendix A.

Chapter 2

The Importance of Bicycling and Bicyclists' Needs

The overall goal of the adopted regional transportation plan is to “provide an integrated, all-mode transportation system, which offers the efficient, effective, and safe movement of people and goods, and provides mode choice wherever possible while enhancing and, where relevant, preserving the character and liability of neighborhoods.” If this goal is to be achieved, the needs of bicyclists and other “alternative” transportation users must be considered when planning and designing all transportation improvements and new neighborhoods.

This chapter of the plan draws attention to the benefits of bicycling, and the different types of bicyclists and their needs. This information provides a useful context for the discussion and analysis of existing facilities, programs, and policies that follows. It will also help in understanding and interpreting the recommended plan goals and policies, implementation actions, and facility improvements. Detailed bicycle facility design guidelines are provided in Appendix A.

A. The Benefits of Bicycling

The bicycle is an effective means of transportation that is quiet, non-polluting, versatile, healthy, and fun. Bicycling is the most energy-efficient form of transportation, and is particularly well suited for shorter trips up to five miles. Bicycling offers low-cost mobility. For those who do not use or have access to a motor vehicle, such as school-age children and students, this is especially important.

While bicycling will not replace all trips by motor vehicle, it can be practical for many, such as:

- Trips to work or school;
- Visits to friends or relatives;
- Errands, such as picking up a few grocery items;
- Children’s activities;
- Combined trips, such as a recreational trip and an errand; and
- Intermodal trips, such as bicycling to a park-and-ride carpool or transit facility.

Increasing bicycling opportunities and levels will improve the efficiency of the region’s transportation system and improve neighborhood livability by:

- Reducing motor vehicle traffic and associated pollution and congestion.
- Reducing the need for motor vehicle parking; and
- Reducing motor vehicle crashes, injuries, and property damage.

Bicyclists take up little roadway space. Under most urban traffic conditions, bicyclists do not significantly limit traffic flow. Therefore, converting motorists to bicyclists will increase roadway capacity, reduce congestion, and decrease trip times for everyone.¹

Improving the bicycling environment can also provide non-transportation-related benefits to communities. Communities benefit from bicycle riders who purchase foods and other needs locally. The tourism industry benefits as more bicycle riders are attracted from outside the county. Most importantly, the overall quality of life of communities is enhanced by the presence of bicyclists and pedestrians. For example, social interactions can occur spontaneously and people feel safer being outdoors.

Increasing bicycling opportunities and levels will benefit Dane County families by:

- Providing those unable to drive or without access to a car with more independence;
- Reducing the need for parents to “chauffeur” their children to school and social and recreational activities;
- Allowing households to meet transportation needs with fewer cars; and
- Improving recreational opportunities and public health.

¹ John Forester, *Bicycle Transportation*, 2nd edition (1994), pp. 87-95.

In addition to playing an important role in the Madison area's transportation system, bicycling is also a popular recreational activity. Improving bicycle facilities for transportation purposes benefits those who bicycle for recreation and exercise as well. Recreational bicycle rides can begin at home and be combined with other trip purposes. Off-street paths in urban areas that serve transportation needs also provide recreational benefits. When linked with a larger bikeway system, off-street paths built primarily for recreational use can also provide important transportation linkages. For example, paths through parks can provide short-cuts and rural trails can serve inter-community trips.

B. Improving Bicycling Conditions

Improving bicycling conditions requires construction of facilities for bicyclists. There are many improvements that can be made to make the transportation system work better for bicyclists. However, it also requires consideration of land use practices, street design, and connections with other transportation modes. If land use practices and the street network result in long distances between origins and destinations, bicycling is less practical. Educational and encouragement programs and enforcement of traffic laws are also needed.

The following is an overview of the planning principles, facility improvements, and other strategies necessary for creating a bicycle-friendly community.

Meet the Needs of All Types of Bicyclists

While bicyclists tend to be younger than the overall population, they are still a very diverse group in terms of age, level of fitness, skills, riding habits, etc. Some people bicycle to meet their daily needs (i.e., commuting to work,

running errands, etc.), while others bicycle primarily for exercise and recreation.

Some people bicycle long distances, while others rarely travel more than a few miles per trip. Some people bicycle throughout the year, while others only bicycle during the warmer months. Some bicyclists are experienced, highly skilled riders who are comfortable riding in traffic on busier roads. Others prefer riding primarily on local streets and off-street facilities. Bicycles also come in different shapes and sizes.

The needs of all of these bicyclists need to be considered in planning and designing bikeway systems. All streets should be designed to accommodate bicyclists. Streets designed to accommodate bicyclists with moderate skills will meet the needs of most riders. Alternative through routes to major arterial roads on parallel streets, and/or off-street paths should be designed and identified wherever possible. Special consideration should be given to areas close to schools and parks, where facilities designed specifically for children should also be provided. Neighborhood design should incorporate a "grid" of streets and paths, connecting all areas of the neighborhood and adjoining neighborhoods. Special attention should be given to providing safe crossings of major streets that divide neighborhoods.

Accommodate Bicyclists on Roadways

Roadways must serve as the backbone for any bikeway system. The roadway system already exists and therefore presents the greatest opportunity for improving bicyclists' mobility and access needs. Creating a totally new infrastructure for bicyclists is not physically or financially feasible. In



addition, the destinations that bicyclists want to reach are located along the existing roadway system.

Neighborhood streets have low volumes of traffic and slow speeds, so bicyclists can use them without the need for any special treatments. However these streets are usually not continuous and have frequent stops, making them inconvenient for all but the shortest of trips.

Likewise, in rural areas, roads with a low traffic volume (generally less than 1,000 vehicles per day) can be shared by adult bicyclists and motorists without the need for extra space for bicyclists.



To safely accommodate bicyclists on busier collector and arterial roadways, however, the roadway system needs to include additional space. Accommodating bicyclists on arterials and collectors is critical because they:

- Serve mobility needs by providing the most direct, continuous routes;
- Have many destination points located on them for which they provide convenient access;
- Are protected from minor street cross traffic;
- Provide controlled crossings of other arterial streets; and
- Bridge obstacles such as expressways and railroad tracks.

Provide Appropriate Facilities

Well-designed bicycle facilities attract users. Lack of facilities on major streets denies access to bicyclists, results in a fragmented bikeway system, and creates hazardous conditions for bicyclists, pedestrians, and motorists.

In urban areas, the appropriate facilities on arterial and collector streets are bicycle lanes and wide curb lanes. Bicycle lanes are the preferred facility, particularly on arterial roads, because they:

- Help define the road space;
- Provide bicyclists with adequate space free of obstructions;
- Decrease the stress level of bicyclists riding in traffic; and
- Signal to motorists that bicyclists have a right to share the road.



Bicycle lanes can be designed as shared use facilities with parking, as shown, or as bus/bicycle lanes.



On those roads where bike lanes are warranted, but cannot be provided due to physical constraints, widening the right-hand or curb lane is an alternative design solution. Wide curb lanes should be at least 14 feet wide, excluding the gutter on streets without parking, and 16 feet wide excluding the parking lane on streets with parking. The extra width is needed to provide sufficient space for a motorist and bicyclist to operate parallel to each other in the same lane without coming too close, and without the motorist having to change lanes to pass a bicycle.



On rural roadways, the appropriate facility is paved shoulders (four feet minimum), which can accommodate bicyclists with few conflicts with motor vehicles. Generally, paved shoulders are desirable when average daily traffic volumes reach 750-1,000, depending on truck volumes and roadway characteristics. They are particularly important in areas with high bicycle use, such as in semi-rural residential areas, near parks, or close to urban areas.



Bicycle lanes and paved shoulders provide additional benefits beyond those provided to bicyclists. Bike lanes can help serve as a buffer between motorists and pedestrians and improve motorists' sight distance. Paved shoulders reduce run-off-the-road motor vehicle crashes and provide an emergency breakdown area. They also reduce road maintenance costs by limiting edge deterioration problems.

Provide Safe Intersections and Street Crossings

Most conflicts between various roadway users occur at intersections and driveways. Intersections and ramp interchange areas designed for the movement of motor vehicles can be very difficult for bicyclists to cross. A network of streets with bike lanes does not fully meet bicyclists' needs if intersections present obstacles.



Intersection design should create space and a travel path for bicyclists that is direct, logical and as consistent with the path of motor vehicle traffic as possible.



Ensure that Traffic Signals Work for Bicyclists

Traffic signals can also present problems for bicyclists. Demand-actuated (vs. pre-timed) traffic signals, which turn green only when the system detects traffic, often do not detect bicyclists well. Bicycle-sensitive loop detectors should be used to make traffic signals work for bicyclists. Stencils, like the one shown below, can be used to show bicyclists where to ride to cross the most sensitive portion of a loop.



The City of Madison has recently installed loop detectors on its bicycle paths at street crossings as a means of counting bicycles and detecting them in order to change the signal to green.

Bicycles should also be considered in the timing of the signal cycle to ensure bicyclists have adequate time to clear the intersection.



Eliminate Barriers and Hazards to Bicyclists

Barriers and hazards create gaps in the bikeway system and present safety risks to bicyclists. They need to be identified and removed or addressed to ensure network continuity and connectivity as well as safety.

Major barriers and hazards and some solutions to overcoming them are:

- Freeways and rivers divide a community if there are few crossings.

Solutions: Build bridges with adequate space to accommodate bicycles and pedestrians, build separate pedestrian/bicycle bridges, overpasses, or underpasses to provide important links in the bikeway system.



- At-grade railroad crossings can be difficult for bicyclists to negotiate if the road surface is not at the same elevation as the railroad tracks and/or bicyclists are unable to cross the tracks at a right angle.

Solutions: Widening of the roadway to allow bicyclists to cross at a safe angle and use of rubberized mats to provide a smooth crossing of the tracks.



- Improperly designed and/or located drainage grates.

Solutions: Install bicycle safe stormwater drainage grates and locate them outside of bicyclists' path.



Utilize Opportunities for Off-Street Facilities

Off-street paths can supplement the roadway system to improve bikeway system continuity and linkages, overcome barriers, and provide recreational opportunities. Off-street paths are most effective when they:

- Provide short cuts and improve connections within and between neighborhoods;
- Can be built with a minimal number of street or driveway crossings;
- Take advantage of opportunities such as rail corridors, greenways, watercourses, and other linear corridors; and
- Provide network continuity where bicyclists cannot be safely accommodated on the roadway.



Ensure Regular Facility Maintenance

Bikeways are subject to debris accumulation and surface deterioration, and require regular maintenance to function well. Bicycles ride on two narrow, high-pressure tires. Small rocks, sand, and other debris can deflect a wheel, and minor ridges in the pavement can cause spills. Broken glass can puncture tires. Bike lanes and paved shoulders in particular require regular sweeping, as motor vehicle traffic tends to sweep debris onto them. Bikeways must also be kept free of snow and ice in the winter.



Implement Neighborhood Traffic Management Strategies

Residential streets—especially those that run parallel to higher-volume arterial streets—are generally ideal for bicycling. However, cut-through traffic and speeding may also occur on those residential streets, making them less comfortable and safe for bicyclists and pedestrians.

“Traffic calming” measures can be used to divert and/or reduce the speed of traffic. Examples include traffic circles, diverters, and speed humps. Some of these measures can increase bicyclists’ mobility on residential streets by reducing stops and providing pedestrian/bicycle-only connections. Traffic calming devices must be properly applied and designed, however, so as not to create bicycling hazards or barriers.



Provide Convenient, Secure Parking and Other Ancillary Facilities

Just as motorists expect conveniently located and secure parking at their destination, so should bicyclists. Adequate, secure parking should be provided at all likely destination points. Bicycle theft is common and the lack of secure parking is often cited as a reason people do not ride to certain destinations. Bicycle racks should accommodate the high security U-shaped bike locks and allow securing of the frame and at least one wheel.

Other important ancillary facilities include lighting for off-street paths and shower and locker facilities at employment centers.



Provide Intermodal Connections

Transit and bicycling have the potential to complement each other well. The transit system can benefit from bicycle-bus trips. Bicyclists can benefit from transit, which can increase their access to the overall transportation system by bridging long distances. In order to develop this connection and encourage use of both modes, secure bicycle parking needs to be provided at bus stations and major stops, and bicycles must have access to the transit system, such as through bike racks on buses.

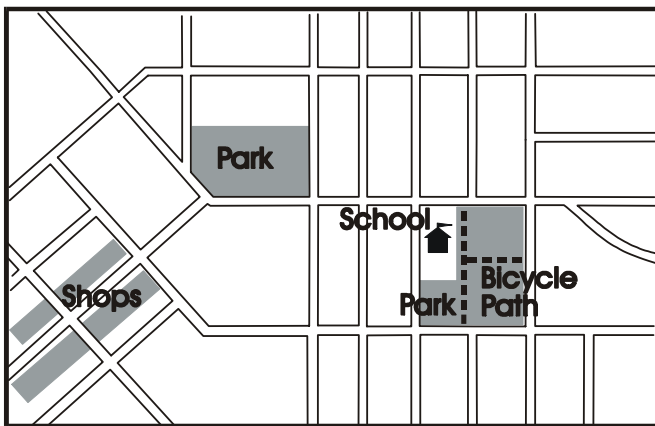


“Bicycle-Friendly” Land Use and Street Design

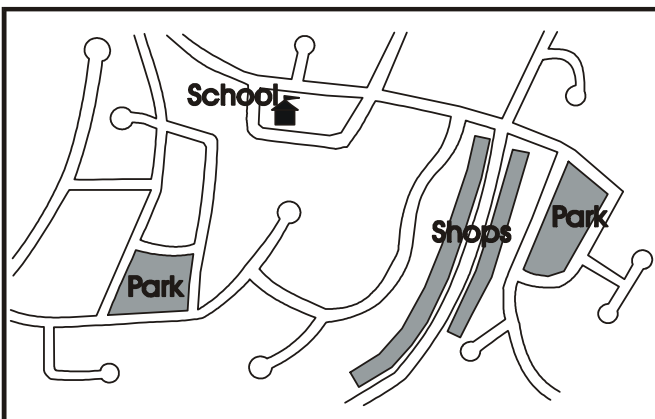
The general patterns of land use in communities and the design of neighborhoods determine to a large degree whether bicycling is practical and attractive for meeting one’s transportation needs.

The most important features of bicycle-friendly land use and urban design are:

- An interconnected street system, which provides bicyclists with direct routes and alternatives to travel along high-volume roadways, as illustrated below.



Many newer neighborhoods include numerous cul-de-sacs, as illustrated below. This requires a long circuitous route to cover a short distance and forces bicyclists to use busy arterial streets to reach many common destinations. The number of cul-de-sacs should be minimized.



Where cul-de-sacs are incorporated into developments, a path should be provided between the cul-de-sac and other streets for bicycle and pedestrian access.



A highly connected street system spreads motor vehicle traffic over a larger number of streets. This helps to minimize the need for multi-lane roadways with large, complex intersections that create barriers for bicyclists.

- Compact, mixed-use development, which provides destinations within easy bicycling of people’s homes and workplaces.

Land uses should be organized so that schools, neighborhood-oriented shopping, parks, and other destinations are within walking and bicycling distance. A network of streets and paths should connect the different land uses. Mixed-use employment centers allow bicyclists to run errands at lunch time and after work.



- Access management on arterial streets.

Limiting and consolidating driveways and providing raised or landscaped medians on urban arterial roads benefits bicyclists and pedestrians in several ways. It reduces the number of points of conflict between cars entering or leaving a roadway and bicyclists riding on the road and pedestrians walking on the sidewalk. It also improves crossing opportunities for pedestrians and bicyclists turning pedestrian style at non-signalized street intersections by providing a refuge and helping to maintain gaps in the traffic stream. Traffic flow is also improved, which may delay the need for road widening. While driveway access should be limited, a sufficient number of local street crossings should be provided to ensure adequate crossing opportunities for pedestrians and bicyclists.

- Open space between communities along bicycle commuter and recreational routes.

Provision of green space between communities helps limit “urban sprawl” and can provide pleasant areas for the location of bicycle routes out of and into urban areas.

Provide Education and Training Opportunities and Encouragement

Construction of bicycle facilities must be combined with education and encouragement activities in order to increase bicycling for transportation. The positive effect of facility improvements is increased when combined with training and promotion.

The most critical education program for bicyclists is traffic operation. Training bicyclists to ride as vehicle operators on the street system in mixed traffic increases their effective mobility and reduces their crash potential.

Education of motorists in sharing the roadway with bicyclists, and education of developers, planners, engineers, and others involved in the land development process about the needs of bicyclists is also important.

Encouragement policies by public agencies and private employers, such as provision of covered bike parking, showers and changing rooms, flextime, a guaranteed ride home program, and financial incentives can make bicycle commuting easier and more attractive.



Enforce Traffic Laws

Most motor vehicle-bicycle collisions occur from motorists or bicyclists not following the “rules of the road.” Safety education programs need to be combined with enforcement programs focusing on common violations by motorists and bicyclists that lead to crashes.



Chapter 3

Existing Bicycle Travel and Conditions

A. Existing Bicycle Travel

Regional and local data on bicycle travel and the characteristics of bicyclists is limited for a number of reasons. The relatively small number of bicyclists compared to those using other transportation modes makes small-scale surveys difficult. Special area transportation studies (e.g., origin-destination surveys) have often either omitted bicycle trips or grouped them together with walking trips. Most available data on bicycling is for work trips, however these make up a small percentage of all bicycle trips. The best current local data in terms of the characteristics of bicyclists and bicycling levels is from transportation surveys the University of Wisconsin (UW) conducts every two years on student and faculty/staff commuting habits.

A comprehensive bicycle survey was conducted in 1974 to provide data and information for development of the 1975 *Long-Range Bikeway Program for the Madison area*. The survey consisted of three parts. The first part was a broad-based questionnaire mailed to 4,000 households. The second part consisted of a series of one-day field counts and interviews at various intersections, mostly in the central city. The third part was a questionnaire distributed to all classrooms or homerooms from 1st to 12th grades at all Madison area schools. The surveys together provided a relatively complete picture at that time of existing and potential bicycling levels for different areas, bicycle trip characteristics, and bicyclist demographics. This is the only bicycle survey that has been conducted for the Madison area.

The Wisconsin Department of Transportation (WisDOT) recently conducted a statewide bicycle and pedestrian travel survey. The survey included two parts, a phone survey of 1,300 people and a mail survey of 250 people who kept a diary of their trips over a three-day period. The phone survey provided basic data on the percentage of people who had bicycled or walked within the past week, and the percentage of total trips made by those modes. The mail survey provided more detailed information on trip purposes, distance traveled, and percentage of trips taken by different modes.

Bicycling Levels

The Wisconsin Bicycle and Pedestrian Survey conducted in August 1999 found that 13% of respondents had bicycled within the past week. For those persons who did bicycle, the overall average percentage of trips made by bicycle was 26.5%. By comparison, 31% had walked within the past week. For those persons who said they had walked, the overall percentage of trips walked was 26.7%, the same as for bicycle trips. The percentage of total trips bicycled was 3.5% for the phone survey respondents and 2.6% for the mail survey respondents, who filled out one-week trip diaries. The percentage of trips made by walking was 8.1% for the phone survey respondents and 7.9% for the mail survey respondents.

Prior to the state survey, the best source of information available on bicycle travel statewide has been the National Personal Transportation Survey (NPTS). The NPTS has been conducted periodically since 1969 to provide detailed information on changing personal travel behavior. Information is collected for a sample of households nationwide, which is then weighted and adjusted to represent the entire population. According to the 1995 NPTS, around 1.8% of all person trips in Wisconsin were made by bicycle compared to 0.7% nationally.

The percentage of bicycle trips in the City of Madison is most likely considerably higher than the statewide averages found in the state and NPTS surveys. Bicycling levels are much higher in urban areas in general, because many more destinations are easily accessible by bicycle. Bicycling levels in Madison are likely to be considerably higher than other urban areas in the state due to the presence of the university, the large government employment base, the documented relatively high levels of bicycle commuting, and the city's extensive network of bicycle transportation facilities.

The City of Madison has conducted a bicycle path traffic count program since 1980. The data is collected from 24-hour bicycle detection devices placed in off-street bicycle paths at various locations. The program has recently been expanded to include locations on two new bicycle paths (Isthmus, Wingra Creek) in addition to the original locations on the Law Park (along John Nolen Drive) and Brittingham

Park paths. In 1998, average weekday bicycle traffic on the Law and Brittingham Park bicycle paths ranged from a high of 1,116 in the month of August to a low of 75 in January. The April-to-October average was 872 and the annual average was 594. The total number of bicyclists on these paths has increased from 4,948 in 1996 to 7,123 in 1998. Traffic count data for the Isthmus and Wingra Creek paths is not yet available.

The city takes continuous bicycle traffic counts on the University Avenue bike lanes at the Mills St. intersection. In 1999, average weekday bicycle traffic (two-way combined) on the University Ave. bike lanes was over 7,000 from April to October. The annual average was 6,200.



Bicycle counts were taken in the fall of 1994 at various street intersections within the UW campus area, as part of development of the UW Campus Master Plan. The intersections with the highest volumes of bicycles entering them from 7:30 a.m. to 5:00 p.m. included:

<u>Intersection</u>	<u>Number of bicyclists</u>
University Ave. at Park St.	6,265
University Ave. at Charter St.	4,595
University Ave. at Randall Ave.	3,795
Breese Ter. at University Ave/Campus Dr.	3,690
Park St. at Observatory Dr./Langdon St.	3,225
Babcock Dr. at Linden Dr.	3,190
Charter St. at Linden Dr.	2,450
Johnson St. at Randall Ave.	2,430
Dayton St. at Randall Ave.	2,230
State St. at Lake St.	1,175

The UW Transportation Services Department conducts a biannual transportation survey on student and faculty/staff commuting habits. According to the 1997 survey, 25% of the 40,000 students and 11% of the 17,500 faculty and staff travel to campus by bicycle in “good” weather. These percentages have remained generally the same since the late 1980s, but are slightly lower than the percentages of bicycle commuters in the early 1980s during the oil crisis.

Table 1
Transportation to Work: 1990

	Total # Work Trips ¹	Bicycle Trips		Walk Trips	
		Number	Percent	Number	Percent
National	--	--	0.4%	--	4.0%
State	2,349,691	11,802	0.50	130,136	5.54
Region					
Dane County	204,399	3,970	1.94	16,859	8.25
Madison Urban Area ²	140,388	3,814	2.72	14,589	10.39
Central Madison Area ³	39,716	2,852	7.18	11,351	28.58
Selected Cities/Villages					
Madison, City	105,887	3,547	3.35	13,447	12.70
Fitchburg, City	9,875	55	0.56	132	1.34
Middleton, City	7,867	56	0.71	251	3.19
Monona, City	4,781	57	1.19	185	3.87
McFarland, Village	2,914	0	0.00	144	4.94
De Forest, Village	2,782	7	0.25	94	3.38
Oregon, Village	2,635	14	0.53	132	5.01
Stoughton, City	4,148	20	0.48	280	6.75
Sun Prairie, City	8,254	55	0.67	258	3.13
Verona, City	2,946	18	0.61	145	4.92
Waunakee, Village	3,187	0	0.00	102	3.20

¹ Includes those working at home.

² Encompasses Madison Area MPO's Planning Analysis Areas (PAAs) 1-89.

³ Isthmus Study Area (PAAs 1-9,12,13).

Source: 1990 Census Transportation Planning Package (CTPP)

The U.S. Census, which is updated every ten years, provides travel information at a very detailed geographic level, but only for work commute trips. Table 1 shows 1990 bicycle commuting information for the region, central Madison area, and the larger communities in Dane County. National and state data and walking trips are shown for comparison purposes. It should be noted that the census data was collected the last week in March when bicycling levels are generally lower in Wisconsin. Actual bicycling levels are also probably underestimated by the fact that the data identifies only the primary mode of transportation. Many people may drive or take the bus the majority of time to work, but still regularly bicycle during good weather.

Bicycle Trip Characteristics

According to data from the mail-in portion of the state bicycle survey, 46% of all bicycle trips were for social/recreation/fitness, 17% were for personal/family business, 25% for work, and 12% for shopping. Surprisingly, none were for school, however this reflects the very small sample size (82 bicycle trips by 22 different persons) and the fact that only four persons surveyed were aged 11-24.

The 1995 National Personal Transportation Survey (NPTS) data indicate that around 60% of bicycle trips nationally are for a combination of visiting friends and relatives and other social and recreational activities. Around 23% of bicycle trips are for shopping or other personal or family business, 9% are for school or church, and 9% are made for work. Table 2 shows NPTS data on trip purpose distribution for all trips compared to bicycle trips.

According to the WisDOT statewide survey data, 70% of all bicycle trips were two miles or less. 18% were 2-5 miles, 7% 5-10 miles, and 5% 10 miles or greater. The most common distance was $\frac{1}{4}$ to $\frac{1}{2}$ mile. As one would expect, the social/recreational trips tended to be longer distances. Only 15% of the trips for other trip purposes were over two miles. This is consistent with 1995 NPTS data and other local studies around the country, which indicate that the average travel distance for bicycle trips is around two miles.

The 1990 Census Journey-to-Work data indicates that both the median and mean travel time to work for those Dane County residents commuting by bicycle was fifteen (15) minutes. National data show the same average travel time for work and social/recreation trips, while family/personal business trips were somewhat shorter at around eleven (11) minutes. Average travel distances and times to work for

Table 2
Trip Purpose Distribution

	All Person Trips	Bicycle Trips
Work or Work Related	20%	9%
Shopping	20	12
School/Church	9	9
Visit Friends & Relatives	8	31
Other Family/Personal Business	26	11
Other Social/Recreational	17	29
Other	Less than 1	Less than 1

Source: FHWA, 1995 National Personal Transportation Survey

UW employees are longer than the national and regional averages. According to the 1997 UW transportation survey, 24% of faculty/staff who commute by bicycle live between five and ten miles from campus. A little over 50% of UW employee bicycle commuters had a travel time of more than twenty (20) minutes, reflecting their longer than average trip distances. Table 3 shows the distances that UW student and employee bicycle commuters live from campus.

Table 3
Distance That UW Students and Employees
Who Commute by Bicycle Live From Campus

Distance	Students	Faculty/Staff
Less than 1 mile	40.7%	5.6%
1 to 1.9 miles	32.6	23.6
2 to 4.9 miles	19.8	44.4
5 to 9.9 miles	5.8	23.6
10 to 24.9 miles	1.2	1.4
25 or more miles	0.0	1.4

Source: 1997 UW-Madison Transportation Survey

Bicyclist Demographics

National data indicate that more men ride bicycles than women. For example, the 1995 NPTS found that men made 72% of the total annual person trips by bicycle. The UW transportation survey found that more male students bicycle to campus (33%) than female students (21%). National data and surveys in other communities also show that the propensity to bicycle decreases with age, with most bicyclists aged 45 and under. University cities had an even more pronounced pattern of younger bicyclists. The WisDOT survey found that the three younger groups of phone survey respondents (with average ages of 19.5, 14.5, and 12) bicycled more than twice as often as the two older groups (with average ages of 48 and 44). Around 20% to 29% of the younger groups of respondents had bicycled within the past week compared to 9% of the older groups.

The NPTS data suggests diminishing bicycle usage with increasing income, particularly for work trips. Interestingly, bicycle trip rates tend to be higher for households with children under age 16, even for non-social/recreational trips.

B. Existing Bicycle Facilities and Conditions in the Madison Urban Area

The initial step in developing an interconnected network of Madison area and countywide bicycle facilities is to inventory existing bicycle facilities, and analyze the current system's strengths and weaknesses. Along with information on likely bicycle trip origins and destinations, this type of analysis can help in prioritizing facility improvements to areas where they are most needed. "Bicycle facilities" refers to any facility improvement or provisions made to accommodate or encourage bicycling. For roadways, this includes any special facility or provision beyond the standard 11- to 12-foot travel lane. It also includes off-street paths, signed bicycle routes, parking facilities, and facilities providing bicycle access to transit stations and vehicles.

Special facilities for bicyclists are not needed on local streets where traffic volumes are low and vehicular speeds are slow. Likewise, special facilities are not needed on rural roadways with low traffic volumes. Nonetheless, these local streets and roadways are important for bicycling, providing access to many origins and destinations within a neighborhood or rural community. They can provide an excellent route alternative to the higher volume arterial and collector streets, as long as through connections can be made via connector streets and paths.

A well-developed network of bicycle facilities already exists within the Madison area. However, improvements are needed in some areas to fill in gaps (e.g., adding bike lanes on key arterial roadways and building connecting bike paths) and overcome barriers (e.g., narrow bridges, access-restricted highways, difficult intersections). In addition, bicycle commuter routes need to be developed connecting the central Madison area and suburban communities, such as Sun Prairie and McFarland.

Madison's extensive bicycle facility network is due to the city's relatively long history of bicycle transportation planning and facility development and bicycle-supportive policies. It has been City of Madison policy since the 1970s to include provisions for bicycles (wide curb lanes or, in most cases now, bicycle lanes) on arterial streets and collector streets, where feasible. Regional policies have encouraged inclusion of bicycle facilities in roadway construction and reconstruction, parks, railroad rights-of-way, and development projects since the first Madison area bicycle plan was adopted in 1975.

With the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, a dedicated federal funding source was created for the first time for independent bicycle, pedestrian, and other "transportation enhancement" projects. The City of Madison has been very successful in obtaining funding under this program, in large part due to past planning efforts and investments in bicycle facilities. ISTEA also provided a dedicated transportation funding source for urban areas, and gave metropolitan planning organizations (MPO) the authority to distribute the funds. The funds are flexible and can be used for a wide variety of projects, including roadway projects and bicycle facilities. In 1993, the Dane County RPC, the former MPO, adopted a project selection process for these funds, which favors multi-modal projects. This has resulted in the inclusion of bicycle lanes on most major roadway reconstruction projects in the Madison area.



On-Street Bicycle Facilities

Bicycle Lanes

The most popular and now-preferred bicycle facility for arterial and higher volume collector streets is a bicycle lane. Bicycle lanes are areas of the road striped off for exclusive, or in the case of shared parking/bike or bus/bike lanes, preferential use by bicyclists. Bicycle lanes have the most potential for attracting new bicyclists, in part because of the psychological effect of having space reserved for them. Unlike off-street paths, bike lanes can be integrated into

the street network. They can therefore provide direct access to important destinations and take advantage of existing travel patterns.

Exclusive bike lanes should be at least four feet wide, excluding the gutter pan. In most cases, the bike lanes are also painted with pavement symbols (a diamond or the now preferred bicycle symbol) and/or the words “Bike Lane,” in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). Along with lane striping, the pavement markings inform motorists and bicyclists of the presence of the bike lane.

Some bicycle lanes in the Madison area are a shared parking/bicycle lane on either one or both sides of the street. Parking/bicycle lanes generally function well where sufficient space is provided—a minimum of thirteen feet is recommended—and the parking turnover rate is not too high. They are generally not recommended on streets with little parking, because they tend to get used as an additional travel lane.

There are also shared bus/bicycle lanes on several major arterial roads. While the bus/bicycle lanes on the Capitol Square function acceptably, there is a general problem with right-turning vehicles remaining in the bus/bicycle lane between intersecting streets, particularly on Mineral Point Rd. Separate bus and bicycle lanes are preferable, and are required where there are relatively large volumes of buses and bicycles and traffic speeds are high, such as on University Ave. near the UW campus.

Within the Madison area, there are 49 miles of arterial and collector streets with striped bicycle lanes or paved shoulders.

Existing bike lanes on arterial and local collector streets in the Madison area include:

- Allen Blvd. (CTH Q) – Century Ave. (CTH M) to University Ave. in Middleton
- American Parkway – High Crossing Blvd. to south of Hoepker Rd.
- Bassett St. – Dayton St. to Main St.
- Broadway – Falcon Cir. to USH 51 in Monona
- Charter St. – University Ave. to Observatory Dr. on the UW campus

- Dayton St. – Randall Ave. to Broom St.
- Fish Hatchery Rd. – Wingra Dr. to Badger Rd.
- Gammon Rd. – Tree Lane to south of Odana Rd. and Watts Rd. to Schroeder Rd.
- Gorham St. – University Ave. to Brearly St.
- High Crossing Blvd. – East Springs Dr. to Crossroads Dr.
- Johnson St. – Bassett St. to Brearly St.
- Junction Rd. – Old Sauk Rd. to Blackwolf Dr.
- Lacy Rd. – Fish Hatchery to Seminole Hwy. in Fitchburg
- Lien Rd. – Eagan Rd. to Zeier Rd.
- McKee Rd. (CTH PD) – Fish Hatchery Rd. to Nesbitt Rd west of Verona Rd. in Fitchburg
- Milwaukee St. – Schenk St. to Wallbridge Ave. east of USH 51
- Old Middleton Rd. – Old Sauk Rd. to Eau Claire Ave.
- Old Sauk Rd. – High Point Rd. to Old Middleton Rd.
- Packers Ave. (CTH CV) – Darwin St. to Tennyson Lane
- Park St. – University Ave. to Regent St.
- Park Lawn Pl/Park St. – Maywood Ave. to Donna Dr. in Middleton
- Rimrock Rd. – John Nolen Dr. to CTH MM
- Seminole Highway – Manitou Way to Lacy Rd. in Fitchburg
- University Ave. – Gorham St. to Campus Drive through the main UW campus area
- West Beltline Hwy. Frontage Rd (South) – Seminole Hwy. to Landmark Place in the Town of Madison
- Wright St. – E. Washington Ave. to Pierstorff St. through the main MATC campus

Shared bus/bicycle lanes include:

- Fish Hatchery Rd. – Badger Rd. to High Ridge Trail in Fitchburg
- Mineral Point Rd. – Whitney Way to the West Beltline
- Park St. – Plaenert Dr. to Badger Rd.
- Capitol Square
- State Street

There are several two-lane arterial streets in the greater Isthmus area where parking is allowed, except during the peak commuter

period in the peak direction. The 12-foot parking/travel lane provides a space for bicyclists between the parked cars and the curb lane stripe during non-peak hours. These include Monroe St., Regent St., Williamson St., Atwood Ave., and portions of the Outer Capitol Loop.

Paved Shoulders

For streets or highways with a rural cross-section (i.e., no curb and gutter), the addition or improvement of paved shoulders is generally the most effective way to accommodate bicyclists on those roadways with higher traffic volumes and speeds. They function much like a bicycle lane if they meet standard specifications, including a minimum width of four (preferably five) feet and a pavement stripe to visually separate the motor vehicle travel way from the shoulder.

Paved shoulders provide motorist safety and maintenance benefits as well by providing space in an emergency, improving drainage, and supporting the traveled portion of the roadway. A 1986 study by the Wisconsin Department of Transportation examined the cost effectiveness of paved shoulders in reducing accidents and maintenance costs, and concluded that 3-foot shoulders were cost effective (i.e. benefits exceeded cost) on highways with initial average daily traffic of 1,085-1,640, depending upon whether virgin or recycled asphalt mixes were used.²

While paved shoulders are not a “bicycle facility” per se, state statutes permit bicycles to be operated on them. Roadways with paved shoulders at least four feet wide (the current minimum standard) in the Madison urban area include:

- Broadway – South Towne Dr. to Falcon Cir. in Monona (which is being converted to an urban cross-section with bike lanes)
- Campus Dr. – Highland Ave. to University Ave. and Randall to Johnson St.
- Cottage Grove Rd. – Thompson Dr. to Sprecher Rd.
- Mineral Point Rd. – from Junction Rd. west
- Fish Hatchery Rd. (CTH D) – High Ridge Tr. to Lacy Rd. in Fitchburg

Wide Curb Lanes

On arterial and some collector streets with heavier traffic volumes, widening the right-hand or curb lane to 14 feet, excluding the gutter pan (16 feet plus the parking lane where parking is allowed) provides additional roadway space for a motorist and bicyclist to operate in the same lane without coming too close. Wide curb lanes do not provide as much space as bike lanes and lack the special designation for bicycle use. As a result, many bicyclists do not feel comfortable using them. However, they are a second best alternative in those instances where bike lanes are not feasible.

Arterial and collector streets with wide curb lanes include the following:

- Agriculture Dr. – Pflaum Rd. to Broadway
- Beltline Frontage Rd. (N) – Todd Dr. to Emil
- Beltline Frontage Rd. (S) – Hammersley to Seminole Hwy. (where bike lanes begin)
- Cottage Grove Rd. – USH 51 North Ramp to S. Thompson Dr.
- Gammon (S) Rd. – Schroeder Rd. to McKenna Blvd
- High Point Rd. – Mineral Point Rd. to D’Onofrio Dr. and south of Beltline to Welton Dr.
- High Crossing Blvd. – Crossroads Dr. to Nelson Road
- International Lane – Packers Ave. to end
- Junction Rd. – Blackwolf Dr. to Mineral Point Rd.
- Lein Rd - East Washington Ave. to Eagan Rd.
- McKenna Blvd. – Gammon Rd. to Raymond Rd.
- Milwaukee St. – Walter St. to Schenk St. (where bicycle lanes begin) and S. Stoughton Service Rd. to N. Thompson Dr.
- Odana Rd. – Segoe to Frederick Ln.
- Park St. – Erin St. to Olin Ave.
- Springs (E) Dr. – East Towne Blvd to Zeier Rd..
- Thompson Dr. – Lien Rd. to CTH T
- W. Washington Ave. – Regent St. to Fairchild St.
- Watts Rd. – S. High Point to S. Gammon Rd.
- Winnebago St. – Atwood Ave. to East Washington Ave.

²U.S. Department of Transportation, Federal Highway Administration, *The Effects of Bicycle Accommodations on Bicycle/Motor Vehicle Safety and Traffic Operations*, (July 1994), Publication No. FHWA-RD-92-069, Appendix 4.

Bicycle Routes

The City of Madison has a signed bicycle route system covering almost all areas of the city and a portion of the City of Monona. The current route system covers 125 miles. The purpose of the route system is to provide reasonably direct major routes through the city on streets that most bicyclists will feel comfortable using. Bicycle paths are used where they are available and do not necessitate too much out-of-direction travel. The routes are located so as to provide access to frequent bicyclist destinations, such as schools, colleges, parks, and employment centers. However, the routes are not designed to link all of these possible destinations. All streets (except limited access highways) are open to bicycle travel. Therefore, actual route selection is determined more by directness, continuity, aesthetics and personal preference.



The bicycle route signs, which are purely informational, include a bicycle symbol and directional arrows. However, individual routes are not typically identified (e.g., by number or name) and no destination and distance information is provided for those routes connecting major destinations.

Several streets in the Town of Madison, including W. Badger Rd. east of Park St., have been signed as bicycle routes. The Cities of Middleton and Fitchburg and the Village of McFarland do not currently have signed bicycle route systems. A route system was identified for Middleton in the city's recently adopted bicycle plan. The city plans on signing the routes in 2001.

On-street bicycle facilities in the Madison urban area are depicted in Figure 1 and existing signed bicycle routes are depicted in Figure 2.

Bicycle Compatibility Evaluation of Madison Area Roadways

The underlying policy or concept of all bicycle transportation planning should be that every street is a bicycling street. The AASHTO Guidelines note that bicycles can be expected to ride on almost all roadways where they are permitted. As a result, the guidelines recommend that "all highways, except those where cyclists are legally prohibited, should be designed and constructed under the assumption that they will be used by cyclists." Therefore, the first task in developing a bicycle transportation plan should be to evaluate the roadway network with respect to the capability of the roads to accommodate safely and efficiently both bicyclists and motorists.

The newly developed Bicycle Compatibility Index (BCI) methodology was used to evaluate the compatibility for bicycling of all collector and arterial roadways in the Madison area.³ The BCI methodology is based on research conducted to determine how geometric roadway conditions, traffic operations, and other factors impact a bicyclist's decision whether or not to use a specific roadway. This research expanded upon earlier "stress level" research done to develop a tool that can be used to predict bicyclists' perceptions of a specific roadway environment and thereby determine the level of bicycle compatibility of the roadway.

The BCI methodology was developed for urban and suburban roadway segments (i.e., mid-block locations exclusive of intersections). It allows analysis of the compatibility of roadway segments for shared-use operations by motorists and bicyclists, and provides assistance in planning for and designing roadways that are bicycle-compatible. The BCI model incorporates the four primary variables typically used to assess the "bicycle friendliness" of a roadway: (1) bike lane or paved shoulder width (where provided); (2) curb lane width; (3) traffic volume; and (4) vehicle speeds. It also includes the additional variables of the presence of a parking lane with more than 30% occupancy and the type of roadside development (residential/open space or other). Finally, adjustment factors are included for truck volumes, parking turnover, and right-turn volumes into driveways and minor streets.

³ U.S. Department of Transportation, Federal Highway Administration, *The Bicycle Compatibility Index: A Level of Service Concept, Implementation Manual* (December 1998), Publication No. FHWA-RD-98-095.

Local and county roadway geometry, parking, and traffic count and operation information was obtained from data compiled by the Wisconsin Department of Transportation (WisDOT) and City of Madison Traffic Engineering Division (Madison). The primary WisDOT data sources were the 1998 version of the Local Roads Inventory and the 1998 Wisconsin Highway Traffic Volume Data Report. For the suburban communities and rural areas, the most recent traffic counts were taken in 1996. City of Madison data sources included: (1) Condition Diagrams showing roadway cross-sections for numerous intersections throughout the city; (2) Traffic Flow Maps with 1997 traffic count information for roadway segments on most collector and all arterial roads; (3) Madison Area Truck Route Map; and (4) City Speed Zone Map. Speed limit data for roadways outside the City of Madison was obtained from local ordinances. All of this information was supplemented by field investigation where necessary.

In those cases where required model data was not available, default values recommended based upon national research were used. For example, the 85th percentile speed was assumed to be the posted speed limit plus either five or nine miles per hour, depending on the type and characteristics of the street and the general area. Ten percent of the annual daily traffic was assumed to occur during the peak hour—the hour of day generally used to evaluate bicycling conditions. Large truck volumes were assumed to range from 1.5% for collector streets to 3.5% for principal arterial roadways. The assumed volume for collector streets on an established truck route (e.g., Femrite Dr., International Ln.) or bus route with frequent service (e.g., Capitol Square) was increased to 2%. Parking occupancy and turnover were based on general observation and any applicable time limits. An exception was areas in

the City of Madison where the residential permit parking program is in effect. The program results in significant levels of all day (low turnover) parking in what is technically two-hour parking zones in several areas of the city.

Bicycle level of service (LOS) criteria have been established based on the range of BCI numerical values. Table 4 shows the BCI ranges associated with each LOS designation. The different levels of service reflect the average adult bicyclists' comfort and convenience and freedom to maneuver under different roadway environments. It is recommended that facilities generally be designed for LOS C or better, where this is feasible given traffic volumes, available right-of-way, parking needs, and other considerations. While less than ideal, many of the more experienced bicyclists would still consider most streets in the LOS D range acceptable for riding. However, only a small percentage of bicyclists would be willing to ride in streets with LOS E, F, or even D at least during peak traffic conditions.

Table 4
Bicycle Compatibility Index (BCI) Ranges
Associated With Level of Service (LOS) Designations

LOS	BCI Range	Compatibility Level ¹
A	Less than 1.50	Extremely High
B	1.51 to 2.30	Very High
C	2.31 to 3.40	Moderately High
D	3.41 to 4.40	Moderately Low
E	4.41 to 5.30	Very Low
F	Greater than 5.30	Extremely Low

¹Pertains to the average adult bicyclist.



Figure 3 depicts the current level of service for bicyclists on all Madison area collector and arterial streets. With a few exceptions, such as in the UW campus area, local streets were not rated and were assumed to be at LOS C or better due to their low traffic volumes and speeds. It should be noted that the LOS designations generally reflect weekday peak hour conditions. The peak hour analysis will usually represent the “worst case” scenario. The level of service would generally be higher during off-peak times, with perhaps some exceptions (e.g., roadways near major shopping centers). In those cases where significant changes in operating conditions occur at different times of day (e.g., presence of peak-hour parking restrictions), the bicycle compatibility analysis was conducted for each set of conditions.

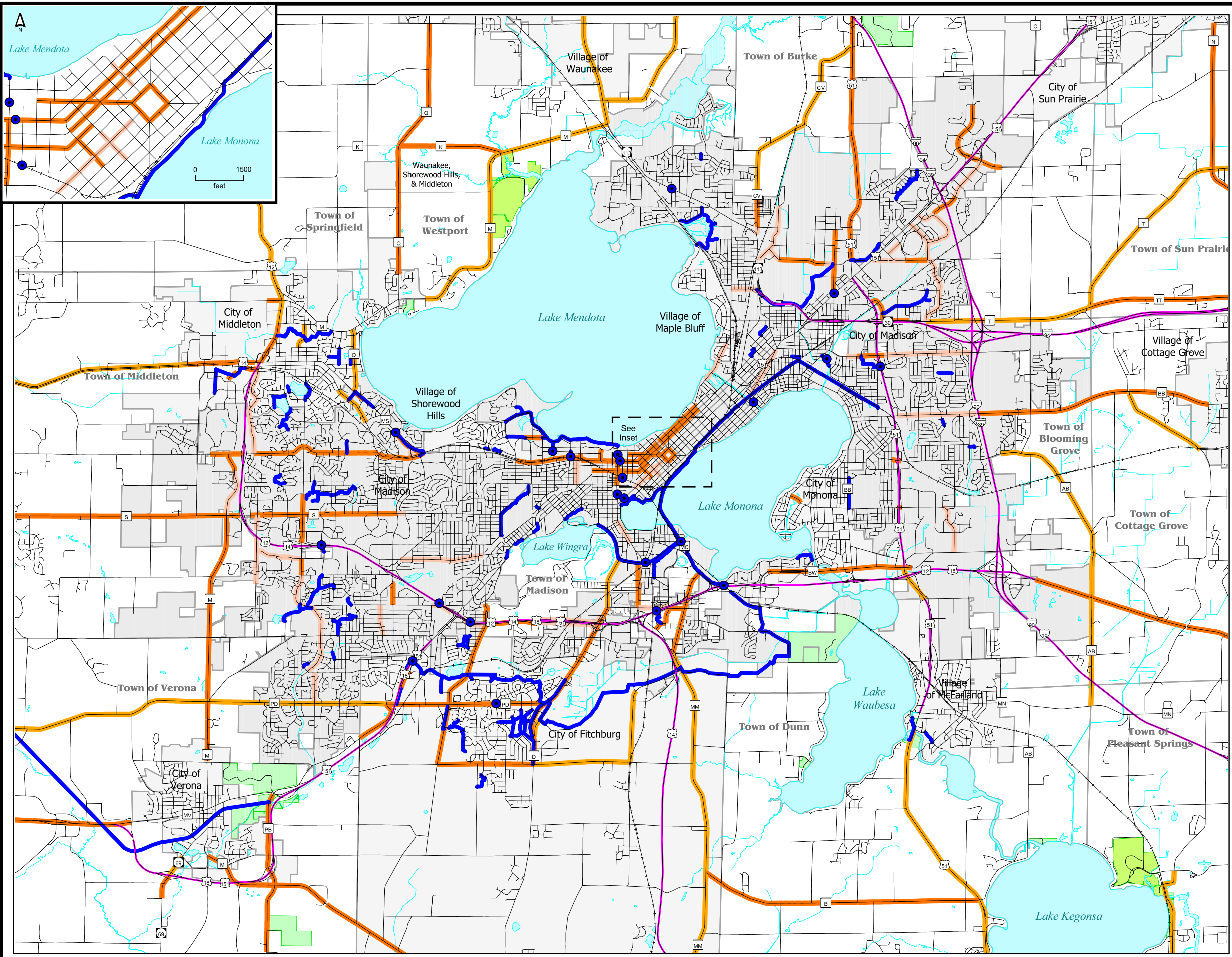


Figure 1
Existing Bicycle
Facilities in the
Madison Urban Area

Existing On-Road Bicycle Facilities

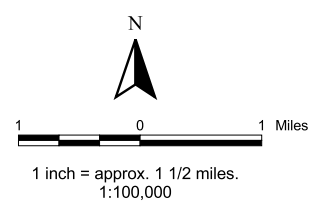
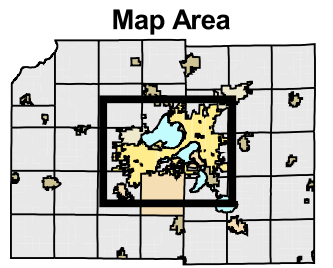
- Bike Lane / Paved Shoulder (3 feet)
- Bike Lane / Paved Shoulder (4 feet or greater)
- Wide Curb Lane

Existing Off-Street Bicycle Facilities

- Multi-Use Path / Trail
- Bike / Pedestrian Over / Underpass

Bicycles Prohibited or not Recommended

- County Park
- State Park
- Open Water



Madison Area
Metropolitan Planning Organization

Map Created 9/2000.

Source Info:
Civil Division Limits: 5/00, Annexation Records (DCRPC).
Roadway Network: 4/95, Orthophoto Derived (DCLIO).
Hydrography Network: 4/95, Orthophoto Derived (DCLIO).

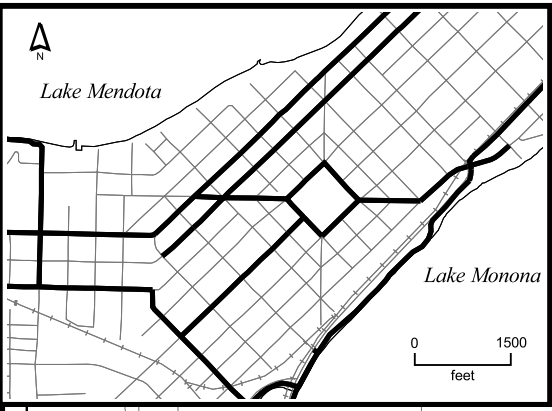
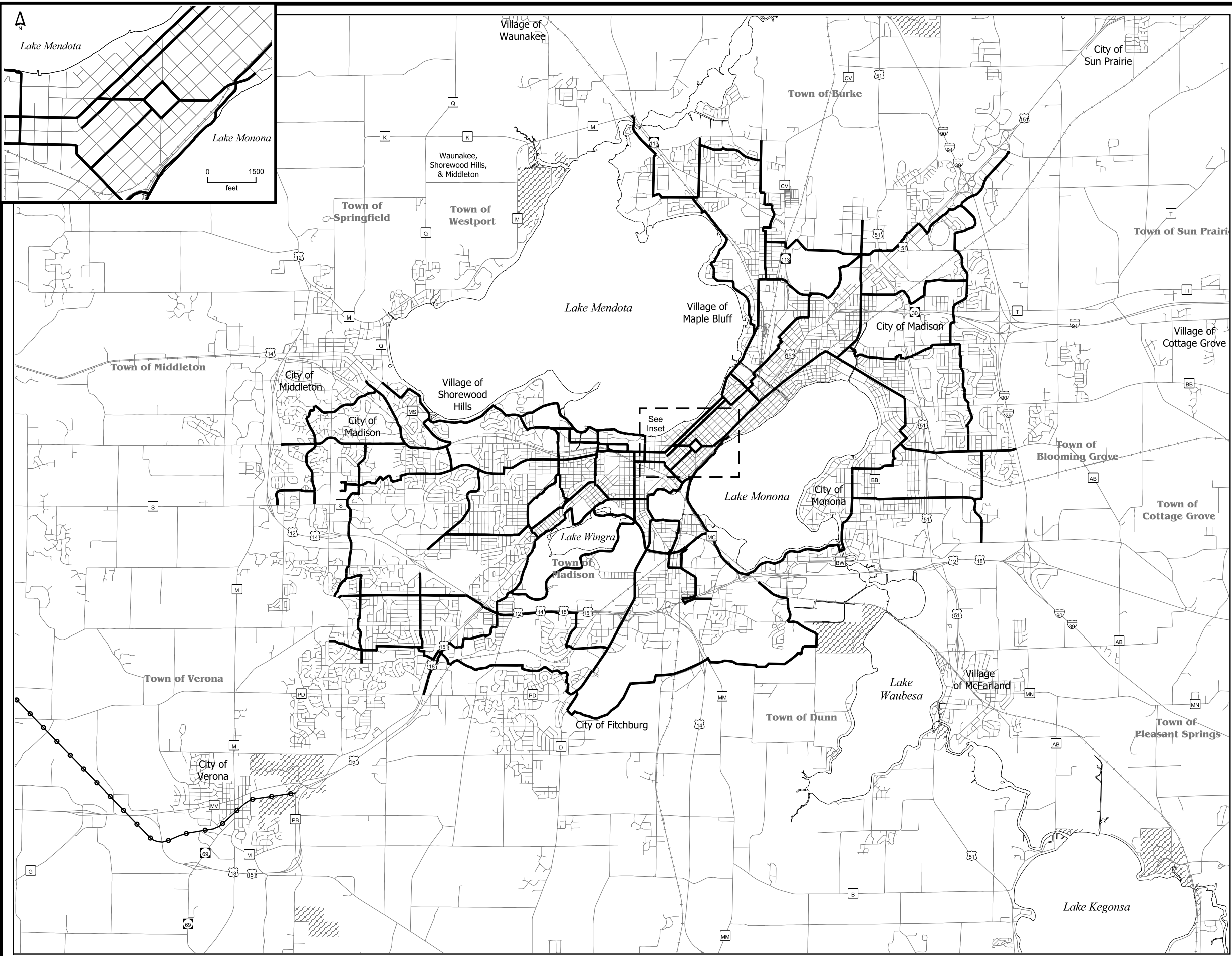
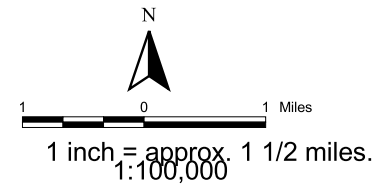
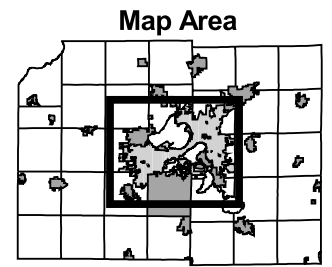


Figure 2
Existing Bicycle Routes
in the
Madison Urban Area

Signed Bicycle Routes on Lower Volume
Roadways and Paved Off-Street Paths

- Existing Route
- State Trail (unpaved)
- ▨ State or County Park



Madison Area
Metropolitan Planning Organization

Map Created 9/2000.

Source Info:
Civil Division Limits: 5/00, Annexation Records (DCRPC).
Roadway Network: 4/95, Orthophoto Derived (DCLIO).
Hydrography Network: 4/95, Orthophoto Derived (DCLIO).

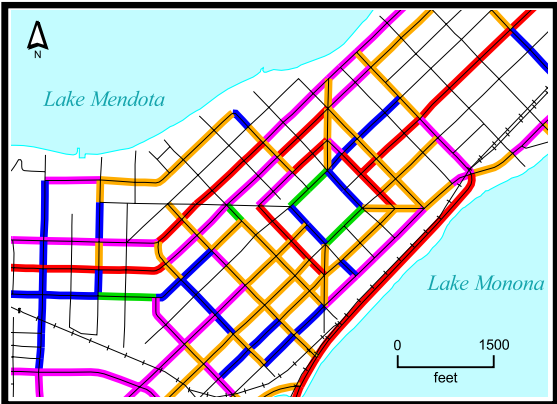
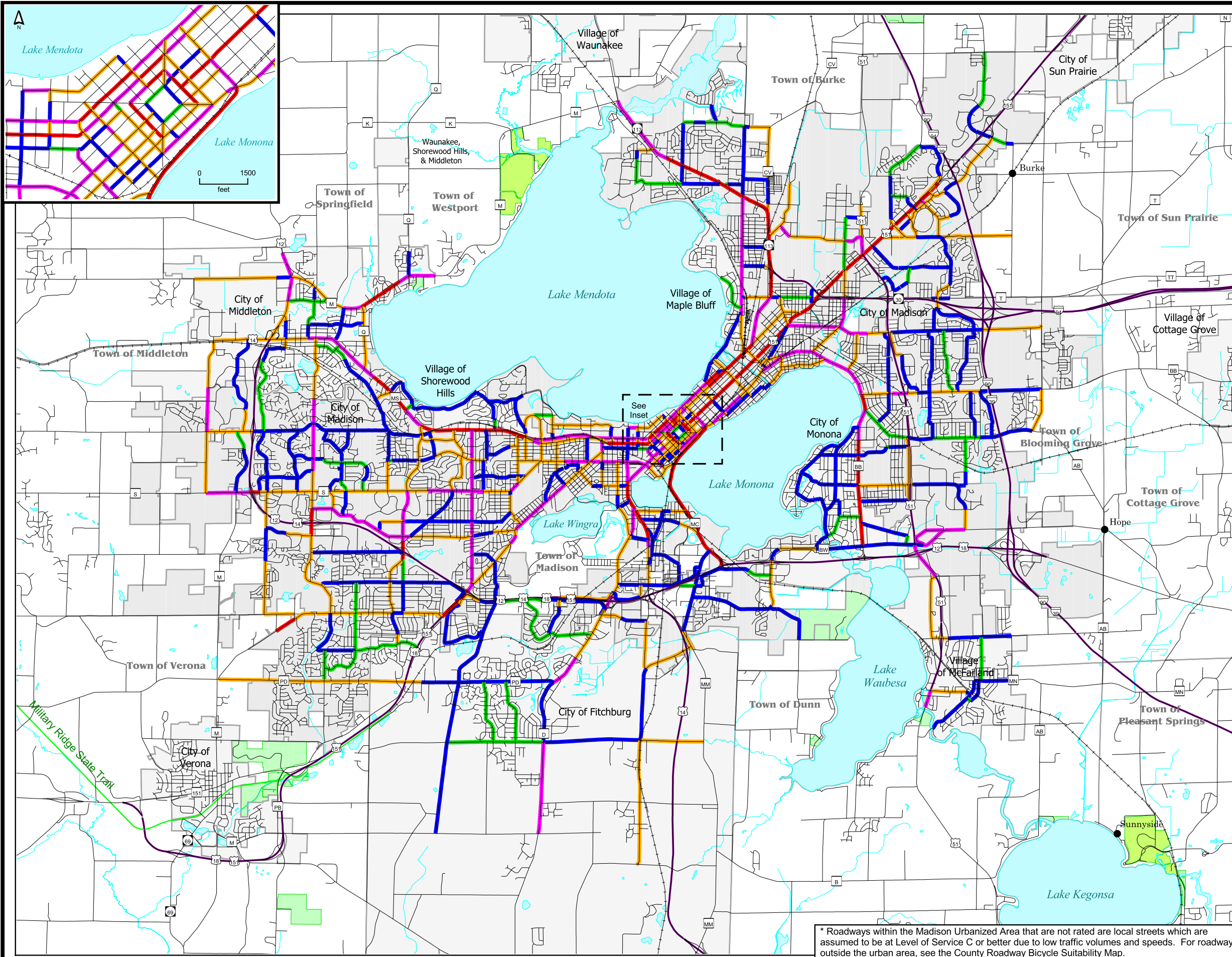


Figure 3
Bicycle
Compatibility
of
Madison Urban
Area Roadways

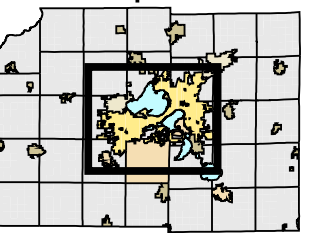
Level of Service

- B Higher
- C
- D
- E
- F Lower

- Bicycles Prohibited or not Recommended
- Not Evaluated*

- County Park
- State Park
- Open Water

Map Area



1 0 1 Miles

1 inch = approx. 1 1/2 miles.
1:100,000

Madison Area
Metropolitan Planning Organization

Map Created 9/2000.

Source Info:
Civil Division Limits: 5/00, Annexation Records (DCRPC).
Roadway Network: 4/95, Orthophoto Derived (DCLIO).
Hydrography Network: 4/95, Orthophoto Derived (DCLIO).

* Roadways within the Madison Urbanized Area that are not rated are local streets which are assumed to be at Level of Service C or better due to low traffic volumes and speeds. For roadways outside the urban area, see the County Roadway Bicycle Suitability Map.

Approximately 134 miles or 48% of all the roadway segments analyzed function at Level of Service (LOS) C or better for bicyclists. 84.5 miles or 30% are rated LOS D and 59 miles or 21% are at LOS E or F. The vast majority of collector streets (60%) operate at LOS C or better. Those collector street segments rated LOS D are concentrated in the Isthmus area (e.g., Baldwin St., Henry St, Randall Ave, Mills St., Lakeside St.), the West Side (e.g., Regent St west of Speedway Rd, Segoe north of Mineral Point Rd, Grand Canyon Dr. between Mineral Pt. and Odana Rd, and Watts Rd), and East Towne area (East Towne Blvd. and Eagan Rd). A combination of moderately heavy traffic volumes, lack of special bicycle facilities, and, in the Isthmus area, high parking occupancy contributes to the lower level of service rating on these roadway segments.

Due to their generally higher traffic volumes and speeds, only 16% of arterial roadway miles are rated LOS C. These include Old Sauk Rd. east of High Point Rd, Buckeye Rd., McKee Rd (CTH PD) east of Commerce Dr., and Broadway (CTH BW) east of Bridge Rd. 37% of arterial road miles are rated LOS D and 47% rated E or F. Those arterial streets with a level of service of D or better generally have bicycle lanes or paved shoulders. Even with bike lanes, some arterial roads (e.g., Fish Hatchery Rd., Milwaukee St.) still operate at LOS D due to their very high traffic volumes. However, the presence of the bike lane allows bicyclists to use them with greater safety, providing accessibility to many important destinations.

Off-Street Bicycle Facilities

Shared-Use Paths

Bicycle paths separated from the roadway system are generally referred to as bicycle paths. However, these paths are open to public use by walkers, runners, in-line skaters, and others as well as bicyclists. Therefore, “shared-use path” is the proper term for these facilities, and they need to be designed with these various user groups in mind. Shared-use paths are typically paved a minimum of ten feet wide and designed for two-way travel.

Shared-use paths are significant generators of bicycle use, particularly in areas that are otherwise difficult to access by bicycle. Shared-use paths encourage bicycling by less experienced bicyclists who are not comfortable riding on many streets. They provide enjoyable recreation opportunities as well as desirable commuter routes. Their popularity is starting to impact their generally low-stress

travel experience in some cases, most notably on the Law Park path.

A community’s road system provides the best means of accessing various destinations within a community, but shared-use paths can enhance the primary bikeway system. Shared-use paths are most effective when used to provide bikeway system continuity, linkages, and/or short cuts where no adequate on-street facilities are available. Railroad rights-of-way, linear parks, watercourses, lakes, and dead-end streets (if planned in advance) provide the best opportunities for construction of paths.

Some of the longer existing shared-use paths in the Madison area include:

- Brittingham Park path, which connects with the John Nolen Drive path;
- John Nolen Drive path from Blair St to Waunona Way, which provides a commuter route from the south side and serves as part of the Lake Monona bike route loop;
- Isthmus path along the east railroad corridor currently extending from Blair St. to Dempsey Rd.;
- Wingra Creek path connecting the John Nolen path to the UW Arboretum;
- Howard Temin Lakeshore path on the UW campus;
- Starkweather Creek path along Aberg Ave. and then leading to the MATC-Truax campus;
- Pheasant Branch Creek unpaved path in Middleton; and
- Capital City Trail along the Nine Springs E-Way in Fitchburg.

The newly built E-way segment of the Capital City Trail will provide a connection to the Military Ridge Trail to the west once an extension of that trail from CTH PB to McKee Rd. is completed in 2001. It will also provide a connection to the John Nolen Drive path once a short connecting path is constructed under the Beltline north of Nob Hill Road. The Capital City Trail will eventually connect to the Glacial Drumlin Trail in Cottage Grove. Numerous other shorter paths provide routes through community parks and across access-restricted highways, and provide shortcuts through residential neighborhoods.

Off-street bicycle facilities in the Madison urban area are depicted in Figure 1.

Sidewalks and Sidepaths

By national and state guidelines, sidewalks are not suitable bicycle facilities and generally should not be designated as such. Sidewalks are typically 4-6 feet—half of that recommended for shared-use paths—and do not allow sufficient room for use by bicyclists, pedestrians, and other non-motorized users. Use of sidewalks by bicyclists also leads to potential safety problems at intersections and driveways, because sidewalk bicyclists and motorists have difficulty seeing and communicating with each other. There are several short street segments (along Nakoma, Monroe, Atwood Ave., and E. Johnson Streets) where Madison's bike routes use the sidewalk due to difficult roadway conditions in order to maintain route continuity. However, plans call for developing alternatives to using these sidewalks and discourage designating new bike routes on sidewalks.

Bicycle Parking Facilities and Access to Transit

Provision of conveniently located, secure bicycle parking is essential for improving bicycle accessibility and decreasing the risk of bicycle theft. There has never been a survey done of bicycle parking facilities in the Madison area. However, it is safe to say there is a need for more and better designed bicycle parking facilities, especially outside the downtown area and University of Wisconsin campus. Even within parts of downtown and UW campus area, there are inadequate parking facilities due to high bicycle usage. A survey done in 1994 as part of development of the UW Campus Master Plan found bicycle parking stall occupancy rates of 100-130% in the Central and South Campus areas.

The City of Madison has an ongoing program to provide user-friendly bicycle racks in the downtown area. As a result, this area is pretty well served in terms of bicycle parking facilities. Madison area schools also generally have an adequate supply of bicycle parking, although many of the racks are sub-standard.

The City of Madison has a comprehensive ordinance requiring the provision of off-street bicycle parking, which was adopted in 1988. However, commercial and multi-family housing developments built prior to this date are not required to provide bicycle parking, unless they are expanded or there is a change of use requiring additional parking. Even then, the bicycle parking required is based

only on the extra amount needed for the addition or change in use. As a result, many commercial and office developments do not have bicycle parking. Many of those that do have older style, substandard racks that do not easily accommodate U-shaped locks. None of the other urban area communities have bicycle parking requirements.

Madison Metro recently implemented a program to provide bicycle racks on most buses. Bicycle racks have also been provided at the new bus transfer points, although they are not covered.

Planned Bicycle Facilities with Approved Funding

The following additional bicycle facilities are currently planned for construction within the near future. The facilities listed below represent only those projects programmed within the next two years (2001-2002) that have funding commitments.

On-Street Facilities

- Beltline (W) Frontage Rd. – Landmark Pl. to Todd Dr.
- Buckeye Rd. (CTH AB) – Stoughton Rd. to Droster Rd.
- CTH PD (McKee Rd.) – Nesbitt Rd. to Maple Grove Rd.
- Femrite Dr. – E. Broadway to Marsh Rd.

Off-Street Facilities

- Blackhawk segment of the University Ave. RR corridor path from Eau Claire Ave. to Maple Terrace.
- Howard Temin (UW) Lakeshore path reconstruction.
- Marsh View/E. Branch Creek Path from Commercial Ave. south under STH 30 to the Madison Corporate Center.
- Mifflin (E) RR corridor path from E. Mifflin St. to E. Johnson St..
- Nob Hill path connecting the Capital City Trail and the John Nolen Path.
- Pheasant Branch Creek (S. Fork) path from USH 12 to USH 14, providing access to the Middleton Business Park.
- Southwest Commuter RR Corridor path from the Capital City Trail to S. Randall Ave.

- USH 12 underpass for the Pheasant Branch Creek path.
- USH 51 corridor path from Terminal Dr. to E. Broadway.

C. Existing Bicycling Facilities and Conditions in Dane County

On-Road Bicycle Facilities

As noted in Section B above, for roadways with a rural cross-section (i.e., no Curb and gutter), the addition or improvement of paved shoulders is generally the most effective way to accommodate bicyclists on those roadways with higher traffic volumes. For rural roadways with higher speed limits, this generally includes those with average daily traffic volumes of greater than 750-2,000 depending on traffic speeds, truck volumes, and other factors. Paved shoulders are generally not marked for bicycle use. They are not a “bicycle facility” per se, but rather a roadway condition that improves bicycle travel and bicyclist safety. Paved shoulders also improve motorist safety and reduce road maintenance costs.

The current standard minimum width for paved shoulders is four feet, with five to six feet preferable for roadways with higher traffic volumes. Unfortunately, for those state and county trunk highways that already have paved shoulders, many are only three feet in width due to past policies and practices, which have now been changed. There are wide paved shoulders (four feet or greater in width) on 21.5% of rural county trunk highway route miles, while another 13% have three-foot shoulders. There are wide paved shoulders on 15% of the non-access restricted rural state highway miles in Dane County.

Bicycle Suitability Analysis of Rural Roadways in Dane County

In order to identify where facility improvements are most needed and identify recommended countywide bicycle routes, an analysis was done to determine the suitability of existing rural roadways in the county for bicycling. Because traffic, roadway, and land use conditions vary significantly between rural and urban/suburban areas, a different methodology was used from the one used to assess the Madison urban area roadways.

The rural roadways were evaluated for bicycling suitability based upon the methodology developed for the Wisconsin Bicycle Map.⁴ The methodology is designed to identify rural roadways that provide a suitable situation for the average

adult bicyclist (age 16 and over) for shared bicycle and motor vehicle use and, for those rated unsuitable, to indicate the improvements needed to attain a suitable situation. The methodology assumes motor vehicle traffic will travel at 55 miles per hour.

The primary roadway characteristics used in the rural suitability evaluation are similar to those used to determine the bicycle compatibility index (BCI) and associated level of service for urban/suburban streets. These characteristics are vehicle lane width, paved shoulder width (if any), and traffic volumes. As with the BCI methodology, the percent truck traffic is also factored into the rural roadway evaluation. The percent truck traffic is a much larger factor in rural roadway versus urban street bicycle suitability analysis due to the higher traffic speeds, which produces a “wind blast” that can cause bicycle handling problems. The rural planning process also factors into the evaluation the percent yellow line (where passing is not allowed) and seasonal traffic peaking characteristics.

The rural roadway evaluation methodology establishes acceptable levels of average daily traffic (ADT) volume for roadways of various widths (including the paved shoulder, if any). The process involves examination of the occurrence of “bicyclist squeeze points,” or how frequently a cyclist may be squeezed off of the roadway by a passing motorist who simultaneously meets an oncoming vehicle. This situation, known as a triple pass occurrence, has been found to be directly proportional to the volume of cars and trucks using a given roadway. The reported ADT is adjusted to arrive at a “working ADT” based on the seasonal traffic peaking characteristics for the type of highway being analyzed. The working ADT considered acceptable differs depending upon the percent truck traffic and the percent yellow line.

Lightly traveled roadways without paved shoulders are generally suitable for rural bicycle riding. These routes are typically not preferred by truck traffic, and the narrow pavement width forces vehicles to wait for a clear passing zone to overtake a cyclist, thereby minimizing the potential for bicyclists to be forced off the roadway. Higher volume roadways require the presence of a minimum 4-foot wide paved shoulder in order to be suitable for bicycling. Even for roadways with relatively low traffic volumes, the presence of a substandard 3-foot paved shoulder reduces the stress level and increases the safety of bicyclists considerably.

Figure 4 depicts the results of the suitability evaluation for rural Dane County roadways. Roadways were classified as

⁴ Philip Van Valkenberg, *Planning for Rural Bicycle Routes*. Van Valkenberg & Associates, Richfield, MN.

either “suitable,” “may be suitable depending on bicyclist’s skills,” or “least suitable.” The “design bicyclist” upon which the suitability ratings were based is the average adult bicyclist (age 16 & over with a driver’s license) in Dane County. The typical bicyclist in Dane County is more experienced and more used to riding on roadways with higher traffic volumes than bicyclists in less populated areas of the state.

The roadways were evaluated using data from WisDOT’s Deficiency File, 1998 Local Roads Inventory, and 1998 Highway Traffic Volume Data Report, and data compiled by the Dane County Highway & Transportation Department for county trunk highways. This was supplemented with field investigations where necessary. Town roads were evaluated where traffic volume information was available. Otherwise, they were generally assumed to be suitable.

69% of the rural county trunk highway route-miles and 18% of non-access restricted rural state highway route miles were determined to be most suitable for bicycling. Another 16% and 21% of rural county and state highway route-miles, respectively, were categorized as possibly suitable, depending upon the cyclist’s skills. 15% of rural county highway route miles were determined to be least suitable for bicycling due to their high traffic volumes, lack of wide paved shoulders, or both. 61% of non-access restricted rural state highway route miles were determined to be least suitable.

Most of the county trunk highway route-miles classified as suitable are in the outer, less populated areas of the county. In contrast, most county trunk highways in the central part of the county leading into the Madison area are the least suitable for bicycling, despite the presence of 4-foot paved shoulders on several of them, due to their high traffic volumes. These include CTH M north of Verona and in the Town of Westport, CTH Q, CTH S, and CTH BB. In addition, many of the town roads leading into the Madison area, which serve as collectors, are also rated as either “may be suitable” or “least suitable” due to increasing commuter traffic volumes and the lack of adequate paved shoulders. These include Airport Rd and Old Sauk Rd on the West Side and River Rd., Portage Rd (between Windsor Rd. and Rattman Rd), Rattman Rd., Hoepker Rd., Reiner Rd., Nelson Rd., and Bailey Rd. on the Northeast side of the greater Madison area. This makes it difficult—in some cases impossible—to identify reasonably direct commuter routes from outlying communities (e.g., Sun Prairie) that the average bicyclist would feel comfortable using.

Bicycle Facilities Associated with Utility or Natural Resource Corridors

Dane County has two major state bicycle trails developed and operated by the Wisconsin Department of Natural Resources (DNR). Both trails have a crushed limestone surface in the rural areas. Trail segments within cities and villages are generally paved with asphalt.

The Military Ridge Trail is located on an abandoned railroad bed and runs from the Capital City Trail just east of Verona Rd. in Fitchburg through the City of Verona and western Dane County to Dodgeville. The trail will be extended in 2001 from CTH PB east of Verona to CTH PD, connecting with the newly built Capital City Trail. This new portion of the trail will be paved. When the short Nob Hill segment is completed, the Capital City Trail will connect to the Isthmus/John Nolen path. The other state trail, the Glacial Drumlin Trail, begins in the Village of Cottage Grove and runs through eastern Dane County and Jefferson County to Waukesha County. Plans call for extending the Isthmus Path, which ends at Dempsey Rd., east along the railroad corridor to eventually connect up with the Glacial Drumlin Trail. This would provide a continuous bicycle trail/path from the west side of the county through the City of Madison to the east side of the county.

Planned Facilities with Approved Funding

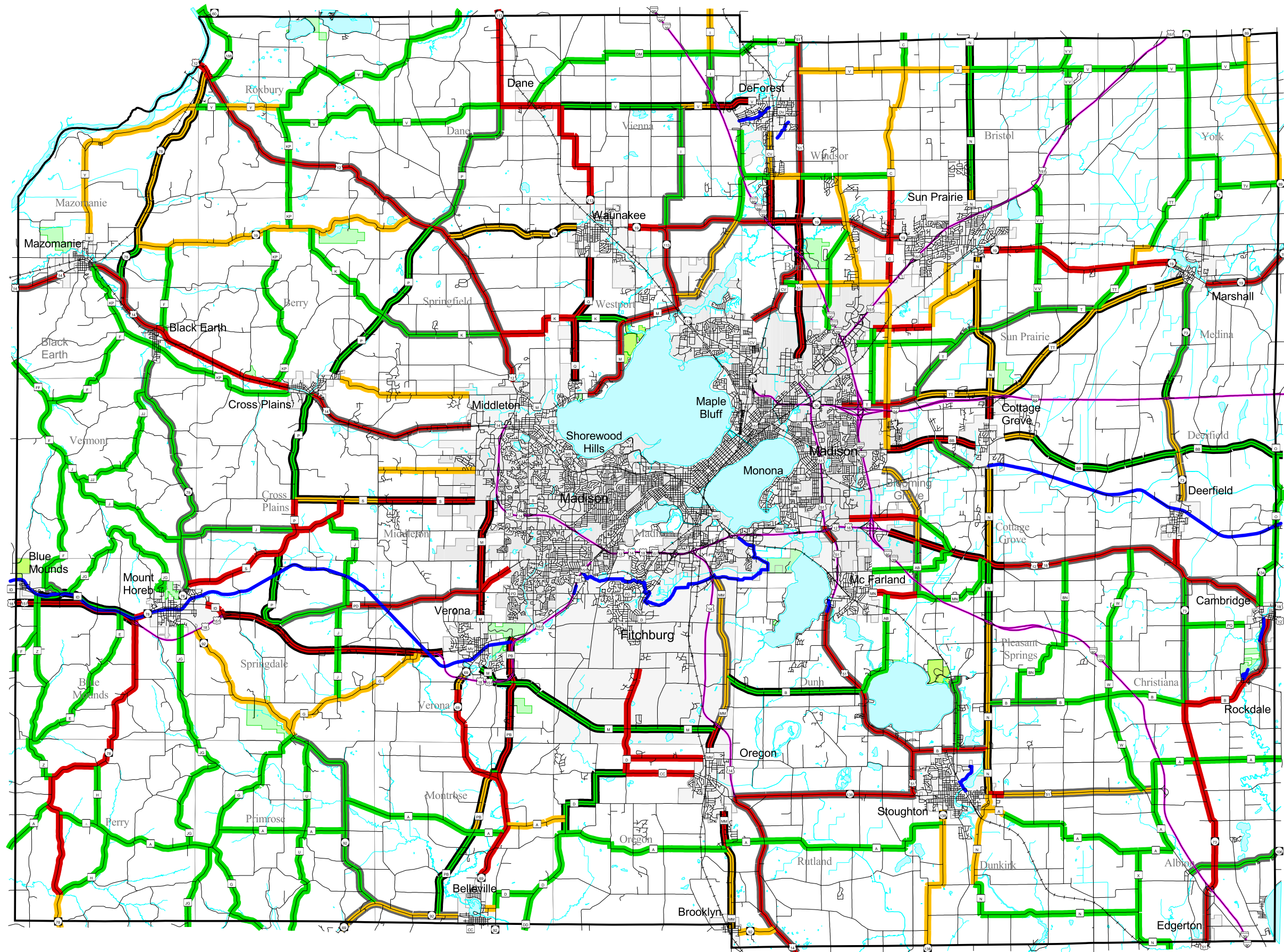
The following additional bicycle facilities in Dane County are programmed for construction in 2000 or 2001:

On-Road Facilities






- CTH D – CTH A (East) to STH 69
- CTH M – Richard St. to Cross Country Rd. in the City of Verona
- CTH MV – Nine Mound Rd. to Legion Dr. in the City of Verona
- CTH PB – STH 69 to Paoli
- CTH S – STH 78 to Pine Bluff
- CTH TT – Ridge Rd. to STH 19
- STH 113 – Cuba Valley Rd. to CTH V

Figure 4

Existing Conditions and Facilities for Bicyclists in Dane County



Roadway Suitability for Shared Bicycle / Motor Vehicle Use.

-  Most Suitable
-  May Be Suitable Depending on Cyclists Skills Operating with Motor Vehicle Traffic
-  Least Suitable
-  Bicycles Prohibited or not Recommended
-  Not Evaluated*

Paved Shoulders

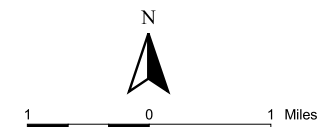
- 3 Feet
 4 Feet or Greater

— Multi-Use Trails / Bike Paths

(generally crushed stone within rural areas, paved within city and villages)

-  County Park
 State Park
 Open Water

* Assumed to be most suitable due to generally lower traffic volumes and speeds.



1 inch = approx. 3 1/2 miles.
1:215,000

**Madison Area
Metropolitan Planning Organization**

Map Created 9/2000.

Source Info:
Civil Division Limits: 5/00, Annexation Records (DCRPC).
Roadway Network: 4/95, Orthophoto Derived (DCLIO).
Hydrography Network: 4/95, Orthophoto Derived (DCLIO).

Chapter 4

Existing Policies and Plans Related to Bicycling

This chapter summarizes existing Federal, state, and local government policies, programs, plans, and regulations related to bicycle facility planning and development. This information on current bicycle transportation planning efforts serves as a context for development of this plan. These plans have been considered and incorporated into this plan to the extent applicable.

A. Federal Transportation Policy

In 1991, Congress passed the landmark transportation legislation, the Intermodal Surface Transportation Efficiency Act (ISTEA), which established a new transportation policy to create an integrated, intermodal transportation system that provides travelers with a real choice of transportation modes. ISTEA recognized the increasingly important role of bicycling and walking in creating a balanced transportation system, and the need for considering the social, land use, and environmental impacts of transportation investments. ISTEA set up a new planning, programming, and funding framework, which requires consideration of non-motorized users during the planning and development of transportation projects and programs and provides new opportunities for funding pedestrian and bicycle improvements. The 1998 Transportation Equity Act for the 21st Century (TEA-21), which superceded ISTEA, continues and improves upon this framework, including the integration of pedestrian and bicyclist considerations into the transportation planning process.

It is Federal transportation policy to promote the increased use and safety of bicycling and walking as transportation modes. The National Bicycling and Walking Study, published by the U.S. Department of Transportation in 1994, translated this policy into two specific goals: (1) to double the current percentage (from 7.9% to 15.8%) of total trips made by bicycling and walking, while (2) simultaneously reducing by ten percent the number of crashes involving bicyclists and pedestrians. The *National Bicycling and Walking Study Report* (Publication No. FHWA-PD-94-023) draws upon work completed through 24 Case Studies and presents a plan of action for activities at the Federal, state, and local levels for meeting the two goals.

Section 1202 of TEA-21 and 23 C.F.R. Part 652 (“Pedestrian and Bicycle Accommodations and Projects”)

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. Consideration must be given for both safety and contiguous routes for bicyclists and pedestrians. Where a bridge deck is replaced or rehabilitated, federal rules require that bicycles be safely accommodated when it can be done at a reasonable cost.

Section 1202 of TEA-21 required the Federal Highway Administration (FHWA) to develop guidance on the various approaches to accommodating bicycles and pedestrian travel. In response, FHWA issued a Joint Statement on Integrating Bicycling and Walking into Transportation Infrastructure. The statement includes the following specific policy regarding the provision of bicycle and pedestrian 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:

- Establishment of bicycle and pedestrian facilities would be “contrary to public safety.”
- The cost of establishing bikeways or walkways would be excessively disproportionate to the need or probable use. “Excessively disproportionate” is defined as exceeding twenty percent of the cost of the larger transportation project.
- Where sparsity of population or other factors indicate an absence of need.

Even if the design of the project meets one or more of these conditions, the project must still go ahead in a way that allows for the future construction of bicycle and pedestrian facilities, and the design of intersections and interchanges shall accommodate bicyclists and pedestrians in a manner that is both safe, accessible, and convenient.

In addition, the Joint Statement encourages state and local agencies to adopt design manuals, relying on existing guides, such as the 1999 American Association of State Highway and Transportation Officials’ (AASHTO) *Guide for the*

Development of Bicycle Facilities and approaches that have already worked in other agencies. It also identifies other actions that agencies can take to achieve the goal of accommodating bicyclists and pedestrians as an integral element of the transportation system.

B. State Bicycle-Related Plans, Policies, and Programs

Translinks 21

In 1994, the Wisconsin Department of Transportation (WisDOT) prepared a bicycle and pedestrian element as part of its overall multi-modal transportation plan, *Translinks 21*. This included commitments by WisDOT to: (1) consider bicycle and pedestrian accommodations on urban state highways where they are included in metro-area or local plans or justified by their projected use; (2) increase its funding of bicycle and pedestrian projects, including a new program for stand-alone projects; (3) increase its share of costs for pedestrian improvements on state highways from 75% to 80%; and (4) prepare a State Bicycle Plan. As part of the planning effort, WisDOT published *Wisconsin Bicycle Planning Guidance* to guide metropolitan and local planning efforts.

State Bicycle Transportation Plan

WisDOT completed the *Wisconsin Bicycle Transportation Plan 2020* in 1998. The plan establishes WisDOT goals, objectives, and policies for both intercity and urban and suburban bicycling, and recommends strategies and actions for WisDOT, local governments, and others to take to implement the plan. The two primary goals mirror the Federal goals to double the number of trips made by bicycles and to reduce bicyclist-motorist crashes by at least 10% by the year 2010 (with additional increases achieved by 2020). Plan objectives address planning and engineering, education, encouragement, and enforcement. The plan calls for WisDOT to take a leadership role in efforts to achieve these goals.

The goals, objectives, and recommended actions of the plan apply directly to state highways and state-supported roadways with state and federal funding investments. In addition, WisDOT will encourage local governments to follow the objectives and recommended actions in planning and designing local roadways and bicycle facility improvements. One of the roles of the plan is to help ensure a seamless inter-connected bicycle transportation network across jurisdictional boundaries and at different functional levels of roadway systems.

The plan is primarily a policy plan, but also identifies a system of “priority corridors and key linkages” connecting larger communities and other major bicyclist destinations. In addition to these improvements, WisDOT will provide bicycle accommodations on other state highways in accordance with its established design procedures. For urban and suburban areas, the state plan incorporates and recommends implementation of metropolitan area plans, such as this one.

WisDOT Policy Regarding Provision of Bicycle Facilities on State Highways

Procedure 11-45-10 of the *WisDOT Facilities Development Manual* was developed in response to Federal transportation policies urging state departments of transportation to encourage bicycle transportation and state law requiring WisDOT to assist in the planning and development of bikeways. It calls for the provision of bicycle facilities on state highways when the roadway is on an officially designated bike plan or 25 or more bicycle trips a day are anticipated during the peak season and the current traffic volume exceeds 1,000 vehicles a day. It also provides some basic design guidelines for different types of facilities and other bicycle-safe design factors, based on the AASHTO Bicycle Facility Design Guidelines.

WisDOT Bicycle and Pedestrian Transportation Program

WisDOT employs two full-time staff in its central office who promote and facilitate the increased use and improved safety of non-motorized transportation. One staffperson, the Bicycle and Pedestrian Coordinator, focuses on the overall coordination, planning, and bikeway facilities. Federal law requires state departments of transportation to fund a Coordinator position. The Coordinator serves as an advocate within the agency for bicycle and pedestrian issues, a technical resource, and a point of contact for local agencies and user groups. WisDOT intends to prepare detailed Bicycle Facility Design Guidelines and Rural Bicycle Planning Guidance to further assist state and local bicycle planning and facility development efforts.

The other primary WisDOT bicycle/pedestrian program staffperson manages the bicycle safety program with its public information, education, and enforcement activities. (See Chapter 5 for a discussion of these activities.) WisDOT also provides bicycle and pedestrian liaisons in each of its transportation district offices. The liaisons serve as a point of contact on matters involving the planning and design of bicycle and pedestrian facilities.

C. Madison Area MPO Bicycle-Related Plans and Policies

Dane County Land Use & Transportation Plan

The Vision 2020 *Dane County Land Use & Transportation Plan* (1997) provides the overall framework for development and transportation decisions within the county. The transportation component of the plan is an overall transportation systems plan, providing goals, objectives, and recommended implementation measures to guide needed improvements to all modes of transportation, including bicycles. The plan has been adopted by the new Madison Area Metropolitan Planning Organization (Madison Area MPO) as the regional transportation plan.

The bicycle element of the Vision 2020 plan includes three major objectives and identifies a number of measures to achieve them. It includes a map of proposed bicycle facilities in the Madison urban area and some proposed locations for future paved shoulders in Dane County. This plan is intended to build upon and refine the bicycle element of the Vision 2020 plan.

Land use patterns and neighborhood design determine to a large degree both the viability and attractiveness of bicycling. The Vision 2020 plan includes numerous goals, objectives, and recommended implementation actions to promote land use and urban design practices that support bicycling. Bicycle-supportive land use goals include: (1) promoting functionally and visually distinct communities; (2) encouraging compact, mixed-use neighborhoods with convenient pedestrian and bicyclist access to neighborhood focal points; (3) discouraging commercial strip development; (4) protecting the scenic values of the Dane County landscape; and (5) developing a county-wide system of open space corridors to protect the environment and provide outdoor recreation opportunities.

MPO Project Ranking Process

ISTEA increased the role of metropolitan planning organizations (MPOs) in planning and programming transportation projects in urban areas with a population greater 50,000 such as Madison. In addition to preparation of a long-range transportation plan and transportation improvement program (TIP) for the urban area, MPOs select projects for funding with Surface Transportation Program (STP)-Urban funds. The STP-Urban is one of the federal-aid highway programs and has provided around \$3.6 million annually to the Madison urban area since the passage of ISTEA. That figure is expected to increase to

\$5 million annually in 2002 with the additional funding provided by TEA-21. STP-Urban is the most flexible transportation project funding program and can be used for a wide variety of projects.

In 1993, the RPC, the former MPO for the Madison area prior to the recent RPC restructuring and MPO redesignation, developed a set of STP-Urban objectives and project selection criteria. In addition to ensuring consistency with the current plans, the criteria emphasize cost effectiveness, multi-modal use, promotion of efficient land use, and minimization of environmental impacts. The project selection process has resulted in the inclusion of bicycle and pedestrian improvements in almost all roadway projects.

The RPC also developed criteria for making recommendations to WisDOT for funding of Enhancement and STP-Discretionary projects. These two programs are incorporated into WisDOT's Statewide Multi-Modal Improvement Program, and serve as the primary source of funding for independent bicycle projects. The project criteria include: the extent to which the project improves mobility; number of people impacted; and impact on overall quality of life. The ranking process has played an important role in helping the City of Madison and other Dane County communities secure Enhancement and STP-D funding for a large number of bicycle projects.

D. County Bicycle-Related Plans and Policies

Dane County Land Use & Transportation Plan

The Vision 2020 *Dane County Land Use & Transportation Plan* has been adopted by the Dane County Regional Planning Commission as the master plan for the Dane County region. It has also been adopted by Dane County and the City of Madison, two of the units of governments responsible for implementing the plan.

Dane County Executive *Design Dane!* Report

Following a series of public meetings to gather input, Dane County Executive Kathleen Falk published the *Design Dane!* Report (May 1998), which sets forth a series of recommended actions for better managing growth in the county. The recommendations cover farmland and open space preservation, community development, environmental protection, and transportation. The report includes two spe-

cific bicycle transportation-related recommendations. The first one is to “give priority to projects that promote efficient development” in funding highway improvements, including possibly adding new criteria for county participation in joint municipal projects and adding funding for transportation options. The second recommendation is to work with towns to create a “rural scenic byways” designation on selected county and town roads, which might then be subject to special access restrictions and development standards, in order to preserve scenic vistas, bike routes, and farmland. The Wisconsin Department of Transportation is in the process of developing a state scenic byways program, which will allow the state to compete for federal discretionary funding for the program.

Dane County Highway and Transportation Department Policies and Programs

The Dane County Highway and Transportation Department has an unwritten, informal policy to provide paved shoulders three- to five-feet wide, depending upon the circumstances, on all county trunk highways with an average daily traffic of 1,000 vehicles or more when they are resurfaced or reconstructed.

For improvement projects on county highways through or adjacent to incorporated municipalities, the county has a policy to share in one-half of the costs of a widened roadway section available for bicycle use. The county will also share in one-half of the costs of any bridge widening or construction involved in the project. Off-street bicycle paths are not funded by improvement project funds.

The Dane County Highway and Transportation Department has a relatively small “Bicycle Paths” fund, which may be used by local municipalities for bicycle-related projects. A total of \$70,000 was available in 1999 and \$62,600 in 2000. A 25% local match by the municipality is required. No more than 50% of the total available funds may be requested by any one municipality. In recent years, around half of the available funding has been used to pay for a portion of the salary of the City of Madison Bicycle and Pedestrian Program Coordinator.

Bicycle projects eligible for county funding include: bicycle safety and educational programs; bike path maps and/or brochures; bike route signs; bike parking facilities; railroad

crossing improvements to aid bicyclists; shoulder paving of roadways; bike route pavement markings; and off-roadway bike trails. The Dane County Transportation Committee makes final selection of projects to be funded based on the following criteria: (1) anticipated bicycle use; (2) overcoming safety problems; (3) providing a linkage with other bikeway routes; (4) complementing area development activities; (5) clarity of project purpose; and (6) completeness of application request.

County Parks and Open Space Plan

The *Parks and Open Space Plan for Dane County, 1996-2000* identifies goals and policies for parks and recreation; natural, cultural, and historic resource protection; and urban green space, and strategies for implementing them. It also identifies and prioritizes acquisitions needs and/or development proposals for existing and proposed parks and trails and resources protection areas. Plans for existing and proposed trails that are open or envisioned to be open to bicycling have been considered and generally incorporated into this plan. The routing for a number of the proposed trails in the plan was conceptual. In many of these cases, more detailed analysis has been done and routing modifications made to take into account environmental, bicycle safety, and other issues as well as more recent detailed planning efforts. Some recommended connections to county parks have been changed to on-road vs. off-road routes.

Northern Lake Mendota Regional Plan

The *Northern Lake Mendota Regional Plan* (1999) includes a greenway trail master plan for the Pheasant Branch Conservancy and the Belfontaine Conservancy (previously known as the Frederick Farm), which together comprise over 500 acres of publicly owned open space. The plan was initiated by the City of Middleton, but was a joint effort of the city, Dane County Parks Department, Wisconsin Department of Natural Resources, and the Town of Westport. The greenway trail plan recommends a series of greenway corridors through the conservancies to connect the headwaters of Black Earth Creek with Governor Nelson State Park and Cherokee Marsh. The proposed corridors also connect the City of Middleton, Village of Waunakee, and northeast side of the City of Madison with the public open spaces of the northern Lake Mendota

region and with each other. In most cases, the trails are envisioned as bicycling and hiking trails. This bicycle plan incorporates one or more of the highest priority trail options outlined for the four different planning areas studied. In some cases, it was recommended to pursue more than one trail option simultaneously.

In addition to development of the proposed greenway trail system, the plan also makes recommendations for restoration management to improve the vegetative communities and provide better wildlife habitat. The plan provides information on previous studies, existing conditions, potential improvements, and makes recommendations for further studies. The goal of the plan was to provide access to the properties for education and passive recreation, but to do so in an ecologically safe and sustainable manner.

E. Local Community Bicycle-Related Plans, Policies, and Regulations

Central Urban Area Communities

City of Madison

The City of Madison has adopted *Objectives and Policies for the City of Madison*, which comprise a part of the Master Plan. The objectives and policies contain a section on transportation and parking. The objectives support the overall policy of providing a flexible transportation system, which provides alternative modes of travel to most destinations, minimizes conflicts among the different modes, and discourages single-occupant vehicle commuting. The bicycle is recognized as a major mode of transportation and vehicle for recreation. Specific bicycle policies include provision of all needed bicycle facilities when constructing or reconstructing city streets and including the requirements of bicycle traffic in the design of all traffic control devices.

The city's land use policies support designing new neighborhoods to minimize the need for driving to access school, shopping, and recreational facilities. The city prepares neighborhood plans prior to the development of new areas, and attempts to implement this policy in designing new neighborhood areas. Recently adopted neighborhood plans include the Sprecher Neighborhood on the East Side, Marsh Road Neighborhood on the Southeast Side, and the Westside Neighborhood and Mid-

Town Road Amendment to the High Point-Raymond Neighborhood on the West Side. The city also uses Community Development Block Grant (CDBG) funding to prepare and update neighborhood plans for existing neighborhoods. Bicycle transportation issues and needs are routinely addressed in these plans.

The recently updated *City of Madison Park & Open Space Plan* (1997) recommends that master plans for future area parks and larger parklands incorporate pedestrian/bicycle circulation to and within them. The plan identifies specific needed bicycle trail links to recreational areas and potential new paths on parklands. The Parks Division maintains most of the off-street multi-use paths in the city.

The city recently adopted a comprehensive *Pedestrian Transportation Plan for Madison, Wisconsin* (1997), which provides a framework for implementing strategies and actions to enhance the pedestrian environment. The plan includes a series of specific recommended actions addressing community and site development, design and maintenance of pedestrian facilities, education, encouragement, enforcement, and pedestrian planning. The recommendations are prioritized (high, medium, low) for implementation. The issues and recommendations regarding community and site development and street crossings are particularly relevant to bicyclists.

The City of Madison Department of Transportation (Madison DOT) employs a Pedestrian-Bicycle Coordinator. The Coordinator's responsibilities include facility planning, policy development, project review, bicycle crash analysis, public relations, education, and coordination among city agency staff and bicycle organization activities. The Madison DOT prepares an annual work program identifying priority independent bicycle projects for the next several years. Projects incidental to street reconstruction, such as new bike lanes, are included in the street improvement plan. The city does not have its own bicycle facility design guidelines, but generally follows the AASHTO Guidelines.

The City of Madison has a Pedestrian/Bicycle/Motor Vehicle Commission (PBMVC), which provides recommendations to the Common Council regarding policies on all pedestrian, bicycle, and motor vehicle matters. The PBMVC consists of three members of the Common Council and six citizen members with two alternates.

Among the duties of the PBMVC are to develop and update pedestrian and bicycle policies, programs, and facilities, including setting priorities for work programs. The PBMVC holds an annual hearing on the pedestrian and bicycle work program.

The city's subdivision ordinance includes a list of policies to which subdivisions shall conform, including favoring land use intensities and patterns that are supportive of alternative modes of transportation. The ordinance contains common design standards relating to street connectivity, but does not discourage use of cul-de-sacs. Block lengths are not limited, except in the R2S Zoning District (allowing smaller lots) where they are generally not to exceed 500 feet. Pedestrian ways (minimum 10 feet in width) are required across blocks greater than 900 feet. Subdividers are required to pay for street and intersection area improvements necessitated by the development, including bicycle lanes, turn lanes, and traffic signals.

The city has a detailed bicycle parking ordinance, passed in 1998, which requires the provision of off-street bicycle parking for new developments, expansion of existing developments, and changes in use that would require additional parking. For expansions or changes in use, bicycle parking is required based only on the extra amount needed by the addition or change in use, similar to the automobile parking requirements. The number of bicycle parking spaces required is determined by the Zoning Administrator based on guidelines in the ordinance. The ordinance also specifies location, space, and rack design criteria.

City of Middleton

The city is near completion of an update to its existing Comprehensive Master Plan, which dates back to 1982. Transportation objectives of the existing Master Plan include supporting the development of safe pedestrian and bicycle way systems connecting residential areas with neighborhood facilities and encouraging use of non-auto transportation. Sub-area plans were prepared in 1988 and 1990 for the Southwest and North/Northwest areas of the city. Greenway Center encompasses a large part of the Southwest area. One of the recommendations of the Southwest Area plan was to improve the pedestrian/bicycle connections between the Downtown and this area. The Northwest Area Plan included recommended traffic corridors for the area west of USH 12 and north of CTH M (Century Ave.).

The City of Middleton recently adopted the *City of Middleton Bicycle and Pedestrian System Plan* (1999), which provides a planning and policy framework for the development of a community-wide network of bicycle and pedestrian facilities that link area schools, parks, community facilities, and business and employment districts. The plan makes specific recommendations for the provision of on-street bicycle facilities and off-street paths and implementation of a bicycle route system. The plan incorporates trail facility improvement recommendations included in the city's *Comprehensive Park and Open Space Master Plan* (1995). The bicycle plan recommends establishment of community-wide bicycle and pedestrian safety educational programs. The plan was adopted as part of the city's Master Plan.

The city's subdivision ordinance requires that subdividers plan any bikeways included in the city's Master Plan or Official Map, and construct dedicated bikeways prior to issuance of a building permit. The requirements for dedication of parks and public sites includes a provision requiring the dedication of land for pedestrian and bikeway linkages necessary to provide access to park, recreation, and open space areas. Provision of bikeways, including lighting for those away from streets is required, where deemed necessary. The subdivision ordinance's street design standards include provisions for access control along arterial streets, and require streets to be generally designed to connect to future development areas, but use of cul-de-sacs is not limited or discouraged. Pedestrian ways (minimum ten feet in width) are required across blocks exceeding 900 feet, where deemed necessary to provide access to schools, parks, etc. The zoning ordinance does not include bicycle parking facility requirements.

City of Fitchburg

The City of Fitchburg updated its General Land Use Plan in 1995, with assistance from Dane County RPC staff. The plan is the city's long-range land use policy document. The goals and policies support compact, mixed-use development that increases the accessibility of services and provides transportation alternatives. Bicycle-specific transportation policies include considering the needs of bicyclists in all roadway improvements and providing pedestrian and bicycle routes that link parks, schools, and open space areas. The plan includes a proposed bicycle way system and recommends inclusion of bicycle lanes on arterial and collector streets when reconstructed. Restriping

for bike lanes is recommended for collector streets included in the bicycle way system, but not scheduled for reconstruction. The city is in the process of finalizing a separate bicycle and pedestrian plan.

The City of Fitchburg's *Plan for Open Spaces and Recreation* (1994) emphasizes the city's policy to provide bicycle lanes and off-street paths to provide bicycle and pedestrian access to recreational areas. The plan includes a specific recommendation to provide an underpass of CTH PD (McKee Rd) east to Chapel Valley Rd. to connect the Capital City State Trail with McKee Farms Park and the city's central neighborhoods.

The City of Fitchburg's *General Land Use Plan* recommends concentrating most future development in the Nine Springs Neighborhood east of the Fitchburg Center, north of Lacy, and west of USH 14. The neighborhood plan for the area calls for a mix of residential types, a business park, and commercial and institutional uses. Multi-use paths are proposed to connect McGaw Park with the Capital City State Trail and the residential area west of Syene Road to the business park, commercial area, and possible future transit station.

The city's subdivision ordinance includes common street design standards that address street connectivity. Proposed streets are required to extend to the boundary lines of the tract being subdivided, unless determined to be unnecessary. Cul-de-sacs are limited to generally no more than one for every 50 lots in the land division. Pedestrian ways (ten feet minimum in width) may be required across blocks greater than 900 feet in length. The ordinance also includes a requirement for dedication of public ways. The zoning ordinance does not require bicycle parking facilities.

City of Monona

The city's Master Plan, adopted in 1979, supports encouragement of bicycling and planning for future bikeways. Given the city's landlocked situation, planning efforts have focused on redevelopment of small areas and key corridors. In 1988, the city adopted the *Broadway Corridor Plan* in response to the construction of the South Beltline. Prepared by RPC staff, the plan identified development strategies, infrastructure improvements, and design criteria for the corridor. Transportation recommendations included access management and provision of bicycle and pedestrian

improvements. A streetscape plan developed a year later refined the recommended pedestrian/bicycle facility improvements, which included bicycle lanes along the entire roadway. Many plan recommendations, including the bike lanes, have been or are being implemented. The city is beginning a similar planning effort for the Monona Drive Corridor.

Monona has a signed "Scenic Bike Route" system, which provides an alternative to the Lake Loop Bike Route through the city. The route follows Winnequah Road to Healy Lane to Nichols Road, and onto Winnequah again before connecting back up with the Lake Loop Route at W. Dean Ave. The scenic route is designed to connect several parks and community facilities, including the pool, library, and community center. The *Dane County Park and Open Space Plan* included a recommendation for a route connecting the Capital City Trail to Edna Taylor Park via Raywood Rd./South Towne Dr. and W. Broadway.

Village of McFarland

The village updated its *Master Plan for the Village of McFarland* in 1994. A *Residential Growth Management Plan* was adopted in 1998 as an amendment to the Master Plan. Dane County RPC staff prepared both plans. The Master Plan includes land use policies that support bicycling and other alternative transportation modes. Transportation policies address the provision of bicycle accommodations on roadways, where needed. The plan includes a proposed bicycle way system, and a recommendation that bike lanes be provided on designated streets. The bicycle way system plan was further refined as part of development of the *Village of McFarland Outdoor Recreation Plan* (1995). Increasing pedestrian and bicycle access to recreational facilities is one of the plan goals.

The village has an ordinance chapter with provisions addressing the operation of bicycles. The provisions supplement the general "rules of the road" contained in the state statutes. The provisions are generally consistent with state law. An exception is a provision generally prohibiting use of adult-sized bicycles (with wheels 20 inches or greater) on sidewalks. The village also has a bicycle registration requirement.

The subdivision ordinance includes a requirement to install bicycle paths in accordance with village plans. The

subdivider is required to assume the cost. The ordinance also contains street design standards, which address street connectivity and pedestrian accessibility. Use of cul-de-sacs is discouraged. Pedestrian pathways (10 feet minimum in width) are required through the center of blocks more than 900 feet long where necessary to provide access to schools, parks, shopping centers, etc. The zoning ordinance does not require bicycle parking facilities.

University of Wisconsin

The *University of Wisconsin Campus Master Plan* (1996) provides a planning framework and identifies opportunities for development of new campus facilities. The plan includes the following planning principles for bicycle circulation:

- Recognize bicycles as an essential mode of transportation.
- Encourage increased ridership by creating major campus corridors and improved storage opportunities.
- Create separate bicycle and automobile routes, including in-street lanes and off-street paths whenever possible.
- Connect campus corridors with regional routes.

The plan recommends the following bicycle facility improvements:

- Add bike lanes to the Linden Drive Corridor and restrict motor vehicle access to special permit holders, buses, and persons with disabilities.
- Develop a bicycle path along the University Ave. railroad corridor with linkage points into the campus bikeway system.
- Construct a bike path on the north side of Observatory Dr. from Willow Creek to Walnut St. and extend the existing path along the westside of Willow Creek to the planned RR corridor path.
- Provide direct linkages from the Lakeshore Path to the planned Murray Mall and Langdon St.
- Provide new bicycle parking facilities in the west campus area and include weather-protected bicycle parking with new building projects.

The plan also includes several intersection and roadway modification recommendations to improve bicycle safety and circulation. These include:

- Conversion of Mills and Charter Streets to a one-way pair to reduce turning movements and conflicts at the Charter St./University Ave. intersection.
- A long-term recommendation to convert Randall Ave. (bet. Johnson and Spring Streets) and Dayton St. (bet. Randall Ave. and Charter St.) into restricted access corridors.

In 1999, UW Transportation Services hired a full-time Bicycle/Pedestrian Coordinator as part of their Transportation Demand Management (TDM) program. The Coordinator develops policies, oversees facilities maintenance, promotes transportation alternatives, develops education programs, and coordinates activities among university departments. The UW has a Bicycle/Pedestrian Subcommittee, which advises the Campus Transportation Committee, the administration and staff. The UW Bicycle/Pedestrian Subcommittee consists of six faculty/staff and one student.

One of the current projects of the coordinator and Bicycle/Pedestrian Subcommittee is the development of a campus bicycle plan. The first task will be to develop a comprehensive bicycle route plan, which will help identify priority projects. UW Transportation Services is also in the process of developing Campus Design Guidelines & Standards for new buildings and transportation facilities.

Outer Area Communities

Development of bicycle plans for communities outside the central urban area was outside the scope of this plan. However, in developing the recommended countywide inter-community bicycle way system, community land use and parks and open space plans were reviewed to ensure coordination of the recommended countywide system with existing and proposed local on-street and off-street bicycle ways identified in these plans. Major bicycle trails included in these plans, such as the planned path system in the DeForest-Windsor area, have been incorporated into this plan.

Chapter 5

Bicycle Operation and Safety Considerations and Current Educational, Encouragement, and Enforcement Programs and Activities

Safety education, training, and promotional programs to increase bicycle use are important components of state and local bicycle and pedestrian programs. The goals of increasing bicycle use while reducing bicycle crashes will not be achieved through facility improvements alone. There are a host of institutional, cultural, and other factors that influence people's choice of transportation mode. Educational and promotional efforts help give people the confidence, information, and motivation to bicycle. The success of safety education is enhanced by an adequate enforcement program.

This chapter reviews state bicycle laws, bicycle crash data and studies, and current safety education and training programs and issues, promotional activities and policies, and enforcement activities.

A. Wisconsin Laws Governing Bicyclists

Chapter 346 of the Wisconsin Statutes contains the traffic laws or "rules of the road" affecting the operation of motor vehicles and bicycles and pedestrians. Bicycles are included within the definition of "vehicle," and bicyclists are granted all of the rights and responsibilities afforded motor vehicle operators, with a few exceptions. For example, bicycles are prohibited on expressways and freeways where signs have been posted prohibiting such use.

The following are the more important state laws relating to the operation of bicycles on the street system:

Lane Positioning, Use of Shoulders, Turning

- Bicyclists must ride as near as practicable to the right edge of the roadway. Situations when this is not practicable include when preparing to make a left-hand turn or passing another vehicle, and when necessary to avoid unsafe conditions (e.g., to avoid objects or when the road is too narrow to be safely shared by a bicycle and motor vehicle).
- Bicycles may be ridden on the shoulder of a highway unless prohibited by the authorities responsible for maintaining the roadway.

- Bicycles and motorists must be in the proper lane position prior to turning or making other movements.
- Bicyclists are required to use the same hand signals as motorists when turning. However, bicyclists are not required to signal continuously before turning if both hands are needed on the handle bars to control the bicycle.
- Bicyclists as well as motorists are required to yield the right-of-way to pedestrians at an uncontrolled intersection or when in a marked or unmarked crosswalk. Motorists shall yield to bicyclists riding in a crosswalk in a manner consistent with the safe use of the crosswalk by pedestrians.

Passing Clearances

- Motor vehicles must allow at least three feet of clearance when passing a bicycle on the roadway and maintain the clearance until safely past.
- Bicyclists must also allow at least three feet of clearance when passing a standing or moving motor vehicle.

Riding Two Abreast

- Bicyclists may ride two abreast if such operation does not impede the normal movement of traffic. If riding on a two-lane road, the bicyclists both have to use a single lane.

Use of Sidewalks

- Bicyclists may ride on sidewalks, where permitted by local governments, but must yield the right-of-way to pedestrians and give an audible warning when passing pedestrians traveling in the same direction.
- At intersections and other sidewalk crossings (alleys, driveways), a bicyclist on the sidewalk has the same rights and duties as a pedestrian.

Use of Off-Street Paths

- Off-street paths are generally two-way, multi-use facilities open to bicyclists, pedestrians, in-line skaters, wheelchairs, and other non-motorized users. While there are no set laws or rules regarding right-of-way, it is generally accepted that applicable “rules of the road” apply and that faster traffic on a path yields to slower traffic.
- Intersections of bicycle paths and streets are generally treated the same as the intersection of two streets, however bicyclists should still use caution when crossing a street.

Bicycling at Night

- Bicycling at night requires at least a white front light visible to others 500 feet away and a red rear reflector or light visible to others 50-500 feet away.

Regulatory Authority of Local Governments

State Statutes allow local governments to designate bicycle ways, including bicycle paths, bicycle lanes, and bicycle routes. Local governments may also prohibit bicycle use on roads under their jurisdiction, provided a public hearing is held and an ordinance is adopted.

Cities, villages, and towns are authorized to require bicycles to be registered and to charge a registration fee. Counties may require registration if it is not required by a city, village, or town. The City of Madison and Village of McFarland have registration programs. Registration is required of all bicycles used on city/village streets. City of Madison registration costs \$8.00 and is good for a four-year period. McFarland’s registration cost \$1.00 and does not expire. The University of Wisconsin requires bicycles on campus to be registered with the City of Madison. Fees from UW registrations go towards bicycle safety and enforcement on the UW campus.

B. Bicycle Crashes

Potential bicyclists often cite the fear of being hit by a motor vehicle as a principal reason for not riding more often. Often, these fears are based on misconceptions. This section reviews data and studies on bicycle crashes. This

information can help the public better understand bicycle crashes, including the situations that are most likely to produce a crash. This information can then be used in educational programs to reduce those behaviors by bicyclists and motorists that pose the greatest potential danger.

A major limiting factor in analyzing bicycle crash data is the lack of data on “exposure.” There is very little information known about the everyday trips people make by bicycle—including trip purpose, length, and frequency—particularly on a local level. This makes it impossible to calculate crash rates. In addition, many bicycle crashes go unreported because they do not result in personal injury and/or do not involve a crash with a moving motor vehicle. It is important to keep this in mind in reviewing the bicycle crash data presented.

Trends and Characteristics of Bicycle Crashes and Bicyclists Involved in Them

City of Madison

The City of Madison’s Traffic Engineering Division maintains traffic crash files, by location, for all reported crashes in the city, including those involving bicyclists. The data comes from State MV 4000 reports, which are filed by the Madison Police Department and compiled in annual published Crash Reports. The police file reports only on crashes involving an injury or \$1,000 or more in property damage.

The numbers of reported bicycle crashes, injuries, and fatalities have decreased from the early 1980s. There were almost 350 reported bicycle crashes in the city in 1983 compared to less than 150 in 1998. The city averaged more than one bicyclist fatality per year in the 1980s. From 1990 through 1998, there were only two bicyclist fatalities.

Part of the decrease in the total number of crashes is attributable to changes in reporting requirements. The threshold for reporting crashes was increased from \$200-\$500 to \$1,000 in property damage, and the Madison Police Department stopped reporting crashes not involving a motor vehicle. Nonetheless, the annual number of bicycle crashes has still shown a positive downward trend.

Ninety-three percent (93%) of the reported 136 bicycle crashes in the city in 1998 resulted in an injury, 7% resulted in property damage only, and one or 0.7% resulted in a fatality.

The City of Madison Transportation Department conducted a study⁵ analyzing bicycle crashes using 1987-1990 data on reportable bicyclist-motorist crashes and other reported crashes not involving motor vehicles. The study found that 62% of the crashes involved bicyclists aged 20-44, reflecting the high level of adult bicycle usage in Madison. Bicyclists aged 10 to 24 were over-represented in terms of the number of reported crashes they were involved in compared to their percentage of the population, according to the 1990 Census. Table 5 shows the age distribution of the bicyclists involved in crashes compared to the overall population.

Table 5
Age Distribution of Bicyclists Involved in Crashes
Madison, Wisconsin, 1987-1990

Age Range	Number of Crashes	% of Crashes	% of 1990 Population
0 to 9	41	4.2	11.6
10 to 14	81	8.2	4.5
15 to 19	162	16.4	8.5
20 to 24	327	33.2	16.0
25 to 44	282	28.6	35.8
45 to 64	34	3.5	14.3
65 & Over	5	0.5	9.3
Unknown	53	5.4	0.0
Total	985	100.0	100.0

Source: Arthur Ross, *Bicyclist Crash Analysis in a City of Adult Bicyclists* (1991)

Two-thirds of the adult bicyclist-motorist crashes analyzed in the City of Madison study occurred on the street, while 30% were on a sidewalk or in a crosswalk. Only 1.6% were on a bike path, and another 1.6% were entering the street from a driveway. In 72% of the crashes in a sidewalk or crosswalk, the bicyclist was traveling against traffic compared to less than 5% for those crashes on the street.

Of the crashes on the street, 72% of the adult bicyclists were on a street without bike lanes. Over half of the crashes occurring on a street with a bike lane occurred on University Ave., a major one-way arterial street with a ten-block long contra-flow bike lane. The average daily motor vehicle traffic volume on this portion of University Ave. is around 30,000, and the average daily bicycle traffic volume is around 7,000

in good weather when UW is in session. According to recent annual city crash reports, of the bicycle-motor vehicle crashes that occur on streets, over 2/3s occur on arterial streets, around 20% on collector streets, and 10% on local streets.

Remainder of Dane County and State

Table 6 shows the number of bicycle-motor vehicle crashes on public roadways reported in Dane County by municipality during the five-year period from 1994 to 1998.

Table 6
Bicycle-Motor Vehicle Crashes¹ in Dane County
by Municipality: 1994-1998

Municipality	1994	1995	1996	1997	1998	Total
C. Fitchburg	3	2	1	0	2	8
C. Madison	146	144	113	104	131	638
C. Middleton	6	4	2	2	8	22
C. Monona	1	5	5	2	4	17
C. Stoughton	7	6	4	8	8	33
C. Sun Prairie	5	8	8	8	10	39
C. Verona	1	0	0	3	3	7
V. Belleville	0	0	0	1	0	1
V. Black Earth	0	0	1	0	0	1
V. Cottage Grove	0	0	0	0	1	1
V. Cross Plains	1	0	0	0	1	2
V. Dane	0	1	0	0	0	1
V. Deerfield	0	0	1	0	0	1
V. DeForest	4	1	0	0	1	6
V. Maple Bluff	0	1	2	0	0	3
V. Marshall	1	0	0	1	0	2
V. McFarland	0	2	1	0	0	3
V. Mount Horeb	1	0	1	0	1	3
V. Oregon	2	1	1	0	1	5
V. Shorewood Hills	1	2	1	1	0	5
V. Waunakee	1	2	2	3	2	10
T. Albion	0	1	1	0	0	2
T. Blooming Grove	0	2	0	1	0	3
T. Burke	0	0	1	0	1	2
T. Cottage Grove	0	0	1	2	0	3
T. Cross Plains	0	0	1	0	0	1
T. Dunn	0	1	2	2	0	5
T. Madison	5	2	2	1	0	10
T. Mazomanie	0	0	1	0	0	1
T. Medina	0	0	0	0	0	0
T. Montrose	0	0	1	0	0	1
T. Roxbury	0	0	0	0	1	1
T. Sun Prairie	0	1	0	1	0	2
T. Verona	1	0	0	0	0	1
T. Vienna	0	0	0	0	0	0
T. Westport	0	1	0	0	0	1
T. Windsor	0	1	0	0	0	1
T. York	0	0	1	0	0	1
Total	186	188	154	140	175	843

¹Numbers represent bicycle/motor vehicle crashes on public roadways.

Source: WisDOT Traffic Accident Database

⁵ Arthur Ross, *Bicyclist Crash Analysis in a City of Adult Bicyclists* (1991).

All except for a small number each year occur in the county's incorporated cities and villages where most of the population lives and most bicycling occurs.

WisDOT staff compiled statewide data on bicycle crashes for the years 1989-1998 as part of development of the *Wisconsin Bicycle Transportation Plan 2020*. As with the City of Madison data, there has been a downward trend in reported bicycle crash injuries and fatalities since the mid-1980s. Most bicyclists (94%) involved in crashes with motor vehicles were injured, but only 15% received serious injuries and only 0.7% were killed. These figures are very similar to the ones in national studies. The vast majority (83%) of all bicycle crashes occurred in incorporated areas with a population of 5,000 or more. However, only 43% of the fatal crashes occurred on urban roadways, reflecting the lower speed limits on these roads. The severe and fatal injury rate of bicyclists involved in crashes with a motorist increases dramatically at higher speeds. See Table 7.

Table 7
Bicyclist Injury Rates¹ by Speed of Motor Vehicle
Wisconsin, 1989-1998

Posted Speed (mph)	Fatal Injury Rate	Severe Injury Rate	Total Injury Rate
25-30	3.3	141	937
35-45	11.3	187	925
55	60.8	352	884

¹Injury rate is the number of injured bicyclists per 1,000 bicyclists in crashes at that speed limit.

Source: Wisconsin Dept. of Transportation

The majority of bicyclists involved in reported crashes statewide were children with 59% under age 16. Motorists aged 15-24 were involved in the largest proportion (22%) of crashes with bicycles. Not surprisingly, most crashes occurred during the warmer months. Over one-half occurred during the three summer months. Late afternoon-to-early evening (3-7 p.m.) was the most common time period for bicycle crashes with nearly one-half occurring during these hours.

Bicycle Crash Types and Contributing Factors

Various studies have shown that only a small minority of crashes—generally less than 20 percent—are the result of bicycle-motor vehicle collisions. By far the most common accident type, accounting for around one-half of accidents, is falls resulting from defective road surface conditions, an object getting caught in moving parts, bicyclist error, or other causes. However, many bicycle crashes resulting in severe injuries and almost all fatal crashes involve motor vehicles. Hence, the reason for the focus on bicycle-motor vehicle crashes.

The above-mentioned Ross study focused on bicyclist-motorist crashes involving adults in the City of Madison. The national crash type studies that had been conducted up until that time, including the most prominent one, the 1977 Cross-Fisher study⁶, had analyzed mainly child crashes. The purpose of the Madison study, which was funded by a grant from WisDOT's Bureau of Transportation Safety, was to get information on typical patterns for crashes involving adult bicyclists. This information could then be used to improve bicyclist safety and encourage more bicycle use.

The National Highway Safety Administration has developed crash typing codes, based on the Cross-Fisher study.⁷ A modified version of these crash typing codes was used for the Madison study. The crash types do not necessarily indicate who was at fault, but rather the sequence of actions leading to the crash. Each crash type has precipitating actions, predisposing factors, and characteristic populations and/or locations that can be targeted for interventions. The term "crash" is used instead of "accident," because the latter term implies an unavoidable event. Most crashes are preventable if drivers and bicyclists were more attentive and courteous and obeyed traffic laws.

In the Madison study, the most common crash type was the motorist left-turn, bicyclist approaching from the opposite direction, which accounted for 23% of the bicyclist-motorist crashes. Over 1/3 of these involved a bicyclist traveling in the University Ave. contra-flow lane. Motorist left-turns, bicyclist traveling in the same direction as motorist, accounted for another 3% of crashes, with 61% of these occurring on Johnson St., a one-way arterial street with a bike lane on the left side of the road.

⁶ Kenneth Cross and Gary Fisher. *A Study of Bicycle/Motor Vehicle Accidents: Identification of Problem Types and Countermeasure Approaches*, U.S. Dept. of Transportation (1977).

⁷ See Federal Highway Administration, *Bicycle Crash Types: A 1990's Informational Guide* (April 1997), Publication No. FHWA-RD-96-104.

The second most common crash type involved a motorist driving out from a stop sign, accounting for 16% of the crashes. In 90% of these crashes, the motorist stopped first, but then failed to yield to the bicyclist. Motorist drive-out from a traffic signal accounted for 3.9% of the crashes—in 2/3s of cases, a right-turn on red. In almost every one of these cases, the bicyclist was in the crosswalk and traveling against the flow of traffic. A bicyclist riding out from a stop sign accounted for 3% of all crashes, while another 4.8% involved a bicyclist ride-out at traffic signal.

Around 10% of crashes occurred when a motorist was exiting a driveway. Most of the time, the motorist was facing forward and the bicyclist was traveling on the sidewalk. Motorists turning or merging to the right accounted for 7.1% of all crashes, while all of the bicyclist turn/merge categories accounted for 6.3%. A motorist overtaking a bicyclist accounted for just 4.1% of the crashes.

Table 8 shows the breakdown of crashes by general crash type for the City of Madison study.

Table 8
Bicyclist-Motorist Crashes by Crash Type
Madison, Wisconsin, 1987-1990

Crash Type	Percentage			
	Bicyclist	Motorist	Unknown	Total
Turn/Merge	6.4	34.0		40.4
Stop Sign Driveout	3.0	16.0	0.3	19.3
Midblock Driveout	2.6	9.9		12.5
Overtaking	6.3	4.1		10.4
Traffic Signal Driveout	5.3	3.9	0.9	10.1
Driveout, Uncontrolled	2.2	0.9	0.5	3.6
Misc. Turns	0.2	0.3	1.0	1.5
Misc. Other	0.9	0.9	0.4	2.2
Total	26.9	70.0	3.1	100.0

Source: Arthur Ross, *Bicyclist Crash Analysis in a City of Adult Bicyclists* (1991).

The 1977 Cross-Fisher study was updated in 1996 by Hunter, Pein, Stutts and Cox based on crash data from 1991 and 1992.⁸ The Hunter/Pein/Stutts/Cox study included more young adult bicyclists aged 25-44 (23%) than the Cross-Fisher study (10%). The results of the Hunter et. al. study generally concur with the City of Madison study in terms of the most common crash types. The following six groups of crashes accounted for 81% of all crashes in the study:

- Motorist failed to yield (22%)
(includes Drive through, Drive out at intersection, Drive out at mid-block, and Right on red)

- Motorist turned/merged into path of bicyclist (12%)
(includes Motorist left turn facing bicyclist, Motorist left turn in front of bicyclist, Motorist right turn, and Drive out from on-street parking)
- Motorist overtaking bicyclist (9%)
- Bicyclist failed to yield at intersection (intersection ride-out) (17%)
- Bicyclist failed to yield at mid-block (mid-block ride-out) (12%)
- Bicyclist turned/merged into path of motorist (9%)
(includes Bicyclist left turn facing traffic, Bicyclist left turn in front of traffic, Bicyclist right turn while riding facing traffic, Ride out from sidewalk)

Based on the national studies, the most common crashes involving child bicyclists are:

- Bicyclist mid-block ride-out
- Bicyclist ride-out at uncontrolled intersection
- Bicyclist makes unexpected turn or swerves into traffic.

In these crashes, the child bicyclist makes the primary error and the motorist has insufficient time to adjust and avoid a collision.

The Hunter et. al. study identified numerous factors in four categories (bicyclist, bicycle, driver, roadway/environment) contributing to the occurrence of the bicycle-motor vehicle crashes, based on the information provided on the crash report forms. Up to three factors were identified in each of the four categories. The most frequently coded driver contributing factors were failure to yield (24%) and failure to see bicyclist (claim by driver or police conclusion) (12%). Other factors included failure to look both ways (4%); improper turn (3%); speeding (2%); improper passing (2%); inattention (2%); right on red (2%); safe movement violation (2%); and stop sign/traffic signal violation (2%). The most frequently cited bicyclist factors were failure to yield (21%) and riding against traffic (15%). Others included stop sign violation (8%); safe movement violation (6%); lack of conspicuity (5%); came off sidewalk at intersection (5%) or driveway (4%); and improper turn/no hand signal (5%).

⁸W.H. Hunter, W.E. Pein, J.C. Stutts and C.L. Cox, *Pedestrian and Bicycle Crash Types of the Early 1990s* (1996).

Summary

Turning, merging, and crossing movements at intersections, driveways, and other junctions account for 3/4s or more of all bicyclist-motorist crashes. The motorist overtaking bicyclist—the most feared accident type—accounts for a very small percentage (e.g., 4% in the Madison study) of crashes in urban areas, but a much larger percentage in rural areas (e.g., 30% in the Cross-Fisher study).

Riding on sidewalks is not as safe as people generally perceive it to be, and may even have a higher rate of crashes per bicycle-mile than roadway bicycling. For example, a recent study of crashes in Palo Alto, California found the risk of a crash with a motor vehicle 1.8 times greater for bicyclists riding on the sidewalk versus on a roadway.⁸ Bicyclists traveling on a sidewalk against the flow of traffic are at greatly increased risk for crashes with a motor vehicle. The Palo Alto study found the risk 3.6 times greater (6.6 times for those 17 and younger) than riding with traffic. The City of Madison study found that 30% of all crashes occurred on sidewalks or within crosswalks with almost 3/4s of those crashes occurring while the bicyclist was riding against the flow of traffic in the adjacent street.

Speed plays a major factor in the seriousness of crashes. While the majority of bicyclist-motorist crashes occur in urban areas, a much smaller percentage of the severe injuries and fatalities occur there due to the generally lower speeds on urban streets. While a small percentage of crashes statewide occurred on state and county highways, half of the bicyclist fatalities occurred on them. National studies, including the Hunter/Pein/Stutts/Cox study, indicate that additional riding space (i.e., paved shoulders, wider travel lanes) has a positive effect on bicycle safety.

The studies on bicyclist-motorist crash types show that bicyclist training in how to properly ride in traffic and motorist education and training in operating with and being more attentive to bicyclists are most important to efforts at improving bicyclist safety. Failure to yield is a common error for both bicyclists and motorists. Failure to see the bicyclist is a common motorist error. Analyses of national studies conclude that the high rate of crashes among teenage and young adult bicyclists is not the result of recklessness, but rather ignorance. Most bicyclist-caused crashes are the result of easily identifiable and avoidable habits that contradict the “rules of the road.”

Aside from education and training programs, the next most important safety countermeasures are reducing road-surface defects and making intersection improvements. The vast majority of bicyclist crashes do not involve a motor vehicle, and of those, road-surface defects are the most common cause. Because most bicycle-motorist crashes occur at intersections, driveways, and other junctions, improvements at these locations on higher volume roads (installing signals, providing protected left-turns, improving sight lines, etc.) is another important safety measure.

C. Bicycle Safety Education and Training

Existing Bicycle Safety and Training Programs and Resources

Youth Bicyclist Programs

The Wisconsin Department of Transportation’s Bureau of Transportation Safety (WisDOT BOTS) offers a variety of bicycle safety education courses. Many of them are directed at youth bicyclists or teachers or instructors who teach bicycling to children.

“Basics of Bicycling” is a seven lesson bike safety curriculum, with video and on-bike lessons, designed primarily for 4th graders. WisDOT sponsors instructor trainings for teachers and parks and recreations staff to teach the course. “Teaching Safe Bicycling” is a one-day training course designed for people who teach bicycling to children. Topics include child traffic skills, common crash types, and crash avoidance skills. In addition, three different “Effective Cycling – Kids” courses are offered for parents who are helping their young children (grades K-3) with early cycling education, for 4th-5th graders, and for middle school students. The courses address bike handling and fit, how to ride safely, basic traffic laws, bike maintenance, riding in challenging roadway situations, and other topics. The Effective Cycling – Kids courses are organized by the Bicycle Federation of Wisconsin (BFW).

WisDOT BOTS also prepares and distributes bicycle safety brochures and other materials and conducts other educational activities. Some of the resources, such as the “Basics of Bicycling” curriculum, are available free for school districts. The “Basics of Bicycling” curriculum was

⁸ Alan Wachtel and Diana Lewiston, “Risk Factors for Bicycle-Motor Vehicle Collisions at Intersections,” *ITE Journal*, pp. 29-35 (Sept. 1994).

developed by the Bicycle Federation of America and is designed to be incorporated into the regular school curriculum in seven 40-minute class periods. It is aimed at 4th graders. WisDOT BOTS also administers grants of up to \$1,000 for bicycle safety programs to communities with unusually high bicycle-crash and severe injury rates. (See Appendix C for more information and the contact person)

The City of Madison Traffic Engineering Division employs a full-time Pedestrian/Bicycle Safety Educator, who works with elementary schools primarily in the Madison Metropolitan School District and with youth and neighborhood organizations. The position is funded with STP-Urban funding. The safety educator's activities are focused on skills development through implementation of a modified "Basics of Bicycling" curriculum and summer bicycle rides. The coordinator also assists with the Wheels for Winners earn-a-bike program.

Several area organizations and health agencies provide bicycle safety programs. One of the most notable in the Madison area is the Dean Medical Center's "Crash Helmet" program. The program includes television spots, printed material, and presentations, using a comical character to educate preschool and elementary school children on the importance of wearing a bike helmet. Discount coupons are also offered towards the purchase of approved helmets.

The National Highway Traffic Safety Administration (NHTSA) provides many bike safety resources on the Web at www.nhtsa.dot.gov/people/injury/pedbimot/. Other resources are available from the SAFE KIDS Coalition of Wisconsin (Contact Jim Savage, (715) 344-7101) and the Wisconsin Information Network for Safety ((800) 261-WINS), which provides safety fact sheets from *Safe Ride News*. Various agencies and organizations can be contacted through the Bike Hub website at www.cdc.gov/ncipc/bike.

The American Automobile Association (AAA) develops materials concerning bicycle safety and provides them to police departments, schools, and others interested on request. The materials address subjects such as conducting "bicycle rodeos," purchasing bicycles for children, and safe bicycling tips for children and adults. Materials can be ordered through the AAA Wisconsin Chapter in Madison.

Adult Bicyclist and Planner/Engineer Programs

The Bicycle Federation of Wisconsin (BFW), a statewide education organization, offers several "Effective Cycling" courses for riders of different skills and age levels as well as a course for instructors. A special course is offered for planners and engineers, which includes bicycle facilities design as well. The "Effective Cycling" course program was developed by the League of American Bicyclists and has been improved over the years. The program is designed to help bicyclists assert themselves in traffic through the development of safe, responsible bicycling skills. It is based on bicycling principles and techniques advanced in John Forester's book *Effective Cycling*. The cost of courses to train and certify instructors has been partially underwritten by WisDOT TDM grants. Several other bicycle organizations provide various types of bicycle safety training and information as well.

The WisDOT BOTS conducts and supports bicycle safety programs and activities for adults as well as children. In addition to the "Teaching Safe Bicycling" course, which is intended for police officers, teachers, and other interested individuals, WisDOT also offers a "Road Hazard Identification Project" course. This is an engineering course, which provides a system for identifying and facilitating the repair of road hazards, which can be dangerous for bicyclists. The Department also publishes a number of safety-related publications that are available to communities and interested groups.

The City of Madison Pedestrian/Bicycle Coordinator provides information and assistance to other staff, organizations, and agencies in support of their programs. This includes assisting UW with bicycle-related student orientation activities and working with WisDOT BOTS to assist with the agency's "train-the-trainer" courses.

The University of Wisconsin Transportation Services Department has employed part-time Bicycle-Pedestrian Coordinators in the past—often graduate students—to provide bicycle safety education and encouragement. In 1999, UW Transportation Services hired a full-time Bicycle-Pedestrian Coordinator. Among the responsibilities of the coordinator is the development of education programs.

The coordinator is in the process of designing a comprehensive bicycle safety program for students and faculty/staff to be implemented in the 2001-2002 academic year. The UW Health Services Department also provides some bicycle safety education, including providing information and discounts on bicycle helmets.

Motorists

The WisDOT BOTS has developed and distributes some safety education materials aimed at motorists, such as the “Share the Road” brochure. Bicycle safety is addressed to a limited extent in driver education materials. However, there are no other existing programs or activities, such as public relations campaigns, that are aimed at motorists.

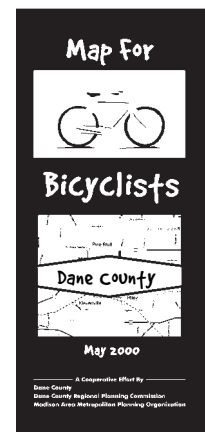
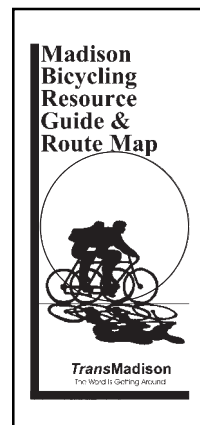
D. Encouragement Activities and Policies

Information and Maps

The City of Madison Pedestrian/Bicycle Coordinator provides ongoing assistance and information to individuals, organizations, businesses, and agencies. This includes providing seminars on promoting bicycling to interested businesses, giving presentations, and facilitating communication between bicyclists and agency staff.

The City of Madison Traffic Engineering Division published the Madison Bicycling Resource Guide & Route Map in 1997. The map shows the Madison area bicycle route system, general compatibility of roadways for bicycling, and off-street paths. In addition to the facilities map, it also includes illustrated bicycling safety tips, helpful information for parents on safe bicycling for children, bicycle commuting and bicycle maintenance tips, and information on area bicycling organizations and contacts.

The Dane County Regional Planning Commission (DCRPC) has in the past published a Dane County Map for Bicyclists with information on roadway suitability for bicyclists. The map also showed state bicycle trails, parks, and other destinations. An updated, color version of the county map with additional information on bicycle facilities and recommended routes into and out of the Madison area was published in May 2000. Preparation and printing of the new map was a joint effort of the Madison Area MPO, Dane County, and DCRPC.



WisDOT published the Wisconsin State Bicycle Map as part of development of the State Bicycle Plan. The set of four maps for different parts of the state is published and distributed through the Bicycle Federation of Wisconsin (BFW). The maps contain information on bicycling conditions for state and county roads, Rustic Roads, bicycle trails, and provides contacts for local bicycle route information.

Other primarily recreation-oriented maps are also available from the Wisconsin Department of Tourism, bicycling organizations and individuals. Among these are the map of central Dane County area recreational routes published by the Bombay Bicycle Club.

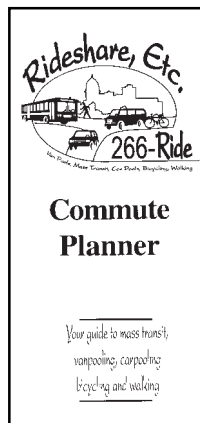
The *Wisconsin State Journal* publishes a regular column on bicycling issues called “In Gear.” Through a WisDOT TDM Program Grant, the BFW has developed a statewide bicycle newspaper column. The column started in March 1999 and will continue for two years. Articles focus on technical information, motivational stories, and bicycle commuting.

Programs and Projects

The BFW implemented the Madison Bicycle Commute Project in 1998 with primary funding from a WisDOT Transportation Demand Management (TDM) Program Grant. BFW worked with several Madison area employers to assess employee commute habits, provide workshops on bicycle commuting, identify routes to work, and support employees with bicycle facilities and incentives. The major product of the project was the creation of a handbook entitled *Parking for Free: A Bicycle Commute Program Guide for*

Madison Area Employers. The handbook provides useful materials and information for employers on setting up a bicycle commute program, including ideas for incentives and promotional activities. It also includes a stand-alone section with information for commuter bicyclists on bike maintenance, equipment and dress, parking, safety tips, and additional resources.

The Rideshare Etc. program promotes transportation alternatives to single-occupant motor vehicle commuting through employer-sponsored programs, special events, name-matching services, and other information and publicity activities. While the focus of the program is on transit and ridesharing, bicycling information is also provided as part of the program.



Madison has two free bicycle programs sponsored by Budget Bicycle Center. The Red Bike program provides between 50-125 bicycles for use by anyone to ride to their destination, where the color-coded bike is then left for another person to use. The Yellow Bike program is a longer-term loan option. A bike, helmet and lock are provided with a \$75 deposit. The deposit is refunded upon return of the bicycle. Around 200 bicycles are currently available. The number of bicycles in the program is expected to double in the near future.

Wheels for Winners is an “earn-a-bike” program for youth run primarily by volunteers, who prepare donated bicycles for delivery to children. Children participate in neighborhood center-coordinated community service projects and safety training in order to receive the bicycles. Recent projects have also included safety training activities and providing a mechanic to assist neighborhood centers in maintaining bikes that children have received in the past.

Events

The BFW organizes Bike-to-Work Week (BTWW) in Madison with various promotions and public events, including a commuter race with bicyclists, bus riders, and car drivers. The week culminates with a party on Friday with food, entertainment, prizes, and free tune-ups for registered bicyclists. The Madison Ped/Bike Coordinator assists BTWW volunteers in working with employment site coordinators.

The Wisconsin Governor’s Advisory Bicycle Coordinating Council, made up of state legislators, state agency staff persons, and citizens, holds a statewide bicycle conference every two years. The purpose of the council is to encourage bicycling and improve bicycling safety through coordination of state agencies, legislators, bicycle organizations, bike manufacturers and retailers, and citizens. The council also makes recommendations to the Governor on bicycling-related issues.

E. Enforcement

Neither the City of Madison Police Department nor the UW Police & Security has a special program to enforce traffic laws and city ordinances pertaining to bicyclists. Both utilize some officers on bicycles in congested areas during the warmer months, as do some other communities, such as Fitchburg, as part of community policing efforts. However, the officers spend little, if any, time enforcing bicycle laws.

The City of Madison began using uniformed police officers for bicycle patrol in the downtown area in 1974. The officers carried out routine patrol, but their responsibilities also included education and enforcement regarding bicycle laws. In 1978, the city initiated a Pedestrian/Bicycle Monitor Program, with a Section 402 grant from the WisDOT. The uniformed, civilian monitors worked out of the Police Department, but had enforcement powers that were limited to issuing citations for violation of bicycle and pedestrian laws. The monitors carried out various educational and public relations activities as well as enforcing pedestrian and bicycle laws. The program was continued until 1992 when it was ended due to budget constraints.

The City of Madison has several traffic enforcement programs aimed at motorists. The Neighborhood Speed Watch Program is run by the Traffic Engineering Division and is designed to educate drivers about speeding. Staff assists residents, who set up and monitor speed display boards. In some cases, police officers near the monitoring site will issue tickets to speeding motorists.

The City of Madison Police Department has a new Traffic Enforcement & Safety Team (T.E.S.T.) with officers who work strictly on traffic enforcement and patrol citywide in targeted areas. There are a number of other city programs aimed at reducing traffic crashes, including Speed Waves, Walk Our Children to School Day, and a new Safe Communities Project, funded through a WisDOT grant.

The WisDOT Bureau of Transportation Safety (BOTS) has developed a course on enforcement for law enforcement traffic personnel entitled “Enforcement for Bicycle Safety.” The course provides basic bicycle safety education, with an emphasis on laws and improving bicyclist crash avoidance through enhanced bicycle and motorist enforcement. Other enforcement courses are also available. The “Police Cyclist” trains officers who are using police bikes for patrol duties. It was developed by the International Police Mountain Bike Association. A similar course, the “Police Cyclist Instructor,” has been developed by the Law Enforcement Bicycle Association. A local contact is Kurt Feavel with the UW-Madison Police Dept.

The Bicycle Federation of Wisconsin (BFW) is currently conducting an “Enforcement for Bicycle Safety” Campaign. The campaign goals are to: (1) Educate police about bicycling and encourage them to take action that only they can take; and (2) Educate bicyclists about their rights and responsibilities under the law. It includes activities such as encouraging the Wisconsin Department of Justice to include more bicycle training for police officers at the recruit school and field training levels.

Chapter 6

Making the Region an Even Better Place to Bicycle: Goals and Objectives and Recommended Actions

Previous chapters of this plan presented information on current bicycle facilities, programs, and policies, and available information on existing levels of bicycling. This information demonstrated that residents of the Madison area and the rest of Dane County enjoy an excellent bicycling environment overall. The Madison area in particular has an extensive network of bicycle facilities for commuter bicycling. Numerous bicycle trails and paths in the county provide recreational bicycling opportunities. Reported bicycle crashes have dropped significantly since the 1980s at the same time that bicycling levels are increasing. All levels of government have policies that support bicycling, and public and private sector participation in bicycle advocacy, safety education, and club activities is high.

While the bicycling environment is good overall, there is plenty of room for improvement. Major gaps in the Madison area and Dane County bicycle facility networks exist. Many newer neighborhoods, schools, and employment/commercial centers have been located and/or designed without consideration of safe bicyclist access. Adult participation in bicycle education and training programs is low, and the attitude of the general public towards bicyclists and their understanding of bicyclists' rights needs to be improved.

Section A of this chapter presents the plan vision, goals, and objectives for continuing to improve the bicycling environment. The vision statement presents the “ideal” bicycling environment that the region is striving to achieve. The goal statements describe three broad elements needed to move the region closer to the vision—improving facilities, increasing bicycling levels, and improving safety. The objectives lay out in much more detail the goals or ends toward which the plan is directed.

Section B outlines specific actions that are recommended for achieving the goals and objectives. For each recommended action, the party or parties responsible for implementing the action are identified. Both the objectives and recommended actions are grouped according to the following categories: (1) bicycle facilities planning and

development; (2) bicycle facilities maintenance; (3) bicycle parking and other end-of-trip facilities; (4) education and encouragement; and (5) enforcement.

A. Vision, Goals, and Objectives

Bicycling Vision for the Region

An interconnected bicycle way network with supportive development patterns will provide people with safe, convenient, and enjoyable access and mobility throughout the county. Bicycling will be encouraged and will become a common and even safer mode of transportation for everyday trips, contributing to the quality of life in Dane County communities and the health, safety, and welfare of all residents.

Bicycle Plan Goals

1. Provide for the safe, convenient and enjoyable travel by bicyclists in the Madison area and throughout the county.
2. Increase levels of bicycling throughout Dane County, doubling the number of trips made by bicycles.
3. Reduce crashes involving bicyclists and motor vehicles by at least 10%.

Bicycle Plan Objectives

Bicycle Facilities Planning and Development

System Level:

1. Complete a continuous system of bicycle ways for the central urban area with connections to other communities throughout the county. The bicycle way network should minimize delay, maximize safety, and provide reasonably direct routes serving bicyclists' needs for travel within and between neighborhoods and to employment centers, commercial areas, schools, institutions, parks and open space areas, and other important destinations.

2. Develop a countywide bicycle way system, which provides reasonably direct connections on suitable roadways and off-street paths between cities and villages and to major employment and shopping centers, schools, parks and open space areas, and other important destinations.
3. Support the development of continuous bicycle way systems within cities and villages in the county, with connections to the countywide bicycle way system. The bicycle way networks should provide safe and direct access within and between neighborhoods and to schools, employment and shopping centers, parks and open space areas, and other important destinations.

Bicycle Transportation Planning – General:

4. Fully integrate the consideration of bicyclists' needs into the community and neighborhood planning and design processes and local and state agencies' planning design, operation and evaluation of transportation programs and projects.
5. Consider the needs of all bicyclists—experienced and novice, commuter and recreational—when planning and designing bicycle way systems and facilities.
6. Continue to improve the level of localized data available on existing and potential future bicycling levels, including establishment of accurate baseline data for the Madison area and Dane County, in order to assist in prioritizing facility improvements and assess progress towards bicycle transportation goals.

Design and Implementation of Specific Bicycle Facility Improvements:

7. Fully integrate the use of a consistent set of bicycle facility design standards throughout the county, based on the 1999 American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities and subsequent revisions and the bicycle facility design guidelines included in Appendix A of this plan.
8. Provide on-street bicycle facilities on arterial and collector roadways that are safe, functional, and

appropriate, given the street classification and cross-section, traffic volumes and speeds, cost, and other factors.

9. Seek to provide a higher level of service (LOS C or better where feasible) for bicyclists on roadways that are designated as bicycle routes.
10. Create and improve continuous bicycle through routes on local connector streets that provide mobility alternatives in addition to use of major arterial roadways.
11. Eliminate bicycling hazards and barriers.
12. Accommodate the needs of bicyclists in the design of bridges and under/overpasses, street intersections, railroad crossings, and traffic control devices.
13. Provide multi-use paths, where feasible and appropriate, when planning for and developing parks, other recreational and open space areas, shorelands, drainage ways, greenways, railroad rights-of-way, utility corridors (e.g., sewer and gas lines), and other linear corridors, especially those that serve both transportation and recreational uses.
14. Manage traffic on local streets through the use of “traffic calming” devices, where feasible and appropriate, without impeding bicyclists' mobility and accessibility.
15. Provide for appropriate access control on arterial roadways in order to increase the function and safety of these roadways for both motorists and bicyclists, while at the same time ensuring adequate access and crossing opportunities for bicyclists and pedestrians.

Funding:

16. Make efficient use of all available funding sources, and seek additional funding sources for bicycle-related projects.
17. Fund bicycle facility improvements in conjunction with roadway projects as a routine part of the cost of the project.

Bicycle Facilities Maintenance

1. Maintain roadways, bikeways, and other bicycle-related facilities to a reasonable level of safety and rideability, giving consideration to pavement surface, clearance conditions in all seasons, traffic control devices, and parking facilities.
2. Address the needs of bicyclists during roadway construction or resurfacing projects.
3. Design and build new roadways and bikeways so as to reduce potential long-term maintenance problems.
4. Continue to search for new methods and procedures to more efficiently and effectively maintain bicycle facilities.

Support Facilities and Transit Connections

1. Provide an adequate number of safe, secure, appropriately designed, and conveniently located bicycle parking facilities in business districts and other public areas where needed (e.g., at public institutions, parks, park-and-ride lots, and bus transfer points).
2. Ensure the provision of adequate short-term and long-term bicycle parking (at least a portion of which should be covered) in employment centers, commercial areas and multi-family residential developments.
3. Support the provision of showers and changing facilities for commuting bicyclists by developers, building owners, and employers.
4. Improve bicycle connections and accessibility to the transit system.
5. Provide adequate rest stop facilities, information, signing, and lighting along shared-use paths and recreational bicycle trails.

Education, Encouragement, and Public Information

1. Promote bicycling for transportation as well as recreation, particularly for trips to school, work, shopping, and special events.



2. Increase public awareness of bicycling facilities, resources, and programs.
3. Provide and promote safety education and encouragement programs taught by qualified instructors and targeted to youth and adult bicyclists and motorists.
4. Coordinate the bicycle safety programs being conducted by various state and local agencies, public institutions, health care providers, and organizations.
5. Increase the participation of schools, college students, and adult bicyclists in safety education programs and training courses.
6. Increase public awareness of the benefits of bicycling, and improve public attitudes towards bicyclists as legitimate road users.
7. Improve the attitude and behavior of both motorists and bicyclists with respect to compliance with traffic laws, especially the responsibilities of each toward the other.
8. Educate law enforcement personnel on bicycle safety, including in particular information on those traffic law violations by bicyclists and motorists that are most likely to lead to crashes.
9. Support the provision of incentives for bicycling by public agencies, private employers, and other entities.
10. Expand education and training programs and opportunities on bicycle transportation for land use and transportation planning and design professionals, developers, public officials, and others.

11. Encourage and seriously consider the input of bicyclists, bicycle organizations, and the general public in bicycle facility and program planning and development.
12. Improve the level of information on bicycle crashes, including data on exposure, in order to address the most serious safety problems through education, enforcement, and facility improvements.

Traffic and Bicycle Law Enforcement and Registration

1. Consistently enforce traffic laws that enhance bicyclist safety by citing violations (particularly those most likely to lead to crashes) by both bicyclists and motor vehicle operators.
2. Increase participation in and compliance with community bicycle registration programs.
3. Support state legislation enhancing the safety of bicyclists, including uniformity of local bicycle ordinances.

B. Recommended Actions

Bicycle Facilities Planning and Development

Bicycle Transportation Planning - General

1. Assist cities, villages, and towns in the county in the development of bicycle transportation plans and projects as part of their community planning efforts. [Responsible parties: WisDOT, Dane County Dept. of Planning and Development, Madison Area MPO]
2. Adopt street design standards and bicycle/pedestrian facility requirements in municipal subdivision and planned development ordinances that ensure provision of a direct and continuous bicycle/pedestrian “grid” of streets and paved paths. [Responsible parties: local jurisdictions]

Examples of the types of provisions that should be considered include:

- Limiting the number of cul-de-sacs;
- Requiring paved paths connecting any cul-de-sacs to other streets, unless topography or other considerations make it infeasible;

- Requiring paved paths (not just pedestrian walkways) through long blocks;
 - Requiring that a certain percentage of street segments interconnect;
 - Requiring the dedication of an easement for or construction of bicycle/pedestrian paths to parks, schools, stores, etc. where necessary to provide convenient connections from planned residential areas; and
 - Encouraging shorter blocks and possibly reducing the maximum length of blocks (in most communities now 1,200 feet).
3. Include access management provisions in subdivision and zoning ordinances to reduce the number of driveways through consolidation and requiring access of businesses along arterial roads from intersecting local streets rather than directly from the arterial road, where possible.
[Responsible party: local jurisdictions]
 4. Provide convenient bicycle/pedestrian access from residential neighborhoods to new commercial areas and employment centers, and convenient bicycle/pedestrian circulation within such centers. Identify opportunities to improve access and circulation within existing centers (e.g., Old Sauk Trails Office Park, UW Research Park) through construction of multi-use paths that provide short-cuts between origins and destinations.
[Responsible parties: local jurisdictions]
 5. Adopt park/open space dedication requirements in subdivision and planned development ordinances that include specific reference(s) to bikeways, and allow fees to be used for construction of multi-use paths. Also, consider requiring construction of planned bikeways on the property to be subdivided.
[Responsible parties: local jurisdictions]
 6. Consider the importance of the recommended bicycle routes into and out of the Madison Urban Area in land use and transportation planning and open space preservation efforts, and in implementation of the “Rural Scenic Byways” program recommended in the County Executive’s *Design Dane!* report.
[Responsible parties: local jurisdictions, Dane County]

The identified bicycle routes into and out of the Madison urban area are, in most cases, the only roadways suitable for bicycling within the particular travel corridor. They are therefore very important for longer distance commuter and recreational bicycling. Efforts should be made to limit future increases in motor vehicle traffic volumes on these roadways, to the extent feasible. Where unavoidable, plans should be made to provide alternative suitable routes in these corridors.

7. Collect bicycle usage data through regional transportation surveys and bicycle user surveys to provide baseline information, measure progress in achieving plan goals, and help prioritize bicycle projects and programs.
[Responsible parties: WisDOT, Madison Area MPO, UW-Madison, City of Madison Traffic Engineering Division, local jurisdictions]

Bicycle trip information could be incorporated into planned future regional origin-destination surveys, “piggy-backed” onto the National Personal Transportation Survey (NPTS), or conducted as a separate survey. If an independent survey was done, information could be gathered on the attitudes and concerns of bicyclists as well as bicycling levels, trip purposes, and demographic information of bicyclists.

8. Continue to improve the City of Madison bicycle traffic count program to justify and evaluate bicycle facility projects and aid bicycle transportation planning in general. The UW and other jurisdictions should consider developing similar programs, as bicycle loop detectors with counters are installed.
[Responsible parties: City of Madison Traffic Engineering Division, UW-Madison, other local jurisdictions]

The Madison bicycle count program might be expanded to include more streets, specific corridors, and/or an isthmus screenline analysis, such as the one done for motor vehicle traffic. All of the bicycle count program data should be included in the division’s annual Traffic Volume Reports. The city has increased the number of bicycle paths with loop detectors that record bicycle volumes, but still needs to add this information to its reports.

9. Improve bicycle transportation forecasting techniques to aid in planning and prioritizing bicycle facility improvements.
[Responsible parties: Madison Area MPO and local jurisdictions]

New more sophisticated methods of forecasting future bicycle use are being developed. For example, a new procedure being developed, called the Bicycle Corridor Profile Method, attempts to predict the number of people that would shift from auto to bicycle travel in a corridor if a bicycle facility were built. The procedure uses a transportation “logit” mode-choice travel model format.

10. Officially map planned future multi-use paths and trails and sufficient road right-of-way for bike lanes, where necessary and feasible.
[Responsible parties: Dane County and local jurisdictions]
11. Incorporate recommended multi-use paths and trails in this plan into Wisconsin DNR, county, and local parks and open space plans, where appropriate.
[Responsible parties: Wisconsin DNR, Dane County Parks Department, local parks departments]
12. Continue to coordinate with other agencies to ensure appropriate bicycle connections are planned, constructed, and maintained.
[Responsible parties: WisDOT, WisDNR, Madison Area MPO, Dane County, UW-Madison, local jurisdictions]
13. Schools should work with local community planning and engineering staff to develop plans for safe bicycle access by students, and educate parents and students on such plans. Where there are barriers to safe access from some areas, schools should work with the school district and the local community to address the problem(s).
[Responsible parties: school districts, schools]

Some schools have discouraged students from bicycling to school, because of safety concerns due to traffic congestion in the vicinity of the school grounds. Schools should instead work with parents, students, and the local community to improve bicyclist safety through a “Four E” program of education/training, encouragement, enforcement, and engineering (i.e., facility improvements). This would be particularly helpful at schools that have limited parking and/or are trying to discourage students from driving to school or parents driving their kids to school.

Design and Implementation of Specific Bicycle Facility Improvements:

14. Include appropriate provisions for bicyclists and pedestrians in the design of transportation facility improvements in accordance with this plan's objectives and the FHWA's Joint Statement on Integrating Bicycling and Walking into Transportation Infrastructure.
[Responsible parties: WisDOT, Dane County, UW-Madison, local jurisdictions]

The only exceptions to provision of bicycle and pedestrian improvements should be projects on those roadways where bicycles are prohibited and those exceptional circumstances outlined in the FHWA Joint Statement (i.e., would be contrary to public safety, the cost is "excessively disproportionate" to probable use, lack of need).

15. Establish a policy to use AASHTO's Guide for Development of Bicycle Facilities (1999), and subsequent revisions, and the guidelines in Appendix A of this plan as a guide for the design of new or reconstructed bicycle facilities, while retaining the flexibility to use alternative approaches that have been successfully used by other agencies.
[Responsible parties: WisDOT, Dane County Highway and Transportation Dept., UW-Madison, local public works/engineering departments]
16. WisDOT and the Dane County Highway and Transportation Department should develop and adopt more detailed policies and/or design guidelines related to the provision of wide paved shoulders on rural roadways when they are reconstructed or resurfaced. The policy should address the circumstances under which a paved shoulder width greater than the AASTHO minimum recommended width of 4 feet should be provided, if feasible.
[Responsible parties: Dane County Highway and Transportation Department, WisDOT]

An extra wide paved shoulder should be considered where two or more of the following factors are present:

- Higher bicycle usage is expected;

- Motor vehicle speeds exceed 50 mph;
- Motor vehicle traffic is higher than a threshold ADT (e.g., 5,000);
- The percentage of trucks, buses, and recreational vehicles is high;
- The roadway section has a steep grade; and/or
- Obstructions exist at the right side of the roadway.

In addition to addressing the preferred paved shoulder width under different roadway conditions, the WisDOT design guidelines should address the possibility of reducing the travel lane width to 11 feet if needed to provide a minimum 4-foot shoulder. The WisDOT design guidelines should address the provision of wide paved shoulders on town and county as well as state roadways.

17. WisDOT should adopt more detailed policies and specific procedures (including a bicycle and pedestrian facility scoping sheet or checklist) related to the provision of bicycle accommodations on federally and state funded highway projects.
[Responsible party: WisDOT]

Examples of policies and procedures include:

- Requiring consideration of bicycle origins and destinations in the early planning stages of projects;
- Adding guidelines for determining bicycle travel demand;
- Identifying situations where bicycle accommodations should be incorporated into a project, such as the following:
 - the improvement is in a plan or the roadway is on a recommended bike route;
 - the route provides primary access to employment center, park, etc.;
 - the route provides unique access across barrier;
 - the roadway project negatively affects the transportation or recreational utility of a path/trail (i.e., severs path, will result in increase in ADT prohibiting safe crossings at-grade);

- Developing a scoping sheet or checklist for project reports to assist WisDOT and local engineers in determining the appropriate level and type of bicyclist accommodation, covering issues such as bicycle trip generators, consideration of bicycle travel, and public coordination.

18. Carefully consider the need for free flow right-turn lanes in urban areas, particularly at intersections with significant pedestrian and bicyclist activity. Where found to be unnecessary for traffic flow purposes, use a standard intersection design. Eliminate existing unnecessary free flow right-turn lanes as part of street reconstruction.

[Responsible parties: local jurisdictions, Dane County, WisDOT]

Free flow right-turn lanes are most problematic for pedestrians and bicyclists when turning motor vehicles have a dedicated lane to move into and do not have to yield to cross traffic and the street the vehicle is turning onto has a higher speed limit. The *Pedestrian Transportation Plan for Madison, Wisconsin* also generally recommends against free flow turn lanes in areas of high pedestrian activity.

19. Identify exiting street intersections that are difficult for bicyclists and pedestrians to cross, and prioritize improvements (e.g., markings, traffic signal adjustments, addition of bike lanes, etc.) to those intersections where bicycle routes or paths cross and others with a high level of current or anticipated bicyclist and pedestrian activity.

[Responsible parties: local jurisdictions, Dane County, WisDOT]

Identification of all of the specific problem intersections for bicyclists in the Madison Urban Area was beyond the scope of this plan. However, making improvements to intersections to improve bicyclists' ability to safely move through them is very important. Difficult intersections create barriers to bicyclist mobility. In addition, the majority of bicycle-motor vehicle crashes in urban areas occur at intersections.

20. Consider the use of innovative design treatments (e.g., different textured or colored bike lanes, advance bicycle stop lines at intersections, bike path crossing markings) for bicyclists, where appropriate.

[Responsible parties: Dane County Highway and Transportation Dept., UW-Madison, local public works/engineering departments]

There are a number of available resources for ideas and specific designs for roadways and intersections that better accommodate bicyclists and pedestrians. One of them is the Federal Highway Administration's *Flexibility in Highway Design* Report.

21. Consider assigning an individual within an agency or department the responsibility for coordinating the planning and design of bicycle and pedestrian facility projects and bicycle/pedestrian facilities to be included as part of larger roadway projects.

[Responsible parties: Dane County Highway and Transportation Department, UW-Madison, local jurisdictions]

22. The Dane County Highway and Transportation Department should review project design plans for consistency with the guidelines outlined in this plan and AASHTO's guidelines when funding projects through the "Bicycle Paths" program.

[Responsible party: Dane County Highway and Transportation Department]

23. Local jurisdictions should consider developing and using bicycle project selection criteria to prioritize proposed projects.

[Responsible parties: local jurisdictions]

24. Local governments should consider developing signed bicycle route systems with appropriate connections to route systems of neighboring jurisdictions and the county. Consideration should be given to providing destination information along the route system, where helpful, and/or adopting a number system to improve the system's utility for bicyclists.

[Responsible parties: Local public works/engineering departments]

The primary value of developing a signed bicycle route system is to provide directional assistance. Because of this, the Manual on Uniform Traffic Control Devices (MUTCD) recommends use of destination plaques as well as arrows. Bicycle routes should be designed to indicate routes through a

community to major destinations on streets and paved paths that most bicyclists will feel comfortable using. A route system is particularly useful for pointing out short-cut paths and routes on local streets that may not be immediately obvious to a bicyclist not familiar with a particular area. For liability reasons, care should be taken to remove all hazards to bicycle travel (e.g., unsafe drainage grates and railroad crossings, pot holes, etc.) prior to signing a route.

25. Develop a signed county bicycle route system that is integrated with the Madison area route system and other planned local community route systems.
[Responsible parties: Madison Area MPO, Dane County Highway & Transportation and Planning Departments]

The signed route system should be based on the recommended routes identified in this plan. However, not all of the routes identified in the plan would necessarily be signed. Development of the signed bicycle route system should be coordinated with development of the “Rural Scenic Byways” program proposed in the County Executives *Design Dane!* Report if/when that program is implemented.

In developing the signed route system, careful consideration needs to be given to the issue of the appropriate type of signage. Use of the standard “Bike Route” sign on rural roadways may not be appropriate due to the higher traffic speeds on these roads. Use of these signs raises liability concerns, because they may be seen to encourage youth and less experienced bicyclists to ride under conditions that are unsafe for their skill level. Alternatives to use of the “Bike Route” sign include standard destination signing, directional bicycle signing using a bicycle logo, or “scenic or back roads route” signing. An advantage of the directional signing with a bicycle logo is that such signing could be combined with the standard “Bike Route” sign when the county routes enter urban areas to show the two route systems are connected.

26. Ensure that existing signals with detector loops are tuned to detect bicyclists, and implement a program to install pavement markings at signals with detector loops to instruct bicyclists where to ride to activate detection.
[Responsible parties: Local public works/engineering departments]

The City of Madison Traffic Engineering Division is implementing a pilot program to install pavement markings on streets with demand-actuated traffic signals. Bicycle markings have been placed at four intersection locations.

27. Install and maintain traffic signal detector loops in multi-use paths at signalized street crossings, where needed, and in bicycle lanes on streets with signal detection.

[Responsible parties: Local public works/engineering departments]

28. Reconstruct railroad crossings to bicycle safe standards, working with railroad companies to retrofit those railroad crossings needing improvements. Also, consider posting signs or using pavement markings at angled crossings warning bicyclists of the need to cross the railway at the proper angle.

[Responsible parties: WisDOT, Dane County, and local jurisdictions]

The Manual on Uniform Traffic Control Devices (MUTCD) does not currently include a standard sign to warn bicyclists on how to approach angled railroad crossings. The Wisconsin Department of Transportation (WisDOT) should consider adopting a standard sign for this purpose in its supplement to the MUTCD.

29. Investigate the possible creation of “bicycle boulevards” in some key corridors in the central Madison area with a high level of bicycle demand (e.g., E. Mifflin St. and Kendall Ave.).

[Responsible party: City of Madison Traffic Engineering Division]

Bicycle boulevards are created through modification of a local street to function as a through street (with few or no stop signs) while maintaining local access for motor vehicles. Traffic calming devices (e.g., traffic circles, diverters) are used to control traffic speeds and discourage through trips by motor vehicles. Traffic controls limit conflicts between motor vehicles and bicycles and give priority to through bicycle movement. Bicycle boulevards are often located on roads parallel to a major arterial roadway. Development of a pilot program to test

such a facility would be advisable, given the lack of experience in the city and elsewhere with bicycle boulevards.

30. Consider lowering posted speed limits on some roadways, particularly at the developing fringes of urban areas and on roadways identified as important bicycle routes. In urban areas, the timing of traffic signals should be set to encourage motorists to obey the speed limit.

[Responsible parties: WisDOT, Dane County, local public works/engineering departments]

The Manual on Uniform Traffic Control Devices (MUTCD) identifies the factors that should be used to determine posted speed limits on roadways. These include: road geometry (grade, alignment, sight distance, curves) and surface characteristics; 85th percentile speed (speed at which 85% of the traffic is traveling regardless of the posted speed limit) and the pace speed; and reported accident experience. The need to accommodate bicycle and pedestrian travel and the safety of residents along the roadway should be balanced with an assessment of the 85th percentile speed and other engineering factors. Any change in posted speed limit should be accompanied by law enforcement efforts. WisDOT and the Dane County Highway and Transportation Department should work cooperatively with local communities in setting and re-evaluating posted speed limits on state and county roadways.

31. Madison should consider budgeting additional funds for its Neighborhood Traffic Management Program (NTMP), and other jurisdictions should consider adopting similar programs, which include both traffic enforcement and use of traffic management or “traffic calming” devices on local streets to improve bicyclist and pedestrian safety. [Responsible parties: City of Madison Traffic Engineering Division and other local public works/engineering departments]

The City of Madison Traffic Engineering Division recently implemented a Neighborhood Traffic Management Program as part of an overall strategy to improve neighborhood livability and improve conditions on local streets for all users. The city

currently budgets \$50,000 per year for traffic management projects. Along with education and traffic enforcement efforts, use of traffic management devices can improve bicyclist and pedestrian safety. However, care must be taken to ensure such devices do not impede bicyclists’ accessibility and mobility.

Consideration should be given to assigning the right-of-way to bicyclists on heavily used bicycle paths where they cross low-volume streets. Speed humps can be used where bicycle paths cross streets to slow traffic and provide a visual cue to motorists that bicyclists have the right-of-way.

Funding:

32. Continue to fund and implement bicycle projects and programs in accordance with the objectives and facility recommendations in this plan through incorporation of such projects into state, county, and local capital improvement programs and the Transportation Improvement Program (TIP) for the Dane County Area.

[Responsible parties: WisDOT, Dane County, Madison Area MPO, local jurisdictions]

Facilities Maintenance

1. Budget for and provide regular maintenance on an established schedule of both off-street and on-street bikeway facilities, particularly sweeping and snow plowing in the winter. [Responsible parties: WisDOT, Dane County Highway and Transportation Dept., local public works/engineering departments]

The regular maintenance schedule should include early spring sweeping and repairing of roadway surface defects in bike lanes and the outside lane of heavily traveled roadways. New bicycle facilities should be incorporated into the regular maintenance budget of the appropriate agency. Extra attention should be given to maintaining a smooth, clean surface on streets designated as bicycle routes.

2. Encourage bicyclists to report maintenance problems and other bicycling hazards to the agency responsible for maintaining the roadway and/or bicycle facility, and respond to such reports in a timely manner.

[Responsible parties: Dane County Highway and Transportation Dept., local public works/engineering departments, bicycle organizations and clubs]

Local public works departments should consider budgeting for and implementing a formal Bicycle Spot Improvement Program to fix small-scale problems (e.g., fixing cracks or potholes, sweeping, signing/stripping, signal modifications) identified by bicyclists, street maintenance crews, and others on notification forms. The City of Madison Traffic Engineering Division does have a Bicycling Improvement Request Form, available primarily on the division's Web site. However, the City of Madison does not set aside funds for small bicycle maintenance projects, and major construction projects have used up all available bicycle facility funding in recent years.

WisDOT, Dane County Highway & Transportation Department, and local public works departments that have Web sites should provide information and a form on the site for reporting bicycle facility maintenance and other improvement needs. A link could also be created from the Dane County Bicycle Community Web site to the Web pages of these departments to report problems. For those local public works departments without e-mail, a phone number could be provided.

3. Maintain the full width of bicycle paths to prevent deterioration of pavement edges.
[Responsible parties: Dane County, local jurisdictions]

4. Train and encourage street maintenance crews, traffic officers, and utility employees to report hazardous roadway conditions for bicyclists.
[Responsible parties: Dane County Highway and Transportation Dept., local public works/engineering departments]

5. Implement "Adopt-a-Bikeway" programs on selected multi-use paths and recreational trails to assist with maintenance efforts.
[Responsible parties: WisDNR, Dane County, and local jurisdictions]

WisDNR has such a program, which has been implemented on some of its trails.

6. Consider developing construction site policies or standards to ensure that bikeways are not rendered useless by ongoing construction work.

[Responsible parties: local public works/engineering departments]

Examples of topics to be covered by the policies or standards include:

- Ensuring bikeways are not used for storage of equipment, vehicles or access;
- Addressing use of cones and other construction zone signing and placement;
- Ensuring any roadway or trail surface affected be returned to its pre-construction condition or better; and
- Identification and signing of on-street detour routes, where necessary.

Parking and Other End-of-Trip Facilities

1. Incorporate bicycle-parking requirements into local zoning ordinances, and ensure enforcement of the requirements by zoning inspectors.

[Responsible parties: local jurisdictions]

The City of Madison is the only urban area community with bicycle parking requirements in its zoning ordinance. Bicycle parking ordinances should address the number and size of bicycle parking spaces and facility design (including definitions for acceptable types of racks), and should require bicycle parking to be located in a safe and convenient location.

Bicycle parking requirements should be tailored to the type of area (e.g., campus area, neighborhood vs. highway commercial district). Specifically, consideration should be given to increasing the required amount of bicycle parking in areas where the demand is anticipated to be high. In those cases where the demand for bicycle parking is anticipated to be low, flexibility should be provided to reduce the required number of bicycle racks, but still reserve space for additional bicycle parking in the future.

The following additional provisions should be considered for inclusion into a bicycle-parking ordinance:

- Requiring a certain percentage of spaces to be covered;
 - Requiring distribution of spaces at various public entrances;
 - Requiring a certain percentage of spaces to be able to accommodate bicycle trailers (e.g., at shopping centers);
 - Requiring sign(s) indicating the location of bicycle parking if it is not visible from street;
 - Allowing conversion of some auto spaces to bicycle spaces;
 - Requiring full compliance with bicycle parking requirements in non-complying, older buildings when they are rehabilitated or undergo a change in use; and
 - Allowing a reduction (e.g., up to 10%) of auto parking spaces for providing a combination of short- and long-term bicycle parking.
2. Budget for and install parking in the public right-of-way, with priority to downtown and neighborhood business districts and other areas with demonstrated need.
[Responsible parties: local jurisdictions]
 3. Ensure all public buildings have good bicycle parking facilities, and include showers and locker room facilities in new public building projects to set a good example for the private sector.
[Responsible parties: State agencies, Dane County, colleges/universities, local jurisdictions]
 4. Budget for and install a sufficient number of bicycle racks with approved designs at schools and colleges/universities.
[Responsible parties: school districts, colleges/universities, local jurisdictions]
 5. The City of Madison should review its existing ordinance requirements concerning placement of structures in the street terrace, and make changes as necessary to reduce the barriers to installing bicycle racks in the terrace as long as public safety, aesthetic, and other concerns are addressed. Other local communities should review their ordinances to determine whether the same problem exists, and make ordinance changes if necessary.
[Responsible parties: City of Madison and other local jurisdictions]
 6. Provide and promote secure, long-term bicycle parking at appropriate park-and-ride lots and bus transfer points.
[Responsible parties: WisDOT District 1, Madison Metro, local jurisdictions]
 7. Promote the program being implemented by Madison Metro to provide bicycle racks on buses.
[Responsible parties: Madison Metro, MPO Rideshare Etc. Program, bicycle shops, bicycle organizations, local jurisdictions]
 8. Encourage and provide incentives for developers, building owners, and employers to provide showers and locker room facilities for employees.
[Responsible parties: local jurisdictions]
 9. Establish a program to assist owners of existing multi-family dwelling complexes in purchasing and siting long-term bicycle parking.
[Responsible parties: local jurisdictions]
 10. Support and work with local bicycle organizations to establish permanent relationships for the provision of temporary, long-term bicycle parking at special events.
[Responsible parties: Madison Bicycle Program, local jurisdictions, business associations]
 11. Work with health and fitness clubs in or near employment centers, particularly those located downtown, to create arrangements whereby, for a small fee, bicyclists could use their shower facilities.
[Responsible parties: Madison Bicycle Program, local jurisdictions]
 12. Identify the need for and possible location of drinking fountains, restroom facilities, maps, etc. at parks located along popular bicycle routes and trails.
[Responsible parties: WisDNR, Dane County, local jurisdictions, business associations]

Consideration should be given to the provision of bike route maps and/or other destination information where multi-use paths end or other locations where way-finding information would be particularly helpful.

Education and Encouragement Programs

1. Continue to cooperatively develop, distribute, and update bicycle maps and other informational materials regarding bicycle safety/training programs and contacts.

[Responsible parties: WisDOT, Madison Area MPO, Dane County Highway and Transportation Dept., Madison Bicycle Program, local jurisdictions, employers, bicycle organizations and clubs]

Updates to the Madison Bicycling Resource Guide and Map, published in 1997, should include bicycle facility and roadway compatibility information for the surrounding communities in the Madison urban area. An updated, color version of the Dane County Bicycle Map was published in May 2000. The new map includes bicycle facility and suitability information and identifies recommended bicycle routes into and out of the Madison area. Efforts should continue to be made to make the Madison area and Dane County maps and other materials more widely available at employment sites, public buildings, bicycle shops, and other locations.

Local communities should consider developing neighborhood-scaled maps targeted for children and inexperienced bicyclists showing recommended bicycle routes to schools, parks, and other destinations, as well as other information such as the degree of difficulty of routes (beginner, intermediate, advanced) considering traffic volumes, street crossings, steep hills, and other factors.

2. Adopt governmental practices and policies that encourage employees to commute by bicycle and other alternative transportation modes.

[Responsible parties: State agencies, colleges/universities, Dane County, local jurisdictions]

Public agencies and institutions should adopt employee transportation, parking, and other policies (e.g., offering mileage allowance for business travel by bicycle, “flex time” provisions) and programs

(e.g., making bicycles available for staff use) that encourage bicycling and other alternatives to single-occupant vehicle driving. By doing so, public agencies serve as “model employers” for the private sector.

3. Continue to work with private employers to promote bicycle commuting.

[Responsible parties: Madison Area MPO Rideshare Etc. Program, Madison Bicycle Program, bicycle organizations]

Private employers have an important role to play in promoting bicycle commuting. In addition to providing good parking and support facilities, employers can make sure bicyclists feel welcome at work by instilling a corporate culture that makes bicycle commuting professionally and socially acceptable. Employers should be encouraged to provide financial and other incentives to employees, such as offering payroll subsidies, obtaining group discounts on bicycles and accessories, and offering a guaranteed ride home program.

Ideas for possible initiatives with employers include:

- Developing a speakers bureau to provide workshops on bicycle commuting to interested companies, covering topics such as bicycle maintenance, ideas for employer assistance, etc.;
- Developing a “Bicycle Friendly Businesses Program,” recognizing businesses that have supportive policies and programs through certificates and advertising media;
- Creating an annual commuter challenge for area businesses;
- Establishing a “Bike Buddies” or “Bike Coaches” program in cooperation with bicycle organizations that matches area residents interested in bicycling to work with experienced bicycle commuters; and
- Working with employers to distribute informational materials, provide assistance to employees in route planning, and develop incentives for bicycle commuting.

Some of these employer assistance activities could be conducted through the Madison Area MPO’s

Rideshare, Etc. program, which promotes alternative transportation through employer-sponsored programs and other information and publicity activities. The Rideshare Coordinator should continue to work with the Madison Pedestrian/Bicycle Coordinator and others to distribute bicycle commuting resources, contacts, etc. Efforts should also be made to advertise the fact that bicyclists are eligible for the existing regional Guaranteed Ride Home Program if they are registered with the Rideshare, Etc. Program.

4. Identify Dane County Planning and/or Highway & Transportation Department staff to work with the Madison Pedestrian/Bicycle Coordinator to provide assistance to communities with bicycle planning and education and encouragement activities. Madison Area MPO staff should continue to assist in coordinating community assistance efforts.

[Responsible parties: Dane County, Madison Area MPO, Madison Bicycle Program]

5. Continue cooperative efforts between government agencies and bicycling clubs/organizations and their activities.

[Responsible parties: WisDOT, Dane County, Madison Area MPO, Madison Bicycle Program, local jurisdictions, Dane County Bicycling Association, bicycle clubs/organizations]

6. Continue to support bicycle-training programs, such as the Effective CyclingTM course, and promote such programs to public schools, law enforcement agencies, community and neighborhood organizations, employers, planning agencies, and others.

[Responsible parties: WisDOT, Madison Bicycle Program, local jurisdictions, bicycle clubs/organizations]

By targeting the courses to agencies and organizations, group discounts could be offered. Grants might also be provided to subsidize the cost of the courses, and thereby encourage greater participation.

7. Develop a public information and education campaign to encourage bicycling and improve the

attitude and behavior of both bicyclists and motorists.

[Responsible parties: WisDOT, Madison Bicycle Program, local jurisdictions, bicycle organizations]

The campaign should make use of multiple print and electronic media, including television and radio PSAs, advertising signs (e.g., posters on buses, seasonal banners), newspaper ads, etc. Private sponsors could be sought for the campaign. Information could also be inserted into utility company mailings. The campaign's message should emphasize bicyclists' rights to use the roadway and associated responsibilities to obey the "rules of the road." Key safety messages could also be developed. Health care organizations and insurance companies could market the benefits of bicycling and walking on personal health.

8. Establish an information clearinghouse on programs aimed at bicycle safety and promotion.

[Responsible parties: WisDOT and Madison Bicycle Programs, Madison Area MPO, bicycle organizations]

In addition to providing information to the public on resources available, establishment of such a clearinghouse will help in coordinating the various programs and activities and ensuring that safety education programs emphasize the right messages and utilize qualified instructors. The Bicycle Federation of Wisconsin currently provides this type of service to some extent, however development of a more coordinated and comprehensive clearinghouse is needed. Clearinghouse information should be available through government agency and bicycle organization Web pages.

9. Continue to provide and promote bicycle safety education and training courses and activities in the regular curricula of the school systems and colleges/universities.

[Responsible parties: WisDOT, Madison Bicycle Program, colleges/universities, school districts]

Education for elementary school students is generally best aimed at basic bicycle safety, while courses, activities, and information for middle and

high school and college students should address bicycle handling and the “rules of the road.” Parents should be encouraged to reinforce bicycle education. The Madison Bicycle Program safety education activities should be expanded to include programs at the middle schools, such as offering a modified Effective Cycling™ course as an after-school club activity. Schools should also consider incorporating bicycling into physical education classes. Schools could seek donations and/or discounts from bicycle manufacturers.

10. Continue and expand on the number of special events to encourage bicycling.

[Responsible parties: Madison Bicycle Program, Dane County, UW-Madison, bicycle organizations]

Ideas for events besides Bike to Work Week include “Bicycle to Shop” or “Go by Bike” days where bicyclists receive discounts and annual family bicycling rides.

11. Continue to implement programs to provide free or discounted helmets and head/taillights.
[Responsible parties: WisDOT, bicycle organizations, and health care agencies]

A survey conducted for the Jefferson County Bicycle Plan found almost half of all respondents never use a headlight when traveling at night, and around 30% do not use a helmet. These numbers would probably be similar in Dane County.

12. Continue to monitor and improve the data available on bicycle crashes.

A simple-to-use, well-publicized reporting system should be developed to report all bicycle crashes resulting in injury or any property damage. Currently, only those crashes that involve a moving motor vehicle and result in serious injury or property damage in excess of \$1,000 (more than the value of most bicycles) are reported.

[Responsible parties: WisDOT, local police departments, Madison Bicycle Program]

13. Provide regular workshops and make available other training opportunities for local planners, engineers, and parks and recreation professionals on bicycle transportation and facility design issues.

[Responsible parties: WisDOT, Madison Area MPO, local jurisdictions, bicycle organizations]

The Bicycle Federation of Wisconsin received a TDM grant from WisDOT to conduct Effective Cycling™ courses for planners and engineers in 2000. Local communities should encourage their staff to attend this course and take advantage of similar opportunities. Participants should educate other local staff, elected officials, and citizens.

Enforcement

1. Educate and train law enforcement personnel in the enforcement of laws concerning bicyclists’ rights and responsibilities through recruit training and in-service refresher courses.

[Responsible parties: WisDOT, Dane County, local police departments, UW Police]

Information provided should include the proper way for bicycles to operate in traffic and common motorists violations that endanger bicyclists. WisDOT Bureau of Transportation Safety’s “Enforcement for Bicycle Safety” and other courses have been developed to assist local communities in these efforts.

2. Involve local law enforcement personnel in safety education programs, and encourage alternative enforcement programs such as police bicycle patrols, permitting training in lieu of fines, and positive reinforcement.

[Responsible parties: Madison Bicycle Program, local police departments, UW Bicycle Program and Police]

Enforcement and education can be combined by offering training program attendance in lieu of paying a fine and/or using fines to pay for training programs. The City of La Crosse has such a program. “Tickets” are issued to bicyclists under age 18. One-hour classes are held once a week for bicyclists cited for committing certain offenses (e.g., no headlight, riding on the wrong side of the street, etc.). Some communities have programs whereby police officers give coupons to bicyclists, usually children, for obeying traffic laws. The coupons are designed to look like traffic tickets and entitle the bicyclist to a discounted bicycle accessory purchase,

free food item, etc. These types of programs reinforce safe riding habits. Police officers should be given appropriate training in enforcement for bicycle safety.

3. Increase traffic law enforcement efforts by properly trained local/UW-Madison police department officers, focusing selectively on those violations most likely to lead to bicycle-motor vehicle crashes. [Responsible parties: local police departments, UW Campus Police]

There is currently little traffic law enforcement activity aimed at bicyclists. Efforts have been made in recent years to re-institute the Madison bicycle/pedestrian safety monitor program, which used citizens to enforce traffic laws against bicyclists and pedestrians. One of the major drawbacks to such a program, however, is that it focuses solely on bicyclists even though studies have shown that motorists are responsible for more than half of all bicycle-motor vehicle crashes. A comprehensive approach is needed that combines improved enforcement directed towards both motorists and bicyclists along with education.

Prior to increasing enforcement efforts against bicyclists and motorists, it is advisable for the responsible agencies to undertake community relations activities, such as soliciting support from parents, schools, civic groups, etc. and publicizing the effort through the local media with an explanation of its purpose. Written policies and procedures should be considered to ensure fair and consistent enforcement.

The goal of enforcement programs should be to increase real and perceived bicycle safety by:

- Correcting illegal behavior by both bicyclists and motorists most likely to lead to crashes;
- Encouraging bicyclists to behave in a predictable manner and be visible to motorists;
- Ensure adult bicyclists set a proper example for younger riders;
- Require motorists to respect the rights of bicyclists as users of the road; and

- Encouraging new and timid bicyclists to observe safe riding practices so they don't unwittingly put themselves in more danger than they are trying to avoid.

4. Implement and improve compliance with bicycle registration programs.
[Responsible parties: local jurisdictions]

The purposes of bicycle registration programs are to: (1) deter theft; (2) identify bicycles in case of theft; (3) identify a bicyclist without other identification in the event of an accident; (4) provide independent proof of ownership for insurance claims; and (5) assist in bicycle planning efforts.

Plan Implementation

1. Encourage local communities to incorporate the bicycle plan into their master plans, and ensure all newly elected or hired officials are aware of the plan and its goals, objectives, and recommendations. [Responsible parties: Madison Area MPO, Dane County Highway and Transportation Dept., Madison Bicycle Program]
2. Ensure the bicycle plan is incorporated into and referenced in other related state, county, and local plans.
[Responsible parties: state, county/regional, and local government agencies]
3. Provide information regularly on the progress of plan implementation.
[Responsible parties: Madison Area MPO, Dane County Highway and Transportation Dept., Madison Bicycle Program]
4. Utilize opportunities to generate media publicity about the bicycle plan.
[Responsible parties: Madison Area MPO, Dane County, Madison Bicycle Program, bicycle organizations]
5. Prepare an update of the bicycle transportation plan within five years of its adoption.
[Responsible party: Madison Area MPO]

6. Make state and local road and accident data more easily accessible to the Madison Area MPO and local governments for bicycle planning purposes through implementation of the new Wisconsin Information System for Local Roads and other similar initiatives.
[Responsible party: WisDOT]

The Wisconsin Information System for Local Roads (WISLR) should incorporate as much of the data as possible that is needed for conducting a bicycle compatibility evaluation of roadways. This information includes bike lane/paved shoulder width, outside travel lane width, speed limit, traffic volumes, truck volumes, and parking availability and occupancy.

Chapter 7

Recommended Madison Urban Area and County Bicycle Facility Plans

This chapter presents the recommended bicycle facility plans for the Madison urban area and Dane County. Both on-street bicycle facility needs and proposed off-street facilities are identified. The on-street bicycle facility needs and proposed path/trail projects are based on the analysis of existing bicycle facilities and conditions contained in Chapter 3, and the bicycle transportation plan goals and objectives outlined in Chapter 6. The facilities are designed to meet bicyclists' needs as discussed in Chapter 2, and specifically to meet the following bicycle facility planning criteria:

- Provide frequent, direct, and safe bicycle access to desired destinations, including employment centers, commercial districts, public institutions, schools, and recreational areas;
- Provide bicycle facilities on all arterial and collector roadways, where needed due to motor vehicle traffic volumes and speeds and other roadway conditions, in order to minimize delay and maximize safety;
- Ensure a continuous bicycle facility network free of missing links, gaps, and barriers;
- Provide a continuous network of suitable bicycle routes within the Madison urban area and countywide between and through all cities and villages;
- Provide off-street multi-use paths or trails where necessary to cross barriers, provide more direct connections, and/or take advantage of available opportunities such as railway and environmental corridors.

Bicycle facility recommendations included in the Vision 2020 Dane County Land Use & Transportation Plan, Dane County Parks & Open Space Plan 2000, and local land use, neighborhood, and parks and open space plans discussed in Chapter 4 have been integrated into this plan to the extent they fit within its regional scope. Some modifications have been made to previously proposed bicycle paths/trails and routes to reflect more recent planning efforts, further refinement of conceptual proposals, changed circumstances, or other considerations.

A. Recommended Madison Urban Area Bicycle Facilities Plan

The Madison urban area bicycle facilities plan includes facilities proposed within the Madison metropolitan planning boundary, which encompasses the 1990 U.S. Census-defined urbanized area plus an additional area of land likely to be developed within the twenty-year planning horizon. Figure 5 illustrates the roadways for which on-street bicycle facility improvements are needed, and shows proposed off-street facilities.

Figure 6 illustrates the recommended bicycle route system. Connections are shown to the existing signed Madison area route system and the recommended county route system. Bicycle routes are intended to identify major routes through and into and out of the Madison urban area on roads that most adult bicyclists will feel comfortable using. One of the plan objectives is to maintain and improve designated on-street bicycle routes to a higher level of service for bicyclists (preferably LOS C or better), reflecting their importance for bicyclists' mobility.

Table 9 lists the roadway segments for which on-street facilities (preferably bike lanes or paved shoulders for roads with a rural cross-section) are needed. Only those roadway segments that fail to meet a minimum acceptable level of bicycle compatibility have been identified and shown on the plan map. The minimum acceptable level was determined to be those roadways with a bicycle compatibility index (BCI) rating of 4.0 or lower (i.e., mid-to low-range Level of Service D). A higher standard (BCI of 3.5 or lower without any adjustment for parking) was used for roadways on currently designated or recommended bicycle routes, where a higher level of service for bicycling is sought. It is an objective of the plan, however, to provide bicycle facilities on all arterial and collector roadways where feasible and desirable, given traffic volumes and speeds and other roadway conditions. (See Chapter 3, Section B for an explanation of the BCI methodology)

Table 9 first identifies all roadway segments that are currently programmed or planned and also in need of bicycle facility improvements. The table then lists all other roadway segments that fail to meet the minimum level of compatibility for bicyclists and that do not currently have bicycle lanes. Some roadways, such as Johnson St., Gorham St., and Fish Hatchery Rd., have bike lanes, but still have relatively low bicycle compatibility ratings due to their high traffic volumes.

The listed bicycle facility improvements have been assigned a relative level of priority (1st, 2nd, 3rd) based on the following criteria:

- Extent to which the improvement enhances mobility and/or accessibility, taking into consideration:
 - Existing bicycling conditions and facilities reflected in the suitability rating of the roadway; and
 - Whether reasonably direct alternative, suitable routes exist within the corridor.
- Number of people impacted (i.e., existing and anticipated future level of use of facility by bicyclists).
- Whether the facility eliminates or reduces an existing barrier (e.g., narrow bridge or unsafe arterial due to lack of facilities) or adds a missing link in the bicycle way system.
- Whether the roadway segment is on a recommended bicycle route and/or the most direct route between bicyclists' likely origins and destinations.

The priority level does not necessarily reflect the expected timing of the improvements, most of which are tied to roadway reconstruction schedules.

The table also includes a comments section, providing a brief statement explaining reason(s) for the assigned priority. Local jurisdictions, Dane County, and WisDOT District 1 will be able to use this information in their capital improvement programming and during the scoping and design phase of projects.

It should be noted that the list of roadways in need of on-street bicycle facility improvements was compiled without consideration of potential right-of-way constraints, parking needs, or other design factors. The list also does not take into consideration the pavement condition of the roadways. Detailed analyses of available space for street widening, need for parking, and other design issues, and roadway

pavement condition are beyond the scope of a long-range regional plan such as this one.

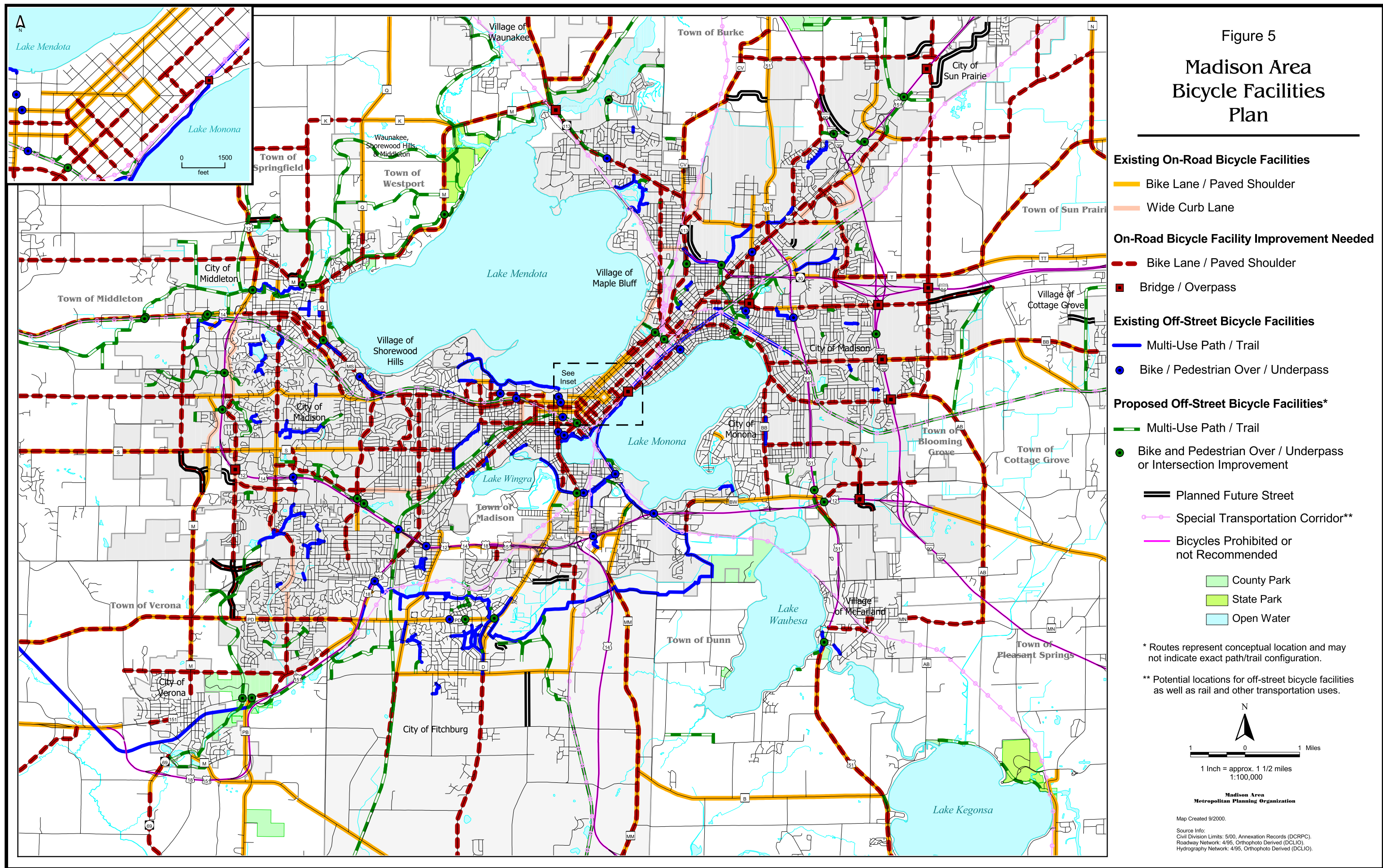
The plan map and table of on-street improvements is designed to indicate those street segments on which bicycle facilities are desired and the level of priority of the improvement for bicycle transportation purposes. The decision on the type of bicycle facility to be provided, if any, will ultimately rest with the government jurisdiction responsible for the roadway, and will be made at the time of project scoping and design.

Madison area roadway segments with the greatest need for bicycle facilities include those listed below. These are roadways with a low bicycle compatibility rating for which there are no suitable alternative routes within the travel corridor, thereby limiting bicyclists' mobility. They include:

- STH 113 (Northport Dr.)
- N. Sherman Ave. – Northport Dr. to Fordem Ave.
- E. Johnson St. – Brearly St. to Fordem
- Gorham St. – Brearly St. to E. Johnson St.
- E. Washington Ave. – Zeier Rd. to Dickinson St.
- Monona Drive (CTH BB)
- Milwaukee St. – Schenk St. to E. Washington Ave.
- Cottage Grove Rd. – Inwood Way to Dempsey Rd.
- Regent St. – Spooner St. to W. Washington Ave.
- University Ave. – USH 12 to Campus Dr.
- Midvale Blvd.
- Whitney Way – Old Middleton Rd. to Gilbert St.
- Odana Rd. – Gammon Rd. to Segoe Rd.
- Mineral Point Rd.- Whitney Way to Speedway Rd.
- Park St./Gammon Rd. – University Ave. to Tree Lane
- CTH M (North) – USH 12 to STH 113

Table 10 lists proposed Madison area off-street paths and pedestrian/bicycle over/underpasses or intersection improvements. The table first identifies those projects with already approved or committed funding, and then lists additional planned projects. The projects have been assigned a relative level of priority based on the following criteria:

Figure 5
**Madison Area
 Bicycle Facilities
 Plan**



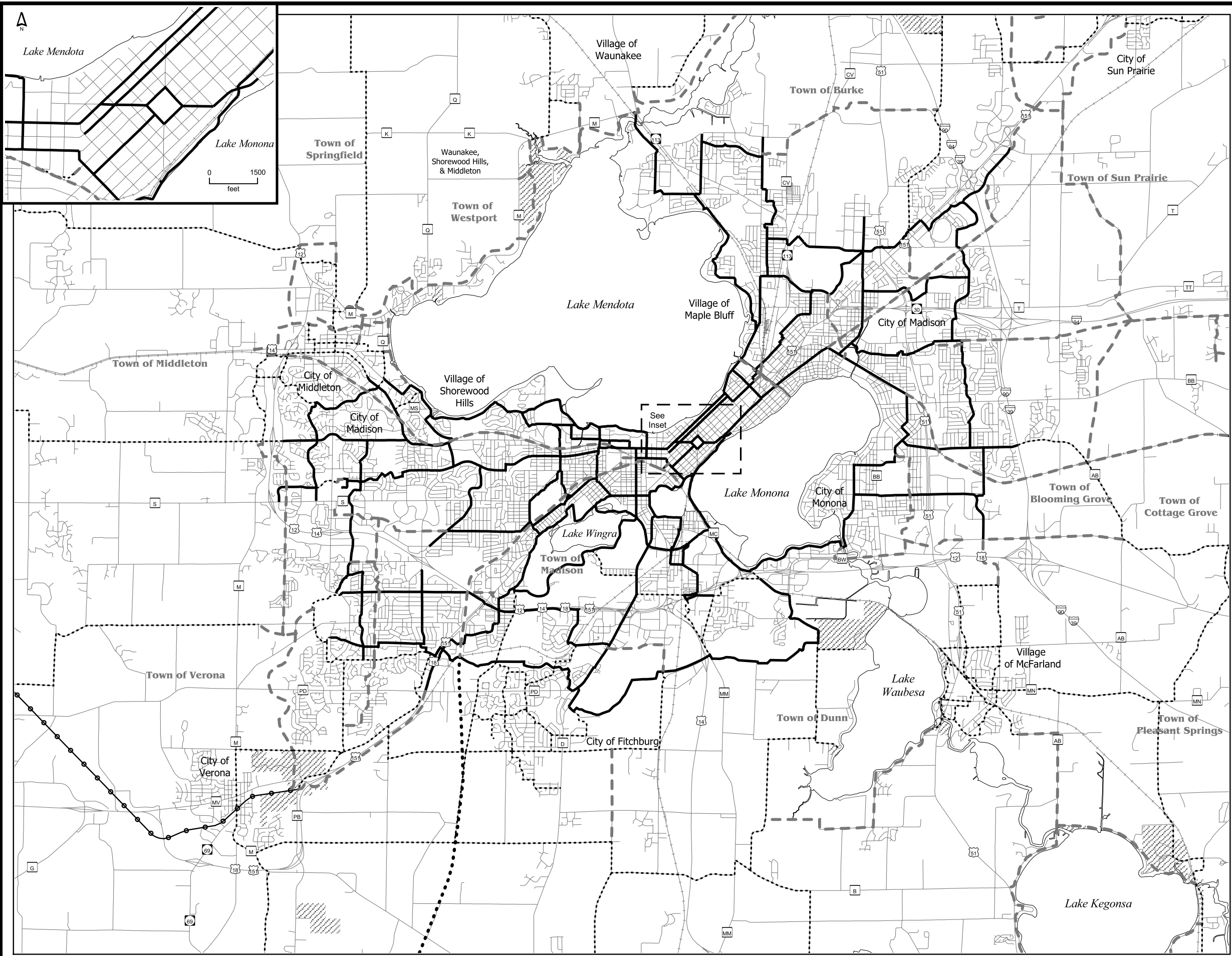



Figure 6
**Madison Area
Bicycle Route
Plan**

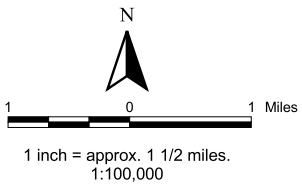
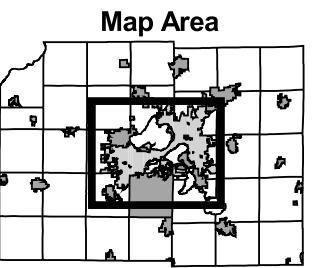
**Signed Bicycle Routes on Lower Volume
Roadways and Paved Off-Street Paths**

- Existing
- Recommended - short term
- - - Planned Future - long term
(requires bicycle facility improvement(s))

State Trails (unpaved)

- Existing
- Proposed

 State or County Park



**Madison Area
Metropolitan Planning Organization**

Map Created 9/2000.
Source Info:
Civil Division Limits: 5/00, Annexation Records (DCRPC).
Roadway Network: 4/95, Orthophoto Derived (DCLIO).
Hydrography Network: 4/95, Orthophoto Derived (DCLIO).

Table 9

Prioritized List of On-Street Bicycle Facility Improvement Needs in the Madison Urban Area¹

Roadway	Segment	Program Year/ Priority ²	Implementor(s)	Comments
Projects Already Programmed or Planned, but Without Programmed Funds				
Airport Rd.	Nursery Dr. to Middleton west city limits	Programmed '02	C. Middleton	Most direct route from V. Cross Plains other than USH 14
Allen Blvd. (CTH Q)	Century Ave. to University Ave.	Planned '01	Dane County, C. Middleton	Pavement width exists, simply needs re-striping
Beltline Frontage Rd.	Landmark Pl. to Todd Dr.	Programmed '03	T. Madison	Bicycle route
Buckeye (E) Rd. (CTH AB)	Stoughton Rd. (USH 51) to Droster Rd	Programmed '01	Dane County, C. Madison	Bicycle route; best existing route to Glacial Drumlin Trail
Cottage Grove Rd (CTH BB)	I-90 bridge widening	Seeking funding	Dane County, WisDOT	Narrow bridge creates barrier
	Thompson Dr. to Sprecher Rd.	Planned '07	Dane County, C. Madison	Important E-W arterial serving developing area
Cross Country Rd.	I-90 bridge widening	Seeking funding	C. Madison, Dane County	Narrow bridge creates barrier
	Nesbitt Rd/Maple Grove Rd to 0.2 mi W	Programmed '03	C. Madison, T. Verona	Recommended bike route between C. Madison and C. Verona
CTH M (North)	CTH Q to STH 113	Seeking funding	Dane County	Barrier due to high traffic volumes, inadequate shldrs.; planned '06
CTH M (West)	Valley View Rd. to Pleasant View Rd.	Seeking funding	Dane County, C. Madison	Road re-alignment to provide continuous N-S road W of Beltline
CTH MN (McFarland)	USH 51 to Milwaukee St.	Seeking funding	Dane County, V. McFarland	E-W arterial through village downtown area
Dutch Mill Rd./Femrite Dr.	E. Broadway Service Rd. to Marsh Rd.	Programmed '02	C. Madison	Route to World Ag. Center, and McFarland after Marsh Rd. extension
	Marsh Rd. to Ohmeda Dr.	Seeking funding	C. Madison	Provides access to large employer; important route out of Madison
Elmwood Ave.	Park St. to east Middleton city limits	Planned '01-'02	C. Middleton	Parking on one side to be removed and bike lanes striped
First (N) St.	E. Johnson St. to E. Washington Ave.	Programmed '04	C. Madison	Important cross-isthmus connection east of Yahara River
	E. Washington Ave. to Winnebago St.	Seeking funding	C. Madison	
Fish Hatchery Rd. (CTH D)	Lacy Rd. to Whalen Rd.	Seeking funding	Dane County	Primary N-S route; improves bike access to community center
High Point (S) Rd.	Ext. from Mid-Town Rd. to McKee Rd	Seeking funding	C. Madison	Important continuous N-S road, rec. bike route on Far West side
Johnson (E) St.	Brearly St. to Few/Baldwin St.	Seeking funding	C. Madison	Barrier to travel in corridor; ROW constraints
Lien Rd.	Zeier Rd. to N. Thompson Dr.	Seeking funding	C. Madison	
Maple Grove Rd.	Nesbitt Rd. to N of Nesbitt Rd.	Programmed '03	C. Madison, Fitchburg	Route between Madison, Badger Prairie Park, and C. Verona
McKee Rd. (CTH PD)	Nesbitt Rd. to Maple Grove Rd.	Programmed '02	Dane Cty, Madison, Fitchburg	E-W arterial roadway south of Beltline
	Maple Grove Rd. to CTH M	Seeking funding	Dane County, C. Madison	E-W arterial roadway south of Beltline; High Pt. Rd west planned '07
Milwaukee St.	I-90 bridge widening	Seeking funding	C. Madison	Narrow bridge creates barrier; planned bike route when extended east
Mineral Point Rd. (CTH S)	Big Sky Dr. to Pleasant View Rd.	Seeking funding	Dane County, C. Madison	Important E-W arterial; major barrier
Monona Dr/Atwood Ave.	CTH BW to Starkweather Creek	Planned '06	Dane Cty, C Monona, Madison	Major barrier due to lack of alternative routes; ROW constraints
Nesbitt Rd.	W of Maple Grove Rd to Fitchrona Rd	Programmed '03	C. Madison	Suitable for bicycling now; recommended bike route
Old Middleton Rd.	Countryside Ln. to Old Sauk Rd.	Planned '02	C. Madison, C. Middleton	Important bike route; alt. designs being considered to minimize width
Old Sauk Rd.	Heartland Trail to Prairie Smoke Rd.	Programmed '03	C. Madison	Rec. bike route into/out of Madison area on West side
Packers Ave. (CTH CV)	Wheeler Rd. to Tennyson Lane	Programmed '04	Dane County, C. Madison	Route from North Madison to Token Creek Park, C. Sun Prairie
Park (S) St.	Regent St. to W. Washington Ave.	Programmed '02	C. Madison	1st priority; feasibility of adding bike lanes uncertain
Pleasant Branch Rd.	Realignment to Frank Lloyd Wright Ave	Planned '01	C. Middleton	Will provide direct connection into city, avoiding Century Ave.
Pleasant View Rd.	Univ. Green to south city limits	Planned '02	C. Middleton	Parallel route available; will connect to CTH M
Post Rd.	Ext. from Fish Hatchery to Watford Way	Planned '05+	C. Madison, C. Fitchburg	Will provide connection to employment center
Sprecher Rd.	CTH T to Cottage Grove Rd; I-94 bridge	Seeking funding	C. Madison	Important N-S road in developing area; I-94 bridge is existing barrier
	Cottage Grove Rd. to Buckeye Rd.	Seeking funding	C. Madison	Portion of existing Sprecher Rd. will be relocated
University Ave.	Allen Blvd. to Grand Ave.	Seeking funding	Dane County, C. Madison	E-W arterial with many destinations; ROW constraints on west part
Washington (E) Ave.	Blair St. to Thierer Ave.	Program. '04-'05	C. Madison, WisDOT	Major arterial providing access to many destinations

Table 9 (continued)

Prioritized List of On-Street Bicycle Facility Improvement Needs in the Madison Urban Area¹

Roadway	Segment	Program Year/ Priority ²	Implementor(s)	Comments
Additional On-Street Bicycle Facility Improvements Needed				
Agriculture Dr.	Pflaum Rd. to Femrite Dr.	2nd Priority	C. Madison	Bike route; provides access to World Agricultural Center
American Parkway	Hoepker Rd. to N of Am. Family Dr.	3rd Priority	C. Madison	Will be improved as development occurs
Anderson St.	International Ln. to Grim St.	1st Priority	C. Madison	Bike route; connection to MATC and Truax Business Park
	Hoffman St. to USH 51	1st Priority	C. Madison	Wright St. to USH 51 is highest priority segment
Atwood Ave.	First St. to Oakridge Ave.	Long-Range	C. Madison	ROW constraints; rush hour parking restriction now
	Oakridge Ave. to Starkweather Creek	2nd Priority	C. Madison	Priority increases if bike lanes added to Monona Dr.
Bassett St.	University to Dayton St.	1st Priority	C. Madison	Could reduce street to two lanes from Johnson St. to Dayton St.
	Main St. to Wilson St.	2nd Priority	C. Madison	Only one additional foot needed for parking/bike lane
Bedford (N,S) St.	Dayton St. to North Shore Dr.	2nd Priority	C. Madison	ROW constraints unless some parking removed
Blair St.	E Washington Ave. to Williamson St.	3rd Priority	C. Madison	Parallel routes with lower traffic volumes available
	Williamson St. Intersection	2nd Priority	C. Madison	Difficult intersection; improved markings, signing needed
Broom (N,S) St.	Gorham to John Nolen Dr	2nd Priority	C. Madison	Dayton St. to Gorham St. most important segment
Buckeye Rd. (CTH AB)	Monona Dr. to Stoughton Rd. (USH 51)	2nd Priority	Dane County, C. Madison	Little used, striped parking lane serves bicyclists now
	Droster Rd. to Sprecher Rd.	3rd Priority	Dane County, C. Madison	Recommended bike route into/out of the Madison area
	I-90 bridge widening	1st Priority	Dane County, C. Madison	Narrow bridge creates barrier
Century Ave. (CTH M)	USH 12 to CTH Q	1st Priority	Dane County, C. Madison	ROW constraints; Middleton bike plan recommends wide curb lanes
Cottage Grove Rd.	Atwood Ave. to Thompson Dr.	1st Priority	C. Madison	Could stripe bike lane now from USH 51 to Thompson Dr
Cross Country Rd.	W of Maple Grove Rd. to CTH M	2nd Priority	C. Madison, T. Verona	Recommended bike route bet. Madison, Verona; route to school
CTH M (West)	Mineral Point Rd. to Cross Country Rd.		Dane County	(See Table 11 List of Dane County Facility Needs)
CTH MM	Rimrock Rd. to McCoy Rd.	1st Priority	Dane County	Recommended bike route; provides access to Capital City Trail
	McCoy Rd. to CTH M		Dane County	(See Table 11 List of Dane County Facility Needs)
CTH Q	CTH M to Middleton city limits	2nd Priority	Dane County, C. Middleton	Could stripe bike lane if parking removed from one side of road
Eagan Rd.	E Washington Ave to East Towne Blvd	2nd Priority	C. Madison	Bike route with 11,200 ADT; part of link bet. East Towne, MATC
East Park Blvd.	Extension to Portage Rd.	3rd Priority	C. Madison	Provides route to American Center from the north
East Towne Blvd.	Eagan Rd. to East Springs Dr.	2nd Priority	C. Madison, WisDOT	Bike route with 8,200-9,100 ADT; access to major retail area
Fair Oaks (S) Ave.	Atwood Ave. to Milwaukee St.	Long-Range	C. Madison	Bike route with 8,500-9,500 ADT; recently reconstructed
Fair Oaks (N) Ave.	Milwaukee St. to E. Washington Ave.	2nd Priority	C. Madison, T. Blooming Grove	Bike route; provides connection to MATC, Madison Corp. Center
Fish Hatchery Rd. (CTH D)	S. Park St. to W. Wingra Dr.	1st Priority	Dane County, C. Madison	Bike route with 20,000 ADT
Fordem Ave.	Sherman Ave. to E. Johnson St.	3rd Priority	C. Madison	Wide street with low parking occupancy, but high traffic levels
Forward Dr.	Extension across USH 12 to Odana Rd	Long-Range	C. Madison	Being evaluated as part of Verona Rd./West Beltline Study
Gammon (N, S) Rd.	Soo Line RR to Tree Lane	1st Priority	C. Middleton, C. Madison	Major barrier; no parallel routes north of Old Sauk Rd.
Gammon (S) Rd.	West Beltline to Watts Rd.	2nd Priority	C. Madison	Bike lanes exist north and south of this segment
Gorham (E) St.	Brearily St. to S. Baldwin St.	1st Priority	C. Madison	Gap in bikeway system; ROW constraints
Grand Canyon Dr.	Mineral Pt. to Odana Rd.	1st Priority	C. Madison	Bike route with 9,400 ADT; recommend striping bike lanes
Greenway Cross/Stewart St.	Fish Hatchery Rd. to Syene Rd.	2nd Priority	C. Madison	Could stripe bike lanes if parking on one side eliminated
Hanson Rd.	Extension west to CTH CV	2nd Priority	C. Madison	Provides connection to Portage Rd., bike route out of/into Madison

Table 9 (continued)

Prioritized List of On-Street Bicycle Facility Improvement Needs in the Madison Urban Area¹

Roadway	Segment	Program Year/ Priority ²	Implementor(s)	Comments
Additional On-Street Bicycle Facility Improvements Needed (continued)				
Herrick Dr.	Walnut St. to Linden Dr.	1st Priority	University of Wisconsin	Main bicycle travel corridor through west central campus
High Crossing Blvd.	Crossroads Dr. to Nelson Rd.	1st Priority	C. Madison	Bike route to American Ctr., C. Sun Prairie; rec. striping bike lanes
Highland Ave.	Marsh Ter. to Campus Dr.	1st Priority	University of Wisconsin	Bike route; connection into/out of west campus area
	Campus Dr. to Regent St.	2nd Priority	C. Madison	ROW constraints, particularly south of University Ave.
High Point Rd.	Old Sauk Rd. to West Beltline	2nd Priority	C. Madison	Recommended bike route paralleling Beltline; no other good route
	Beltline Overpass	1st Priority	C. Madison	Narrow bridge creates barrier
	West Beltline to Mid-Town Rd.	2nd Priority	C. Madison	Recommended bike route; important continuous N-S roadway
International Lane	Packers Ave. to Anderson	2nd Priority	C. Madison	Commuter bike route with 20,000 ADT on this segment
Johnson (E) St.	Few St/Baldwin St to Pennsylvania Ave	1st Priority	C. Madison	Major gap in bikeway system; ROW constraints
Johnson (W) St.	Campus Dr. to Bassett St.	2nd Priority	C. Madison	Univ. Ave., Dayton St. provide alt. routes, but important for access
Lien Rd.	East Washington Ave. to Eagan	3rd Priority	C. Madison	Bike lane could be striped on existing roadway
Linden Dr.	Creek Ln. to Charter St.	1st Priority	University of Wisconsin	Main travel corridor through west central campus; bicycle route
Maple Grove Rd.	McKee Rd. to N of Nesbitt Rd.	2nd Priority	C. Madison	Recommended bike route; route to school, neigh. commercial area
Marsh Rd.	Ext. to Agric. Dr with Beltline Overpass	1st Priority	C. Madison	Provides alternative bicycle route to USH 51 into Madison
McKenna Blvd.	Schroeder Rd. to Raymond Rd.	1st Priority	C. Madison	Provides connection to two bike paths, routes and Elver Park
Mid-Town Rd.	CTH M to Raymond Rd.	2nd Priority	C. Madison	Planned future bike route; will connect to planned bike path
Midvale (N, S) Blvd.	University Ave. to West Beltline	1st Priority	C. Madison	Important N-S roadway with no alternative routes in corridor
Milwaukee St.	East Washington Ave. to Schenk St.	2nd Priority	C. Madison	ROW constraints; no alternative route west of Fair Oaks Ave.
	Walbridge Ave. to Thompson Dr.	2nd Priority	C. Madison	Has wide curb lanes now; segment on bike route
	I-90 to Sprecher Rd.	Long-Range	C. Madison	Important E-W arterial serving developing area
	Extension to Gaston Rd.	Long-Range	C. Madison	Will provide more suitable route between Madison & Cottage Grove
Mineral Point Rd.	Speedway Rd. to Whitney Way	2nd Priority	C. Madison	ROW constraints unless parking removed; Tokay Blvd. is alt. route
Monroe St.	Odana Rd. to Randall Ave.	Long-Range	C. Madison	ROW constraints; recently reconstructed
Nakoma Rd.	Manitou Way to Odana Rd.	1st Priority	C. Madison	Gap in bikeway system; route on sidewalk due to 14,700 ADT
Nelson Rd.	Felland to Reiner Rd.		C. Madison, T. Burke	(See Table 11 List of Dane County Facility Needs)
Northport Dr.	CTH M to Packers Ave.	1st Priority	C. Madison, WisDOT	No parallel route; provides access to major shopping center
Odana Rd.	Gammon Rd. to Segoe Rd.	1st Priority	C. Madison	Arterial road with access to many destinations; no alternative route
Old Sauk Rd.	High Point Rd. to Beltline	1st Priority	C. Madison	Bike route; bike lanes missing from only this short segment
Overlook Ter.	Marsh Ter. to Campus Dr.	2nd Priority	University of Wisconsin	Part of route bet. west campus area and University Ave. corridor
Packers Ave.	Darwin Rd. to Aberg Ave.	1st Priority	C. Madison	Connection from North side to International Lane most critical
	Aberg Ave. to Pennsylvania Ave.	3rd Priority	C. Madison	Alternative, though somewhat circuitous, route available
Park St. (Middleton)	University Ave. to Soo Line RR	1st Priority	C. Middleton	No suitable alternative route available
Park (S) St.	West Washington Ave. to Wingra Dr.	1st Priority	C. Madison	Alternative routes exist only north of Fish Hatchery Rd.
Parkside Dr.	Extension south to Mendota St.	1st Priority	C. Madison	Will provide N-S route east of USH 51; planned future bike route
Pennsylvania Ave.	Packers Ave. to E. Johnson St.	3rd Priority	C. Madison, WisDOT	Alternative routes generally available
Pflaum Rd.	Monona Dr. to Vondron Rd.	1st Priority	C. Madison	Bike, school route; connection to World Agricultural Center

Table 9 (continued)

Prioritized List of On-Street Bicycle Facility Improvement Needs in the Madison Urban Area¹

Roadway	Segment	Program Year/ Priority ²	Implementor(s)	Comments
Additional On-Street Bicycle Facility Improvements Needed (continued)				
Pheasant Branch Rd.	Frank Lloyd Wright Dr. to N city limits	2nd Priority	C. Middleton	Recommended bike route, although traffic volumes not high
Pleasant View Rd.	N Madison city limits to Mineral Pt. Rd.	2nd Priority	C. Madison	Parallel route available; will connect to CTH M
Portage Rd.	East Washington Ave. to I-90/94	2nd Priority	C. Madison	Important bike route; speed limit increases north of city
Proudfit St.	W. Washington Ave. to North Shore Dr	3rd Priority	C. Madison	Alternative routes generally available
Randall (N) Ave.	University Ave. to Regent St.	1st Priority	C. Madison	Terminus of SW Commuter Path; provides access into campus
Regent St.	Speedway Rd. to Park St.	Long-Range	C. Madison	ROW constraints; rush hour parking restriction now
	Park St. to West Washington Ave.	1st Priority	C. Madison	No alternative route; 21,000 ADT
Schneider Rd.	Extension from USH 12 to High St.	Long-Range	C. Middleton	Provides alternate connection to USH 12 into Middleton
Segoe Rd.	University Ave. to Mineral Point Rd.	2nd Priority	C. Madison	Univ. Ave. to Regent most critical; bike route south of Regent St
Seminole Highway	Lacy Rd. to Whalen Rd.	1st Priority	C. Fitchburg	Important bike rte. into/out of Madison area; links to Capital City Trl.
Sherman (N) Ave.	Northport Dr. to Sherman Ave.	1st Priority	C. Madison	Improvement planned from Aberg Ave. to Roth St.
Shopko Dr.	Extension north to Pankratz St.	1st Priority	C. Madison	Will provide bike route in Packers Ave. corridor
South Towne Dr.	Beltline Hwy. to Moorland Rd.	3rd Priority	C. Monona	Nob Hill bike path will provide alternative access across Beltline
Springs (E) Dr.	East Towne Blvd. to High Crossing	2nd Priority	C. Madison	Wide curb lanes now, but bike route with 10,000+ ADT
Syene Rd.	Stewart St. to McCoy Rd.	2nd Priority	C. Madison, C. Fitchburg	Connection from Capital City trail to employment center
Thompson (N) Dr.	Lien to Swanton	2nd Priority	C. Madison	Sufficient pavement width to CTH T for striping bike lane
Todd Dr.	West Beltline to Greenway View	3rd Priority	C. Madison	Bike route with 7,000 ADT
University Ave.	University Ave. to Allen Blvd.	2nd Priority	Dane County, C. Middleton	Provides access to shopping areas, downtown
USH 12	Donna Dr. to Schneider Rd.	3rd Priority	WisDOT, C. Middleton	Alternative route, access will be provided by planned bike path
Verona Rd. (USH 18/151)	West Beltline to Raymond Rd.	3rd Priority	WisDOT	Frontage Roads, two alternative crossings of Beltline available
Walnut St.	Marsh Dr. to University Ave.	2nd Priority	University of Wisconsin	Best access into west campus from the south; bike route
Washington (E) Ave.	Webster St. to Blair St.	2nd Priority	C. Madison	Alt. through routes; needed for access purposes
Washington (W) Ave.	Park St. to Regent St.	3rd Priority	C. Madison	Alternate route available (Brittingham Park path to Main St.)
	Regent St. to Fairchild	2nd Priority	C. Madison	Bike route; parallel routes available from Bedford St. east
Watts Rd.	S. High Point Rd. to Struck St.	3rd Priority	C. Madison	Link bet. High Point Rd. and Struck St. bike/pedestrian overpass
	Ext. from S. High Pt. to Commerce Dr.	3rd Priority	C. Madison	Will be built as development occurs
Williamson St.	Blount St. to First St.	Long-Range	C. Madison	ROW constraints; rush hour parking restriction now to Baldwin St
Wilson (E,W) St.	Blair St. to Henry St.	2nd Priority	C. Madison	ROW constraints unless parking elim.; bike rte. from Blair to King St.
Whitney (N,S) Way	University Ave. to Gilbert Rd.	1st Priority	C. Madison	Mineral Point Rd. south is most crucial segment
	Gilbert Rd. to Raymond Rd.	3rd Priority	C. Madison	Gilbert Rd. provides parallel route
Zeier Rd.	East Washington Ave. to Lien Rd.	3rd Priority	C. Madison	Has wide curb lanes, but bike rte. w/ 10,000+ ADT S of E Springs Dr.

¹ Includes only those roadways that are at the low end of Level of Service (LOS) D in terms of bicycling compatibility and/or are important bike routes. Plan objectives and design guidelines call for providing bicycle facilities, preferably bike lanes, on all arterial and collector streets, where warranted due to higher traffic volumes and where feasible given available right-of-way, parking, and other considerations. (See Chapter 3, p. 236 plan for discussion of LOS ratings for bicyclists.)

² "Programmed" means that the roadway project is included with programmed funding in the 2001-2005 Transportation Improvement Program (TIP). "Planned" or "seeking funding" means the project is included in local capital budget plans and may be listed in the TIP, but federal or state funding for the project has not been programmed. Priority level is based on bicycle accessibility/mobility criteria and doesn't necessarily reflect expected timing of the improvement, most of which are tied to the street reconstruction schedule.

Table 10

Prioritized List of Proposed Off-Street Bicycle Facility Projects in the Madison Urban Area

Path/Corridor/Location	Segment	Program Year/ Priority	Implementor(s)	Comments
Programmed Projects with Approved or Committed Funding				
Am. Center (USH 151 Corridor Path)	Capitol Ave./Terra Ct. to Nelson Rd.	Programmed '03	WisDOT	Part of route connecting Sun Prairie and Madison
American Center Area	USH 151 Bike/Ped Underpass (E of Am.Pkwy)	Programmed '03	WisDOT	Improves access bet. Sun Prairie and American Center
Howard Temin Lakeshore Path	N. Park St. to UW Crew House	Programmed '01	University of Wisconsin	Reconstruction and safety improvements
Marsh View/E. Branch Creek Path	Commercial Ave. Frontage to Regas Rd.	Programmed '02	C. Madison	Provides connection to Madison Corporate Center
E. Mifflin Rail Corridor Path	E. Johnson St. to N. Thornton Ave.	Programmed '01	C. Madison	Improves connection to CBD from far east isthmus area
Nob Hill Path	John Nolen Bike Path to Nob Hill Rd.	Programmed '01	C. Madison	Connects John Nolen/Isthmus Path and Capital City Trail
Pheas. Branch Creek (S Fork) Path	USH 12 to USH 14 and Eagle Dr.	Programmed '02	C. Middleton	Links residential areas with employment center
Pheasant Branch Creek Path	USH 12 Bike/Ped Underpass	Programmed '02	C. Middleton	Removes barrier between residential, employment areas
Rimrock Rd. Path	John Nolen Dr to State DOR Building	Programmed '01	DOR, Dane County	Provides connection from John Nolen Dr Path to DOR Bldg.
Southwest Commuter RR Path	Capital City Trail to Randall Ave.	Prog. '00-'02	C. Madison	Provides mobility in Monroe St. corridor and connection to Capital City and Military Ridge Trails
USH 51 Corridor Path	Terminal Dr. to East Broadway	Programmed '01	WisDOT	Short-term solution for connection bet. McFarland, Mad. Area
Wis.River RR Path (Blackhawk Segment)	N. Eau Claire Ave. to Maple Terrace	Prog. '00-'01	C. Madison, V. Shorewood	Future extension to Babcock Dr. planned
Yahara River Parkway Path	E. Johnson St. Bike/Ped Underpass	Programmed '03	C. Madison	Improves cross-isthmus mobility
Proposed Projects				
Acewood Park Path	Academy Dr. to Remington Rd.	3rd Priority	C. Madison	Links Rolling Meadows Neigh. to proposed E Rail Path Ext.
American Center Area	USH 151 Bike/Ped Overpass (at Benjamin Dr)	2nd Priority	C. Madison, WisDOT	Improves bike access to Am. Center from Madison
American Center Area	I-90/94 Bike/Ped Over/Underpass	2nd Priority	C. Madison, WisDOT	Improves bike access to American Center from Madison
Arbor Hills Greenway/Leopold Park	Greenway View to Greenway Cross	2nd Priority	C. Madison	Provides more direct link to major employment center
Badger State Trail	Cap.City Trail to Belleville via RR Corridor		WisDNR	(See Table 12 List of County Projects)
Belfontaine Conservancy and Spring Creek Trail	Ph. Branch (North) Trail to Gov. Nelson Pk via MRD site, Dorn Creek Fisheries Area	2nd Priority	Dane Cty., C. Middleton, Town of Westport	Connects Middleton and Gov. Nelson Park; one of three potential routes
Bishops Bay Development	Ph. Branch (East) Trail to Gov. Nelson Pk.	2nd Priority	T. Westport, C. Middleton	One of three possible paths/trails from NE Middleton to Gov. Nelson Park; connection still needed to central Middleton
Black Earth Creek Path	Evergreen Rd. to USH 14 at Creek crossing	3rd Priority	C. and T. Middleton	Planned path/trail continues west to headwaters area
Blackhawk Park Path	Settlers Rd. to Bear Claw Way	3rd Priority	C. Madison	Neighborhood connection
Blooming Grove Drumlin Resource Area	Gaston Rd. to CTH AB, planned Glacial Drumlin Trail extension	2nd Priority	C. Madison, Dane County	Provides connection for new Sprecher Neigh. Area to Glacial Drumlin Trail ext.; part of route bet. trail and Token Creek Park
Bowman Park Path	Fish Hatchery Rd. to Burr Oak Lane	3rd Priority	C. Madison	Burr Oaks and T. Madison neighborhood connection to park
Capital City Trail (E-Way Segment)	Overpass of Fish Hatchery Rd.	3rd Priority	C. Fitchburg, Dane County	Alt., low-cost improvement is prohibiting right turn on red
Capital City Trail (Eastern Segment)	Dempsey Rd in Madison to V Cottage Grove	1st Priority	C. Madison, WisDNR	Connection to the Glacial Drumlin Trail
Cherokee Marsh Area Path	Burning Wood Way to N. Sherman Ave.	3rd Priority	C. Madison	Part of recreational route through Cherokee Marsh areas
Cherokee Park Path	Wheeler Rd. to Menomonie Ln., incl. ped/bike overpass of creek	3rd Priority	C. Madison	Alt. on-road route available

Table 10 (continued)

Prioritized List of Proposed Off-Street Bicycle Facility Projects in the Madison Urban Area

Path/Corridor/Location	Segment	Program Year/ Priority	Implementor(s)	Comments
Proposed Projects (continued)				
Country Grove and Manchester Park Connector Path	East Pass to Manchester Rd. and Dylun Dr	3rd Priority	C. Madison	Provides access to new school and access thru neighborhood
CTH M (North) Corridor	Highland Way/CTH Q to West Point Rd.	1st Priority	C. Middleton, Dane Cty.	Provides suitable bike route to Mendota Park
	West Point Rd. to Gov. Nelson Park	1st Priority	Dane County	Provides suitable, direct bike route to Gov. Nelson Park
	Gov. Nelson Pk to Cherokee Marsh Res. Area	1st Priority	Dane County	Links parks and Middleton and North Madison
Debs Road Connector Path	White Aspen Rd. to Debs Rd.	3rd Priority	C. Madison	Importance dep. on adding bike facility to STH 113 corridor
Edna Taylor Conservation Park Path	Woodlawn Dr. to Femrite Dr.	2nd Priority	C. Madison	Provides N-S connection bet. Monona Dr. and USH 51
Elvehjem Park Path	Meadowlark Dr. to Painted Post Rd.	3rd Priority	C. Madison	Provides connection to Elvehjem School
Femrite Drive	USH 51 Over/Underpass & path connection to S. Stoughton Service Rd.	2nd Priority	C. Madison, C. Monona	Provides alt. access across USH 51 to East Broadway
Fish Hatchery Road Corridor	E. Cheryl Parkway to Lacy Rd.	3rd Priority	C. Fitchburg	Connects to McKee Farms Park and High Ridge Trail
Fitchburg	Chapel Valley Rd. to Capital City Trl., incl CTH PD ped/bike over/underpass	3rd Priority	C. Fitchburg	Good on-road routes and CTH PD crossings exist
Fitchburg	Golden Ter. to Edenberry St., Edenberry St. to Commons of Highlands Park, CCT	3rd Priority	C. Fitchburg	Good on-road route exists
Fitchburg Center Area	Gunflint Tr. to E.Cheryl Pkwy and proposed path linking McGaw Park, CCT	3rd Priority	C. Fitchburg	Path through Gunflint Trail Park; connection to proposed area park and potential school sites for Nine Springs Neigh.
Gammon Pl. Connector Path	Gammon Pl. to Normandy Lane	1st Priority	C. Madison	With UW Research Park Path, provides alt. thru connection in the Mineral Point Rd./Odana Rd. corridor, access to W Towne
Glacial Hill Park/Greenway Paths	Esler Dr to Twin Pines Dr, Glacier Hill Dr	3rd Priority	C. Madison	Neighborhood connection
Hammersley Rd/Pontiac Tr Access Path	SW Commuter Path to Pontiac Trail	2nd Priority	C. Madison	Provides access to commuter path, across Midvale Blvd.
Hartmeyer Path	Commercial Ave. to Roth St.	2nd Priority	C. Madison	Provides alt. route to N. Sherman Ave.; planned for '02
Hatchery Hill Development	Caddis Bend to Capital City Trail	3rd Priority	C. Fitchburg	Connection for Hatchery Hill dev. residents to Cap. City Trail
Highpoint Park Path	Watts Rd. to Ondossagon Wy, Kottke Dr.	3rd Priority	C. Madison	Neighborhood connection
Howard Temin Lakeshore Path	Bridge over Crew House	2nd Priority	University of Wisconsin	Addresses safety, access issues associated with Crew House
Ice Age Trail Junction Area Path	Elver Park Path to Badger Prairie Park	1st Priority	C. Madison, Dane Cty.	Links Elver and Badger Prairie Parks; potential links to west
	Verona Rd. (CTH MV) Bike/Ped Underpass and path to Military Ridge State Trail		Dane County	(See Table 12 List of County Projects)
Junction Ridge Path/Overpass	Path from N. High Pt. to Junction Rd.	2nd Priority	C. Madison	Removes barrier bet. residential neighborhood east of Beltline and commercial, employment areas west of Beltline
	W. Beltline Ped/Bike Overpass			
Junction Ridge Park Path	Blackwolf Dr. to Eldenberry Rd.	3rd Priority	C. Madison	Neighborhood connection
Kingston Onyx Park Path	Onyx Lane to Vernon Ave.	3rd Priority	C. Madison	Neighborhood connection
Knollwood Conservation Park Path	Knollwood Cons. Park to Capital City Trail	3rd Priority	C. Madison	Improves access to park
Lakeview Community Park Paths	Paths connecting Branch Rd, Maywood Ave. and Mendota Ave.	3rd Priority	C. Middleton	Paving of trails into, through park
Marshall Park Connector Path	Camelot Dr. to Middleton Beach Rd.	2nd Priority	C. Madison, C. Middleton	Provides alt. route to Allen Blvd; avoids Univ. Ave. intersection
McCaffery Dr. Connector Path	Iroquois Dr. to McCaffery Dr.	3rd Priority	C. Madison	Provides short-cut to McCaffery Dr. (Arboretum) from north
McFarland	Ped Signal or Overpass of USH 51-Yahara Rd	2nd Priority	McFarland, WisDOT	Allows safe crossing of USH 51 to Babcock Park

Table 10 (continued)

Prioritized List of Proposed Off-Street Bicycle Facility Projects in the Madison Urban Area

Path/Corridor/Location	Segment	Program Year/ Priority	Implementor(s)	Comments
Proposed Projects (continued)				
McGaw Park Connector Path	Capital City Trail to Lacy Rd.	Long-Range	C. Fitchburg	Part of Fitchburg Heritage Circle Route Concept
McGinnis Park Path	Acewood Blvd. to Charleen Ln.	3rd Priority	C. Madison	Neighborhood connection; future bike route
Middleton	Amherst Rd. to Middleton Springs St.	2nd Priority	C. Middleton	Provides connection to Middleton Beach Rd.
Murray St. Pedestrian Mall Path	University Ave. to W. Dayton St.	1st Priority	C. Madison, UW	Provides access across Univ. Ave./Johnson St. corridor
Northeast Greenspace Path	Token Creek Park Connector Path to Reiner Rd	3rd Priority	C. Sun Prairie, C. Madison	Alt. on-road route available
NCL Middleton/Ph. Branch Ridge	USH 12 to Pheasant Branch Rd.	3rd Priority	C. Middleton	Links Graber Park, planned Pheas. Branch Conservancy Trails
North Shore Drive Area Park Path	S Bassett to S Broom St along RR Corridor	3rd Priority	C. Madison	Provides connection to John Nolen Dr. Path
Northwestern RR Corridor Path	McGaw Park in Fitchburg to Oregon	Long-Range	C. Fitchburg, V. Oregon	Part of Fitchburg Heritage Circle Route Concept
Odana Hills Golf Course Path	SW Commuter Path to Odana Rd.	2nd Priority	C. Madison	Improves access to path from Midvale Heights Neighborhood
Olbrich Gardens Path	Fair Oaks Ave. to Starkweather Dr.	3rd Priority	C. Madison	Links with proposed Starkweather Creek Path
Olbrich Park Path	Lakeland Ave. to Walter St.	3rd Priority	C. Madison	Recreational route along lakeshore
Old Sauk Trails Office Park Connector Path	Blackhawk Rd. to Deming Way to Excelsior Dr to High Pt. Rd. to S. Woodmont Cir, incl. W. Beltline Over/Underpass	2nd Priority	C. Madison	Paths improve access to and circulation within office park; provides alt. access to Old Sauk Rd., avoiding interchange area
Olin (E) Ave Path	Path S of Wingra Creek to John Nolen Dr.	3rd Priority	C. Madison	Short cut to Wingra Creek Path from John Nolen Dr Path
Olin-Turville Park Path	John Nolen Dr Path to Lakeside Drive	3rd Priority	C. Madison	Alt. recreational route along lakeshore
Owen Conservation Park Path	Bordner Dr. to Inner Dr.	3rd Priority	C. Madison	Path would link Wis. Co-op Housing, Glen Oak Hills neigh. to path from Inner Dr. west to Memorial H.S.
Packers Ave. south of Aberg Ave.	Packers Ave. Overpass near Myrtle St.	3rd Priority	C. Madison	Provides alt. rte. across Packers Ave. to Aberg interchange area
Pheasant Branch Creek Path	USH 12 to Columbus Dr.	1st Priority	C. Middleton	E-W bike corridor with planned connections across USH 12 and north to planned Ph. Branch Conservancy trail system
	Confluence of N & S Forks of Pheas. Branch Creek to north of Airport Rd.	3rd Priority	C. Middleton	Alt. on-road access to industrial park is/will be available
Pheas. Branch Creek (S. Fork) Path	USH 12 to USH 14 thru Business Park	2nd Priority	C. Middleton	Connects residential neighborhoods with employment center
	USH 14, Wis. So. RR Underpasses	3rd Priority	C. Middleton	Removes barrier, but Deming Way ext. will also provide link
	Path from RR to trail north of Market St.	3rd Priority	C. Middleton	Provides separate bike/ped link bet. employment centers
	Trail N. of Greenway Blvd. to Pleasant View	3rd Priority	C. Middleton	Alt. on-road route available
Pheas. Branch Conservancy (West)	Century Ave. to Pheasant Branch Rd.	3rd Priority	C. Middleton	Pheasant Branch Rd. provides suitable on-road alternative
Pheas. Branch Conservancy (North)	East Side Conservancy Trail to West Side	2nd Priority	C. Middleton	Importance depends on whether the South Conservancy Trail is built; both link NE Middleton to rest of city
Pheas. Branch Conservancy (South)	Branch St. to Highland Way/East Side Trail, incl. CTH M bike/ped underpass at Branch St.	1st Priority	C. Middleton	Provides most direct connection bet. NE res. areas and rest of city; also connects to planned CTH M corridor path
Pheas. Branch Conservancy (East)	Highland Way to North Side Trail	1st Priority	C. Middleton	Provides access to future school site and connects with planned trails to Gov. Nelson Park
Quarry Cove Park Path	Dorchester Way to Nesbitt Rd.	3rd Priority	C. Madison	Neigh. connection to Nesbitt Rd route, Military Ridge Trail
Quarry Ridge Recreation Area	Military Ridge Trail and Lacy Rd. to Market Place	2nd Priority	C. Fitchburg	Connects residential neighborhoods with the recreation area, the USH 18/151 business/industrial area, and planned RR Trail
Richmond Hill Park Path	Cottontail Trail to Dell Dr.	3rd Priority	C. Madison	Neighborhood connection

Table 10 (continued)

Prioritized List of Proposed Off-Street Bicycle Facility Projects in the Madison Urban Area

Path/Corridor/Location	Segment	Program Year/ Priority	Implementor(s)	Comments
Proposed Projects (continued)				
Sandstone Park Path	Manchester Rd. to Ulrich Terrace	3rd Priority	C. Madison	Neighborhood connection
STH 113 Corridor Path	River Rd. to CTH M	1st Priority	WisDOT	Critical missing link in county route system link to Madison
	CTH M to School Rd.	2nd Priority	WisDOT, C. Madison	Provides more direct suitable route in corridor
Sauk Creek Greenway/Walnut Grove Park Path	Old Sauk Rd. to Farmington Way, Tree Ln, and existing Walnut Grove Park Path	3rd Priority	C. Madison	Suitable on-road routes exist
Soo Line (NE) RR Corridor Path	Isthmus Path to City View Dr.	Long-Range	C. Madison	Links Isthmus Path to East Towne, American Ctr, Sun Prairie
Southwest Commuter Path Extension	Randall Ave. to North Shore Drive	1st Priority	C. Madison	Improves access to CBD; links SW and John Nolen Dr paths
Sprecher, Rolling Meadows Neigh.s	Bike/Ped Over/Underpass of I-90/94	Long-Range	C. Madison, WisDOT	To be located between Milwaukee St. and Cottage Grove Rd.
Starkweather Crk. (W. Branch) Path	Aberg Ave. Ped/Bike Overpass	2nd Priority	C. Madison	Improves connection to Starkweather Creek Path
	Aberg Ave to Isthmus Path/Olbrich Gardens	2nd Priority	C. Madison	Links Isthmus and Starkweather Crk. Paths
	Olbrich Gardens to Lakeland Ave. with Bike/Ped Overpass of Atwood Ave.	3rd Priority	C. Madison	
Starkweather Crk. (E. Branch) Path	Starkweather Crk. Path to Marsh View Path	Long-Range	C. Madison	Potential path link once quarry closed, site redeveloped
Stoner Prairie Park Connector Path	Stoner Prairie School to Savannah Oaks School	3rd Priority	C. Fitchburg	Neighborhood connection to park, schools
Stricker Pond Park Path	Middleton St. into park	3rd Priority	C. Middleton	Paving of trail south of Voss Parkway
USH 12 Bypass Corridor Path	Path along E. corridor - USH 14 to NCL	2nd Priority	WisDOT	Connects Ph. Branch Crk. Trail with planned Conservancy Trails
UW Research Park Connector Path	Enterprise Ln. to Research Pk/Tokay Blvd.	1st Priority	C. Madison	Improves bike access to research park; provides alt. thru route
Walnut St.	Underpass of Campus Drive	Long-Range	C. Madison, UW	To be provided if street reconstructed with at-grade intersection
Warner Park	Existing path to Northside Community Center	3rd Priority	C. Madison	
W. Beltline Highway Corridor Path	Struck St. Overpass to SW Commuter Path	2nd Priority	C. Madison, WisDOT	Provides link to overpasses of Beltline, E-W thru route
	Over/underpasses of Whitney Way, Ramp	2nd Priority	C. Madison, WisDOT	Connection possible to Odana Hills Park, Milward Dr.
Wexford Detention Area Path	N. High Point Rd. to S. Woodmount Cir.	3rd Priority	C. Madison	Provides shortcut from Wexford Village Neigh. to High Pt. Rd.
Whitetail Ridge Park Path	Gullseth St. to Rigney Ln.	3rd Priority	C. Madison	Provides link bet. N. Sherman Ave. and CTH CV
Willow Creek Path	Herrick Dr. to planned RR corridor path	2nd Priority	University of Wisconsin	Provides link bet. planned RR corridor path and lakeshore path
Wingra Creek Path	Bike/Ped Underpass of Park St.	3rd Priority	C. Madison	To be built in conjunction with reconstruction of street
Wingra Park Path	Arbor Dr. to Edgewood Dr.	1st Priority	C. Madison	Provides shortcut thru park, alt. to Monroe St. sidewalk path
Wis. & Calumet RR Corridor Path	Murray St. Underpass to E. Mifflin St.	2nd Priority	C. Madison	Located on north side of RR tracks with crossing to south side
Wisconsin River RR Corridor Path	Maple Terrace to Babcock Dr.	1st Priority	V.Shorewood, C.Madison, UW	Removes bike mobility barrier in University Ave. corridor
	University Ave. to Black Earth Creek Path	2nd Priority	C. Madison, C. Middleton	Serves same general corridor as Old Middleton Rd/Elmwood St
Woodside Heights Park Path	Pond View Rd. to Voss Parkway	3rd Priority	C. Middleton	Paving of trail through park
Yahara River Parkway Path	Sherman Ave to Isthmus Path/Williamson St	1st Priority	C. Madison	Provides attractive, convenient cross-isthmus connection
	E. Washington Ave. Underpass	1st Priority	C. Madison	To be built in '04 as part of street re-construction

- Extent to which the improvement enhances mobility and/or accessibility, taking into consideration:
 - Whether reasonably direct, suitable on-road routes already exist within the corridor; and
 - The extent to which the path/trail provides a short cut or improves connections between likely bicyclist origins and destinations.
- Number of people impacted (i.e., existing and anticipated future level of use of facility by bicyclists).
- Whether the facility eliminates or reduces an existing barrier (e.g., access restricted highway or unsafe roadway) or adds a missing link in the bicycle way system.
- Extent to which the facility improves the overall quality of life by providing bicycling opportunities in scenic areas of natural, cultural, or historical interest.

As with the on-street projects, the priority level doesn't necessarily reflect the expected timing of the projects due to prior commitments, the need for acquiring right-of-way, roadway reconstruction schedules, and other factors.

Some of the highest priority projects not already funded include:

- Extension of the Isthmus/East Rail Bike Path along the railroad corridor between Madison and Cottage Grove, to connect with the Glacial Drumlin Trail, completing the Capitol City Trail;
- Path along the CTH M (North) corridor, providing a connection around Lake Mendota between North Madison and Middleton through Gov. Nelson State Park, and a suitable route between Waunakee and these areas;
- Ice Age Trail Junction Area path, providing a connection between Elver Park and the Madison bike route system and Badger Prairie County Park;
- STH 113 path along the short segment from River Rd. to CTH M to eliminate this barrier in the bike route between North Madison and Windsor/De Forest area;
- Pheasant Branch Creek Path;
- Pheasant Branch Conservancy Paths (particularly South and East segments); and

- UW Research Park Path, providing a bicycle route in the Mineral Point Rd./Odana Rd. corridor.

Figure 7 illustrates and Table 11 lists key bicycle facility projects needed to facilitate travel in regional bicycle travel corridors leading into, out of, and through the Madison area.

B. Recommended Countywide Bicycle Facilities Plan

The recommended county bicycle facilities plan covers the rural areas of the county, focusing on longer distance trips into and out of the Madison urban area, between outer area communities, and to parks, bicycle trails, and other major destinations within the county. The plan identifies rural roadways with higher traffic volumes that are in need of added or widened paved shoulders. The plan also identifies desired off-street bicycle paths and trails designed to improve bicyclists' mobility and the overall quality of the county bicycling environment.

With the exception of the planned bicycle path in the USH 12 corridor and a short path segment along STH 19, bicycle paths parallel to rural roadways are not being recommended due to cost considerations and because of safety conflicts that occur at intersections of roadways and driveways. The proposed bicycle paths and trails make use of linear corridors, such as railways and environmental or open space corridors.

Figure 8 shows the rural roadway segments in Dane County that are in need of added or widened paved shoulders and the proposed bicycle paths and trails. Planned major trails within outer area communities are shown along with rural trails. Roadway segments shown as in need of added or widened paved shoulders include all those with average daily traffic volumes greater than 1,000.

Figure 9 of the plan shows a recommended county system of bicycle routes on roadways with lower traffic volumes and paved bicycle paths. The routes are designed to accommodate travel between the cities and villages within the county and travel from these population centers to state and county parks, the major bicycle trails, and other desired destinations. The bicycle route map shows the connections from the county routes to existing or planned routes into and through the Madison urban area and planned routes through outer area communities.

Table 11

Key Project Links in Regional Bicycle Travel Corridors

Travel Corridor	Roadway or Multi-Use Path	Segment	Program/Plng. Status	Implementor(s)	Comments
Northwest North Lake Mendota	Century Ave. (CTH M)	W. Beltline to CTH Q	Not programmed	Dane County, C. Middleton	Needs bike lanes; ROW constraints
		CTH Q to STH 113	Planned '06	Dane County, C. Middleton	Needs wider paved shldr.
	CTH M Corridor and Pheasant Branch Conservancy Paths	Century Ave., Pheasant Branch Rd. to STH 113	Not programmed	Dane County, T. Westport, C. Middleton	Several potential routes, which should be pursued simultaneously
	CTH Q	CTH M to Rolling Hill Dr.	Not programmed	Dane County, C. Middleton	Recommend striping bike lanes
	CTH K/Pheasant Branch Rd.	Pheasant Branch Rd. (N) to CTH M	Planned '06	Dane County, T. Springfield	Paved shoulders needed
	Pheasant Branch Rd.	Re-alignment to Frank Lloyd Wright Ave.	Planned '01	C. Middleton	Provides connection across Century Ave. into city
	CTH M underpass/intersection improvement and Branch St. Connector Path	Branch St. to Pheasant Branch Rd.	Not programmed	C. Middleton	Provides more direct link to east side of city, Univ. Ave. corridor
	Pheasant Branch Creek Path	Bike/Ped Underpass of USH 12	Programmed '02	C. Middleton	Connects paths across USH 12
	Ph. Branch Creek (S Fork) Path	USH 12 to Columbus Dr.	Not programmed	C. Middleton	Paving w/ Columbus Dr. connection
	Allen Blvd. (CTH Q)	USH 12 to USH 14 and Eagle Dr.	Programmed '02	C. Middleton	Connects residential, employ. areas
East to West Middleton	Allen Blvd./Univ. Ave. intersection improvement	CTH M to University Ave.	Not programmed	C. Middleton	Needs re-striping to inc. bike lane width
	University Ave.	to/from St. Dunstan Dr.	Not programmed	C. Madison	Need safe connection from St. Dunstan path to Allen Blvd.
	Elmwood Ave/Old Middleton Rd	Allen Blvd. to Grand Ave.	Partially prog.	C. Madison	Feasibility of bike lanes west of Segoe Rd. uncertain
	Wis. River RR Corridor Path	Park St. to Old Sauk Rd.	Planned '01-'02	C. Middleton, C. Madison	Alternative designs being studied for Old Middleton Rd.
Middleton to Madison/ University Ave.		N. Eau Claire Ave. to Babcock Dr.	Partially prog.	C. Madison, V. Shorewood, UW	Alternative to use of University Ave.
West Old Sauk Rd. Corridor	Old Sauk Rd.	Heartland Trail to Timber Lane	Partially prog.	C. Madison, T. Middleton	Paved shoulders needed
	Junction Ridge Bike/Ped Overpass of W. Beltline	N. High Point Rd. to Junction Rd.	Seeking funding	C. Madison	Provides alt. access across Beltline
	Mineral Point Rd. (CTH S)	USH 12 to Junction Rd.	Seeking funding	Dane County, C. Madison	Needs wider paved shoulders
	Odana Rd.	Gammon Rd. to Segoe Rd.	Not programmed	C. Madison	Feasibility of bike lanes uncertain
Mineral Pt. Rd./Odana Rd. Corridor	Gammon Pl. Connector and UW Research Park Paths	Gammon Pl. to Normandy Lane and Enterprise Ln. to Tokay Blvd.	Not programmed	C. Madison, UW	Provides alt. through connection to Mineral Point Rd. or Odana Rd
Southwest Verona to West Madison	Ice Age Trail Junction Area Path	Elver Park to Badger Prairie Park	Not programmed	C. Madison	Links parks
	Bike/Ped Underpass of CTH MV	Badger Prairie Park to Military Ridge Trail	Seeking funding	Dane County	Links Military Ridge Trail to parks, west side of Madison
	S. High Point Rd. extension	Mid-Town Rd. to CTH PD	Seeking funding	C. Madison	High Point Rd. is important N-S route
	S. High Point Rd.	Bridge over W. Beltline	Not programmed	C. Madison	Barrier in N-S route
Monroe St. Corridor	Wingra Park Path	Path east of Arbor Dr. to Edgewood Dr.	Not programmed	C. Madison	Provides link around lake
	SW Commuter Path Phase III	Breese Ter. to Randall Ave.	Programmed '02	C. Madison	
	SW Commuter Path Extension	Randall Ave. to North Shore Dr.	Not programmed	C. Madison	Links SW and John Nolen Paths

Table 11 (continued)

Key Project Links in Regional Bicycle Travel Corridors

Travel Corridor	Roadway or Multi-Use Path	Segment	Program/Plng. Status	Implementor(s)	Comments
South Oregon/Fitchburg to Madison	Cap City Trl (Nob Hill Segment)	Nob Hill Rd. to John Nolen Dr. Path	Programmed '01	C. Madison	City negotiating path route
	Oregon Rd. (CTH MM)	Rimrock Rd. to McCoy Rd.	Not programmed	Dane County	Width of paved shldr. needs to be increased from 3 to 4 feet
	Fish Hatchery Rd. (CTH D)	Lacy Rd. to CTH CC	Partially prog.	Dane County	Continuous N-S route from Oregon
	S. Park St.	S. Park St. to Wingra Dr.	Not programmed	Dane County, C. Madison	Bicycle route
	Seminole Highway	Regent St. to Wingra Dr.	Partially prog.	C. Madison	No alt. route south of Park St.
	Badger State Trail	Lacy Rd. to Whalen Rd.	Not programmed	C. Fitchburg	Important recreational/commuter rte.
Belleville to Madison SW Madison to Fitchburg/S. Madison	Post Rd. extension	Capital City Trail to Belleville	Seeking funding	WisDNR	Provides link to Madison area paths
	Gunflint Rd. extension	Fish Hatchery Rd. to Watford Way	Not programmed	C. Fitchburg, C. Madison	Provides additional E-W link
Southeast		Glacial Valley Rd. to Woods Hollow Rd.		C. Fitchburg	Improves access to Fitchburg Center
	Monona Dr.	Oakridge Ave. to Broadway	Not programmed	C. Madison, Dane County,	CTH BB portion planned for '06;
				C. Monona	feasibility of bike lanes uncertain
	Ped/Bike Over/underpass of USH 51	Femrite Dr. to E. Broadway Serv. Rd	Not programmed	C. Madison, C. Monona	Provides alt. access across USH 51
	Dutch Mill Rd./Femrite Dr.	E. Broadway Service Rd. to Ohmeda Dr.	Partially prog.	C. Madison	Only bike route on the far SE side
	Marsh Rd. extension	Marsh Rd. to Femrite Dr.	Not programmed	C. Madison	Provides access across USH 12
McFarland to Monona/ Madison	USH 51 Corridor Path	Terminal Dr. to E. Broadway	Programmed '01	WisDOT	Provides access across USH 12
	Bike/Ped Over/underpass of USH 12	S. Dutch Mill Rd. to Dutch Mill Rd.	Not programmed	C. Madison, WisDOT	Potential alt. access across USH 12
East Cottage Grove to Madison	Capital City Trail (East Segment)	Ext. of Isthmus path to Glacial Drumlin Trl	Not programmed	WisDNR, C. Madison	Will link state trails through city
	Buckeye Rd. (CTH AB)	I-94 to Femrite Dr.	Not programmed	Dane County	Needs wider shldr.; best route now
		I-94 bridge widening	Seeking funding	C. Madison, WisDOT	bet. Gl.Drumlin Trl. & Isthmus path
	CTH BB	I-94 to CTH N	Not programmed	Dane County	Needs wider paved shoulders
		I-94 bridge widening	Seeking funding	C. Madison, WisDOT	
	Milwaukee St.	I-94 to Sprecher Rd.	Not programmed	C. Madison	Bike lane/paved shoulders needed
Northeast Sun Prairie to Madison		Ext. from Sprecher Rd. to Gaston Rd.	Long-Range	C. Madison	Will be built as neigh. develops
		I-94 bridge widening	Seeking funding	C. Madison, WisDOT	
	Commercial Ave./CTH T	Mesta Ln. to Gaston Rd.	Not programmed	C. Madison, Dane County	
North Waunakee to Madison	O'Keefe Ave.	Extension to Reiner Rd.	Planned '01-'02	C. Sun Prairie	Will be built as neigh. develops
	USH 151 Corridor Path	Capitol Ave./Terra Ct. to Nelson Rd.	Programmed '03	WisDOT	Part of connection bet. Madison, SP
	USH 151 Bike/Ped Underpass	South of Capitol Ave.	Programmed '03	WisDOT	
	USH 151 Bike/Ped Over/underpass	Benjamin Dr.	Not programmed	C. Madison, WisDOT	Land reserved within American Ctr.
	Brooks Dr.	Extension to Hoepker Rd.	Programmed '02	C. Sun Prairie, WisDOT	To be done as part of CTH C/ Reiner Rd. interchange project
					Provides access to American Center
Cross-Isthmus	Bike/Ped Overpass of I-94	Portage Rd. to Eastpark Blvd.	Not programmed	C. Madison	Provides access to Corporate Center
	Marsh View/E Branch Cr Path	Commercial Ave to Regas Rd.	Programmed '02	C. Madison	Links existing part of path to
	Starkweather Creek Path	Aberg Ave. Overpass and	Not programmed	C. Madison	Isthmus path
		Aberg Ave. to Isthmus Path at Olbrich Park			
South Oregon/Fitchburg to Madison	STH 113	Bong Rd. to CTH M	Programmed '05	WisDOT	Needs wider paved shoulders
	STH 113 Corridor Path	River Rd. to CTH M	Not programmed	WisDOT	More attractive alt. to STH 113
	Northport Dr. (STH 113)	CTH M to Sherman Ave.	Not programmed	WisDOT, C. Madison	Bike lanes, alt. off-street route needed
	N. Sherman Ave.	Northport Dr. to Sherman Ave.	Partially planned	C. Madison	Bike lanes planned bet. Aberg Ave. and Roth St.
	Hartmeyer Path	Roth St. to Commercial Ave.	Not programmed	C. Madison	Provides alt route thru part of corridor
Cross-Isthmus	Yahara River Parkway Path	Isthmus Path to Sherman Ave.	Not programmed	C. Madison	
		E. Washington Ave. Underpass	Planned '04	C. Madison, WisDOT	To be built as part of street re-const.
Cross-Isthmus		Johnson St. Underpass	Programmed '03	C. Madison	

Table 12 lists the needed on-road improvements by inter-community travel corridor and the planning or programming status of the project. The improvements have been assigned a relative priority level (1st, 2nd, 3rd) based on the same criteria used for prioritizing the Madison area on-street facility needs outlined in Section A above. A brief comments section provides an explanation for the assigned priority level. The priority level does not take into account the pavement condition of the roadways. Such an analysis was beyond the scope of the plan, as was an analysis of the feasibility and cost-effectiveness of adding 4-foot paved shoulders to the roadways identified as needing them. The plan simply identifies those roadways in need of bicycle facility improvements and the priority of the improvement from a bicycle transportation perspective.

Some of the roadway segments in the county with the greatest need for added or widened paved shoulders are listed below. These are roadways that: (1) are either currently rated as unsuitable or marginally suitable for bicycling; (2) are on a recommended bicycle route or important travel corridor; and (3) for which no reasonably direct, suitable alternative route exists. These include:

- CTH AB – Madison to CTH MN;
- CTH MN – CTH AB to McFarland;
- CTH BB – Madison to Cottage Grove;
- CTH C/Reiner Rd. interchange, including connection of Brooks Dr. to Hoepker Rd.
- CTH CV – Wheeler Rd. to Hoepker Rd.;
- CTH D – Whalen Rd. to CTH CC;
- CTH K – Pheasant Branch Rd. (north) to Pheasant Branch Rd. (south);
- CTH S – STH 78 to Pine Bluff;
- CTH Y – Mazomanie to STH 78;
- Hoepker Rd. – CTH CV to CTH C;
- Old Military Rd. – CTH J (North) to CTH J (South);
- Old Sauk Rd. – Pleasant View Rd. to Timber Ln.;
- River Rd. – STH 113 to STH 19;
- STH 19 – Canal Rd. to Waterloo;

- STH 19 – STH 78 to USH 12 and Waunakee to West County Line; and
- USH 51 – Lake Drive Rd. to Edgerton.

Table 13 lists proposed bicycle paths or trails in the county. The projects have been prioritized according to the same criteria used for the Madison urban area projects outlined in Section A above. The comments section provides a brief explanation of the priority rating and/or purpose of the project. Higher priority projects include:

- Extension of the Glacial Drumlin Trail from Cottage Grove to Madison;
- Path and overpass connecting Badger Prairie Park with the Military Ridge Trail;
- USH 12 Corridor path from North Dunlap Hollow Rd. to West Cty. Line and widening of USH 12 bridge over the Wisconsin River to Sauk City;
- Cam-Rock Park Trail linking existing trails from Cambridge to Rockdale; and
- Badger State Trail from the Capital City Trail to Belleville.

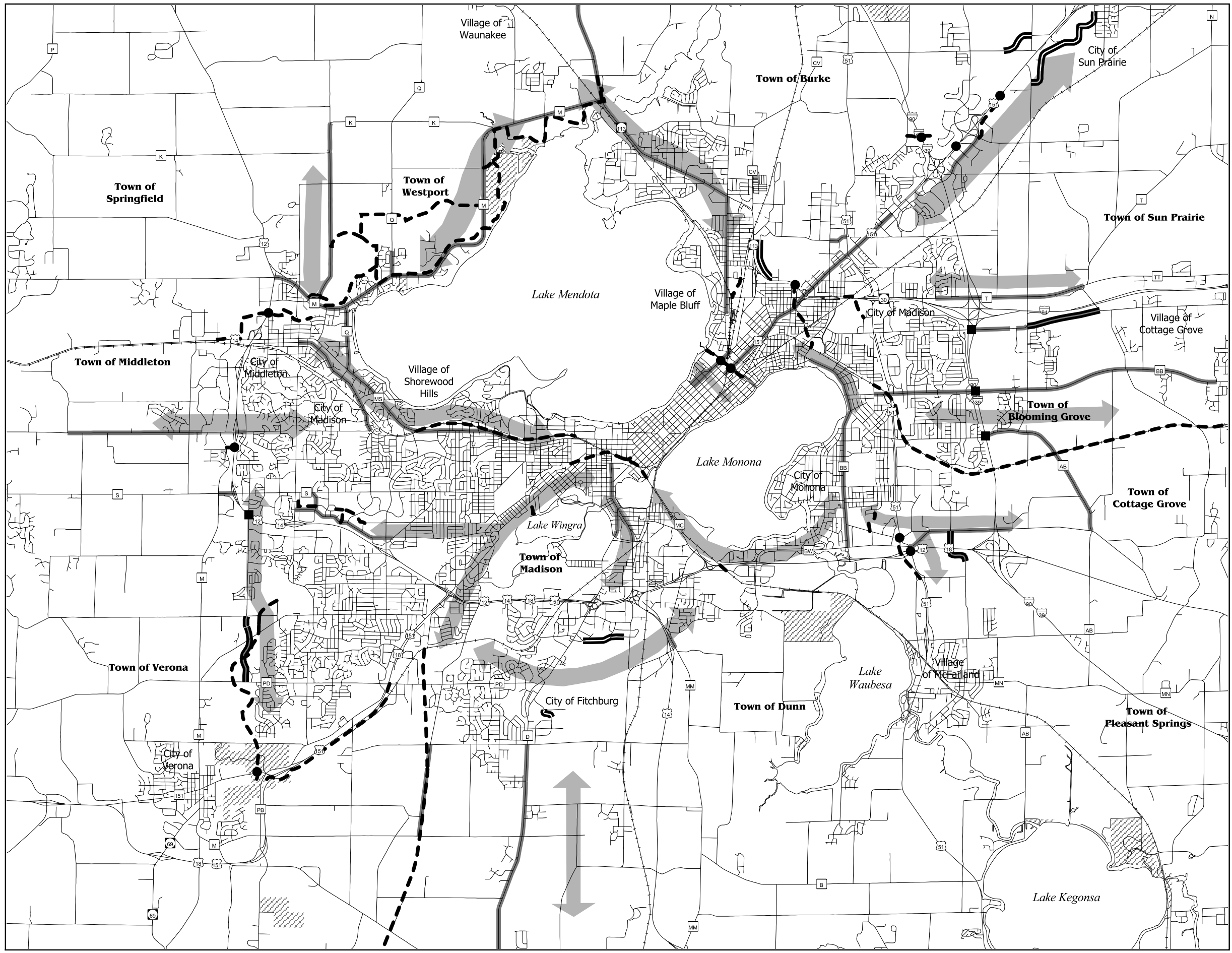
C. Bicycle Plan Costs and Funding Sources

Bicycle Plan Costs

The bicycle transportation plan includes 183.8 miles of proposed shared-use paths and trails. Of this total, at least 36.8 miles would likely be constructed with a crushed stone surface, which is much less expensive than paving with asphalt. A total of 20.6 miles of proposed paths and trails already have programmed or committed funding. All of these projects, except a 0.8-mile trail in the City of Verona, will be paved paths. The two largest of the projects already funded are the Southwest Commuter Path in the City of Madison and the U.S. Highway 12 Corridor path, which includes two segments. Excluding these funded projects, some of which are now under construction, the bicycle plan includes a total of 127.2 miles of new paved paths and 36.0 miles of unpaved trails.

Using an average per unit cost of \$40 per linear foot or \$211,000 per mile for paved shared-use paths, the total estimated cost of the paved paths is \$26.8 million. Using an average per unit cost of \$15 per linear foot or \$79,000 per mile for unpaved trails, the total estimated cost is \$2.8 million. The total estimated cost for both the paved paths and unpaved trails is therefore \$29.6 million.

Figure 7
Key Project Links in
Regional Bicycle
Travel Corridors



On-Road Bicycle Facility Improvement Needed

- Bike Lane / Paved Shoulder
- Bridge / Overpass

Proposed Off-Street Bicycle Facilities*

- - Multi-Use Path / Trail
- Bike and Pedestrian Over / Underpass or Intersection Improvement

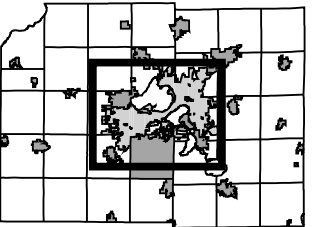
== Planned Future Street

Major Bicycle Travel Corridor

State or County Park

* Routes represent conceptual location and may not indicate exact path/trail configuration.

Map Area



N

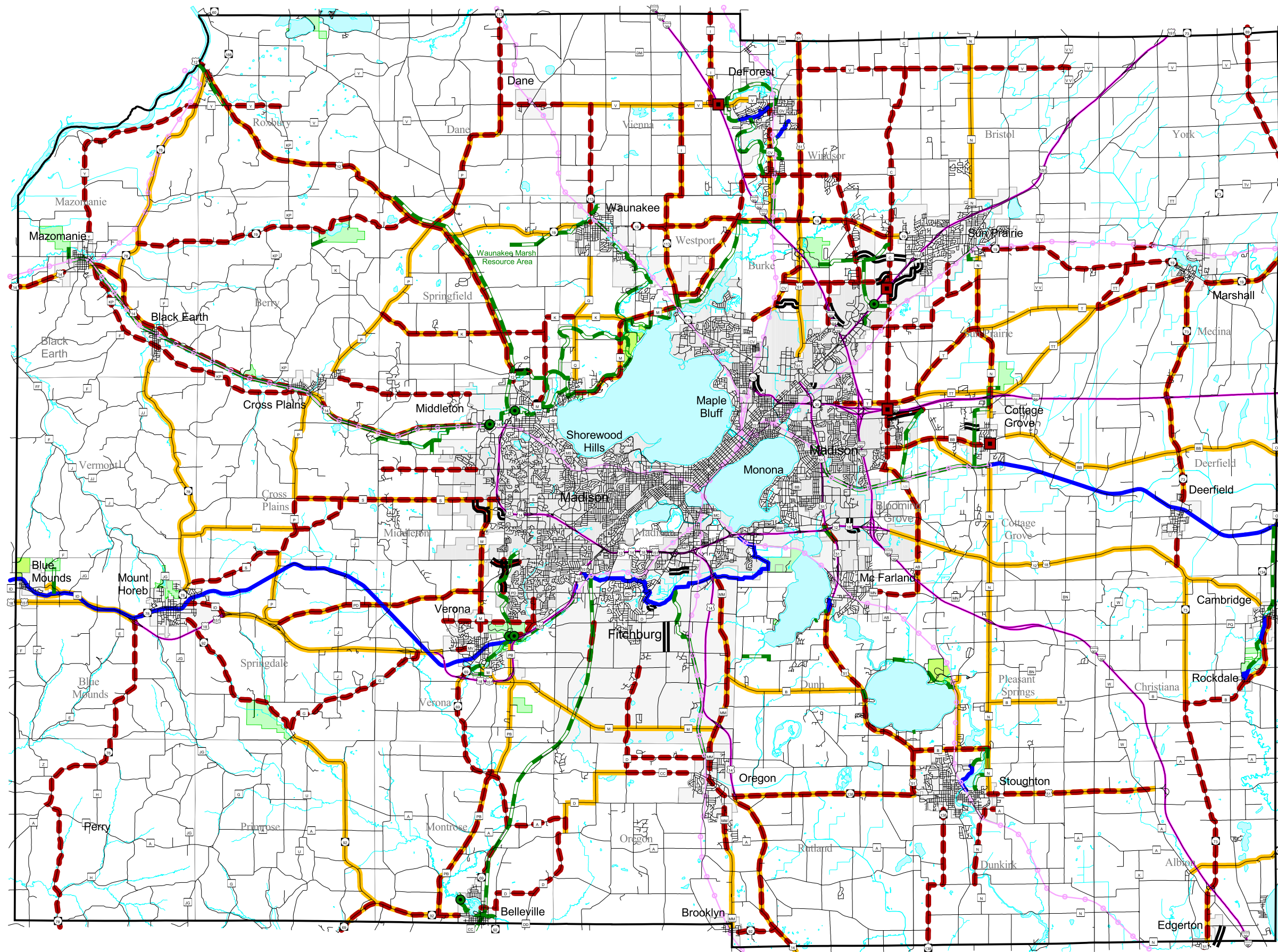
1 0 1 Miles

1 inch = approx. 1 1/2 miles.
1:100,000

Madison Area
Metropolitan Planning Organization

Map Created 9/2000.
Source Info:
Civil Division Limits: 5/00, Annexation Records (DORPC).
Roadway Network: 4/95, Orthophoto Derived (DCLIO).
Hydrography Network: 4/95, Orthophoto Derived (DCLIO).

Figure 8
Dane County
Bicycle Facilities
Plan



Existing On-Road Bicycle Facilities

- Roadways with Paved Shoulders / Bike Lanes*
- Roadways Suitable without Paved Shoulders

On-Road Bicycle Facility Improvement Needed**

- - - Bike Lane / Paved Shoulder Addition or Widening
- Bridge / Overpass

Existing Off-Street Bicycle Facilities

- Multi-Use Path / Trail
- Bike / Pedestrian Over / Underpass

Proposed Off-Street Bicycle Facilities***

- Multi-Use Path / Trail
- Bike and Pedestrian Over/Underpass or Bridge or Intersection Improvement
- = Planned Future Street
- Special Transportation Corridor****
- Bicycles Prohibited or not Recommended

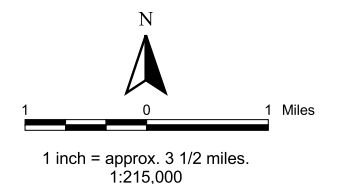
- County Park
- State Park
- Open Water

* Generally 4+ feet in width where the average daily traffic (ADT) is greater than 1,000 and 3 feet where the ADT is less than 1,000.

** Only programmed state and county roadway projects shown in outer urban areas.

*** Routes represent conceptual location and may not indicate exact path/trail configuration.

**** Potential locations of off-street bicycle facilities as well as rail and other transportation uses.



Madison Area
Metropolitan Planning Organization

Map Created 9/2000.

Source Info:
Civil Division Limits: 5/00, Annexation Records (DCRPC).
Roadway Network: 4/95, Orthophoto Derived (DCLIO).
Hydrography Network: 4/95, Orthophoto Derived (DCLIO).

Figure 9 Dane County Bicycle Route Plan

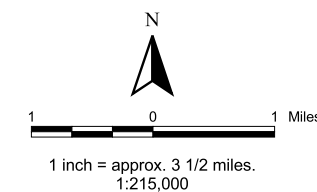
Signed Bicycle Routes on Lower Volume Roadways and Paved Off-Street Paths

- Existing
- Recommended - short term
- Planned Future - long term
(requires bicycle facility improvement(s))

State Trails (unpaved)

- Existing
- Proposed

State or County Park



Madison Area
Metropolitan Planning Organization

Map Created 9/2000.

Source Info:
Civil Division Limits: 5/00, Annexation Records (DCRPC),
Roadway Network: 4/95, Orthophoto Derived (DCLIO),
Hydrography Network: 4/95, Orthophoto Derived (DCLIO).

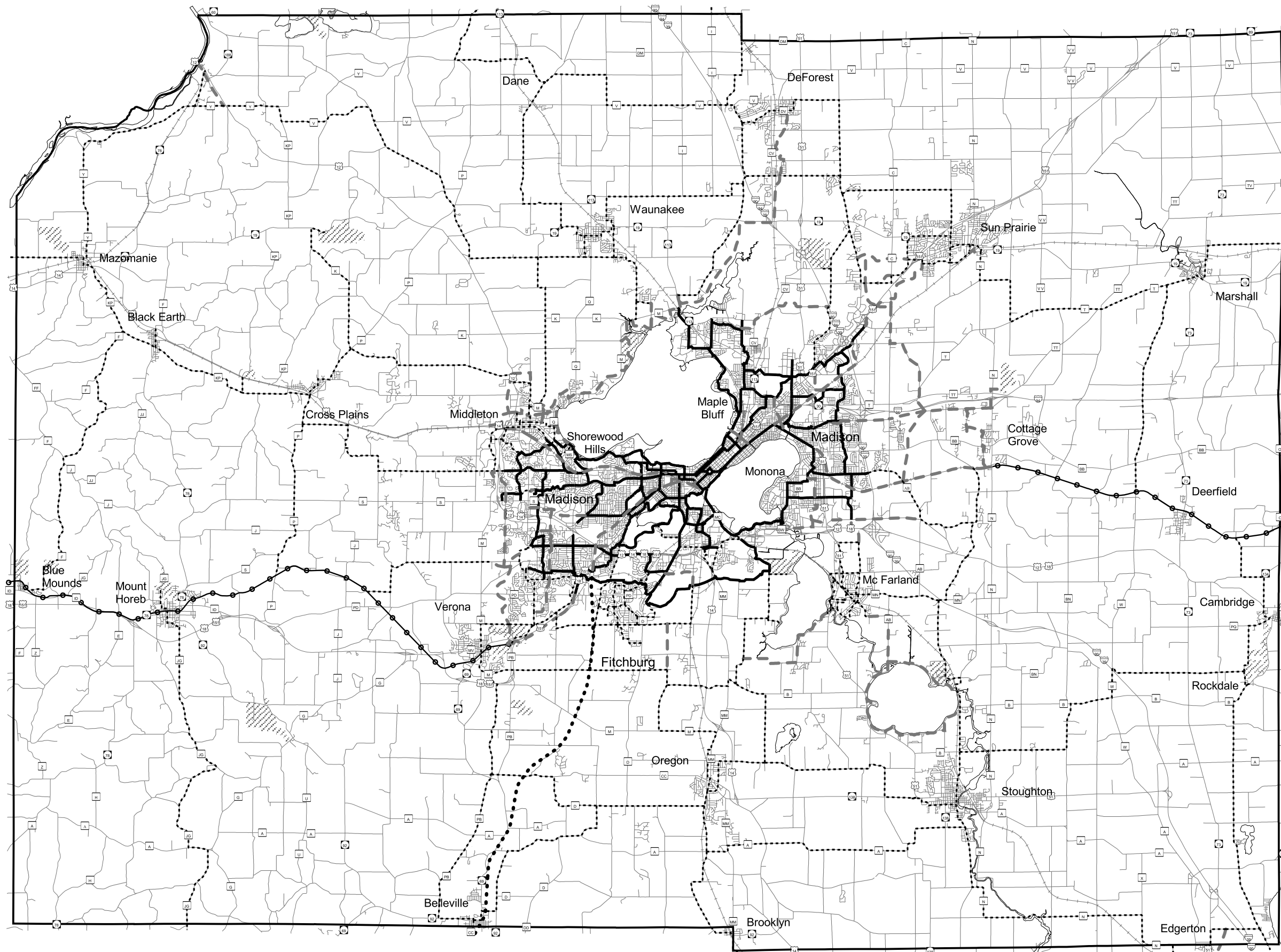


Table 12

Prioritized List of On-Road Bicycle Facility Improvement Needs in Dane County

Corridor	Roadway	Segment	Program Year/ Priority ¹	Implementor(s)	Comments
De Forest/Windsor to Madison and Sun Prairie	CTH CV	Vinburn Rd. to Windsor Rd.	2nd Priority	Dane County	Most direct route to T. Windsor
		USH 51 to Wheeler Rd.	Part Prog. '03-'04	Dane County	Route from North Madison to Sun Prairie, American Center
	Windsor Rd.	River Rd. to CTH CV	3rd Priority	Town of Windsor	If ABS development occurs, would increase priority
		CTH CV to Portage Rd.	1st Priority	Town of Windsor	On recommended bike route to Token Creek Park, Madison
	River Rd.	Windsor Rd. to STH 19	3rd Priority	Town of Windsor	If ABS development occurs, would increase priority
		STH 19 to STH 113	2nd Priority	Town of Westport	Most direct route to Madison
	STH 113	River Rd. to CTH M	Planned '05	WisDOT	Barrier due to high traffic levels; path also recommended
	CTH M	STH 113 Intersection	Planned '06	Dane County	Improved highway crossing, connection to Westport Rd. needed; ROW constraints
	Portage Rd.	Windsor Rd. to Rattman Rd.	2nd Priority	Town of Windsor	On recommended bike route to Madison, American Center
	Rattman Rd.	Portage Rd. to Hoepker Rd.	2nd Priority	Town of Burke	Alternative route to STH 19 into/out of Sun Prairie to the west
	CTH C	CTH V to Egge Rd.	3rd Priority	Dane County	Alternate route (Portage Rd.) available
		Egge Rd. to STH 19	2nd Priority	Dane County	One of three routes into/out of Sun Prairie to the north
Waunakee to De Forest and Sun Prairie	W. Main St.	Ext. from N. Thompson to Rattman Rd.	Long-Range	City of Sun Prairie	Will be constructed as area develops
	USH 51	CTH V to STH 19	Planned '06	WisDOT	Reconstruction to 4-lane expressway planned
Sun Prairie to Madison	CTH I	STH 19 to CTH V	3rd Priority	Dane County	3-foot shoulders now; Easy St. segment most important
	STH 19	Waunakee (EL) to STH 113 (South)	Planned '05	WisDOT	Most direct route between communities
		STH 113 to N. Thompson Rd. (Sun P)	2nd Priority	WisDOT	Most direct route between communities; no good alt. route
Sun Prairie to Madison	O'Keefe Ave.	Extension southwest to Reiner Rd.	1st Priority	City of Sun Prairie	With USH 151 corridor path, provides connection between cities; to be constructed within 5 years as neigh. develops
	Brooks Dr.	Ext./Re-alignment to Hoepker Rd.	Programmed '02	City of Sun Prairie	Provides better connection bet. cities north of USH 151
	Hoepker Rd.	CTH CV to CTH C	2nd Priority	T. Burke, C. Madison	Route to American Center, Madison, Token Creek Park
	Portage Rd.	I-90/94 to Hoepker Rd.	2nd Priority	T. Burke, C. Madison	Recommended bike route; speed limit increases north of city
	CTH C	STH 19 to USH 151	3rd Priority	Dane County	Alternate route (Brooks Dr/Thompson Rd) available
	CTH C/Reiner Rd	USH 151 interchange	Programmed '02	Dane County, WisDOT	Adds roadway connection across USH 151
	Reiner Rd.	Capitol Ave. to CTH T	Long-Range	T. Burke	Important N-S through roadway; recommended bike route
	Sprecher Rd.	CTH T to CTH AB		C. Madison	(See Table 9 List of Madison Area Facility Needs)
	S. Bird St.	Linnerud Dr. to Bailey Rd.	3rd Priority	C., T. Sun Prairie	Most direct existing route to Madison south of USH 151
	Bailey Rd.	CTH N to Nelson Rd.	3rd Priority	T. Sun Prairie	Most direct existing route to Madison south of USH 151
Sun Prairie to Cottage Grove	Nelson Rd.	Bailey Rd. to Felland Rd.	3rd Priority	T. Sun Prairie, T. Burke	Alternative route (Burke Rd.) available
Sun Prairie to Cottage Grove	CTH N	STH 19 to CTH TT	Planned '09	Dane County	Only direct route between communities; has 4-foot shoulders
	CTH N	CTH TT to Gaston Rd.	Programmed '03	Dane County, WisDOT	Route to McCarthy County Park from Cottage Grove
Sun Pr. to C. Grove (cont.)	CTH T	CTH N to CTH TT	3rd Priority	Dane County	Suitable for bicycling now; 3-foot paved shoulders
Cottage Grove to Madison	CTH T	CTH TT to N. Thompson Dr (Madison)	2nd Priority	Dane County	Alternative route to CTH BB between communities
	CTH BB	CTH N to Sprecher Rd.	1st Priority	Dane County	Most direct route between communities; has 4-foot shldrs.
	CTH BB/CTH N	Intersection	Programmed '03	Dane County	Addition of traffic light, turn lanes w/ bike accommodations
	Milwaukee St.	Ext. from Sprecher Rd. to Gaston Rd.		City of Madison	(See Table 9 List of Madison Area Facility Needs)

Table 12 (continued)

Prioritized List of On-Road Bicycle Facility Improvement Needs in Dane County

Corridor	Roadway	Segment	Program Year/ Priority ¹	Implementor(s)	Comments
E. Madison/McFarland to Stoughton	CTH AB	Sprecher Rd. to CTH MN	1st Priority	Dane County	Rec. bike rte.; only suitable rte. now bet. Madison, Stoughton
	CTH MN	Holscher Rd. to CTH AB	1st Priority	Dane County	On rec bike rte. from McFarland to Kegonsa Park, Stoughton
	CTH B	USH 51 to CTH N	2nd Priority	Dane County	Important E-W through roadway; route to Viking Park
	USH 51	McFarland (SL) to STH 138	3rd Priority	WisDOT	Alternative, more suitable routes available
Stoughton to Edgerton and South	USH 51	CTH N to CTH A	3rd Priority	WisDOT	Alt. route available; segment to Spring Rd. more important
	CTH A	CTH N to Collins Rd.	2nd Priority	Dane County	Only suitable route from east out of/into Stoughton
	STH 138	Stoughton (SL) to South Cty. Line	3rd Priority	WisDOT	Alternative route (Taylor Ln.) available
	CTH N	Stoughton (SL) to Hauge Rd.	Planned '09	Dane County	Route out of/into city from south on east side of river
Stoughton to Cambridge/Rockdale	USH 51	CTH N to Spring Rd.	2nd Priority	WisDOT	Route into/out of city to the east
	USH 51	Spring Rd. to CTH A	3rd Priority	WisDOT	Alternative routes available; 3-foot paved shoulders now
Stoughton to Oregon	STH 138	USH 51 to USH 14	2nd Priority	WisDOT	Only route directly into/out of Stoughton to the west
Oregon to Fitchburg/Madison	CTH MM	Wolfe St. to Oregon (NL)	Planned '04	Dane Cty., V. Oregon	Village Main St.; 1st priority
	CTH MM	Oregon (NL) to CTH M	Planned '05	Dane Cty., C. Fitchburg	Widening to divided 4-lane; has 4-foot paved shoulders now
	CTH MM	CTH M to Murphy Rd.	2nd Priority	Dane County	Provides most direct route to Lake Farm Park, Madison
	CTH MM	Murphy Rd. to McCoy Rd.	3rd Priority	Dane County	Parallel route (Lalor Rd./Larson Rd.) avail. for this segment
	CTH CC	Oregon (WL) to CTH D	2nd Priority	Dane County	Provides route west to planned Badger State Trail
	Netherwood Rd.	Oregon (WL) to CTH D	2nd Priority	T. Oregon	Alternative route to CTH CC east of CTH D
	CTH D	CTH CC to CTH M	Planned '07	Dane County	Alt. route to CTH MM/CTH M from Oregon; 2nd priority
	CTH D	CTH M to Whalen Rd.	Programmed '03	Dane County	High traffic volumes, no existing paved shldr.; 2nd priority
Oregon to Brooklyn	CTH MM	Oregon (SL) to CTH A (West)	3rd Priority	Dane County	Alt. route (Union Rd.) available; 4-foot paved shldr. now
Oregon to Belleville	CTH D	CTH A (East) to STH 69	Programmed '01	Dane County	Portion on recommended bike route
	CTH A	CTH D to STH 69	3rd Priority	Dane County	Low traffic volumes, but only 20-foot pavement width
Verona to Belleville	STH 69	Verona (SL) to CTH PB	3rd Priority	WisDOT	Alternative route available
	STH 69	CTH PB to Belleville (NL)	3rd Priority	WisDOT	Most direct route
	CTH PB	Paoli to STH 69/STH 92	Programmed '02	Dane County	Recommend bike route; has 4-foot paved shoulders now
Verona to Bellvle (cont.)	STH 92	CTH PB to Belleville (WL)	1st Priority	WisDOT	Recommended bike route; has 3-foot paved shoulders now
Verona to Madison	CTH M	Richard St. to Cross Country Rd.	Programmed '01	Dane County	Recommended bike route; connection to schools, park
	CTH M	Cross Country Rd. to CTH S	2nd Priority	Dane County	Parallel route will exist N of CTH PD after S. Point Rd. ext.
	CTH PD	CTH M to Madison west city limits		Dane County	(See Table 9 List of Madison Area Facility Needs)
	Cross Country Rd	N. Nine Mound Rd. to Nesbitt Rd.	2nd Priority	C,T Verona, C. Madison	Rec. bike route east of CTH M; route to school; part prg. '03
	Nesbitt Rd.	CTH PB to Cross Country Rd.	2nd Priority	T. Verona	Recommended bike route
	S. High Point Rd.	Ext. from Mid-Town Rd. to CTH PD		C. Madison	(See Table 9 List of Madison Area Facility Needs)
Verona to Mt. Horeb	CTH PD	CTH M to CTH P	3rd Priority	Dane County	High traffic volumes; alternate routes generally available
	CTH ID	USH 18/151 to STH 78 (North)	2nd Priority	Dane County	Direct route into Mt. Horeb from east
	CTH MV	Nine Mound Rd. to Legion Drive	Programmed '01	Dane County	Provides access to Military Ridge Trail in Verona

Table 12 (continued)

Prioritized List of On-Road Bicycle Facility Improvement Needs in Dane County

Corridor	Roadway	Segment	Program Year/ Priority ¹	Implementor(s)	Comments
Madison to Mt. Horeb	CTH S	CTH M to Pine Bluff	3rd Priority	Dane County	High traffic vol; alt. routes available; 4-foot paved shldr. now
	CTH S	Pine Bluff to STH 78	Programmed '02	Dane County	Rec. bike route; best route to Mt. Horeb from west
	Old Military Rd.	CTH S to CTH J	1st Priority	T. Cross Plains	Segment from CTH J to CTH S part of route to Mt. Horeb
Cross Plains to Middleton/Madison	Airport Rd.	Cross Plains (EL) to Middleton (WL)	2nd Priority	T Cr. Plains, T Middleton	Alt., though less direct route (Schneider Rd.) available
	W. Old Sauk Rd.	Timber Ln to Prairie Smoke Rd.	1st Priority	T Middleton, C Madison	Important recommended bike route
	USH 14	CTH P (Cr. Plains) to Pinehurst Dr.	3rd Priority	WisDOT	Alternate routes available
Waunakee to Middleton/Madison	CTH K	CTH Q to Pheasant Branch Rd. (N)	2nd Priority	Dane County	Best existing route available to Governor Nelson Park
	CTH K	Ph. Branch Rd (N) to Ph. Branch Rd (S)	1st Priority	Dane County	Recommended bike route out of/into Middleton to the north
	CTH K	Ph. Branch Rd (S) to USH 12	2nd Priority	Dane County	Only road with access across USH 12 south of CTH P
	Pheas. Branch Rd	CTH K to Middleton city limits	2nd Priority	T. Middleton	Recommended bike route
	STH 113	STH 19 to CTH M	Programmed '05	WisDOT	Major barrier due to high traffic volumes, lack of alternatives
Middleton to North Madison	CTH M	Middleton (EL) to STH 113	Planned '06	Dane County	Major barrier due to high traffic volumes, lack of alternatives; off-road as well as on-road improvement needed
	CTH M	STH 113 Intersection Area	Planned '06	Dane County	Major barrier due to high traffic volumes, lack of alternatives
Waunakee to Dane and Lodi (Columbia Cty.)	STH 113	STH 19 to Cuba Valley Rd.	2nd Priority	WisDOT	Kopp Rd. south most critical segment
	STH 113	Cuba Valley Rd. to CTH V	Programmed '01	WisDOT	Alternate routes available
	STH 113	CTH V to Dane	2nd Priority	WisDOT	Most direct route between Dane and De Forest
	STH 113	Dane to V. Lodi	Programmed '03	WisDOT	Alternate route available
Dane to De Forest	STH 113	CTH P (South) to Clemens Rd.	2nd Priority	WisDOT	East-west route through Dane
	CTH V	CTH I to River Rd.; I-90 Interchange	Programmed '02	Dane County	Addition of 2 lanes and bridge widening; 5-ft. shoulders now
Cross Plains to Mazomanie and West	CTH KP	Cross Plains (WL) to Mazomanie (EL)	2nd Priority	Dane County	Recommended bike route; route to school bet. CP, Mazo
	USH 14	Cross Plains (WL) to Mazomanie (EL)	Programmed '02	WisDOT	Alternate route (CTH KP) available
	USH 14	Mazomanie (WL) to west county line	Programmed '02	WisDOT	
Mazomanie to Sauk City	CTH Y	Mazomanie (NL) to STH 78	2nd Priority	Dane County	Rec. bike route to Sauk City; Amenda Rd. north planned '06
	USH 12	STH 78 to Sauk City	Programmed '03	WisDOT	Major barrier due to high traffic volumes and lack of bike accommodations on bridge, roadway
Blue Mounds to Mt. Horeb	CTH 78	CTH ID to Mt. Horeb (WL)	2nd Priority	WisDOT	Only on-road route to Mt. Horeb from west; no paved shoulders now
Sun Prairie to Marshall and Waterloo	STH 19	Sun Prairie (EL) to Marshall (WL)	Programmed '02	WisDOT	Most direct route; no paved shoulders now
	STH 19	Marshall (EL) to Waterloo	Planned '05	WisDOT	Only route to Waterloo east of Canal Rd.
	CTH T	CTH TT to Marshall (WL)	3rd Priority	Dane County	Recommended bike route; 4-foot paved shoulders now
	CTH TT	Ridge Rd. to STH 19	Programmed '01	Dane County	Suitable now due to low traffic volumes
	CTH TT	STH 19 to Canal Rd.	Planned '06	Dane County	Connection to Canal Rd., recommended route to Marshall

Table 12 (continued)

Prioritized List of On-Road Bicycle Facility Improvement Needs in Dane County

Corridor	Roadway	Segment	Program Year/ Priority ¹	Implementor(s)	Comments
Marshall to Deerfield and Cambridge	STH 73	Marshall (SL) Deerfield (NL)	3rd Priority	WisDOT	Alternate route available
	STH 73	Deerfield (SL) to USH 12/18	3rd Priority	WisDOT	Requires travel on USH 12/18
Cambridge/Rockdale to Edgerton	CTH B	Cambridge (SL) to Rockdale (NL)	3rd Priority	Dane County	Alternate route available
	CTH B	Rockdale (SL) to STH 73	2nd Priority	Dane County	Recommended bike route from Hillside Rd. west
	STH 73	CTH B to I-90/39	3rd Priority	WisDOT	Alternate route available
	USH 51	I-90/39 to Lake Drive Rd.	3rd Priority	WisDOT	Alternate route available
	USH 51	Lake Drive Rd. to south county line	1st Priority	WisDOT	Recommended bike route; route to business park
Other	CTH G	STH 92 to USH 12/18	3rd Priority	Dane County	Suitable now with 3-foot shoulders No paved shoulders now Only road with access across USH 12 south of CTH P Suitable for bicycling now Suitable now with 3-foot shoulders Alt. route (Muller Rd.) available; CTH N east planned '06 Connection to pl. bike path along USH 12 to Sauk City Very high traffic levels; bicycle path to be constructed at both ends of corridor Alternate more suitable route (CTH MM) available No paved shldrs. now; route to Indian Lake County Park Alternate routes available Route between Columbus and Waterloo; alt. route available Only route east from Brooklyn; no paved shoulders now
	CTH I	CTH V to CTH DM	Planned '08	Dane County	
	CTH I	CTH DM to north county line	3rd Priority	Dane County	
	CTH K	USH 12 to Ripp Rd.	Programmed '04	Dane County	
	CTH K	Ripp Rd. to CTH P	3rd Priority	Dane County	
	CTH P	USH 12 to STH 113	3rd Priority	Dane County	
	CTH V	USH 51 to CTH VV (South)	3rd Priority	Dane County	
	CTH Y	USH 12 to CTH KP	2nd Priority	WisDOT	
	USH 12	Sauk City to Airport Rd. (Middleton), incl. Widened bridge over Wis. River	Prog. '02-'04	WisDOT	
	USH 14	STH 138 to south county line	3rd Priority	WisDOT	
	USH 51	CTH V to north county line	3rd Priority	WisDOT	
	STH 19	STH 78 to USH 12	2nd Priority	WisDOT	
	STH 69	STH 92 to south county line	3rd Priority	WisDOT	
	STH 78	CTH ID to south county line	3rd Priority	WisDOT	
	STH 89	North county line to east county line	Programmed '04	WisDOT	
	STH 92	Brooklyn (EL) to USH 14	2nd Priority	WisDOT	
	STH 92	CTH PB to STH 69 (South)	3rd Priority	WisDOT	
	STH 92	CTH JG to CTH G	3rd Priority	WisDOT	

¹ "Programmed" means that the roadway segment improvement is included with committed funds in the 2001-2005 Transportation Improvement Program (TIP) for the Dane County Area.

Planned means the project is included in WisDOT, county, or local capital budget plans and listed in the TIP, but does not have programmed funds. The priority level is based on bicycle mobility, projected use, etc. and does not take into account the pavement condition of the roadway. The priority level doesn't necessarily reflect the expected timing of the improvements, which are tied to roadway repaving/reconstruction schedules.

Table 13

Prioritized List of Off-Street Bicycle Facility Projects in Dane County

Path/Corridor/Location	Segment	Program Year/ Priority	Implementor(s)	Comments
Programmed Projects with Approved or Committed Funding				
Am. Center (USH 151 Corridor Path)	Capitol Ave./Terra Ct. to Nelson Rd.	Programmed '03	WisDOT	Part of connection bet. Sun Prairie and Madison
American Center Area	USH 151 Bike/Ped Underpass (E of Am. Prkwy)	Programmed '03	WisDOT	Improves access from Sun Prairie to Am. Center
Ice Age Trail	Ped/Bike USH 12 Overpass near Rauls Rd.	Programmed '03	WisDOT	
Military Ridge Trail	Extension from CTH PB to McKee Rd.	Programmed '01	WisDNR	Paving of trail linking with Capital City Trail
STH 113 Corridor Path (Waunakee)	STH 19 to new res. dev. west of Madison St.	Programmed '01	V. Waunakee	
USH 12 Corridor Path	Pheas Branch Crk. Trail (Middleton) to Rauls Rd	Prog. '02-'03	WisDOT	Provides direct, suitable bike route in corridor
	N. Dunlap Hollow Rd. to Sauk City	Prog. '02-'03	WisDOT	Removes barrier to bike access into Sauk City
Verona Community Bike Path	Fireman's Park to CTH M at Whalen Rd.	Programmed '01	City of Verona	Connects Fireman's Park to Ice Age Trail on SW side
Proposed Projects				
Badger Mill Creek Trail (Verona)	Military Ridge Trail to Fireman's Park	2nd Priority	City of Verona, Dane County	Connects city residents, park to Military Ridge Trail
Badger State Trail	Capital City Trail to Belleville via RR corridor	1st Priority	WisDNR	Will connect with Sugar River State Trail near New Glarus & Cheese Country Trail at Monroe, and continue to Freeport, IL (See Table 10 List of Madison Area Projects)
Belfontaine Conservancy and Spring Creek Trail	Ph. Branch (North) Trail to Gov. Nelson Park via MRD Site, Dorn Creek Fisheries Area		Dane County, C. Middleton, T. Westport	
Black Earth Creek Trail	USH 14 to Cleveland Rd., incl. over/underpasses of USH 14 and Soo Line RR	3rd Priority	Dane County, T. Middleton,	Links to Black Earth Creek Headwaters Area in the Ice Age Trail Corridor
Blackhawk Neighborhood Path	Blackhawk Rd. to Black Earth Creek Trail	3rd Priority	T. Middleton	Connection to the Black Earth Creek Trail
Blooming Grove Drumlin Resource Area	Gaston Rd. to CTH AB, planned Glacial Drumlin Trail extension		C. Madison, Dane County	(See Table 10 List of Madison Area Projects)
Brigham County Park Connector Trail	Military Ridge Trail to Brigham Cty. Park	3rd Priority	Dane County Parks Dept.	Suitable alt. on-road route (CTH F) exists
Cam-Rock Park Trail	Cambridge to Rockdale	2nd Priority	Dane County Parks Dept.	Would complete trail thru park connecting villages
Cambridge to Glacial Drumlin Trail	V. Cambridge to London, Glacial Drumlin Trail	3rd Priority	Dane County Parks Dept.	Suitable on-road route exists
Cottage Grove Community Trail	CTH N to Glacial Drumlin Trail Extension	Long-Range	Village of Cottage Grove	Provides alternate connection to CTH N
CTH M (North) Corridor Path	Middleton to Cherokee Marsh Resource Area		Dane County, C. Middleton	(See Table 10 List of Madison Area Projects)
De Forest Loop Trail	Loop connecting existing Western Pkwy. Trail	3rd Priority	V. De Forest	Connects park/open space areas and pl. school site
De Forest-Windsor Env. Corridor Trail	Western Parkway Trail to Windsor Rd.	Long-Range	V. De Forest, C. Windsor	Connects De Forest Loop Trail to planned Windsor Center dev. via environmental corridor; links parks
De Forest-Windsor Connector Trail	Extension of path to high school, Gray Rd.	2nd Priority	V. De Forest, C. Windsor	Connects Windsor res. area to De Forest, schools; connection to trail west of CTH CV also planned
Glacial Drumlin Trail	Extension from CTH N in V. Cottage Grove to Dempsey Rd. in C. Madison	1st Priority	WisDNR, C. Madison	Missing link in E-W trail system thru county; Segment east of CTH AB most critical due to lack of direct, suitable on-road alternative
Ice Age Trail Junction Area Path	Elver Park Path to Badger Prairie Park		C. Madison, Dane County	(See Table 10 List of Madison Area Projects)
	Verona Rd. (CTH MV) Bike/Ped Underpass and path to Military Ridge Trail	1st Priority	Dane County	Links trail with park, Madison area bike routes
Indian Lake County Park Connector Trail	CTH K into park	3rd Priority	Dane County Parks Dept.	Allows access to park w/o having to use STH 19

Table 13 (continued)

Prioritized List of Off-Street Bicycle Facility Projects in Dane County

Path/Corridor/Location	Segment	Program Year/ Priority	Implementor(s)	Comments
Proposed Projects continued				
Lake Kegonsa Loop Route	Path connections from Fish Camp Rd. to Sunnyside Rd, thru park, from Shadyside Dr to Aalseth Ln, and Colladay Point Dr to CTH B	1st Priority	Dane County Parks Dept.	Path connections provide continuous lake loop route and improve connection between McFarland and Stoughton
Lake Waubesa Loop Route	Path connections from Babcock Park Path to Camp Leonard Rd., Bible Camp Rd. to Crescent Dr., and Mahoney Rd. to Lalor Rd.	2nd Priority	Dane County Parks, T. Dunn	Path connections provide continuous lake loop route; connects McFarland, cty. parks to Cap. City Trail; Mahoney to Lalor Rd. path uses utility easement
McCarthy Park Connector Path	Gaston Rd. to park along CTH N, TT	3rd Priority	Dane County	Provides off-road connection to park
Northeast Greenspace Path	Token Creek Park Connector Path to Reiner Rd	Long-Range	Dane Cty., C. Mad., Sun Prairie	(See Table 10 List of Madison Area Projects)
Northwestern RR Corridor Path	McGaw Park in Fitchburg to V. Oregon	Long-Range	C. Fitchburg, V. Oregon	N of CTH M, part of Fitchburg Heritage Circle Route
River Rd. to STH 19 to RR Corridor from T. Westport to T. Windsor	Cherokee Marsh Resource Area to Windsor Rd.	3rd Priority	Dane County, T. Westport T. Windsor	River Rd. provides adequate bike route in corridor, particularly if existing paved shoulders widened
Six Mile Creek Path	Governor Nelson Park to V. Waunakee	2nd Priority	Dane Cty. Parks, T. Westport, V. Waunakee	Allows bicyclists to avoid CTH M in accessing park; connects to planned CTH M corridor path
Soo Line RR Corridor (West) Path	V. Waunakee to Waunakee Marsh	3rd Priority	Dane Cty. Parks, V. Waunakee	Recreational trail to resource area from the village
	Deming Way (Middleton) to V. Cross Plains	Long-Range	Dane County, WisDOT	Provides direct, suitable route bet. communities
STH 113 Corridor Path	V. Cross Plains to Mazomanie	Long-Range	Dane County, WisDOT	Suitable alternative on-road route (CTH KP) exists
	River Rd. to CTH M (North)		WisDOT	(See Table 10 List of Madison Area Projects)
Sugar River Trail (Belleville)	North of river to Harmon Ave. & N. Grant St. Frederick St. to Remy Rd.	3rd Priority 3rd Priority	V. Belleville V. Belleville	Recreational trail along river thru the village with connection to Lake Belle Park and pl. Freeport Trail
Token Creek Connector Path	CTH C to Token Creek Park Rd.	3rd Priority	C. Sun Prairie, Dane County	Provides off-road access to park, into city from west
Walking Iron Park Connector Trail	RR Corridor path thru Mazomanie to park	3rd Priority	V. Mazomanie, Dane Cty. Parks	Provides off-road access into park
Yahara River Loop Trail (Stoughton)	Ext. of trail from Business Park Cir. west thru Viking County Park to Ridge St. on SW side	2nd Priority	C. Stoughton, Dane Cty. Parks	Trail extension would complete loop route

The bicycle transportation plan also identifies 29 locations for proposed bicycle/pedestrian over- or underpasses or intersection improvements (e.g., markings, traffic signals, traffic calming devices). Four of the proposed over/underpasses have already been programmed. Grade-separated overpasses and underpasses are expensive projects. However, the cost is considerably less if they are built in conjunction with the reconstruction of the roadway. For example, the Hammersley Road Overpass of the West Beltline for the Southwest Commuter Path cost \$950,000 and the Murray Street Pedestrian/Bicycle Railroad Underpass cost \$836,000. On the other hand, the Verona Rd. (USH 18/151) Underpass of the West Beltline Highway near Williamsburg Way, constructed in 1990 in conjunction with improvements to the Beltline, only cost around \$150,000. The preliminary cost estimate for the U.S. Highway 12 Underpass for the Pheasant Branch Creek Path in Middleton, which will be constructed as part of the USH 12 Bypass project, is \$393,000.

Construction of on-street bicycle facilities (new bike lanes/paved shoulders vs. re-striping lanes) is generally done as part of roadway reconstruction or repaving, and is funded as part of the overall project. It is impossible to identify those roadway construction, reconstruction, and repaving projects that will be undertaken within the 20- to 25-year period of the plan. The typical time frame for capital improvement programs is 6 years, although the Dane County Highway & Transportation Department prepares a 10-year capital budget. In addition, the decision on whether bike lanes or paved shoulders will be included as part of a roadway reconstruction project depends upon a number of design issues, such as available right-of-way, necessary grading work, and, in urban areas, whether parking space is needed. Therefore, the bicycle plan simply identifies those roadways for which bicycle facilities are needed, irrespective of the time frame and the technical or political feasibility of the project. As a result, it is impossible to calculate a total plan cost figure for on-street bicycle facilities.

Table 14 identifies the unit costs of bike lanes, paved shoulders, paved shared-use paths, unpaved trails, and bicycle overpasses/underpasses.

Other bicycle facility costs include bicycle lane striping and marking, bicycle lane and route signage, and bicycle parking, as well as bicycle facility maintenance costs.

Bicycle Plan Funding Sources

State funding for the construction of on-street and off-street bicycle facilities is available through programs administered by the Wisconsin Department of Transportation (WisDOT), and includes funds provided directly by the state and “pass-through” funds provided by the Federal government as part of the Federal-aid Highway, Transit, and Highway Safety Programs.

Bicycle projects funded with Federal-aid program funds (except the Recreational Trails Program) must be “principally for transportation, rather than recreation, purposes.” 23 C.F.R. Part 652 FHWA has determined that to meet this requirement, a bicycle facility must be more than a closed loop trail. Any facility providing access from one point to another can and will be used for transportation purposes and is therefore eligible for Federal funding. Federally funded projects must generally be on the Federal-aid highway system, which does not include minor collector or local streets. Exceptions are projects funded through the Surface Transportation Program, Bridge Program, and Hazard Elimination Program.

Bicycle projects must be designed and located pursuant to State and Metropolitan Planning Organization (MPO) transportation plans, and included in the annual element of the MPO Transportation Improvement Program (TIP). Most of the Federal-aid programs require a local or state funding match, usually 20%.

State funding for off-street, multi-use paths and trails is also available through programs administered by the Wisconsin Department of Natural Resources (WisDNR).

Local funding is available through county and local government appropriations for land acquisition and transportation improvements. Dane County has a Conservation Fund Program to fund purchase of park and open space lands. In 2000 Dane County adopted the Conservation Fund Grant Program, which earmarks up to 20% of the monies available each year from the Conservation Fund Program for matching grants to local governments and non-profit conservation organizations. Funding is provided on a 50% cost share basis which can be used to supplement funding received from DNR through the Stewardship Program. Almost \$1 million was budgeted for the grant program in 2000. Acquisition of land in corridors where bicycle trails are planned is eligible for funding under the program.

Table 14
Unit Costs for Bicycle Facilities

Type of Facility	Cost
<u>On-Street Facilities</u>	
Paved Asphalt Shoulders, 4-foot wide (part of rural roadway repaving)	\$26,000 to \$33,000 per mile ^{1,2}
Paved Asphalt Shoulders, 5-foot wide (part of rural roadway repaving)	\$33,000 to \$40,000 per mile ^{1,2}
Bicycle lanes, asphalt, 4-foot wide (part of urban road reconstruction)	\$80,000 to \$105,000 per mile
<u>Off-Street Facilities</u>	
Shared-Use Path, Paved Asphalt, 10-foot wide	\$24 to \$65 per linear foot ³ (\$127,000 to \$343,000 per mile)
Shared-Use Path/Trail, Crushed Limestone, 10-foot wide (within railroad right-of-way)	\$2 to \$6 per linear foot ⁴ (\$10,000 to \$30,000 per mile)
Shared-Use Path/Trail, Crushed Limestone, 10-foot wide (new alignment, e.g., along environmental corridor)	\$15 to \$30 per linear foot (\$79,000 to \$158,000 per mile)
Bicycle/Pedestrian Overpasses (e.g., over limited-access freeway)	\$600,000 to \$1 million (varies greatly)
Bicycle/Pedestrian Underpass (10' x 12' box culvert included as part of roadway work)	\$1,500 per linear foot, incl. lighting, etc.

¹ Assumes sufficient gravel shoulder width exists to accommodate additional paving. The cost increases significantly if additional right-of-way acquisition, grading, etc. is required.

² Three-foot wide paved shoulders are provided on state and county highways to improve motorist safety and reduce maintenance costs. The net cost of an additional 1-2 feet for bicyclists is therefore only \$6,500-\$8,250 per mile for 4-foot shoulders and \$13,200-\$16,000 per mile for 5-foot shoulders.

³ The low end of the cost range is for a short path, such as through an urban park, where no grading or drainage is required. The high end is for paths through longer urban corridors requiring drainage, street crossings, etc. Cost does not include lighting, which is recommended for urban area paths.

⁴ The low end of the cost range is for projects requiring only application of limestone screening (e.g., rails-to-trails), while the higher end is for projects requiring some grading and addition of base material.

Sources: WisDOT District 1, Dane County Highway & Transportation Department, City of Madison Engineering Division, Dane County Parks Department, WisDNR

On-street bicycle facilities (e.g., bike lane, wide curb lane) are now routinely included in state and local roadway projects funded through the different Federal-aid Highway and State programs. The principal source of funding for stand-alone, off-street bicycle projects (e.g., bicycle/pedestrian paths and over/underpasses) is WisDOT's Statewide Multi-Modal Improvement Program (SMIP), which incorporates funding from two federal programs, Enhancements and Surface Transportation Program-Discretionary. The following is a more detailed description of funding programs for bicycle and pedestrian projects administered by WisDOT and WisDNR.

Funding Programs Administered by WisDOT for Bicycle Projects

Federal-aid Highway Programs:

National Highway System (NHS) funds may be used to construct bicycle and pedestrian facilities on land adjacent to any highway on the National Highway System. The NHS includes the Interstate, other urban and rural principal arterial roadways, and strategic highway network connectors. The Federal share of the costs of transportation projects is 80% with a 20% state or local match.

The Highway Bridge Replacement and Rehabilitation Program funds replacement or rehabilitation of highway bridges that are unsafe. Funds can be used for bicyclist and pedestrian improvements on the bridge, and such improvements must be included as part of the project if the safe accommodation of non-motorized users can be done at a “reasonable cost.” There is a 20% local or State funding match required.

The Surface Transportation Program (STP) provides states with flexible funds, which may be used for a wide variety of projects, including arterial and collector roadway improvements and construction of bicycle and pedestrian facilities. Non-construction projects, such as planning and information and education programs (e.g., maps, brochures, PSAs) related to safe bicycle use and walking, are also eligible for funding. The STP program provides a designated funding amount to the Madison urban area, since is an area of over 200,000 population. Under ISTEA, the Madison area has received \$3.6 million per year of STP-Urban funds. Under TEA-21, the new federal transportation law, the amount will increase to \$5 million in 2002. Federal rules require the Madison Area MPO to coordinate and approve priority listings for use of these funds. The rural component of the STP program provides funding for improvements (including paved shoulders) to Federal-aid eligible rural roadways, primarily county trunk highways.

WisDOT has used a portion of the STP funds it receives to establish the State STP-Discretionary Program, which is intended to promote alternatives to automobile travel. Bicycle and pedestrian projects are among those eligible for funding. In addition, ten percent of each state’s STP funds must be set-aside for Transportation Enhancement Activities, which include facilities and safety and educational activities for bicyclists and pedestrians and preservation of abandoned railway corridors (including their conversion and use for bicycle/pedestrian trails).

WisDOT has established the Statewide Multi-Modal Improvement Program (SMIP), incorporating STP-Discretionary (STP-D) and Enhancement funds. A single form is used to solicit applications for funding under both programs. A 20% local funding match is required. Increased funding from TEA-21 allowed WisDOT to increase funding for the Enhancement Program from \$3.75 million to \$6.25 million per year in December 1999. Another \$2.72 million per year is available in STP-D funds.

In 1999, WisDOT developed a State Enhancements Program in order to address current and projected unspent federal Enhancements program apportionments. The state legislature failed to approve an increase in state budget authority for the program beyond the \$6.25 million per year amount. If the unspent balance of Enhancement program apportionments continued to grow, federal rules could restrict the amount of spending on other federal aid program categories in the future. The State Enhancements Program was designed to utilize the unspent federal Enhancement apportionments for SFY 2000-2003. Funds are targeted to projects related to the state highway system where “3R” program (Resurfacing, Reconditioning, and Reconstruction) activities are scheduled. Bicycle projects must be within ¼ mile of the highway and demonstrate a positive transportation benefit to the state highway system.

In addition to the ten percent set-aside for Enhancement projects, another ten percent of each state’s STP funds must be set aside for infrastructure safety projects. Each state is required to implement a Hazard Elimination Program to identify and correct locations that may constitute a danger to motorists, bicyclists, and pedestrians. Eligible bicycle project activities include a survey of hazardous locations, construction of bicycle/pedestrian paths, and safety-related “traffic calming” measures. Improvements to railway-highway crossings are required to take into account bicycle safety. Both hazard elimination and railway-highway crossing projects are 90% Federally funded.

A small percentage of the available funds under the Hazard Elimination Program are set aside for small safety projects on local roads. The funds are designed to address immediate concerns. Projects are prioritized by WisDOT District offices. The total cost of projects funded under this part of the program cannot exceed \$25,000. Some kinds of bicycle safety projects could potentially be funded under this program.

A potential future funding program available to the state and local communities is the National Scenic Byways Program, which recognizes roads having outstanding scenic, historic, cultural, natural, recreational, or archaeological qualities. Funds may be spent on a variety of activities, including bicycle and pedestrian facility improvements along a scenic byway. WisDOT does not currently have a State Scenic Byway Program, and thus funding is not currently available to the state or local communities. However, WisDOT is considering initiating such a program.

Federal Transit Programs:

The Urbanized Area Formula Grants Program (UAFP) provides transit capital assistance to urban areas with a population of more than 50,000. The City of Madison owns and operates the transit system and is the designated recipient of these funds. These funds can be used for improving bicycle and pedestrian access to transit facilities and vehicles. TEA-21 created a Transit Enhancement Activity program with a required one percent set aside of UAFP funds. Eligible projects include bicycle storage facilities and bicycle racks for buses. Bicycle-related Transit Enhancement activities are 95% Federally funded. Madison Metro used Transit Enhancement funding to purchase bike racks for most of its buses in 2000.

Highway Safety Program:

The State and Community Highway Safety Grant Program (Section 402) supports state highway safety programs designed to reduce traffic crashes. A state is eligible for these grants by submitting a Performance Plan with goals and performance measures for improving highway safety and a Highway Safety Plan describing activities to achieve the goals. Eligible activities and programs include those that improve bicycle and pedestrian safety. Section 402 Highway Safety funds 100% Federally funded, but grants from WisDOT to local communities require a 20% match. Among the activities WisDOT has used these funds for are bicycle safety training courses and bicycle safety materials. WisDOT provides local grants of up to \$1,000 each year for bicycle/pedestrian education and enforcement projects under two separate programs.

State TDM Program:

WisDOT created the Transportation Demand Management (TDM) Grant Program in 1991, which is supported solely with state funds. Projects that promote alternatives to automobile travel—including bicycling and walking—are eligible for funding. A 20% applicant matching share is required.

Local Road Aid Programs:

WisDOT administers four different local aid programs, which provide funding to local units of government for roadway and bridge construction and maintenance and traffic and police costs. Funding from these programs can

potentially be used for paved shoulders or bike lanes if such facilities are incorporated as part of the roadway or bridge project.

General Transportation Aids (GTA) is by far the largest of WisDOT's local aid programs, providing a payment to every county and municipality based upon distribution formulas that include the local government's mileage of roadways. The SFY 2000 budget included \$338 million in GTA funding. Another program, the Local Road Improvement Program, provides funding for long-lasting infrastructure improvements to local roadways. The program includes both formula funding allocations and a discretionary component for funding of high-cost projects. The Local Bridge Program provides funding for local bridge rehabilitation and replacement. The Surface Transportation Program – Rural (STP-R) provides funding to local units of government in rural and small urban areas for transportation improvements to Federal-aid roadways and rural collectors. WisDOT guidelines for the Local Bridge and STP-R programs encourage local units of government to provide accommodations for bicyclists and pedestrians as part of roadway or bridge projects.

Funding Programs Administered by WisDNR for Bicycle Projects

Federal Programs:

The Recreational Trails Program funds development and maintenance of recreational trails and trail-related facilities, and acquisition of easements or property for trails. Of the funds apportioned to a state, 30% must be used for motorized trail uses, 30% for non-motorized trail uses, and 40% for diverse trail uses (any combination). Eighty percent (80%) of the motorized and non-motorized trail project funds and 50% of the diverse trail project funds are available for locally sponsored projects. The remaining funds are used for state trail projects.

Applicants are eligible to receive up to 80% Federal funding. However, the state policy has been to provide a 50% Federal share with a 50% match in order to stretch limited funds and make the required match consistent with the other trail funding programs. In-kind contributions (e.g., new right-of-way) may be credited towards the project match. The program is a Federal-aid Highway Program, but is administered by the Wisconsin Department of Natural Resources (WisDNR). Funds may only be used on trails

Table 15
Federal and State Funding Opportunities for Bicycle Facilities and Programs

Facility/Program	Federal and State Transportation Funding Categories													Recreation Funding Categories	
	NHS ¹	STP	EN	SAF	RTP	RHC	BR	FTA-TE	PLN	BYW ²	TCSP ³	TDM	LRA	LAWCON	WSP
Bicycle Lanes	•	•	•			•	•			•			•		
Paved Shoulders	•	•	•			•	•			•			•		
Bicycle Route Signage	•	•	•							•					
Shared-Use Path	•	•	•		•		•			•				•	•
Spot Improvement Program		•	•	•											
Bicycle Parking Facilities		•	•					•		•		•			
Bicycle Storage/Service Center		•	•					•			•	•			
Path/Roadway Intersection	•	•	•	•	•					•				•	•
Bicycle Racks on Buses		•	•					•							
Signal Improvements	•	•	•	•		•							•		
Traffic Calming		•	•	•		•					•				
Bicycle Maps		•		•								•			
Bike Coordinator		•													
Safety/Education Coordinator		•		•											
Safety Educ./Training/Encouragement		•	•	•								•			
Bicycle Plan		•							•		•				

Key

NHS	National Highway System
STP	Surface Transportation Program (STP) - Urban and STP - Discretionary
EN	Transportation Enhancement Program
SAF	STP Safety, including Hazard Elimination Program and Sec. 402 Traffic Safety Program
RTP	Recreational Trails Program
RHC	Railway-Highway Crossing Program
BR	Bridge Replacement and Rehabilitation
FTA-TE	Federal Transit Administration Sec. 9 Transit Enhancement
PLN	State/Metropolitan Planning Funds
BYW	Scenic Byways Program
TCSP	Transportation and Community and System Preservation Pilot Program
TDM	State Transportation Demand Management Program
LRA	Local Road Aids, including General Transportation Aids, Local Road Improvement Program, Local Bridge Program, and STP-Rural
LAWCON	Land and Water Conservation Fund
WSP	Wisconsin Stewardship Program, which includes several subprograms

¹Bicycle facilities funded with NHS funds must be within or along NHS roadway corridors.

²Wisconsin does not currently have a scenic byways program, but is in the process of creating a program, which will allow the state to compete for discretionary Federal funding under the program.

³Discretionary program administered by FHWA.

which have been identified in or which further a specific goal of a local, county, or state trail plan included or referenced in a statewide comprehensive outdoor recreation plan required by the Land and Water Conservation Fund Program.

The Land and Water Conservation (LAWCON) Program provides funding for the acquisition of land for recreational purposes and for the development of bicycle and pedestrian paths or trails. There is a required 50% local match. A comprehensive outdoor recreation plan is required to participate. Funding for state and local projects was available in 2000 for the first time since 1995. Wisconsin's share in 2000 is \$740,000 with 50% of that available for local projects.

State Program:

The Wisconsin Stewardship Program incorporates several different local assistance funding programs for the acquisition and development of outdoor recreation and open space areas, all administered by WisDNR. These include Aids for the Acquisition and Development of Local Parks, Urban Green Space Program, Trails Program, and Urban Rivers Grant Program. There is up to a 50% match required per project. A comprehensive outdoor recreation plan is required to participate. Funding for the program was nearly doubled to \$46 million per year for ten years beginning on July 1, 2000. Up to \$8 million per year is available for local projects.

Table 15 includes a list of the types of bicycle projects eligible for funding under the different federal and state programs.

D. Transportation Improvement Programming Process

Transportation projects are prioritized and scheduled for implementation through the multi-year capital improvement budgeting processes of the various units of government and the five-year Transportation Improvement Program (TIP) prepared by the Madison Area Metropolitan Planning Organization (Madison Area MPO). Governmental unit's capital budgets and the TIP are both updated annually. They include all types of transportation projects from engineering design to spot improvements to reconstruction. On-street bicycle facility projects are often included within the scope of roadway improvement projects.

The Madison Area MPO encourages units of government to involve the public in prioritizing projects for funding. This is not always done, particularly for bicycle projects. The City of Madison Pedestrian-Bicycle-Motor Vehicle Commission holds a public hearing every spring to take suggestions on bicycle and pedestrian projects that should be prioritized for funding and incorporated into the city Traffic Engineering Division's work program. Bicycle Facility Improvement forms are also available for submission of comments throughout the year.

One of the recommendations of this plan is for units of government to develop criteria to prioritize projects on a need basis to help ensure that limited funds are used wisely. Local communities are encouraged to develop prioritized lists of projects based upon the adopted criteria, and to routinely re-assess these priorities based upon growth, new opportunities that may arise, and other changing conditions. Establishment of county and local bicycle/pedestrian funds to annually implement projects identified in this plan should be considered. Communities are also encouraged to develop partnership arrangements for implementation of projects that cross jurisdictional boundaries.

Whenever possible, units of government should maximize local funding by securing matching funds from federal and state funding programs and private funding sources, such as developers, businesses, and non-profit organizations. Opportunities to implement bicycle projects can also be maximized by including them as a routine part of new development and roadway projects.



Appendix A

Design Guidelines for Bicycle Facilities

A. Introduction

Purpose of the Guidelines

These design guidelines are intended to serve as an aid to engineers, designers, planners, and others in accommodating bicycle traffic in different riding environments and encouraging predictable bicycling behavior. They are based primarily on the national guidelines outlined in the 1999 *Guide for the Development of Bicycle Facilities* (AASHTO Guide), published by the American Association of State Highway and Transportation Officials (AASHTO), and the *Manual on Uniform Traffic Control Devices* (MUTCD), published by the U.S. Department of Transportation, and the Wisconsin Department of Transportation's *Facilities Development Manual*, Procedure 11-45-10. However, other sources and the experience of Madison area facility designers and users have also been considered. A list of sources consulted is provided at the end of this appendix.

The guidelines are intended as a primer on bicycle facilities design, not as a stand-alone document. They highlight important issues, cover issues not addressed or addressed in insufficient depth by the AASHTO Guide, and note a few instances where the recommended guidelines differ from the AASHTO Guide. The AASHTO Guide, MUTCD, and other sources should be used in conjunction with these guidelines. The AASHTO Guide provides a high level of detail on shared use path design, in particular.

Bicycle facility guidelines will not cover all of the design details encountered in developing bicycle facilities. Where details are not covered, appropriate engineering principles and judgment must be applied in providing for the safety and convenience of bicyclists, pedestrians, and motorists. It should be noted that knowledge of the human and environmental factors contributing to bicycle crashes is also very important for facility designers. Chapter 5 of this plan and the *Wisconsin Bicycle Transportation Plan 2020* summarize some of this information.

Plan Policy Regarding Provision of Bicycle Facilities

Chapter 2 of this plan provides an overview of the needs of bicyclists, which include safe, convenient, well-designed bicycle facilities. Since bicyclists may ride on all non-access restricted roadways, bicycle facilities should be included as

part of all appropriate projects unless there is a compelling reason not to include them (e.g., would reduce safety or the cost is excessively disproportionate to projected use). An example is the case of a rural roadway with narrow, steep shoulders where bicycle travel demand is low and expected to remain low in the future. It is best to estimate high levels of use. Judging the need for facilities based on current bicycle counts and/or projected levels is often unreliable due to past and still-existing disincentives for bicycling. Paved shoulders, bike lanes, and wide curb lanes, which benefit bicyclists, also provide a number of other benefits related to maintenance, general safety, and joint uses, and can often be justified for these reasons.

Since facilities are constructed on a project-by-project basis, bicycle facilities should generally be provided even for short sections (e.g., as part of an intersection improvement). If desired, bike lane striping, markings, and signing can be left out until the segment is connected to a longer facility.



Bicycle lanes should be added as part of intersection projects.

If there is a question as to whether or not a special effort (e.g., purchasing additional right-of-way, eliminating parking on one side of the street, etc.) to accommodate bicyclists is justified, the following factors should be considered:

- Whether the roadway section is identified as in need of bicycle facility improvements in this plan (and the level of priority assigned to it), any applicable state plans, and the local community's plans;
- Whether the roadway section is identified as a recommended bicycle route in this plan and/or the local community plan;

- Whether the project is within or close to an urban area;
- The location of existing or planned schools, parks, bicycle paths/trails, employment centers, commercial areas, or other likely bicyclist destinations near the project location or corridor;
- The need for access to destinations along the project corridor and/or connectivity of the bicycle facility network;
- Existing and potential bicycle use; and
- Any available information on bicycle crash history.

Definitions

ADT – Average Daily Traffic. The measurement of the average number of vehicles passing a certain point each day on a roadway or path.

ARTERIAL ROAD – Divided or undivided, relatively continuous routes designed to serve primarily through traffic, high traffic volumes, and long average trip lengths.

BICYCLE FACILITY – A general term denoting improvements and provisions made by public agencies to safely accommodate or encourage bicycling, including shared-use paths, bicycle lanes, paved shoulders, signed bicycle routes, and shared roadways not specifically designated for bicycle use. Also includes bicycle parking and storage facilities and lockers and showers at employment sites.

BICYCLE LANE – A portion of roadway (typically 4 to 5 feet), which has been designated by signing and pavement markings for the preferential or exclusive use by bicyclists.

COLLECTOR STREET – A street designed to carry traffic between local streets and arterial roadways, or from local street to local street.

GRADE – A measure of the steepness of a roadway, shared-use path, or sidewalk, expressed as a ratio of vertical rise per horizontal distance, usually in a percentage. For example, a 5% grade equals five feet of rise over a 100-foot horizontal distance.

GRADE SEPARATION – The vertical separation of conflicting travelways with a structure. An overpass and tunnel or underpass are examples of common grade separations used to avoid conflicts.

LOCAL STREET – A street designed to primarily provide access to and from residences and businesses, generally with low traffic speeds and volumes.

MUTCD – The “Manual on Uniform Traffic Control Devices,” approved by the Federal Highway Administration as a national standard for placement and selection of all traffic control devices on or adjacent to all highways open to public travel.

PAVEMENT MARKINGS – Painted or applied lines or legends placed on a roadway or shared-use path surface for regulating, warning, or guiding traffic.

RIGHT OF WAY – The right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian.

RIGHT-OF-WAY – A general term denoting publicly owned land, property, or interest therein, usually in a strip, acquired for or devoted to transportation purposes.

SHARED ROADWAY – A roadway that does not have designated bicycle lanes and has not been designated as a preferred route for bicycle use, but which is open to both bicycle and motor vehicle travel. This may be a local roadway with narrow or standard travel lanes, a roadway with wide curb lanes, or a roadway with paved shoulders.

SHARED-USE PATH – A path or way, often paved, which is physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent alignment. In addition to bicyclists, pedestrians, in-line skaters, wheelchair users, and joggers will use such paths.

SHOULDER – That portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use and for lateral support of sub-base, base, and surface courses. Frequently, part of the shoulder is paved.

SIGNED SHARED ROADWAY (SIGNED BIKE ROUTE) – A shared roadway which has been designated by signing as a preferred route for bicycle use.

TRAVELED WAY – The portion of the roadway for the movement of vehicles, exclusive of shoulders.

WIDE CURB (OUTSIDE) LANE – A wider than normal curbside travel lane (14 to 16 feet) that is provided for ease of bicycle operation. The preferred treatment for bicyclists now is a bicycle lane, however the treatment is recommended where there is insufficient room for a bike lane or paved shoulder.

B. The Design Bicyclist

Bicycles and bicyclists come in a variety of shapes and sizes. To effectively design bicycle facilities, the range of dimensions and characteristics of common commercially available bicycles and the physical details of the typical bicyclist (e.g., dimensions, speed) should be understood. Bicyclists generally require 3.3 feet of operating space based solely on their profile. Due to steering wobble, bicyclists typically track over a 4-foot width. The necessary width is increased to 5 feet or greater for steep hill climbs and descents.

The narrow width of bicycle tires and the lack of shock absorbers or suspensions on most bicycles make bicyclists much more sensitive to roadway surfaces than other road users. Most bicycles also require longer stopping distances at high speeds than autos. Emergency maneuvers on bicycles cannot be accomplished quickly because it takes time to set up for a quick turn.

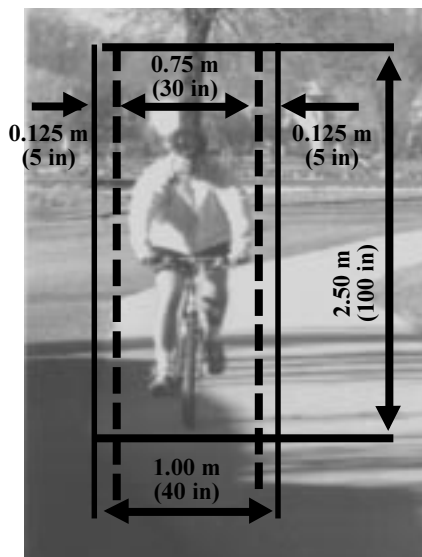


Figure A-1 *Bicyclist Operating Space*
Source: *AASHTO Guidelines (1999)*

C. Types of Bicycle Facilities

The appropriate bicycle facility for any given roadway depends on the roadway's classification, pavement and right-of-way width, motor vehicle speeds and volumes, adjacent land use and expected growth patterns, and other factors. On-street facilities generally consist of either bicycle lanes/paved shoulders or shared roadways (with or without wide outside travel lanes). Off-street facilities consist of shared-use paths and pedestrian/bicycle over- or underpasses. Shared-use paths are best used to supplement the on-street

bikeway network by locating them in corridors not served by roadways and/or along utility, rail, or other linear corridors.

The travel volumes and choice of design of a roadway will affect the level of use by bicyclists and the level of mobility and accessibility the roadway affords bicyclists. For example, a high-speed, high-volume, four-lane divided highway will attract only more experienced bicyclists even with 4- to 6-foot wide paved shoulders. Bicycle facilities are still generally needed on major roadways in order to provide access to destinations in the corridor and to get across barriers, such as access-restricted freeways. No one type of bicycle facility will serve all bicyclists. Within any given travel corridor, it will often be desirable to provide more than one option to meet the through travel and access needs of all potential users.

Shared Roadways

Local streets with low traffic volumes and speeds safely accommodate bicyclists (except young children) without any special bicycle treatments. Shared roadways with narrow or standard 11- to 12-foot travel lanes are generally adequate for bicyclists on streets with speed limits of 25 mph and average daily traffic (ADT) volumes of 3,000 or less. In rural areas, the suitability of a shared roadway decreases as traffic volume reaches 750-1,000 ADT due to the higher traffic speeds and greater percentage of truck traffic on them. A large percentage of bicycling takes place on shared roadways with no dedicated space for bicyclists. Shared roadways that carry more traffic at higher speeds than they were designed for can be made more suitable for bicycling through "traffic calming" techniques. (See discussion of traffic calming on page A-22)



Residential streets with low traffic volumes do not need special facilities for bicyclists.



Paved shoulders are not necessary on rural town roads with low traffic volumes.

Wide Curb Lanes

On collector and arterial streets with higher traffic volumes and speeds that do not have bicycle lanes, outside travel lanes wider than the standard 11-12 feet are a desirable alternative. Wide curb lanes benefit bicyclists and motorists by providing additional operating space compared to a standard travel lane. In many cases, this will allow a motorist to pass a bicyclist without the need to change lanes. However, because they provide less operating space than bike lanes and are not designated for bicycle use, many bicyclists do not feel comfortable using them. They are therefore a least preferred option for use when adequate space isn't available for bike lanes.

To accommodate bicyclists, a wide outside (curb) travel lane should provide a usable width of 14-15 feet. Usable width would normally be from the edge of the pavement (gutter pan seam), absent surface irregularities or other hazards in the street. Where on-street parking is provided, an outside lane width of 16 feet (excluding the parking lane) is needed



Wide outside travel lanes provide extra space for bicyclists on streets without bicycle lanes.

to accommodate bicyclists. In such cases, a bike/parking lane should be striped, if the adequate space is available. Provision of a 15- to 16-foot outside lane allows future striping of a bike lane, even if it is decided not to stripe the lane right away.

Re-striping to provide wide curb lanes (by making the remaining travel lanes and left turn lanes narrower) may be possible and should be considered on existing multi-lane facilities, where physical limitations prevent widening the road or reconstruction is not planned for a long time. This should be done only after careful review of the traffic characteristics of the roadway.

Right Turn Lanes

At intersections with right turn lanes, the extra width for bicycle use should be added to the rightmost through lane. If the right-turn-only lane is a high-speed merging lane (a practice generally not recommended in urban areas), providing extra width in that lane is desirable as well. A bicycle lane at the intersection, striped to the left of the right turn lane, is preferred. (See Bicycle Lane Treatments at Intersections)

Wide Streets with Low Parking Occupancy

Residential and local collector streets in newer neighborhoods have often been built to a width of 40 to 54 feet. A width of 44 feet is common, providing space for two extra



Removing parking from one side and striping bicycle lanes should be considered for wide streets with low parking occupancy.

wide 14-foot travel lanes as well as parking on both sides of the street, even though the parking space is rarely used due to off-street parking requirements. These wide streets encourage speeding. As traffic volumes increase, they also

encourage the operation of two motor vehicles in one lane, resulting in the “squeezing” of bicyclists off the road.

Communities should carefully consider whether there is a need for parking on both sides of new streets. Where off-street parking requirements, proposed land uses, and other factors reduce the need for street parking, narrower streets should be allowed with parking on only one side and either wide curb lanes or bicycle lanes. Elimination of parking from one side of the street and striping of bike lanes should be considered for existing streets that are wider than necessary, particularly where speeding is a problem.

Signed Shared Roadway

Signed shared roadways are designated by bike route signs. The AASHTO Guide cites the following reasons for designating bike routes:

- The route provides continuity to other bicycle facilities, generally bike lanes or shared-use paths;



Signed bike routes can be helpful for way finding and to indicate a preferred route through a corridor.

- The street is a preferred or recommended route through a major travel corridor;
- The route is preferred for bicycling in a rural area due to low traffic volumes and/or paved shoulder availability; and/or
- The route extends along local or collector streets that lead to neighborhood destinations, such as schools and parks.

It is desirable to include with bike route signs supplemental plaques that include direction, destination, and distance information, regardless of the type of roadway or facility they are used on.

Agencies must make sure that potential safety hazards have been removed prior to signing a bike route. Bike route signs should not end at a barrier. Information directing the bicyclist around the barrier should be provided. A commitment should also be made to maintain designated bike routes to a higher standard than that of other comparable streets (e.g., more frequent street sweeping).

Further guidance on signing bike routes is provided in the MUTCD.

Bicycle Boulevard

The bicycle boulevard involves modifying a local shared roadway to function as a through street for bicycles. Local access for motor vehicles is maintained, but not necessarily through motor vehicle traffic. Traffic calming devices are used to reduce traffic speeds and through auto trips. Traffic controls limit conflicts between automobiles and bicycles and give priority to through bicycle movement.

Bicycle boulevards work best on a street grid system with continuous connector streets parallel to major arterial roadways. The elements for creation of a bicycle boulevard are illustrated in Figure A-2.

Bicycle boulevards offer a number of advantages, including providing improved conditions for pedestrians and an attractive alternative for bicyclists that are not comfortable on higher volume arterial roadways. However, as with traffic calming devices in general, they require careful planning with residents to avoid traffic diversion onto other local streets and other undesirable impacts.

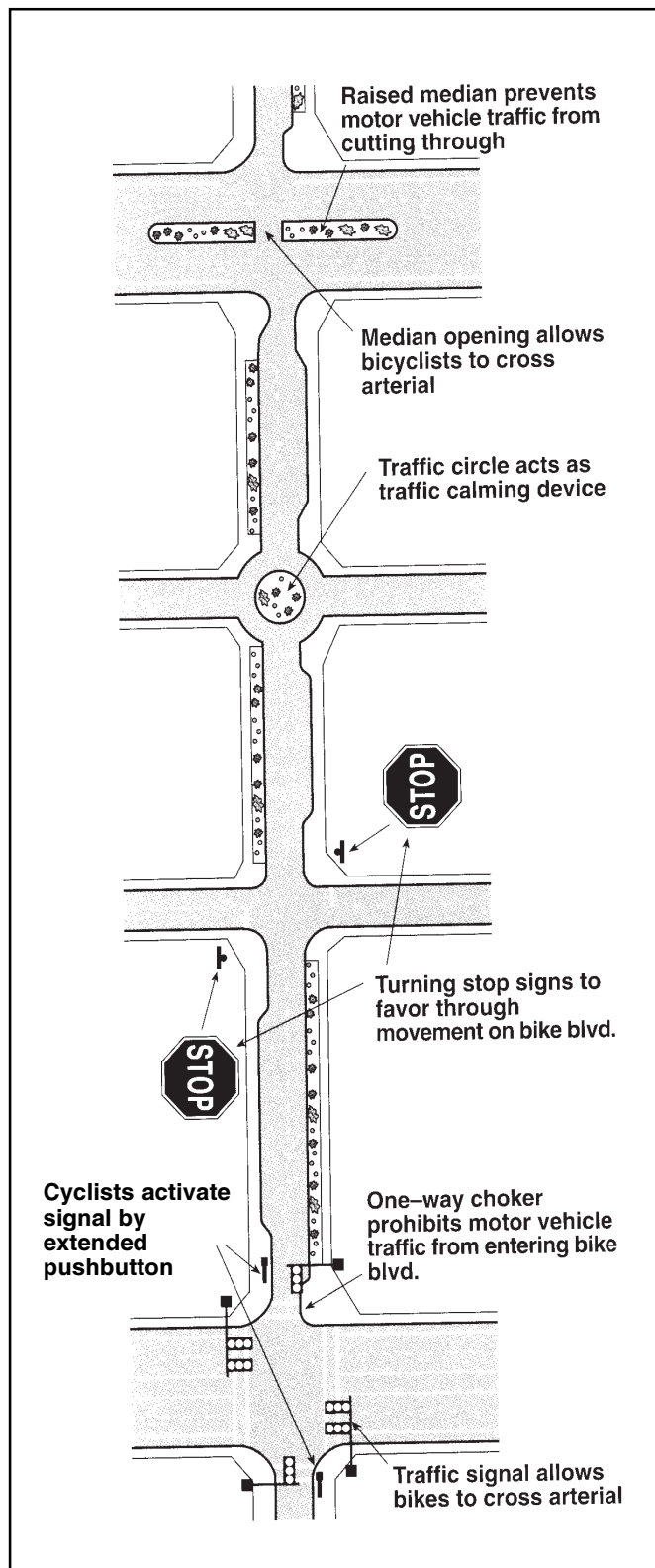


Figure A-2 Elements of a bike boulevard, with street crossings
Source: Oregon Bicycle and Pedestrian Plan (1995)

Bicycle Lanes

A bicycle lane is a portion of the roadway designated for the exclusive or preferential use by bicyclists, with pavement markings and signing. Bicycle lanes are the preferred bicycle facility on higher volume urban roadways where available right-of-way permits them.



Bike lanes define a space for bicyclists to ride, and create a buffer for pedestrians.

Among the benefits of bicycle lanes are:

- Defining a space for bicyclists to ride, helping less experienced bicyclists feel more confident and willing to ride on busier streets;
- Reducing motorist lane changing when passing bicyclists;
- Guiding bicyclists through intersections on the safest, most predictable course;
- Increasing the visibility of bicyclists in the transportation system.

Secondary benefits of bicycle lanes include:

- Reducing pedestrian/bicyclist conflicts due to fewer bicyclists using the sidewalk;
- Creating a buffer between the pedestrian and motorist (on streets without parking);
- Improving sight distances;
- Increasing effective turn radii at driveways and intersections; and
- Providing temporary space for disabled motor vehicles.

Location within Street Cross-Section and Width

Bicycle lanes should always be one-way facilities carrying traffic in the same direction as adjacent motor vehicle traffic. On one-way streets, a one-way bicycle lane should generally be located on the right side of the road, absent special circumstances (e.g., greater numbers of potential conflicts on the right side).

Bicycle lanes should be a minimum of 4 feet wide, measured from the inside edge of the bike lane stripe to the joint between the pavement and the gutter pan. Additional space should be provided if obstructions (e.g., storm sewer drains) reduce the usable bike lane width. The AASHTO Guide permits a 3-foot wide bike lane where there is a 2-foot gutter pan. However, this is *not* recommended since bicyclists are unable to use the gutter pan space and typically must ride away from the joint between the pavement and gutter pan. On streets with speed limits in excess of 35 miles per hour, high traffic volumes, and/or significant numbers of trucks and buses, a bike lane width of 5 to 6 feet is recommended. Motor vehicle travel lanes adjacent to bicycle lanes should be at least 11 feet wide.

A design that has been experimented with in the Madison area, but which is not preferred, is the use of 4- to 5-foot wide gutter pans for bicycle lanes. See photo. This design has a number of disadvantages. The joint between the street

and gutter pan is often uneven and/or deteriorates over time. Using the gutter pan as the bike lane requires bicyclists to cross this joint in order to merge into traffic to get into proper position for a left-turn or straight through movement. The gutter pan also typically has a 4% versus 2% slope, creating a problem for bicyclists, especially in the winter. In the case of concrete streets, an integral curb design functions well if the longitudinal joint is placed on the inside edge of the right most travel lane and the 4% (vs. 2%) slope is reserved for a one-foot area closest to the curb. The bicycle lane should be striped 5 feet off the curb.

Bicycle lanes should *not* be separated from motor-vehicle travel lanes by a parking lane, curbing, or other barriers. Such barriers prevent motorists and bicyclists from executing proper merging maneuvers in advance of intersections, and limit the ability of bicyclists to take evasive action at driveways. They also create significant operational problems relating to street maintenance, snow removal, and utility maintenance and construction.



Use of 5-foot gutter pans for bicycle lanes is generally not recommended.

Signing and Marking of Bike Lanes

Designated bike lanes should be marked and signed. The bike lane should be separated from the travel lane by a solid white line. The stripe should be placed so as not to encroach into the necessary 4- to 5-foot bike lane space. Striping material used should be durable, but skid-resistant. Temporarily substandard bike lanes (e.g., only 3 feet wide) may be left undesignated. In addition, a short or discontinuous bike lane may also be better left unmarked.

Pavement markings are used within the lane to designate the bike lane. Among the currently proposed changes to the MUTCD is a new standard pavement marking for bike lanes. The new standard marking is the bicycle symbol or

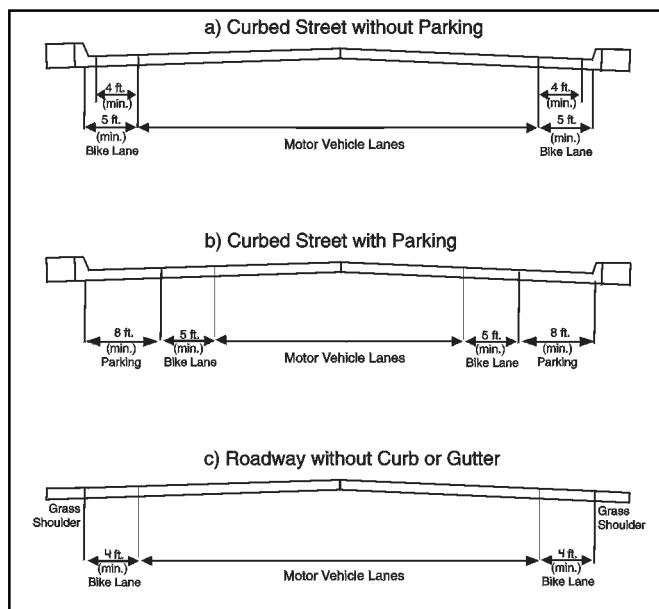


Figure A-3 *Bicycle Lane Width Guidelines*

Source: *Florida Bicycle Facilities Planning & Design Handbook (2000)*

the words “Bike Lane” and a directional arrow. The diamond symbol, which is used to indicate a restricted use lane, will no longer be used for this purpose. Rather, the diamond symbol is reserved for preferential or restricted lanes, such as bus lanes, in the new MUTCD.

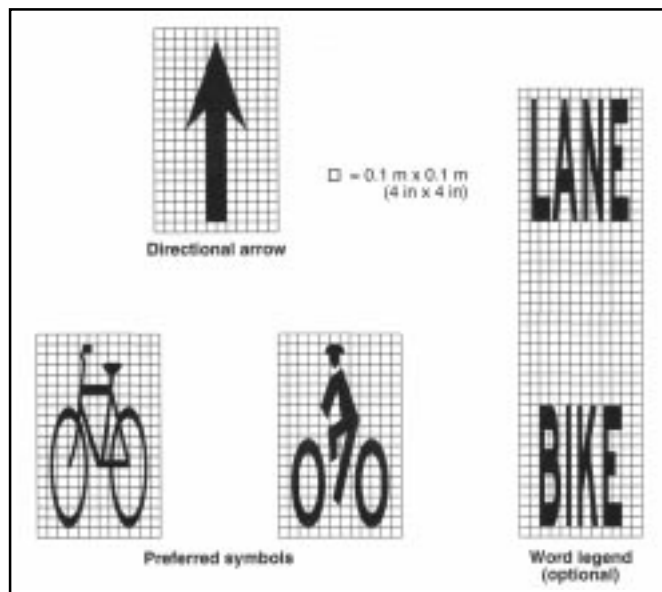


Figure A-4 Bicycle pavement markings

Source: AASHTO Guidelines (1999)

Lane markings should be appropriately spaced (e.g., around every 600 feet for urban sections and ¼ mile for rural sections) and placed after every major intersection. Lane markings should also be placed in the short sections of bike lanes used at intersections, most commonly to the left of the right-turn only lane. (See “Bike Lane Treatments at Intersections” on the following page). Care should be taken to avoid placing markings in an area where motor vehicles are expected to cross a bike lane (e.g., commercial driveways and immediately after an intersection).

Bike lane signs should be used in advance of the beginning of a designated bike lane to call attention to it and the possible presence of bicyclists. Where a bike lane is ending, the same sign may be used with the word “Ends” substituting for the word “Ahead.” Chapter 9B and C of the MUTCD address bicycle facility signs and markings, respectively.

Bicycle/Parking and Bus/Bicycle Lanes

Bicycle lanes may be put on an urban street where a parking lane is provided. In such cases, a width of 5 feet is needed for the bicycle lane, especially where there is sub-

stantial parking and turnover. The minimum combined bike lane/parking lane width is 13 feet. The bike lane should always be placed between the parking and outside motor vehicle traffic lane. Appropriate tapers should be used when transitioning to and from parking.

Combined bus/bicycle lanes can be used and should generally be 16-feet wide. Right-turns are also generally allowed from such bus/bicycle lanes. This tends to create problems with motorists remaining in the lanes between intersections. Simply increasing the width of the bus lane for bicyclists doesn’t address this problem. Therefore, delineating a separate 4-foot bicycle lane and 12-foot bus lane is preferable, particularly on busy, higher speed arterial roadways.



Bicycle/parking lane.

Contra-Flow Bike Lanes

Contra-flow bike lanes (those in an opposing direction from the normal traffic flow) are generally not recommended, and should never be placed on a two-way street. However, they may sometimes be appropriate in the following circumstances:

- A substantial saving in out-of-direction travel is provided.
- Direct access to high-use destinations is provided.
- There are few intersecting streets, alleys, or driveways on the side of the contra-flow lane.
- Bicyclists can safely and conveniently enter and leave the contra-flow lane.

In addition to arterial roadways, a contra-flow bike lane may also be appropriate on local access or residential streets where a street has been made one-way to calm traffic or otherwise restrict motor vehicle access.



Contra-flow bicycle lane on Babcock Dr. provides access to UW campus.

The following important design features should be incorporated:

- Placement of the contra-flow bike lane on the right side of the street (to motorists' left), separated by a barrier or double yellow line.
- Posting of signs at intersecting streets and major driveways indicating to motorists that they should expect two-way bicycle traffic.
- Installation of appropriate traffic signs and signals for the contra flow bicycle traffic.
- Proper marking of the bike lanes, including a directional arrow.

Because of the potential serious safety problems associated with contra-flow bike lanes, they should only be used in rare circumstances, and should be carefully evaluated following installation.

Bicycle Lane Treatments at Intersections

Bicycle lanes and their position are a very important consideration in intersection design. A high percentage of bicycle-motor vehicle crashes occur at intersections. By their very nature, intersections put one group of travelers in the path of others. As with other roadway design features, bicyclists should be treated as vehicle drivers, except in rare cases. The striping of bicycle lanes at intersections should encourage bicyclists to properly position themselves, which is generally to the right side of the rightmost lane for their direction of travel.¹

Intersections with Driveways

At high volume commercial driveways, the solid bike lane stripe may be replaced with a 2- to 4-foot long dashed or skip line to warn bicyclists of frequent motor vehicle turning movements across the bike lane.

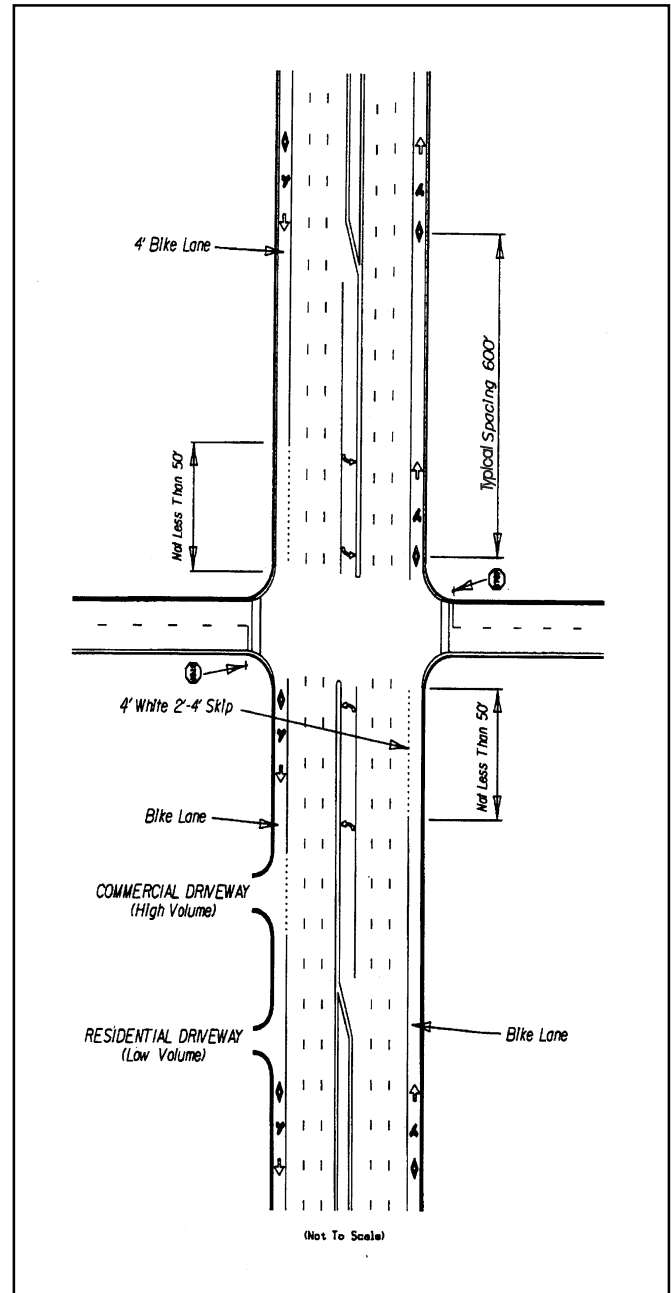


Figure A-5 *Bicycle lane striping should be replaced with a dashed line at major intersections. Dashed lines may also be used at high volume driveways, as illustrated.*

Source: *Florida Bicycle Facilities Planning and Design Handbook (2000)*

¹ Bicyclists should center themselves in the travel lane where there is insufficient space for the bicyclist and motorist to share the travel lane in order to discourage motorists from passing them unsafely.

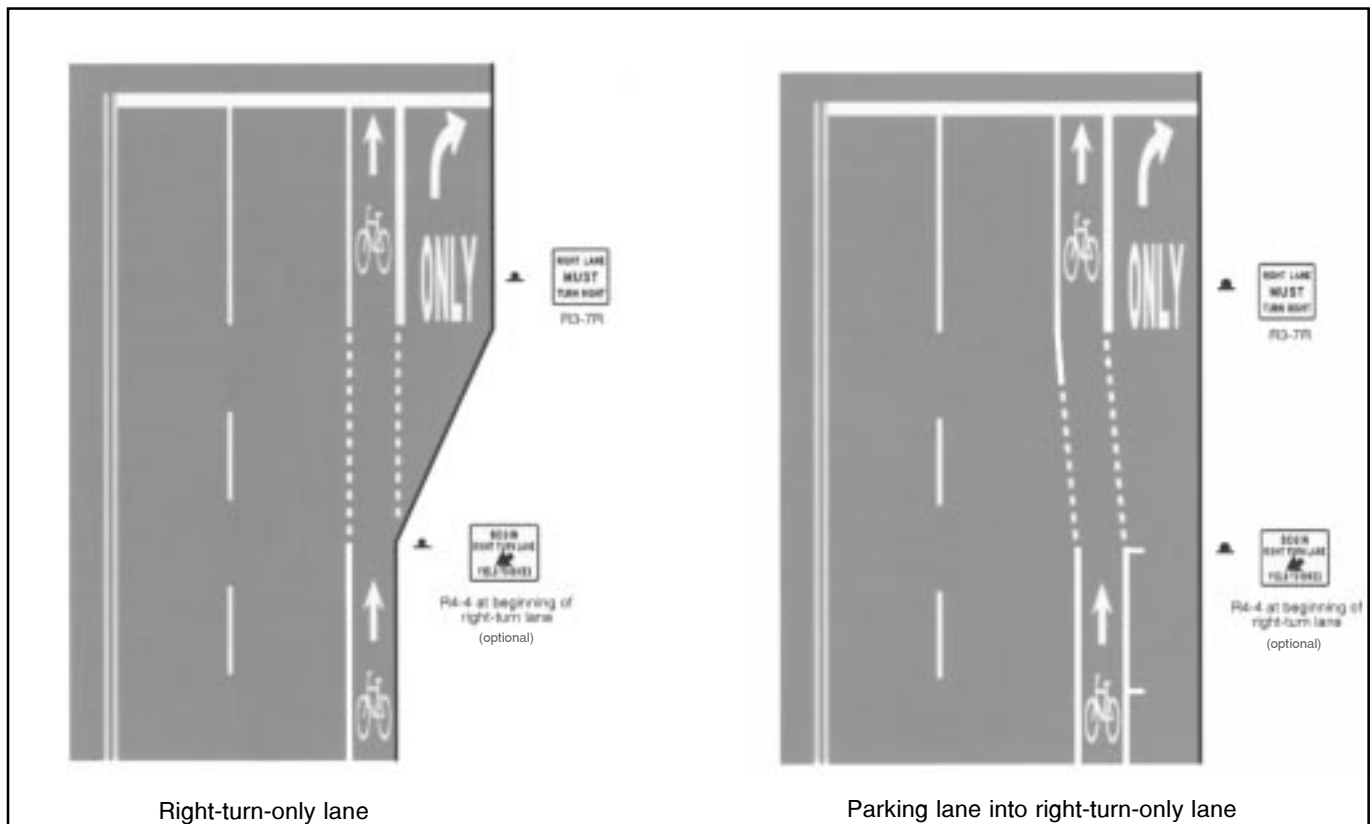


Figure A-6 Markings for Right turn bike lanes
Based on AASHTO Guidelines (1999)

Intersections without Right-Turn Lanes

At signalized or stop-controlled intersections on streets with bicycle lanes, but no exclusive right-turn lanes, the solid bike line stripe should generally be replaced with a dashed or skip line at least 50 feet prior to the intersection, as illustrated in Figure A-5. The dashed line delineates the bicycle lane for through bicyclists, and encourages right turning motorists to merge into the bicycle lane so that they can properly make their turn from the right side of the roadway.

At non-signalized minor intersections with no stop controls, the bike lane may be continued to the crosswalk on the near side of the intersection. However, if there is a bus stop or high volume of right turning vehicles, the solid bike lane stripe should be replaced with a dashed line at least 50 feet prior to the intersection (including the entire length of the bus stop).

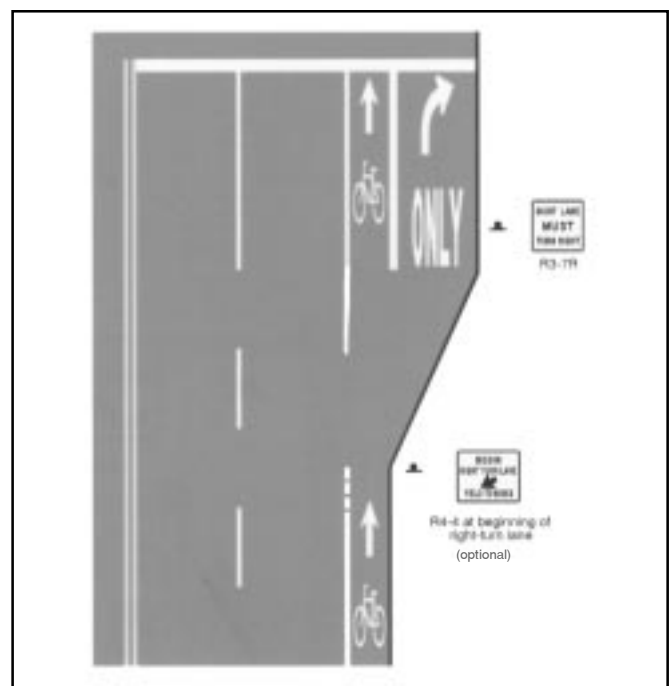


Figure A-7 Right-turn-only lane (without dashed lines)
Based on AASHTO Guidelines (1999)

Intersections with Right-Turn Lanes

Right-turn lanes present special problems for bicyclists because right-turning cars and through bicyclists must cross paths. Merging and lane changes should occur in advance of the intersection. The intersection design should channelize through bicycle traffic to the left of the right-turn lane.

It is recommended that the bicycle lane stripe be dashed at least 50 feet before the intersection to allow and encourage motor vehicle and bicycle traffic to cross paths prior to the intersection. (See Figure A-6) Another less desirable option is to simply drop the bicycle lane markings. (See Figure A-7) In either case, it is recommended that the striped bicycle lane be resumed at the intersection between the regular through lane and the right-turn lane.² The bike lane at the intersection should be marked. Although not required by the MUTCD, it is also recommended that a “Begin Right Turn Lane, Yield to Bikes” sign be placed at the beginning of the right-turn lane. (See Figures A-6 and A-7)

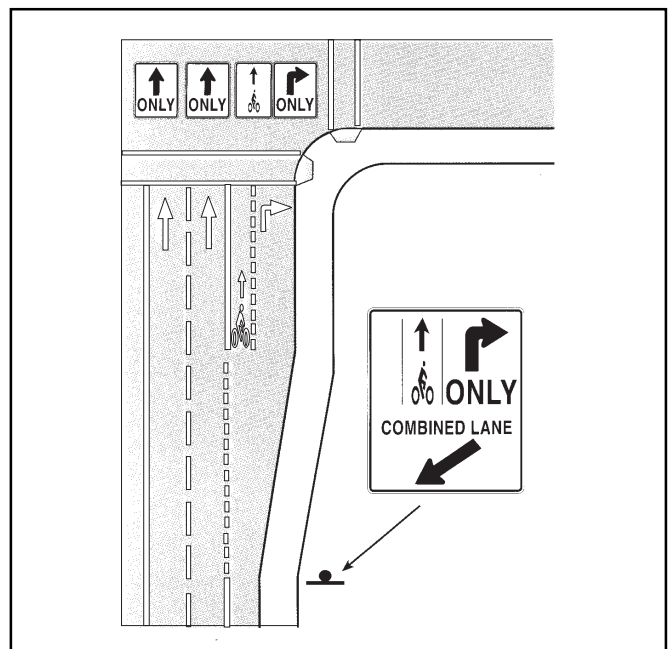


Figure A-9 Shared use of a right-turn lane for through bicyclists where there is insufficient room for separate bike lane

Source: Oregon Bicycle and Pedestrian Plan (1995)

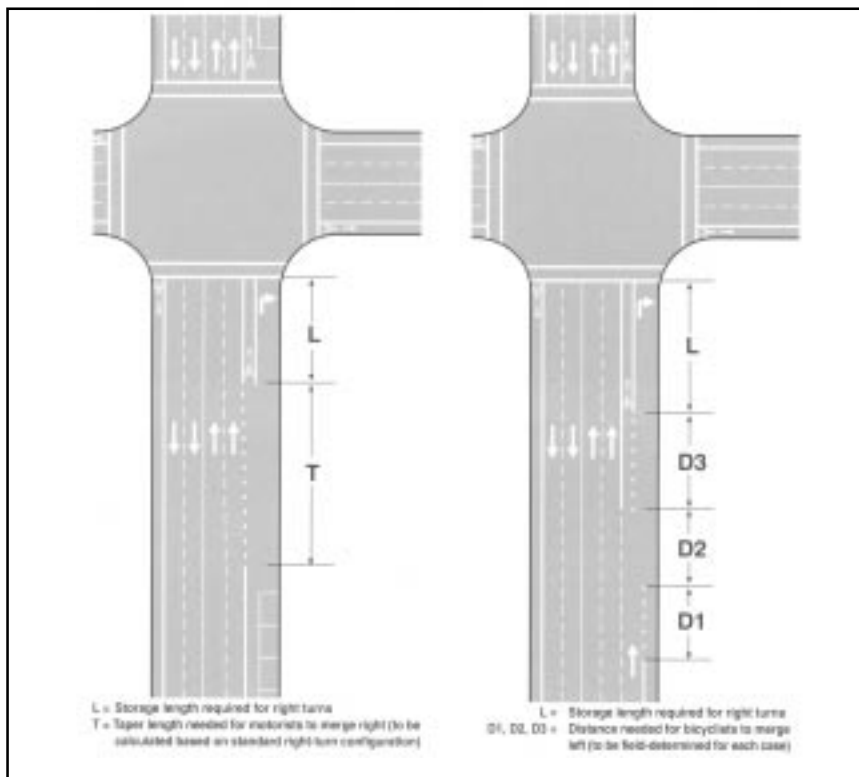


Figure A-8 Bike lane left of right-turn lane developed by dropping parking or a travel lane

Source: Oregon Bicycle and Pedestrian Plan (1995)

It is not always possible to widen intersections to provide a right-turn lane. In these situations, parking or a travel lane is typically dropped to create a right-turn lane. A bike lane to the left of right-turning cars should still be provided, if possible. (See Figure A-8)

On bike lane retrofit projects where there is insufficient space to mark a 4-foot bike lane to the left of the right-turn lane, a right-turn lane could be marked and signed as a shared-use lane. (See Figure A-9) This encourages through-bicyclists to occupy the left portion of the turn lane and alerts motorists to their possible presence and intentions. The design has been successfully used in Oregon, but is not included in the AASHTO Guidelines or MUTCD. It is best used on slow-speed streets.

² An exception to this is where the major traffic movement at the intersection is to the right (e.g., a highway is routed over local streets) and the straight through move leads to a minor street. In this case, the bike lane may be placed on the right and wrapped around the curve. This assumes the majority of bicyclists will want to turn right too.

Intersections with Dual Right-Turn Lanes

In some cases, intersections include a right-turn lane and a shared through/right-turn lane. This configuration is particularly difficult for bicyclists, because they must either merge into a lane where drivers could be either going straight or turning, or merge across two lanes. Some drivers make a last minute decision to turn right from the shared through/right-turn lane, catching bicyclists unaware. This configuration should only be used where found to be necessary based on a traffic study. Figure A-10 presents two alternative designs for such intersections. Use of the dashed line in example A is helpful in guiding the bicyclist along the proper path. Engineering judgment should be used to determine the most appropriate design for the situation. A curb cut with access to the sidewalk could be provided prior to the intersection for those bicyclists that prefer to proceed as a pedestrian.

Intersections with Predominant Left-Turn Movement

Providing a left-turn lane for exclusive use by bicyclists is useful where there are large numbers of left-turning bicy-



Left turn for bicyclists is provided at Park St. and University Avenue.

clists to ensure they properly position themselves. See the photograph above.

Offset Intersections

At intersections with offset travel lanes, dashed offset motor vehicle and bike lane markings may be continued through the intersection to direct traffic flow (see MUTCD Section 3B-7). This helps ensure that motorists do not inadvertently drive in the bike lane because of the offset travel lanes.

Tee Intersections

At Tee intersections where the traffic is fairly evenly split between left- and right-turning vehicles, the bike lane should be dropped (again maintaining a wide curb lane) prior to the intersection to allow bicyclists to properly position themselves to the right or left. Where traffic volumes are high and sufficient space is available, both a left- and a right-turn bike lane should be considered. (See Figure A-11)

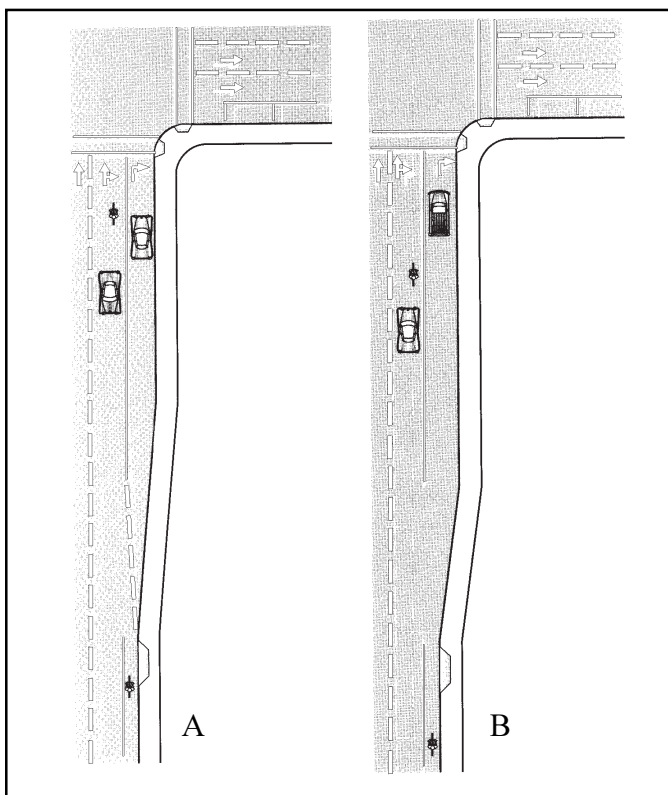


Figure A-10 Alternative bike lane treatments at intersections with dual right turn lanes

Source: Oregon Bicycle and Pedestrian Plan (1995)

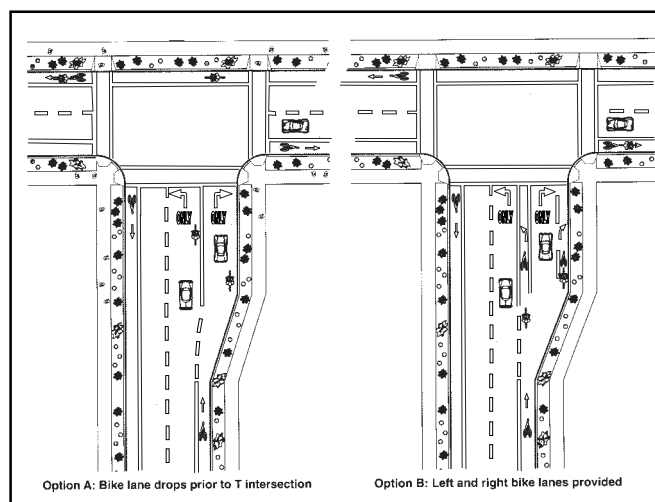


Figure A-11 Bike lanes at Tee intersections

Source: Oregon Bicycle and Pedestrian Plan (1995)

Freeway/Expressway Interchange Areas

Interchanges with free-flowing motor vehicle traffic movements are the most difficult for bicyclists to negotiate, and present barriers to bicycle circulation. Bicyclists must perform merging, weaving, or crossing maneuvers with motor vehicles, which are traveling at higher speeds.

Urban style interchanges with access ramps connected to local streets at a right angle are the easiest for bicyclists to negotiate. The distance needed to cross at the ramps is minimized, traffic is stopped at signalized or controlled intersections, and visibility is enhanced. See photo below.



Hwy 51 Interchange design on Milwaukee Street allows bicyclists to proceed straight through in bike lane.

Interchanges with free-flowing entrance and exit ramps on the cross street should generally be avoided in urban areas. The City of Portland, Oregon has been experimenting with the use of blue-colored pavement markings in addition to dashed lines to delineate the conflict area at exit and entrance ramps as well as intersections with right-turn lanes. For illustrations of designs and other information on this experimental program, see “Portland’s Blue Bike Lanes,” City of Portland Office of Transportation (July 1, 1999), available on the department’s Web site at www.trans.ci.portland.or.us.

Retrofitting Streets with Bike Lanes

Many major roadways in urban areas were built without bike lanes. These roadways often serve as deterrents to bicycle travel. Physically widening the roadway to add bike lanes is not always possible or desirable (e.g., if it reduces sidewalk space) within existing developed areas. Retrofitting bike lanes onto existing urban streets with little or no

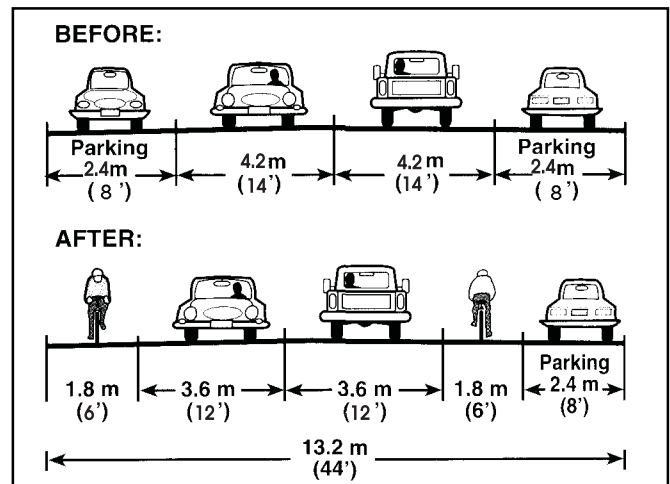


Figure A-12 Bicycle lanes can be striped on existing streets if parking is removed on one side.

widening of the street is sometimes possible using one or more of the following methods:

1. Restriping to reduce the widths of the other travel, turn, and/or parking lanes.
2. Removing parking on one side of the roadway, as illustrated in Figure A-12.
3. Reducing the number of travel lanes from 4 to 2 with a center turn lane, as illustrated in Figure A-14.
4. Reducing the width of the gutter pans, typically from 2 to 1 feet, as part of street re-construction.

On streets with posted speeds of 40 mph or less, travel lane widths can be reduced to 10-11 feet.³ Parking lanes may be reduced to 7 feet. Parking may only be needed on one side of the street and doesn't necessarily need to be on the same side of the street through an entire corridor. It may be possible to work out alternative parking arrangements (e.g., use of adjacent lots during special events) or replace some of the lost parking, as shown in Figure A-13.

Reducing the number of motor vehicle travel lanes is another potential solution for retrofitting streets with bike lanes. The most common roadway conversion is the restriping of two-way streets with four travel lanes to two travel lanes, a two-way center turn lane, and bike lanes, as illustrated in Figure A-14. While controversial, these types of roadway conversions have been implemented with success in a number of communities throughout the U.S. and Canada on roadways with 10,000 to 25,000 ADT. Experience with these conversions has shown that on roadways

³ FHWA approval is needed for use of 10-foot travel lanes if the project is federally funded.

with significant turning movements, the 3-lane design provides a more uniform traffic flow, and reduces speeding, conflicts, and crashes. Much of the traffic capacity of the road can be maintained by providing turn lanes at intersections.⁴

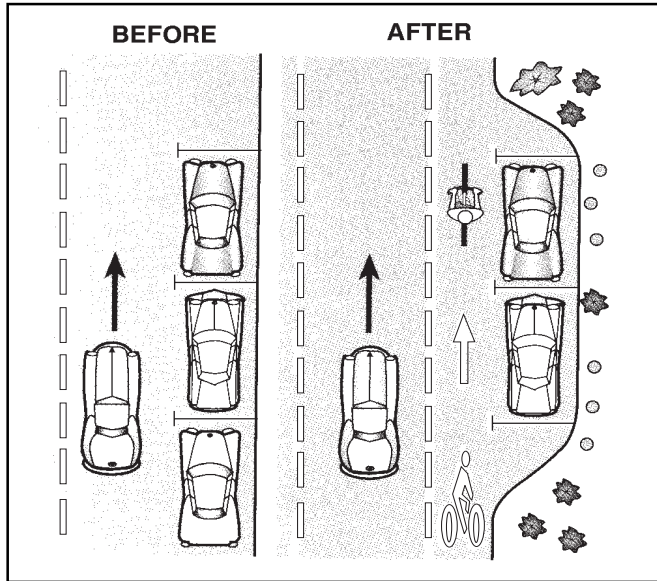


Figure A-13 Maintaining parking when there are no reasonable alternatives

Source: Oregon Bicycle and Pedestrian Plan (1995)

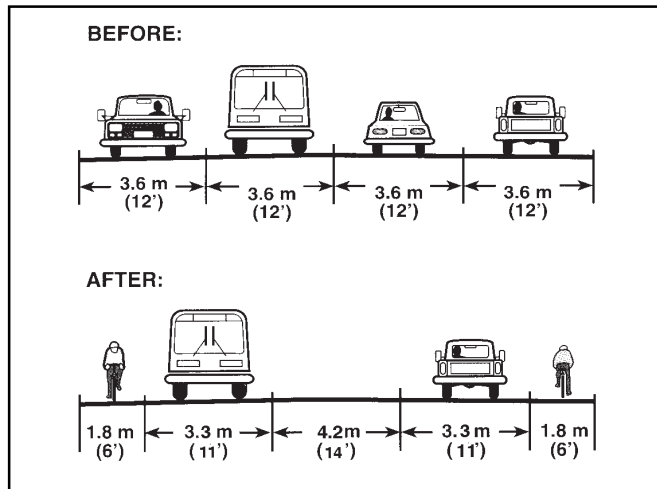


Figure A-14 Travel lanes reduced from 4 to 2, with center turn lane

Source: Oregon Bicycle and Pedestrian Plan (1995)

Paved Shoulders on Rural Roadways

A shoulder is the portion of a roadway contiguous to the travel lane on rural roadways without curbs and gutters. Paved shoulders are provided for a variety of safety, operational, and maintenance reasons. These include the following:

- Provision of space for motorists to stop out of traffic in case of an emergency.
- Provision of space to make evasive maneuvers to escape potential crashes.
- Provision of a recovery area to regain control of a vehicle.
- Improvement of highway capacity (e.g., by providing space for turning traffic).
- Provision of space for maintenance operations, such as snow removal.
- Provision of structural support to the pavement, reducing maintenance costs.

Adding or widening paved shoulders on rural roadways with few intersections is also a cost-effective way to accommodate bicyclists. Bicyclists are permitted to use shoulders under state law.

Width Standards

Paved shoulders should be at least 4 feet wide to accommodate bicyclists. However, where this width cannot be achieved, any additional paved shoulder width is helpful, especially if there is no joint between the travel lane and shoulder. A paved shoulder width of 5 feet is recommended from the face of guardrail, curb, or other roadside barriers. A pavement edge line should be striped separating the travel lane from the paved shoulder.



Paved shoulder on rural roadway.

⁴ For more information, see Dan Burden and Peter Lagaerwey, "Road Diets: Fixing the Big Roads," Walkable Communities, Inc. (March 1999).

It is desirable to increase the width of paved shoulders to 5-6 feet on roadways with high traffic volumes (e.g., over 5,000 ADT) and/or a high percentage of trucks, buses, and recreational vehicles (e.g., over 5%). A wider paved shoulder is also desirable on steep grades, as bicyclists need more room for maneuvering. Other factors that should be considered in determining the desired shoulder width are the average travel speed (whether above 50 mph), roadway location (e.g., whether within 1-3 miles of an urban area), adjacent land use, and current and projected use by bicyclists.

Due to the buildup of debris and the trapped condition a bicyclist faces, paved shoulders on bridges are especially important. Bridge shoulder width should, at a minimum, match the approaching roadway shoulder width. Bridges exceeding a 3% grade benefit from wider shoulder widths.

It is best to add or widen paved shoulders in conjunction with pavement overlays in order to ensure a smooth, seamless joint, reduce costs, and minimize traffic disruptions. When paved shoulders are provided as part of new road construction, the pavement structural design should be the same as that of the roadway. If paved shoulders need to be added on a roadway that isn't scheduled for an overlay project in the near future, it should be done with use of a saw cut joint, pavement grinder, or asphalt feathering. (For more information, see Design Standards for Shoulder Bikeways in the *1995 Oregon Bicycle and Pedestrian Plan*)

Wherever a roadway is constructed or widened, paving of gravel driveways and intersecting streets should be considered for a sufficient distance to prevent loose gravel from spilling onto the shoulders.

Shared-Use Paths

A shared-use path is a bicycle facility that is physically separated from motor vehicle traffic by distance or a barrier. Shared-use paths are sometimes referred to as "trails," however this term is best used to refer to unimproved, recreational facilities for mountain bicycling. Shared-use paths are almost always two-way facilities, often paved, and are typically used by pedestrians, runners, and in-line skaters, as well as bicyclists.



Capital City Trail through the Nine Springs E-way.

Shared-use paths can be advantageous in a number of circumstances, such as the following:

- To serve areas not well served by the roadway system (e.g., only served by limited access highways or with few intersecting roadways).
- To create short cuts through a residential neighborhood or urban park and/or link urban or suburban destination and origin points.
- To make use of continuous greenbelts such as rivers, shorelines, drainages, and rail corridors. Those may serve both as elements of regional or community transportation and recreational trail plans (e.g., when located in a park).

Shared-use paths should be thought of as extensions of the highway system that are intended for the exclusive or preferential use of bicyclists and pedestrians similar to the way freeways are intended for the exclusive or preferential use of motorists. Shared-use paths should *not* be used to preclude on-street bicycle facilities, but rather to complement the on-street bicycle facility network.

Shared-use paths should generally *not* be placed directly adjacent to roadways, because this creates a number of safety problems. For example, unless paired, bicycle paths require one direction of bicycle traffic to ride against motor vehicle traffic, contrary to the rules of the road. At intersections and driveways, motorists entering or crossing the roadway often do not notice bicyclists coming from their right, as they are not expecting vehicles coming from that direction. Even bicyclists coming from the left often go unnoticed, because motorists' attention is directed at crossing motor vehicle traffic on the street at the intersection. Also,



Shared use path skirting the convention center.

bicyclists tend to travel on the wrong side of the road against traffic when approaching or leaving the path.

Shared-use paths may be considered along roadway corridors under the following conditions:

- The path will generally be separated from motor vehicle traffic.
- There is a desire to provide path continuity throughout the corridor.
- There are few at-grade intersections or driveways.
- The path connects at each end onto streets with good bicycle and pedestrian facilities, or onto another safe, well-designed path.
- There is adequate access to local cross-streets and other facilities along the route.
- Any needed grade separation structures do not add substantial out-of-direction travel, and are comfortable to users.



Shared-use paths are used by others besides bicyclists.

- Bicycle and pedestrian use is expected to be high.
- The total cost of providing the path is proportionate to the need.

Width and Clearance: The minimum recommended width for a two-way shared-use path is 10 feet.⁴ A width of 12 feet, or even 14 feet, is desirable in areas with heavy use by bicyclists, pedestrians, runners, and in-line skaters. One-way paths are discouraged, because they are often used as two-way facilities. If necessary, one-way paths should be at least 6 feet wide and designed and signed appropriately.

A minimum two-foot wide graded area on each side of an off-street path is necessary for safe operation. A distance of 4 feet or more is generally desirable to provide clearance from trees, fences, and other obstructions. A distance of 6 feet or more is desirable from any steep embankments (3:1 slope or greater); otherwise a safety railing should be installed. The recommended clearance to overhead obstructions is 10 feet, with a minimum of 8 feet. For paths adjacent to a roadway, a minimum separation of 5 feet is recommended between the path and the edge of the roadway. Otherwise, a physical barrier of sufficient height (4 ½ feet) should be installed. Signage along paths should be 4-7 feet high.

Design Speed, Radii, and Grades: Shared-use paths should generally be designed for the preferred speed of the faster bicyclists. The AASHTO Guide recommends a design speed of 20 miles per hour (30 mph when the downgrade exceeds 4 percent). However, paths should not be designed to encourage speed. Paths are used by bicyclists with vastly different skill levels as well as pedestrians, in-line skaters, and others. Paths designed to encourage higher speeds may

⁴In some instances, a reduced width of 8 feet can be adequate.

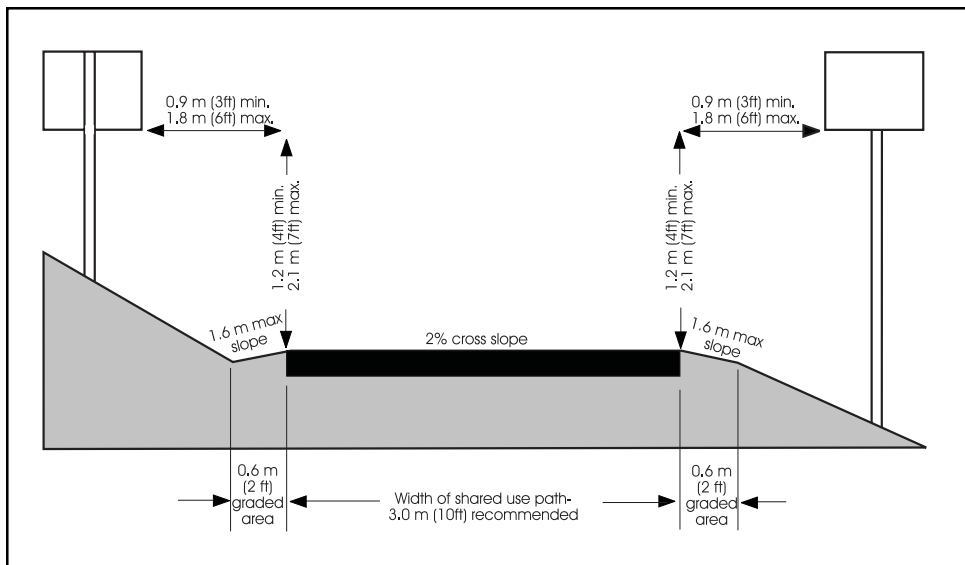


Figure A-15 Shared use path cross-section
Based on AASHTO Guidelines (1999)

create too great of an operating speed differential between families and high speed bicyclists. The need to work within the natural terrain and provide an attractive path experience must also be considered. Just as roads can be over-built, so too can paths.

The AASHTO Guide recommends a minimum radius of curvature of 100 feet for bicycle paths with a design speed of 20 mph. Adequate stopping sight distances should also be provided at curves and intersections. When substandard radius curves and stopping sight distances must be used because of right-of-way, topographical or other considerations, standard curve warning signs and/or supplemental pavement markings (yellow center stripe) should be installed in accordance with the MUTCD. Widening the pavement through the curve should be considered in such situations.

Grades on shared-use paths should be kept to a minimum, especially on long inclines. The maximum desirable grade is 5%, although steeper grades may be needed and are acceptable for short distances of up to 500 feet. The width of bicycle paths should be increased on steep slopes, where feasible. Grades steeper than 3% may not be practical for paths with crushed stone surfaces.

Pavement Structure and Drainage: A crushed stone surface is adequate for purely recreational paths in rural areas. However, in urban areas it is recommended that paths be paved to provide a higher level of service, improve accessibility, and allow for year-round use. Pavement structures

should be machine laid and constructed of asphaltic or portland cement concrete. Paths should be designed with sufficient structural depth to sustain without damage loads of occasional emergency, maintenance, and other motor vehicles that can be expected to use or cross the path. Special consideration should be given to the location of motor vehicle wheel loads on the path.

For adequate drainage, a minimum pavement cross slope of 2% is recommended. Sloping

in one direction instead of crowning is preferred and generally simplifies the drainage and surface construction. A smooth surface is essential to prevent water ponding and ice formation in the winter.

Curb Cuts: Curb cuts for bicycle access to shared-use paths should be designed so that the bottom of the curb cut matches the gutter grade without an elevated lip. The bottom width of the curb cut should be the full width of the bikeway, generally 10 feet wide. Additional width may be necessary on downhill grades.

In some situations, mid-block curb cuts for paths are desirable to allow bicyclists to enter the road prior to an intersection. This allows bicyclists to get in proper position to make a left turn instead of having to cross two streets (pedestrian style).



Mid-block curb cut for bicycle path.

Path-Roadway Intersections: Intersections with roadways must be carefully considered in bicycle path design. If alternate locations for a shared-use path are available, the one with the most favorable intersection conditions should generally be selected. For crossings of high-speed, high-volume arterial roads and highways, grade separation may be the only practical treatment. Unless bicycles are prohibited from the intersecting highway, providing for turning movements at at-grade intersections must be considered.

For at-grade mid-block intersections, a major consideration is establishment of right-of-way. Right-of-way is normally assigned based upon: (1) heavier volume of traffic; (2) higher speed traffic; and (3) higher classification of roadway. In the case of path-roadway intersections, the unique behavioral characteristics of bicyclists and motorists must also be considered. For example, bicyclists have a strong desire to maintain momentum, while motorists tend to assume that bicyclists will or should always yield.



Path-street crossing with curb and crosswalk marking.

It should not be assumed that just because bicyclists are the ones who may be injured in the event of a crash, they should always be required to stop at intersections. This can lead to unsafe practices and increase the potential for a serious crash. Four-way stops should generally be avoided, as they lead to confusion. A common approach to path intersections with low-speed, low-volume streets is to leave them uncontrolled. If bicyclists are given the right-of-way, use of a raised crosswalk and/or a flashing signal may be needed in addition to stop or yield signs in order to alert motorists to their need to slow down and stop or yield.

For mid-block crossings, the type of traffic control to be used (e.g., yield sign, stop sign, signal) and location should be provided in accordance with the MUTCD. Care should be taken to ensure adequate stopping sight distances at intersections and adequate warning to permit bicyclists to stop, especially on downgrades. Advance warning signs of all crossings should be on the roadway in advance of the intersecting path as prescribed in the MUTCD. For path crossings of busy roads, a refuge island or signal may be required. The refuge island width should be 8 feet at a minimum, with 10 feet preferred. Where a signal is needed, bicycle-sensitive loop detectors in the pavement should be used. Techniques to slow motor vehicle traffic approaching the bicycle path crossing (e.g., speed hump, curb extension) should be considered, particularly on roads with traffic speeds greater than 25 mph.



Path crossing is integrated close to the signalized street intersection.

For adjacent path crossings, where the path crosses a roadway at an existing intersection between two roadways, it is usually preferable in urban situations for the crossing to be integrated close to the intersection. This allows motorists and path users to recognize each other as intersecting traffic. See photo above. Traffic controls, such as no right-turn on red or an all-red signal phase may be necessary for these types of crossings where the intersecting and/or parallel roadways have high traffic volumes. There are times, particularly in rural areas, when it is preferable that the path crossing of a roadway be located away from the intersection with another roadway. Path-roadway crossings should be at right angles whenever possible.

Undesirability of Sidewalk Bikeways: While in rare instances they may be necessary, sidewalk bikeways are not recommended. Bicyclists are safer when they are allowed to function as roadway vehicle operators, rather than as pedestrians. Sidewalk bicycle paths create conflicts between pedestrians and bicyclists. Conflicts with fixed objects (e.g., utility poles, sign posts, etc.) are also common. Unsafe conditions are created at intersections and driveways. Bicyclists on sidewalks are often not visible to motorists, and motorists are not expecting them. While some sidewalk bicycle use is expected (e.g., young children riding in residential areas) and often legally permitted by local ordinance (if bicyclists yield to pedestrians), it is inappropriate to sign a sidewalk as a bicycle path.

D. Traffic Signals

At signalized intersections, the timing of the traffic signal cycle and the method of detecting the presence of bicyclists needs to be considered.

Signal Timing

At signalized intersections, traffic signal clearance intervals should be timed to provide bicyclists with sufficient time to react, accelerate, and pass through the intersection on the clearance interval. An all-red phase is not required, but can be used to allow bicyclists that enter the intersection during the yellow interval to clear the intersection. Normally, a bicyclist can cross an intersection under the same signal phasing arrangement as motor vehicles. However, special consideration of bicyclists may be needed for on multi-lane crossings and acute angle intersections, which require longer crossing times for bicyclists. To check the clearance interval, a bicyclist's speed of 6-8 mph and a perception/reaction/braking time of 2.5 seconds should be used. (See AASHTO Guide for additional guidance on determining minimum green time)

Demand-Actuated Signals

Traffic detector loops for demand-actuated signals should be designed to detect bicycles and should be located in the bicyclist's expected path, including bike lanes/paved shoulders and left-turn lanes. This is crucial both for bicyclists' safety and compliance with traffic laws. Special accommodation may be needed on the right side of the rightmost through lane in order to ensure bicycle detection. Quadrapole and diagonal-type loop detectors generally provide for bicycle detection. Dipole and rectangular loops can also detect bicycles if the detector sensitivity is adjusted.



Traffic detector loop in bike lane.

Detector loops are usually not installed across the entire lane, and it is therefore possible that a bicycle on the far right side of the travel lane or road will not be detected. Pavement markings that indicate to bicyclists the area of the loop where they will be detected, preferably the right side of the travel lane, should be considered. Figure A-16 shows the standard pavement symbol to use to notify bicyclists where to stop. The symbol would typically be used on side streets crossing major streets and left-turn lanes. Florida has recently been testing use of the sign shown in Figure A-17 in conjunction with the symbol to explain its purpose.

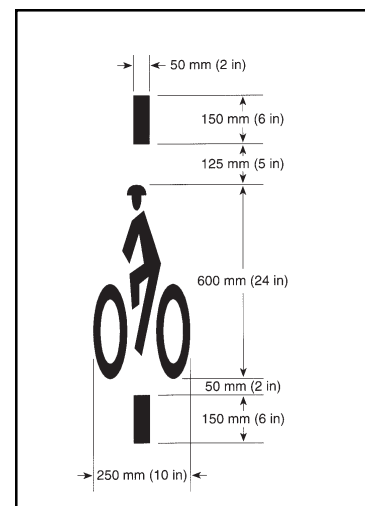


Figure A-16 *Pavement symbol to notify bicyclists where to stop to activate traffic signal*

Source: *AASHTO Guidelines (1999)*

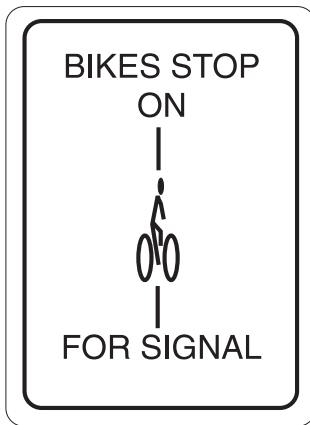


Figure A-17 Sign that can be used with pavement symbol to explain purpose

Source: *Florida Bicycle Facilities Planning and Design Handbook (2000)*

Programmed Visibility Signals

Where programmed visibility signal heads are used, which are designed to have a finite field of view, they should be checked to ensure they are visible to bicyclists who are properly positioned on the road. If the programmed signals cannot be aimed to serve bicyclists, separate signals should be provided.

E. Additional Design Considerations

Road Hazards

In addition to road debris, there are a variety of other hazards to bicyclists that should either be avoided or eliminated, or kept outside the travel path of bicyclists. The following are the most common.

Drainage Grates and Utility Covers: Drainage grates and utility underground access and handhole covers should be located outside the travel path of bicyclists. Drainage inlets in the curb face, shown in photo below, are preferable to street-surface designs and save space by allowing a one foot wide gutter pan. Bicycle-safe drainage grates should always be used. Otherwise, a bicycle wheel may fall into the slots of parallel bar grates, causing the bicyclist to fall. It is also important that grates and utility covers be adjusted flush with the road surface. As a last and temporary resort, identifying an unsafe grate with a pavement marking visible at night could be done.



Drainage inlets in curb face keep grates out of bicyclists' path.

At-Grade Railroad Crossings: Railroad crossings can present a hazard to bicyclists if not properly designed. Where possible, the rails should cross the road or bicycle path at or near a right angle to minimize the potential for a bicyclist's front wheel becoming trapped in the flangeway and causing loss of steering control. If the crossing angle is less than 45 degrees, the outside lane, shoulder, or bicycle lane should be widened, where possible, to improve the angle of approach. Pavement markings directing the bicyclist toward the best crossing angle are also a good idea.



Outside lane widened to allow bicyclists to cross RR tracks at safe angle.

It is also important that the roadway or path surface be at the same elevation as the rails. Rubberized railway crossing mats or concrete panels (vs. asphalt or timber) are recommended for their smoothness and durability. See photo on next page. The width of the open flange area between the

rail and the roadway surface should be kept to a minimum. Warning signs and pavement markings should be installed in accordance with the MUTCD.



Rubberized rail crossing mats provide smooth crossings for bicyclists. An even better alternative is concrete panels.

Paths should be paved an extra two feet on both sides at railroad crossings in order to maintain the necessary clearance space for safe operation.

Rumble Strips: Rumble strips are sometimes provided continuously in the paved shoulder area of 4-lane divided highways to alert motorists that they are wandering off the travel lanes onto the shoulder. They are also sometimes used in the travel lanes on rural 2-lane highways prior to a controlled intersection to alert motorists of the upcoming intersection. In either case, the rumble strips should not be placed across the entire width of the paved shoulder or travel lane. Rather, a 4-foot or greater smooth surface for bicyclists should be provided on the outside half of the paved shoulder or travel lane.

Lighting

The presence of fixed-source lighting on streets is important to help bicyclists see road surface conditions and avoid potential obstacles, particularly during low light conditions. The needs of bicyclists should be considered when designing lighting for streets. Adequate lighting should also be provided for off-street bicycle paths, through underpasses and tunnels, and at bicycle path and street intersections.



Urban paths should have lighting for safe use during hours of darkness.

Structures

Roadway Bridges: Roadway bridges often present obstacles to bicyclists because of high traffic volumes, narrow widths, open grate decking, and expansion joints. Safe accommodation of bicycles on roadway bridges is important to provide access across major barriers and to assure bicycle facility network continuity. Bicycle-safe decking and expansion joints should be used on all bridge decks. The width of new bridges should equal the width of the approach



Bike lane continues across bridge.



Pedestrian/bicycle overpass provides access across freeway.

roadway, including bicycle lanes, gutter pan, and sidewalks. Even where the approach roadway does not have bike lanes or paved shoulders, space for bicyclists and pedestrians should generally be provided. If bicyclists must be directed to use the sidewalk, sidewalks should be provided on both sides of the street and should be widened to a minimum of 8 feet, with 10 feet preferred. A wider bicycle-pedestrian way may be desirable under some circumstances, such as steep grades and/or heavy use.

Shared-Use Path Over/Underpasses: Separate over- or underpasses for shared-use paths are necessary to provide access across barriers, such as rivers, freeways, and railroads. In selecting an over- or underpass, the advantages and disadvantages of each should be considered. For example, underpasses provide an opportunity to reduce or eliminate approach grades, since the required clearance is less than an overpass of a highway. However, underpasses sometimes present security problems or concerns and may require drainage. Overpasses are more open, but require longer approaches to achieve the standard clearance (17 feet over highways and 23 feet over railroad tracks).

The minimum total width of shared-use path over- or underpasses should be the same as the approaching paved bicycle path (generally 10 feet), plus a minimum of 2 feet clear distance on both sides, for a total of 14 feet. Access by emergency and maintenance vehicles should be considered in establishing the design clearances of bicycle path structures. An overhead clearance of 10 feet is desirable, where possible. Approaches to overpasses and underpasses should have good visibility. Grades of 5% or less are desirable, if possible. Grades should not exceed requirements set by the Americans with Disabilities Act (generally 8%).

Railings or other barriers on both sides of a shared-use path bridge should be a minimum of 3½ feet high. Adequate, vandal-resistant lighting should be provided for both bridges and underpasses for safety and personal security reasons.

Traffic Calming Devices: Considerations for Bicyclists

Speeding on local neighborhood streets is a problem in some areas, in part due to street design that accommodates high-speed travel. Older neighborhoods also sometimes have problems with speeding and cut-through traffic. Well-designed traffic calming devices can effectively reduce traffic speeds and volumes while maintaining local access to neighborhoods. These measures are generally complementary to (or at least not detrimental to) bicycle use. However, consideration should be given to bicyclists to ensure the design doesn't compromise their safety. Street lighting should be used with traffic calming devices, because bicycle lighting requirements are for visibility of the bicyclist, not for the bicyclist to detect hazards. The following other bicyclist-related design issues for these devices should be considered, particularly for identified bicycle routes.

Speed Humps: Speed humps should generally be constructed with a longitudinal length of 12-22 feet with a raised area 3-4 inches high. Where a series of humps are used, they are typically spaced between 300 and 600 feet apart. This will slow motor vehicles while providing a smooth ride for bicyclists. Signing and marking of the humps is essential and they should be visible at night (e.g., through use of lighting).



Speed humps slow motor vehicles down while providing a smooth ride for bicyclists.

Medians: Medians are most useful to accommodate bicyclists and pedestrians at crossings of major multi-lane roadways. They can be either raised or flush with the roadway surface. If raised, they should include an area at least 10-12 feet wide that is ramped or flush with the road for bicyclists. The minimum central refuge width for safe use by bicyclists should be 8 feet. Used in isolation, roadway medians do not have a significant impact on reducing vehicle speeds.

Traffic Circles: Traffic circles are circles of varying diameter formed by curbs that are placed in the intersection of local streets to reduce motor vehicle speeds. The traffic circle should be designed to incorporate adequate deflection on each approach to enforce appropriate entry speed for motor vehicles and discourage a motorist from trying to overtake a bicyclist in the intersection.



Traffic circles slow motor vehicles on residential streets.

Street Closures and Diverters: Traffic diverters and street closures should preserve bicycle turning and through movement options, unless overriding safety concerns exist. Bicycle “cut-throughs” or gaps at diverters and street closures should be wide enough (five feet) to accommodate a bicycle trailer. They should also be designed to permit good visibility of adjacent roads and to minimize the risk of obstruction by parked vehicles. Painting a bicycle symbol and other directional markings in front of the gap can help in minimizing the risk of obstruction by parking vehicles.



This street is closed to through motor vehicle traffic, but provides bicycle access to the neighborhood.

Curb Extensions: Motor vehicles can safely pass bicyclists at an intersection with a curb extension, if the street does not have a centerline stripe. On streets with a centerline stripe, the curb extension should be placed so that a minimum 14-foot outside lane is left on the roadway to allow bicyclists to pass through the intersection safely. Alternatively, motorists should be encouraged to let bicyclists through first by using complementary traffic calming techniques such as speed tables and cautionary signing.

Bicycle Network Continuity During Construction or Other Travel Disruptions

Through bicycle and pedestrian movement must be maintained during construction projects and other activities disrupting travel (e.g., special events), particularly on bridges. Bicyclists and pedestrians are most susceptible to disruptions in their normal routes, because of their slower speeds



Bicycle and pedestrian access should be maintained through construction zones.

and exposure to noise, dirt, and fumes. Temporary lane restrictions, detours, and other traffic control measures instituted during construction or other traffic disruptions should be designed to accommodate non-motorized travelers, if at all possible.

It is recommended that local communities develop and implement bicycle and pedestrian access policies for street and building construction zones. Compliance with the policies can be achieved through training in-house staff and incorporating the policies into contractor agreements and building permits.

On low-volume rural roadways or through short street construction zones, standard traffic control practices are generally adequate. On roadways with heavier traffic or longer construction zones, a wide outside lane or temporary bicycle lane should be provided for motor vehicles to safely pass bicyclists. A detour route for bicyclists may be advisable on highways with very heavy traffic volumes and high speeds. In urban areas, bicyclists should not be routed onto sidewalks, unless no other reasonable alternative exists. If through travel on a designated bicycle route is disrupted, a reasonable detour should be established and signed. Debris from construction activity should be swept to maintain a reasonably clean riding surface in the bike lane/paved shoulder or outer area of the roadway.

Other considerations for construction-related street disruptions include the following:

- Metal plates create a slick and dangerous surface for cyclists, and are not easily visible at night. If they are used to accommodate traffic, the plates should not have a vertical edge greater than one inch without a temporary asphalt lip to accommodate bicyclists. They should also not have knobs on top for lifting.
- Construction holes or depressions should never be left without physical barriers, which prevent bicyclists from running over them.
- The placement of advance construction signs should obstruct neither the pedestrian's nor bicyclist's path.
- Information regarding construction and route changes should be communicated to the public via the local media. Project managers should also notify and consult with affected groups (e.g., PTAs, businesses) and transportation policy committees.

F. Maintenance

Streets and bicycle paths should be adequately maintained to allow safe use, protect the investment of public funds in bicycle facilities, and guard against legal liability. Street maintenance crews should be trained to spot conditions that are hazardous to bicyclists, and bicycle facility users should be encouraged to report problems (e.g., through use of facility improvement forms). A regular maintenance schedule should be established and sufficient funds budgeted for the work. Special attention should be given to signed bicycle routes and other high-volume bikeways.

Pavement Surfaces

Street and paved bicycle path surfaces should be smooth and free from major surface irregularities. Care should be taken to promptly repair cracks, potholes, and other physical problems, particularly in the bicycle travel path. Patching and pavement overlays should be done to a high standard (e.g., not leaving a ridge, sweeping away loose materials, etc.).

Removal of Debris

Routine maintenance programs should be established to remove sand, gravel, glass, and other debris from streets and bicycle paths. Bicycle lanes and paved shoulders tend to collect debris and need extra attention. Special attention should also be given to the areas of roadways between the typical paths of turning and through motor vehicle traffic. These areas also tend to fill with debris and are in the usual travel path of bicyclists. Poor drainage may cause a reoccurring debris problem in some areas, and should be corrected.

Snow and Ice Removal

Bicycle lanes and bicycle paths should be kept clear of snow and ice.

Signs, Stripes, Legends

Signs, striping, and legends should be kept in a readable condition, including those directed at motorists.

Encroaching Vegetation

Bushes and tree branches adjacent to bicycle paths should be trimmed back to allow a minimum of two feet of clearance, particularly at curves. Vegetation should be prevented from breaking up the edge of pavement and encroaching on the path surface.

G. Bicycle Parking

Bicycle parking facilities should be provided at both trip origin (e.g., multi-family housing developments) and likely trip destination points (e.g., employment center, commercial area). Bicycle parking areas should be accessible from driveways or ramps designed to accommodate bicycle travel, and should be located close to building entrances for convenience and added security.

Bicycle parking is generally grouped into two classes: long-term and short-term. Long-term parking facilities provide weather protection and a higher level of security. Covered



Bicycle lockers provide secure, protected parking.



Bicycle parking.

parking (via awning, roof overhang, etc.), bicycle lockers, or rooms in buildings are examples. At least some long-term parking should be provided at employment centers, schools, transit stops, and multi-family housing developments. Short-term parking provides a means of locking the bicycle frame and a wheel, but does not provide accessory

security or weather protection. It is intended for situations where the bicycle will be left for a relatively short period of time and it is visible and convenient to the building entrance. Many sites need both types of parking; short-term for customers and long-term for employees.

Dimensions and Location

Bicycle parking spaces should be at least 6 feet long and 2 feet wide. Overhead clearance for covered spaces should be at least 7 feet. A 5-foot aisle should be provided behind each row of bicycle parking. (See Fig. 18) For double-sided rack, an access aisle is required on both sides of the rack. Some spaces should be large enough to accommodate bicycle trailers, particularly at grocery stores. Bicycle parking should be located in well lit, secure locations close to building entrances. Bicycle parking provided in the public right-of-way (e.g., in downtown, neighborhood commercial districts) should allow 6 feet for passage of pedestrians.

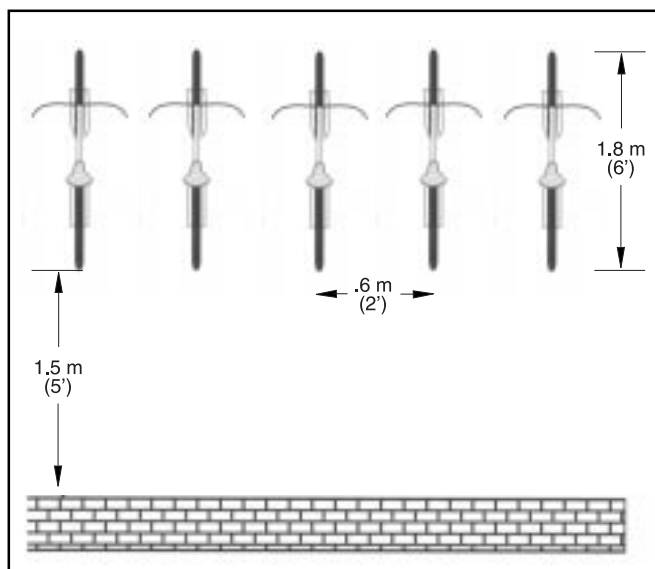


Figure A-18 *Bicycle parking dimensions*

Source: *Oregon Bicycle and Pedestrian Plan (1995)*

Number of Spaces

The amount of bicycle parking can be based on: (1) the number of employees, residents, students, etc.; (2) building square footage; and/or (3) number of motor vehicle spaces provided. For information purposes, the City of Madison's Off-Street Bicycle Parking Guidelines are provided in Figure A-20. Flexibility should be provided in the local ordinance to increase or decrease the required number of spaces,

Off-Street Bicycle Parking Guidelines	
Land Use	Bike Space
Dwellings/Lodging rooms	1 per dwelling unit or 3 lodging rooms
Clubs/lodges	1 per lodging room plus 3% of person capacity
Fraternities/sororities	1 per 3 rooms
Hotel/lodging houses	1 per 20 employees
Galleries/museums/libraries	1 per 10 auto spaces
Colleges/universities/junior and high schools	1 per 4 employees plus 1 per 4 students
Nursery/elementary schools	1 per 10 employees plus students above second grade
Convalescent and nursing homes/institutions	1 per 20 employees
Hospitals	1 per 20 employees
Places of assembly, recreation, entertainment and amusement	1 per 10 auto spaces
Commercial/manufacturing	1 per 10 auto spaces
Miscellaneous/other	To be determined by the Zoning Administrator based on the guideline for the most similar use listed above

Notes: 1) In all cases where bicycle parking is required, no fewer than two (2) spaces shall be required.
2) After the first fifty (50) bicycle parking spaces are provided, additional bicycle parking spaces required are 0.5 (one half) space per unit listed.

3) Where the expected need for bicycle parking for a particular use is uncertain due to unknown or unusual operating characteristics of the use, the Zoning Administrator may authorize that construction and provision of not more than fifty (50) percent of the bicycle parking spaces be deferred. Land area required for provision of deferred bicycle parking spaces shall be maintained in reserve. (Sec. 28.11(3)(1) I. Cr. by Ord. 9426, 3-11-88)

Figure A-19 Off-street Bicycle parking guidelines

Source: City of Madison Zoning Ordinance

depending upon the area, type of business, and other factors. If the number of required bicycle parking spaces is reduced, space should still be required to be set aside for the parking if needed in the future.

Bicycle Racks

Bicycle racks should be securely anchored to the surface or a structure and should be designed so that the frame and front wheel of the bicycle can be locked to the rack with a standard high-security U-shaped lock. Racks must hold bicycles securely, supporting the frame so that the bicycle cannot be pushed or fall to one side. (See Appendix B “Bicycle Parking Rack Selection”)

Consideration should also be given for provision of showers and changing facilities at office buildings and other locations (e.g., health clubs).



Front wheel of bicycle can be locked with high-security U-shaped lock.

Bicycle Facility Design References

Guide for the Development of Bicycle Facilities, American Association of State Highway and Transportation Officials, 1999.

Manual on Uniform Traffic Control Devices, U.S. Department of Transportation (see in particular Part 9 covering Traffic Controls for Bicycle Facilities)

Facilities Development Manual, Procedure 11-45-10, Wisconsin Department of Transportation (Feb. 1994)

Florida Bicycle Facilities Planning and Design Handbook, Florida Department of Transportation, July 1999, Revised April 2000.

Oregon Bicycle and Pedestrian Plan, Oregon Department of Transportation, 1995.

City of Portland (OR) Bicycle Master Plan, Office of Transportation, City of Portland, 1996.

FHWA DRAFT Course on Bicycle and Pedestrian Transportation, U.S. Department of Transportation, Federal Highway Administration, 2000.

Appendix B

Bicycle Parking Rack Selection¹

Background

Madison's zoning ordinance regarding bicycle parking [MGO 28.11, see esp. Subsections (3)(e) and (3)(h)2d] specifies some basic bicycle parking space and rack design criteria. These design criteria are based on the dimensions of standard adult sized bicycles, and the spatial needs for accessing each space. This is similar to the City's car parking lot design requirements. The table below lists typical bicycle dimensions, and the resultant design criteria included in the ordinance.

Measurement	Typical Dimension	Madison Zoning Ordinance Design Criteria
Width		2 feet
Drop Handlebars (road bike)	15 - 18 inches	
Flat Handlebars (mountain bike / hybrid)	20 - 24 inches	
Pedals	16 inches	
Length of Bicycle	68 inches	6 feet
Access Aisle		5 feet
Vertical Clearance (adult height)		6 feet

In addition to meeting these spatial requirements, bicycle parking racks must also accommodate the use of all popular locking devices used by bicyclists. These include U-shaped locks such as Kryptonite, Citadel, the Bike Club and others that have similar designs. Most bicyclists use a U-lock to lock the front wheel and bicycle frame to something solid. Some bicyclists will lock the back wheel and frame, and a few will remove the front wheel and lock it along with the back wheel and frame to something solid. The rack should accommodate any and all of these ways of using a U-shaped lock.

It should be noted that these design criteria are not unique to Madison. Most other communities across the country that require bicycle parking as part of their zoning ordinances (and there are many such communities) have similar design criteria. Despite the commonness of these design criteria, few manufacturers of bicycle parking racks build racks to meet them. Below is a discussion of criteria for evaluating bicycle parking racks.

Madison's ordinance also specifies criteria for the location of bicycle parking racks on the property. "Bicycle parking facilities shall be located in a clearly designated safe and convenient location. The design and location of such facility shall be harmonious with the surrounding environment. The facility location shall be at least as convenient as the majority of auto parking spaces provided." Further, "All . . . racks shall be securely anchored to the ground or building structure . . . [and] . . . the surface of such facilities shall be designed and maintained to be mud and dust free." [MGO 28.11(3)(I)3 and 28.11(3)(h)2d]

¹ Source: City of Madison Department of Transportation

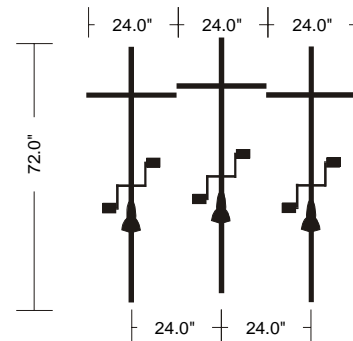
In general, bicycle parking should be located in a visible location, as close to the building entrance as possible. The area should also be lit at night. Bicycle parking located in areas where many people pass by decreases the chances that a bike thief will have time to steal a bike. Bike racks located in remote areas, behind fences or shrubs, or out back by the dumpster, for example, give bike thieves cover and time to steal bicycles. Poor rack locations will lead to the racks not being used as bicyclists will have a hard time finding them, or will find something closer to their destination to lock up to.

Criteria for Evaluating Bicycle Parking Racks

The best racks have the following qualities:

- Spaces clearly at least 2 feet wide (2 feet from center of one space to center of adjacent spaces is another way to conceptualize this. See figure 1);
- Simple design that needs no explanation as to how the rack works (which direction does the bike go in, how is the lock attached, every space is useable for any standard bicycle with typical accessories such as lights and fenders, etc.), the rack is difficult to mis-use, and will not cause problems for others (either other bicyclists using the rack, or pedestrians).
- Each space accommodates all types of user supplied locking mechanisms, including U-shaped locks, with the lock used to lock the bicycle frame and wheel(s) to the rack.
- Spaces that are clearly designated for each bicycle (it is obvious to the user where each space is) whether the rack is designed for single or double sided loading. For example, a rack designed for double sided loading with four bicycles on each side at two foot spacings is placed near a wall resulting in single sided use of the rack. Does the user see 8 one foot wide spaces or four two foot wide spaces? This type of confusion can lead to either fewer spaces being available as bicycles are loaded randomly into the spaces, or crowding and difficulty getting bicycles out if users try to squeeze more bikes in than the rack is designed to hold. Note that these problems will occur with this type of rack under double sided loading conditions as well.

Figure 1



Special Considerations for Double-Sided Rack Design

Racks that are intended for loading bicycles from both sides can park more bicycles in given width, but require additional length for both the second row of bicycles plus a second access aisle. Note, however, that the width savings will only occur as long as the handlebars of the bicycles parked on each side do not overlap. If the handlebars overlap (as with wave or loop type racks), then the width space savings of double-sided loading racks is lost. Figures 2 - 4 illustrate this point.

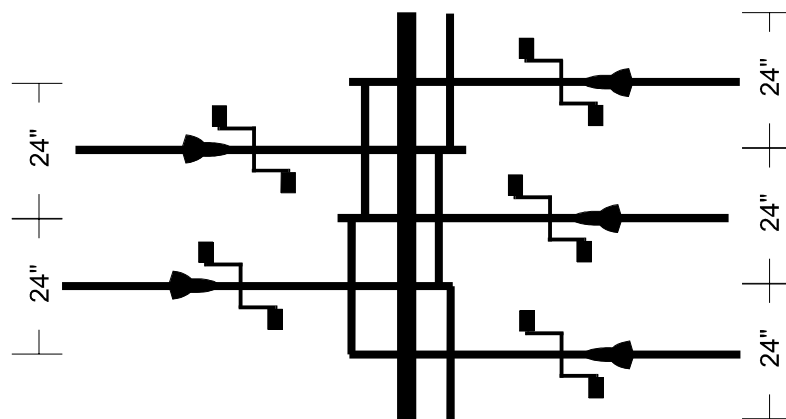


Figure 2 Double-sided rack, handlebars do not overlap the rack. Five bikes can be parked in the width of three, provided the location has adequate length (20 feet total: 10 feet for bicycles, assuming 1 foot of overlap, plus two 5-foot access aisles, one behind each row of bicycles).

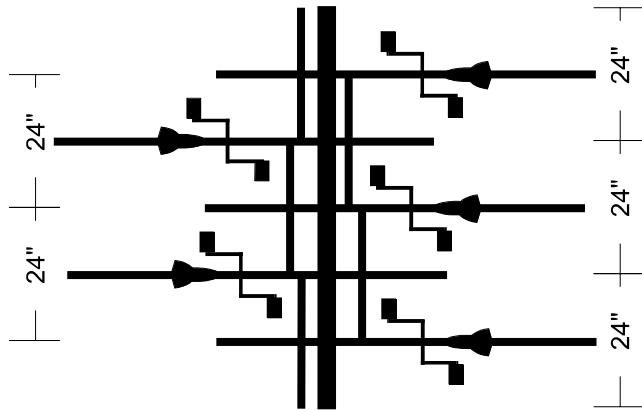


Figure 3 *Double-sided rack, handlebars overlap rack.*

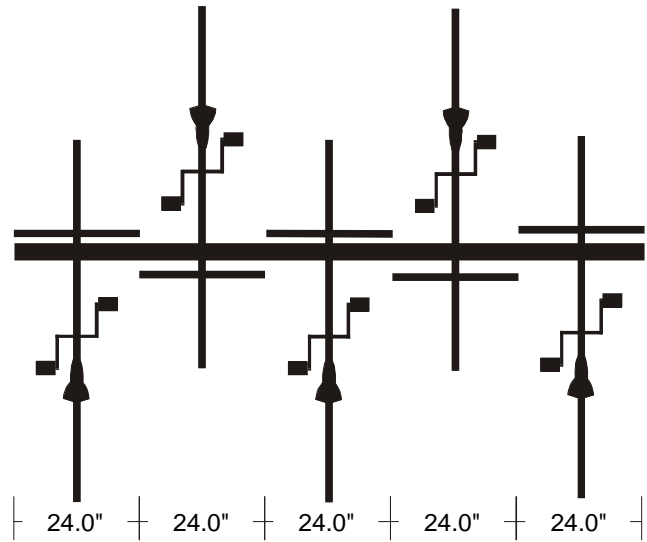
Even though spaces on each side are 2 feet wide, it is difficult for the user to place/remove bicycle into/from the rack without having to lift the bike up and over other bicycles. This design is unacceptable.

Figure 4 *Double-sided racks where the handlebars overlap the rack* require a full 2 foot width for each bicycle regardless of which side the bicycle is loaded from, thus there is no width saving from double sided loading with this design.

Note also that the height of the rack should be below the handlebars so that the bicycles do not have to be lifted up and over the rack.

A single sided rack will save space lengthwise, or a double sided rack where the handlebars do not overlap the rack will better utilize the space, accommodating more bicycles.

Different racks will be more or less appropriate for different locations. For more information on bicycle rack designs generally, or for specific rack information, contact the City of Madison's Bicycle Coordinator at 266-6225.



Federal and State Discretionary Funding Sources for Bicycle Transportation Projects

Program	Purpose	Funding Details	Applic. Date	Notes	Administering Agency	Contact
Surface Transportation Program (STP) - Urban	Provides flexible funds, which can be spent on a wide variety of projects, including roadway projects on the Federal-aid highway system, bridges, transit facilities, and bicycle and pedestrian facilities.	Funds must be spent on projects within the approved Madison urban area boundary; 20% local match required; \$3.6 million available in 2001; \$5 million in '02-'04	Mid-June	Madison MPO coordinates and prioritizes projects based on established criteria that encourage multimodal projects; most bicycle projects funded are on-street facilities incidental to roadway construction.	Madison Area MPO and WisDOT	MPO: Bob McDonald 266-4518 rmcdonald@madison.ci.wi.us
Statewide Multi-Modal Improvement Program (SMIP)				Incorporates STEP and STP-D programs listed below		
Statewide Transportation Enhancement Program (STEP)	Promotes activities that "enhance" a transportation project or an area served by a transportation project, including bicycle and pedestrian facilities and preserving abandoned railway corridors.	Created in ISTEA and continued in TEA-21; Requires at least a 20% local match per project; \$12.5 mil. total was avail. for SFYs 2002 and 2003	Mid-April	Only projects costing \$20,000+ for non-construction and \$50,000+ for construction-related activities are eligible; MPO priorities part of state committee ranking process	WisDOT Program Mgr. John Duffe 264-8723	District 1 Office: Dave McCosh 246-5445 davidmccosh@dot.state.wi.us
Surface Transportation Discretionary Program (STP-D)	Encourages projects that foster alternatives to single-occupancy motor vehicle (SOV) trips, including bicycle and pedestrian facilities, and developing bicycle and/or pedestrian plans.	Created in ISTEA and continued in TEA-21; Requires at least a 20% local match per project; \$5.44 mil. total was avail. for SFYs 2002 and 2003	Mid-April	Only projects costing \$20,000+ for non-construction and \$50,000+ for construction-related activities are eligible; MPO priorities part of state committee ranking process	WisDOT Program Mgr. John Duffe 264-8723	District 1 Office: Dave McCosh 246-5445 davidmccosh@dot.state.wi.us
National Recreational Trails Act (NRTA) or "Symm's Fund"	To provide funds for maintenance, development and rehabilitation, and acquisition of land for both motorized, non-motorized, and diversified trails.	Created in ISTEA and continued in TEA-21; Requires at least a 20% local cost share; \$937,000 available statewide in 2000; \$900,000 available in 2001	May 1	Funds may only be used on trails identified in or which further a goal of a comprehensive outdoor recreation plan; donations of labor, land, equip., and materials may be utilized for local cost share; projects must comply with ADA	WisDNR	South Central Region: Stefanie Brouwer 275-3218 brouws@dnr.state.wi.us
Section 402 Highway Safety Funds				Incorporates programs listed below		
Community Programs: Empowerment Program	For bicycle and pedestrian safety education and training projects, including helmet promotion and purchases, sponsorship of rodeos, classes, development of brochures, etc.	\$1,000 mini-contracts available each year; one per community for bicycle safety; one for pedestrian safety	Oct. to Dec.	Communities with higher than average pedestrian and/or bicycle crashes may be contacted by WisDOT re: use of funds; Engineering and maintenance work not eligible for funding	WisDOT Bureau of Transp. Safety	Program Mgr. Joanne Pruitt Thunder 267-3154 joanne.pruitt@dot.state.wi.us

Federal and State Discretionary Funding Sources for Bicycle Transportation Projects (continued)

Section 402 Highway Safety Funds (continued)					Incorporates programs listed below		
	Community Programs: Pedestrian and Bicycle Enforcement Program	For bicycle and pedestrian enforcement programs (e.g., using police on bicycles), including education-related enforcement.	\$1,000 mini-contracts available each year; one per community for bicycle enforcement; one for pedestrian enforcement	Oct. to Dec.	Communities with higher than avg. ped. and/or bicycle crashes may be contacted by WisDOT re: use of funds; Engineering work (e.g., signage) not eligible.	WisDOT Bureau of Transp. Safety	Program Mgr. Joanne Pruitt Thunder 267-3154
	Community Programs: School Zone Study Program	Funds preparation of engineering studies to assess pedestrian and bicyclist safety around schools and safe routes to school.	\$15,000 total available in 2000; \$3,000 per study	Oct. to Dec.	Only school districts eligible for funding	WisDOT Bureau of Transp. Safety	Jerry Smith 266-0420 jerry-dtim.smith@dot.state.wi.us
Wisconsin Stewardship Program					Incorporates the different subprograms listed below		
	Aids for the Acquisition and Development of Local Parks (ADLP)	To acquire or develop public nature-based outdoor recreation areas and facilities.	Up to 50% match per project; \$541,000 avail. annually for local grants in the South-Central Region	May 1	A comp. outdoor recreation plan is required to participate; priority for land acquisition projects; projects must comply with ADA	WisDNR	South Central Region: Stefanie Brouwer 275-3218
	Urban Green Space Program (UGS)	To acquire land to provide natural space within or near urban areas, or to protect scenic or ecological features.	Up to 50% match per project; \$1.2 million avail. annually statewide for local grants	May 1	A comprehensive outdoor recreation plan is required to participate; projects must comply with ADA accessibility req.s	WisDNR	S Central Region: Stefanie Brouwer 275-3218
	Urban Rivers Grant Program (URGP)	To acquire lands, or rights in lands, adjacent to urban rivers for the purpose of preserving or restoring them for economic revitalization or nature-based outdoor recreation activities.	Up to 50% match per project; \$1.2 million avail. annually statewide for local grants	May 1	A comprehensive outdoor recreation plan is required to participate; projects must comply with ADA accessibility req.s	WisDNR	S Central Region: Stefanie Brouwer 275-3218
	Development Rights Acquisition Program	To acquire development rights for nature-based outdoor recreation areas and facilites.	Up to 50% match per project; \$750,000 avail. annually statewide for local grants	May 1	A comprehensive outdoor recreation plan is required to participate.	WisDNR	S Central Region: Stefanie Brouwer 275-3218
	Land and Water Conservation Fund (LAWCON)	To acquire and develop public outdoor recreation areas and facilities.	Up to 50% match per project; \$370,000 avail. statewide in 2000 for local grants	May 1	A comprehensive outdoor recreation plan is required to participate.	WisDNR	S Central Region: Stefanie Brouwer 275-3218

Appendix D

List of Abbreviations

AASHTO	American Association of State Highway Transportation Officials
ADT	Average Daily Traffic Volume
BCI	Bicycle Compatibility Index
BFW	Bicycle Federation of Wisconsin
BTWW	Bike-to-Work Week
CTH	County Trunk Highway
DCRPC	Dane County Regional Planning Commission
DNR	Wisconsin Department of Natural Resources
DOT	Department of Transportation
FHWA	Federal Highway Administration
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
LAWCON	Land and Water Conservation Fund Program
LOS	Level of Service
MPO	Metropolitan Planning Organization
MUTCD	Manual of Uniform Traffic Control Devices
NHS	National Highway System
NPTS	National Personal Transportation Survey
PBMVC	City of Madison Pedestrian- Bicycle- Motor Vehicle Commission
STH	State Trunk Highway
STP-D	Surface Transportation Program- Discretionary
STP-U	Surface Transportation Program-Urban
TDM	Transportation Demand Management
TEA-21	Transportation Efficiency Act of the 21st Century
TIP	Transportation Improvement Program
USH	United States Highway
UW	University of Wisconsin-Madison
WisDNR	Wisconsin Department of Transportation
WisDOT	Wisconsin Department of Transportation
BOTS	WisDOT Bureau of Transportation Safety