

# AMENDMENT TO THE REGIONAL BICYCLE AND PEDESTRIAN FACILITIES SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN: 2020

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Special acknowledgment is due Mr. Christopher T. Hiebert, SEWRPC Senior Engineer, for his contribution to the preparation of this report.

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# SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

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**SUBJECT:** Certification of Adoption of an Amendment to the Regional Bicycle and Pedestrian Facilities System Plan for Southeastern Wisconsin

**TO:** The Legislative Bodies of All of the Local Units of Government within the Southeastern Wisconsin Region Comprising the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha

This is to certify that at a regular meeting of the Southeastern Wisconsin Regional Planning Commission held at the Milwaukee County War Memorial Center, Milwaukee, Wisconsin, on the 5th day of December 2001, the Commission, by a vote of all Commissioners present, being 18 ayes and 0 nays, and by appropriate resolution, a copy of which is made a part hereof and is incorporated by reference to the same force and effect as if it had been specifically set forth herein in detail, did adopt an amendment to the regional bicycle and pedestrian facilities system for Southeastern Wisconsin as part of the master plan for the physical development of the Southeastern Wisconsin Region. Said regional transportation plan is documented in the SEWRPC document, *Amendment to the Regional Bicycle and Pedestrian Facilities System Plan for Southeastern Wisconsin: 2020*, published in December 2001, which is attached hereto and made a part hereof. Such action taken by the Commission is hereby recorded on and is a part of said plan, which plan is hereby transmitted to all concerned units and agencies of government in the Southeastern Wisconsin Region for implementation.

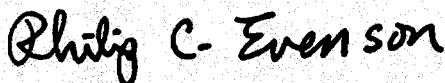
IN TESTIMONY WHEREOF, I have hereunto set my hand and seal and cause the Seal of the Southeastern Wisconsin Regional Planning Commission to be hereto affixed.

Dated at the City of Waukesha, Wisconsin, this 6th day of December 2001.



Thomas H. Buestrin, Chairman  
Southeastern Wisconsin  
Regional Planning Commission

**ATTEST:**



Philip C. Evenson, Deputy Secretary

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**RESOLUTION NO. 2001-29**

**RESOLUTION OF THE SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION AMENDING THE ADOPTED REGIONAL BICYCLE AND PEDESTRIAN FACILITIES SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN, THE PLAN BEING A PART OF THE MASTER PLAN FOR THE PHYSICAL DEVELOPMENT OF THE REGION CONSISTING OF THE COUNTIES OF KENOSHA, MILWAUKEE, OZAUKEE, RACINE, WALWORTH, WASHINGTON, AND WAUKESHA IN THE STATE OF WISCONSIN**

WHEREAS, pursuant to Section 66.0309 of the *Wisconsin Statutes*, the Southeastern Wisconsin Regional Planning Commission, at the meeting held on the 25th day of January 1995, duly adopted a regional bicycle and pedestrian facilities system plan as documented in SEWRPC Planning Report No. 43, *A Regional Bicycle and Pedestrian Facilities System Plan for Southeastern Wisconsin: 2010*; and

WHEREAS, the Commission has undertaken the extension of the design year of the adopted regional bicycle and pedestrian facilities system plan from 2010 to 2020 taking into account new forecasts of resident population and economic activity levels for the Region and the year 2020 regional land use plan; and

WHEREAS, under the guidance of the Advisory Committee on Regional Bicycle and Pedestrian Facilities System Planning, the Commission staff has completed all planning studies necessary for the preparation of the design year 2020 regional bicycle and pedestrian facilities system plan, including a review of the implementation to date of the 2010 plan, and the preparation of a SEWRPC document entitled *Amendment to the Regional Bicycle and Pedestrian Facilities System Plan for Southeastern Wisconsin: 2020*, which document contains proposals for a system of regional bicycle and pedestrian facilities and which is intended to constitute an integral part of the master plan for the physical development of the Region; and

WHEREAS, the Advisory Committee on Regional Bicycle and Pedestrian Facilities System Planning unanimously approved the updated and extended regional bicycle and pedestrian plan at its meeting held on September 26, 2001; and

WHEREAS, under the provisions of Section 66.0309 of the *Wisconsin Statutes*, the Regional Planning Commission is authorized and empowered, as the work of making the whole master plan progresses, to adopt a resolution approving the design year 2020 regional bicycle and pedestrian facilities system plan for Southeastern Wisconsin as a part of the master plan;

NOW, THEREFORE, BE IT RESOLVED:

FIRST: That the design year 2020 regional bicycle and pedestrian facilities system plan, being a part of the master plan for the physical development of the Region, as set forth in a SEWRPC document, *Amendment to the Regional Bicycle and Pedestrian Facilities System Plan for Southeastern Wisconsin: 2020*, published in December 2001, shall be and the same hereby is in all respects ratified, approved, and officially adopted.

SECOND: That the said SEWRPC document, together with all maps, plats, charts, programs, and descriptive and explanatory matter therein contained, are hereby made matter of public record, and the originals and true copies thereof shall be kept at all times at the offices of the Southeastern Wisconsin Regional Planning Commission, presently located in the Old Courthouse Building in the City of Waukesha, County of Waukesha, and State of Wisconsin, or at any subsequent office that the said Commission may occupy, for examination and study by whomsoever may desire to examine the same.

RESOLUTION No. 2001-29

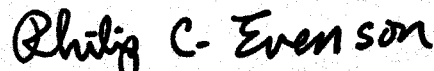
THIRD: That a true, correct, and exact copy of this resolution, together with a complete and exact copy of the SEWRPC document, *Amendment to the Regional Bicycle and Pedestrian Facilities System Plan for Southeastern Wisconsin: 2020*, containing the said descriptive and explanatory matter, shall be forthwith distributed to each of the local legislative bodies of the governmental units within the Region entitled thereto and to such other bodies, agencies, or individuals as the law may require or as the Commission or its Executive Committee or its Executive Director, in their discretion, shall determine and direct.

FOURTH: That the design year 2020 regional bicycle and pedestrian facilities system plan for Southeastern Wisconsin, following the adoption of this resolution, shall become an element of the master plan for the entire Region, which master plan shall be made for the general purpose of guiding and accomplishing a coordinated, adjusted, and harmonious development of the entire Region and which will best promote public health, safety, order, convenience, prosperity, or the general welfare, as well as efficiency and economy in the process of development; and that the purpose and effect of the adoption of the master plan shall be solely to aid the Regional Planning Commission, the local governments and local governmental officials in the Region, the State government and State governmental officials, and the Federal government and Federal government officials in the performance of their functions and duties.

The foregoing resolution, upon motion duly made and seconded, was regularly adopted at the meeting of the Southeastern Wisconsin Regional Planning Commission held on the 5th day of December 2001, the vote being: Ayes 18; Nays 0.

  
Thomas H. Buestrin, Chairman

ATTEST:

  
Philip C. Evenson, Deputy Secretary

PCE/KRY/REB/kjk

#55358-v1 Resolution Bicycle-Pedestrian Plan

**AMENDMENT TO THE REGIONAL BICYCLE AND PEDESTRIAN  
FACILITIES SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN: 2020**

This Document Amends SEWRPC Planning Report No. 43  
A Regional Bicycle and Pedestrian Facilities System Plan  
for Southeastern Wisconsin: 2010, December 1994

Prepared by the

Southeastern Wisconsin Regional Planning Commission

P. O. Box 1607

Old Courthouse

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December 2001

Inside Region	\$10.00
Outside Region	\$20.00

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## INTRODUCTION

This report documents the review, reaffirmation, amendment, and extension of design year from the year 2010 to the year 2020 of the regional bicycle and pedestrian plan for Southeastern Wisconsin. The year 2010 regional bicycle and pedestrian facilities system plan was adopted by the Southeastern Wisconsin Regional Planning Commission in January 1995, and is documented in SEWRPC Planning Report No. 43, *A Regional Bicycle and Pedestrian Facilities System Plan for Southeastern Wisconsin: 2010*, December 1994.

The original year 2010 plan, and this updated and extended year 2020 plan, were developed by the Commission staff under the guidance of the Commission's Technical and Citizen Advisory Committee on Regional Bicycle and Pedestrian Facilities System Planning.

The remainder of this report describes the original year 2010 plan, the extent of implementation of that plan since its adoption in 1995, and the revised and amended year 2020 plan.

## YEAR 2010 PLAN

### Basic Concepts

Bicycle riding and walking can serve both as modes of transportation and as forms of recreation. Recreational bicycle and walking trips are taken for the primary purpose of enjoying the trip or to improve physical fitness. Bicycle and pedestrian trips for transportation purposes include trips made for work, school, shopping, personal business, and social events.

Transportation-oriented bicycle and walking trips tend to follow more regular and predictable patterns than do recreational trips, with origins and destinations similar to those of trips taken by motorized vehicles. As such, the existing street system often provides the most direct and desirable travel routes for nonrecreational bicycle and pedestrian travel. The year 2010 bicycle and pedestrian plan therefore sought to provide safe facilities for bicyclists and pedestrians as integral parts of the street and highway system, with consideration given to locating bicycle and pedestrian ways in off-street corridors where suitable alternatives to on-street locations exist.

The term "bicycle way" was defined for regional planning purposes as a pathway or portion of a roadway that is specifically designated for exclusive or preferential bicycle travel. The term includes bicycle paths, bicycle lanes, and bicycle routes. Bicycle paths are physically separated from motorized vehicular traffic by open space or barriers, and may be located off-street in natural resource corridors, utility corridors, or abandoned railway corridors; or they may be located within a street right-of-way but separated from motor-vehicle traffic by a planting strip. Bicycle lanes are portions of roadways that are designated by striping, signing, and pavement markings for bicycle use. A bicycle route is a bicycle way designated with directional and informational markers, and is often located on a roadway and shared with motor-vehicle traffic.

### Pedestrian And Bicyclist Safety

Safety for all users of the transportation system was an important consideration in the development of the bicycle and pedestrian plan. Appendix A to this report sets forth the planning and design guidelines for the development of safe bicycle and pedestrian facilities which were applied in the development of the year 2010 plan.

The existing street system provides the most extensive network of direct travel routes practicable, and serves to connect virtually all trip origins and destinations within the Region. As such, the existing street system was used as the basis for developing a comprehensive network of bicycle ways within the Kenosha, Milwaukee, and Racine urbanized areas, and was used to supplement the regional network of off-street bicycle ways where necessary to provide convenient bicycle access to an urban area or activity center. Providing a fully separated off-street bicycle

and pedestrian path network may not only be cost prohibitive, but also entail substantial disruption for right-of-way acquisition.

The provision of bicycle and pedestrian facilities is an important means of enhancing bicycle and pedestrian safety; however, education and enforcement measures intended to avoid bicycle and pedestrian collisions are also important. The year 2010 plan recommends that local, county, and State agencies work to develop and carry out educational programs for all street and highway users, including motor-vehicle operators, relating to the rights and responsibilities of bicyclists and pedestrians, and that where necessary, such programs be supplemented with enforcement programs designed to improve the safety of bicyclists and pedestrians.

### **Bicycle Way System Plan Element**

The year 2010 regional bicycle way system plan was intended to assist public officials in considering improvements to better accommodate bicycle travel as part of the existing and planned regional transportation system. The plan seeks to remove existing impediments to bicycle travel related to the lack of bicycle paths, the lack of safe bicycle accommodation on streets and highways, and the lack of support facilities such as bicycle parking racks and storage lockers. The plan recommends that improvements such as extra-wide outside travel lanes or paved shoulders be considered to be provided whenever an arterial street or highway is constructed or reconstructed to better accommodate shared roadway use by bicycles and motor vehicles.

As appropriate, existing and planned bicycle ways identified in adopted community bicycle facilities plans were incorporated into the year 2010 regional plan. The identification of community-level bicycle facilities designed to serve neighborhoods or neighborhood facilities, however, was considered to be outside of the scope of the regional planning effort, and, therefore, such facilities were not included as part of the regional bicycle way system plan.

Maps 1 through 8 show for the Region and each of the seven counties the adopted year 2010 regional bicycle way system plan for Southeastern Wisconsin. The plan was designed to provide connections between the Kenosha, Milwaukee, and Racine urbanized areas and between cities and villages with a population of 5,000 or more located outside the three urbanized areas, such cities and villages being termed "small urban areas"; and to provide bicycle access to major activity centers and transit stations located outside an urbanized or small urban area. Existing bicycle ways and bicycle ways proposed under adopted park and open space plans, which are primarily off-street bicycle ways located in natural resource and utility corridors, served as the basis for the design of this regional bicycle way system. Supplemental on-street bicycle ways are recommended where necessary to provide direct connections to urban areas or activity centers not served by off-street bicycle facilities.

In addition to this regionwide network of bicycle ways, a network of bicycle ways at appropriate spacing was identified for the Kenosha, Milwaukee, and Racine urbanized areas to provide convenient bicycle access to transit stations and to major activity centers identified in the adopted regional land use plan. The network of bicycle ways recommended within the three urbanized areas is more dense than the regionwide network in recognition of the greater potential for utilitarian bicycle travel in the urbanized areas due to the concentration of population and activity centers in such areas.

The adopted bicycle way system plan envisions the development of a total of approximately 1,527 miles of recommended bicycle ways within the Region. Table 1 provides a summary of the mileage and types of existing and proposed bicycle ways in each county in the Region, as well as information regarding the recommended jurisdictional responsibility for existing and proposed bicycle ways.

The proposed bicycle ways depict recommended locations for bicycle ways and, in the case of bicycle ways located along existing streets and highways, do not necessarily indicate streets and highways that are currently suitable for bicycle travel. Many of the streets and highways designated as planned bicycle ways will require improvements such as widened shoulders, widened outside travel lanes, or the provision of bicycle lanes or separate bicycle paths to make them more suitable for bicycle travel. These improvements would be considered for implementation at the time the street or highway is constructed, reconstructed or resurfaced.

## Map 1

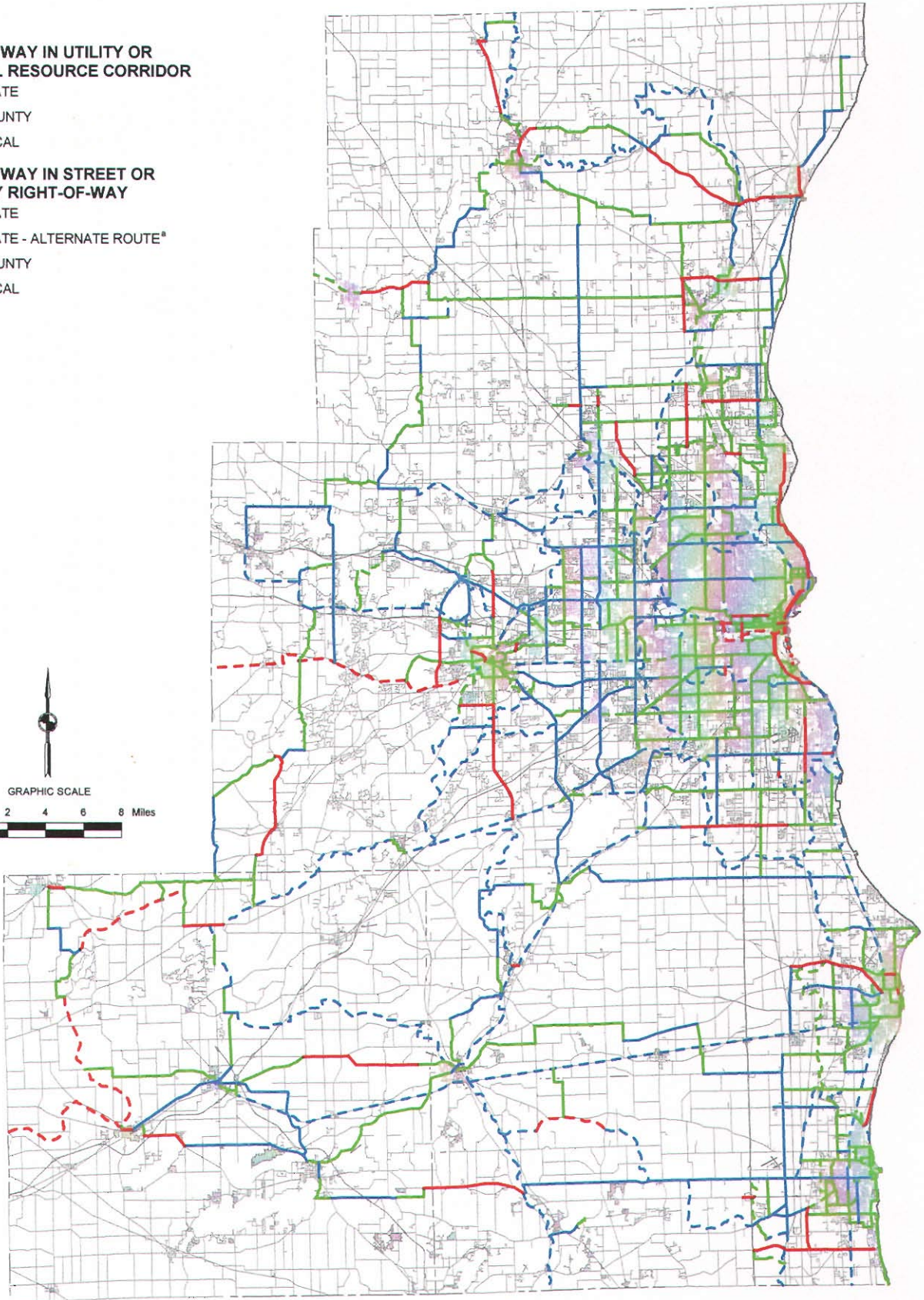
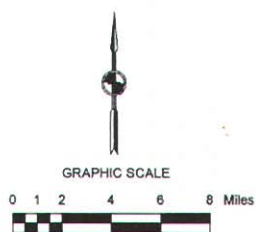
### RECOMMENDED BICYCLE WAY SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN: 2010

#### BICYCLE WAY IN UTILITY OR NATURAL RESOURCE CORRIDOR

- STATE
- COUNTY
- LOCAL

#### BICYCLE WAY IN STREET OR HIGHWAY RIGHT-OF-WAY

- STATE
- ... STATE - ALTERNATE ROUTE<sup>a</sup>
- COUNTY
- LOCAL

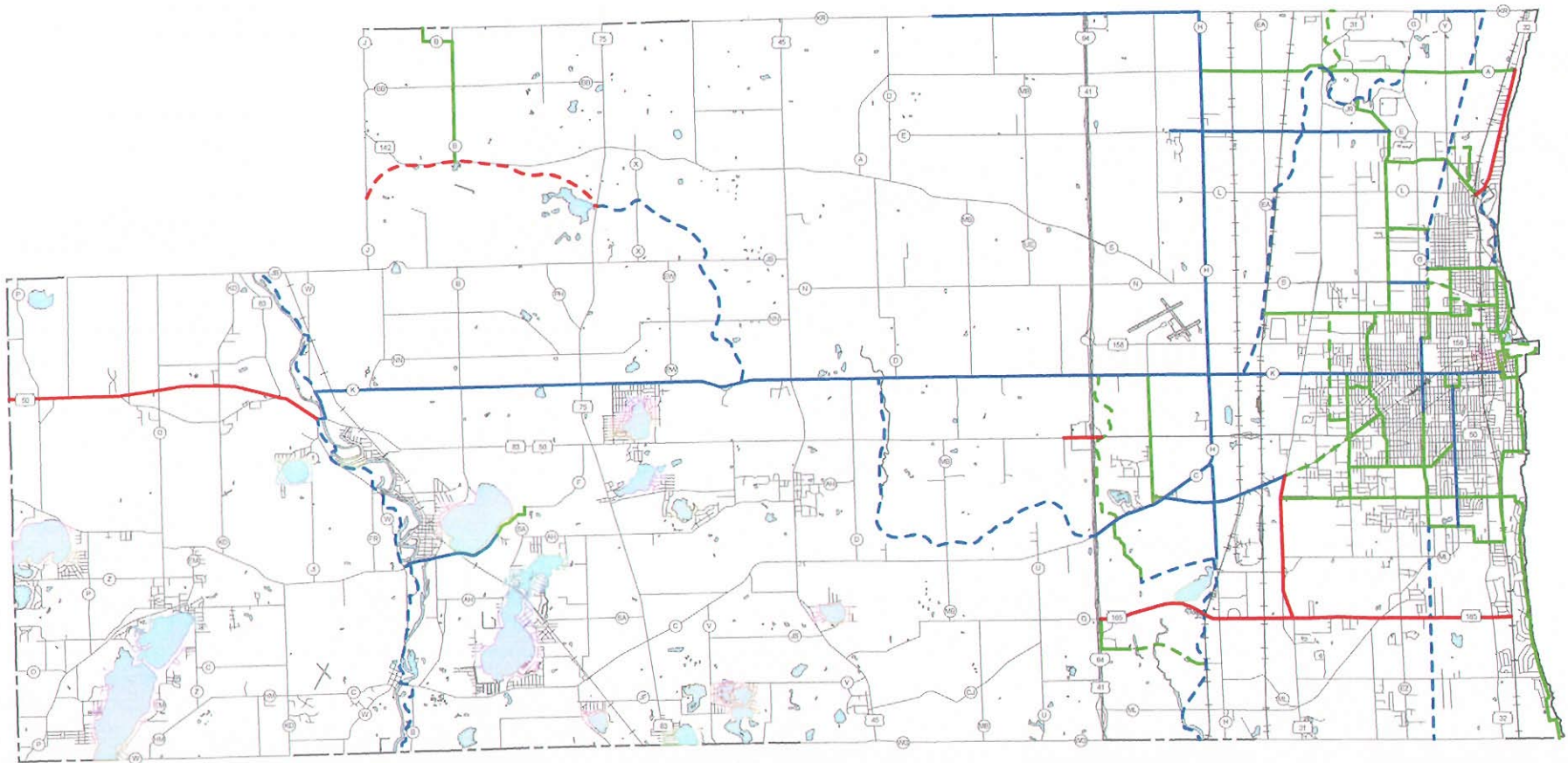


<sup>a</sup> Wisconsin Department of Transportation study to determine whether bicycle way to be provided over Hoan Bridge alternative or other on-street and off-street alternative routes.

Source: SEWRPC.



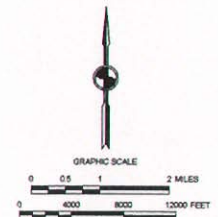
## RECOMMENDED BICYCLE-WAY SYSTEM PLAN FOR KENOSHA COUNTY: 2010

BICYCLE WAY IN UTILITY OR  
NATURAL RESOURCE CORRIDOR

- STATE
- COUNTY
- LOCAL

BICYCLE WAY IN STREET OR  
HIGHWAY RIGHT-OF-WAY

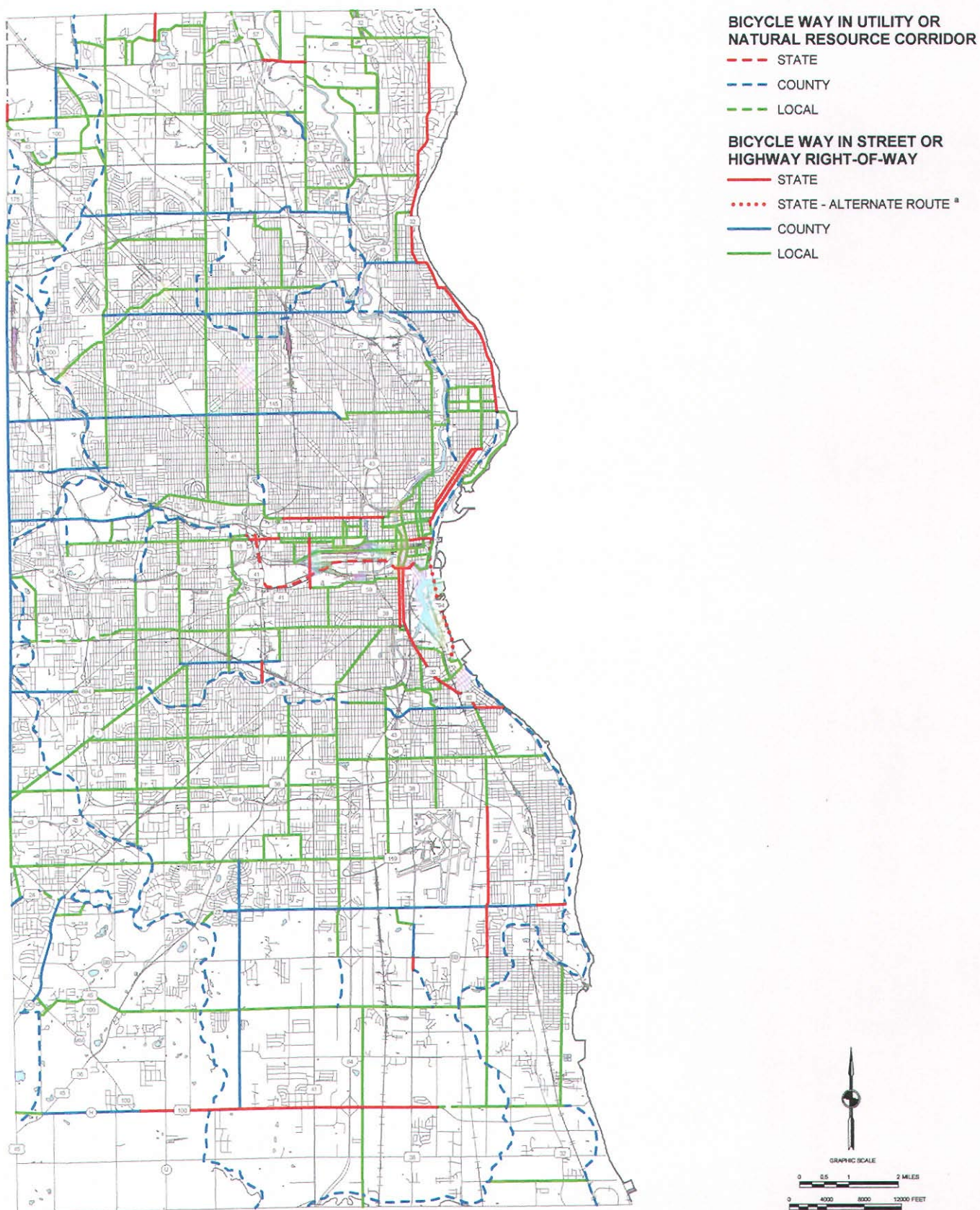
- STATE
- COUNTY
- LOCAL





### Map 3

## RECOMMENDED BICYCLE-WAY SYSTEM PLAN FOR MILWAUKEE COUNTY: 2010

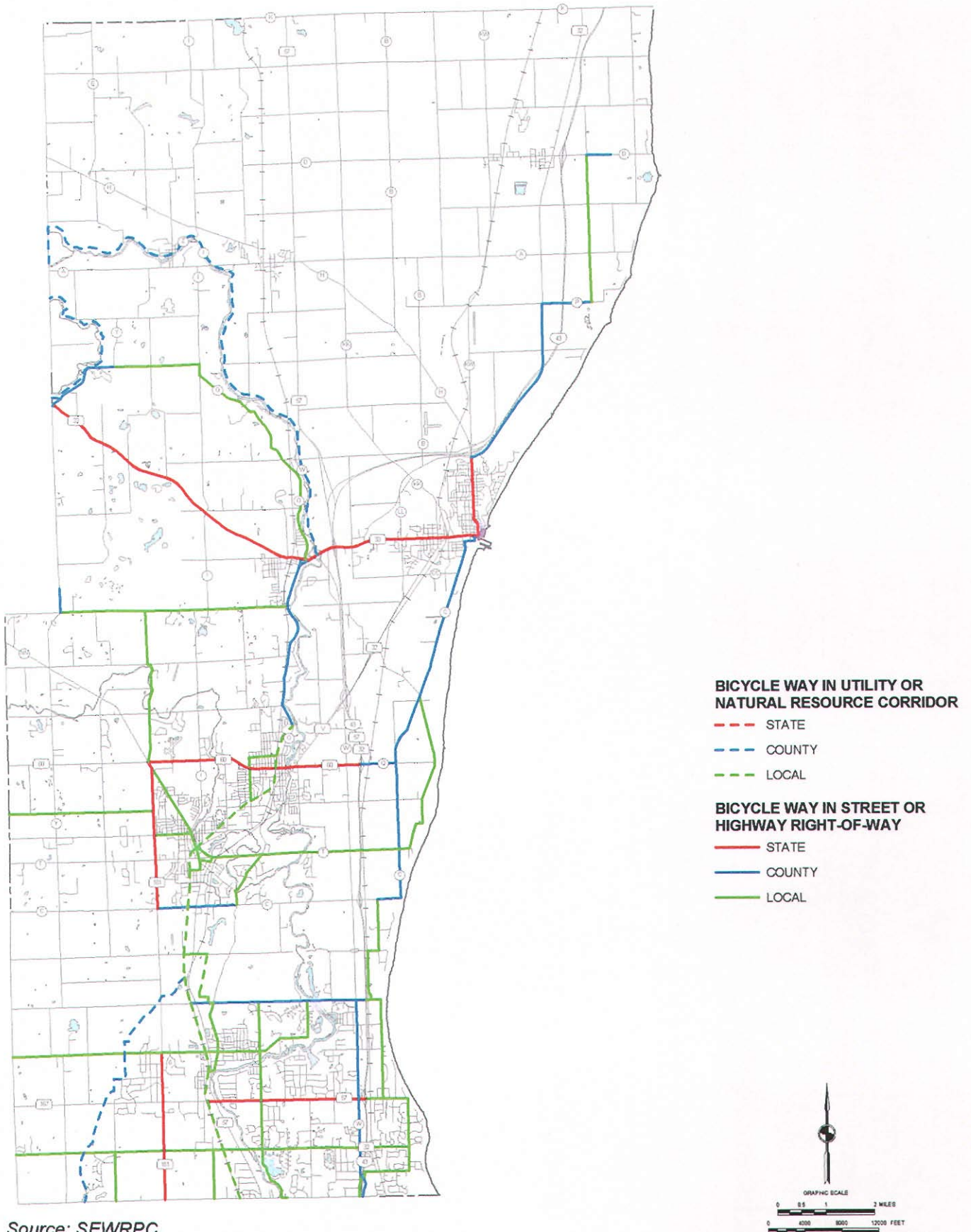


\* Wisconsin Department of Transportation study to determine whether bicycle way to be provided over Hoan Bridge alternative or other on-street and off-street alternative routes.

Source: SEWRPC.

## Map 4

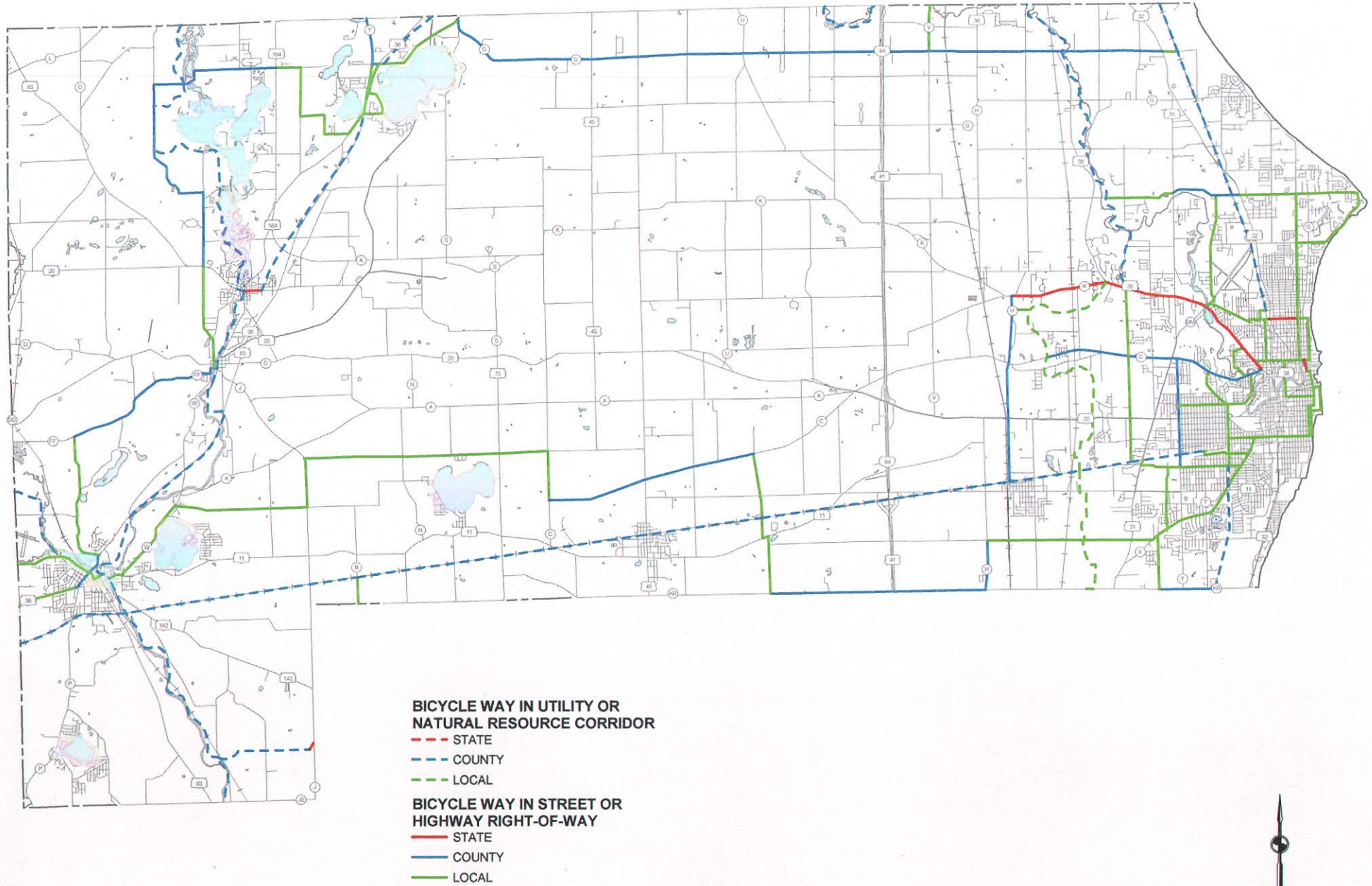
### RECOMMENDED BICYCLE WAY SYSTEM PLAN FOR OZAUKEE COUNTY: 2010



Source: SEWRPC.

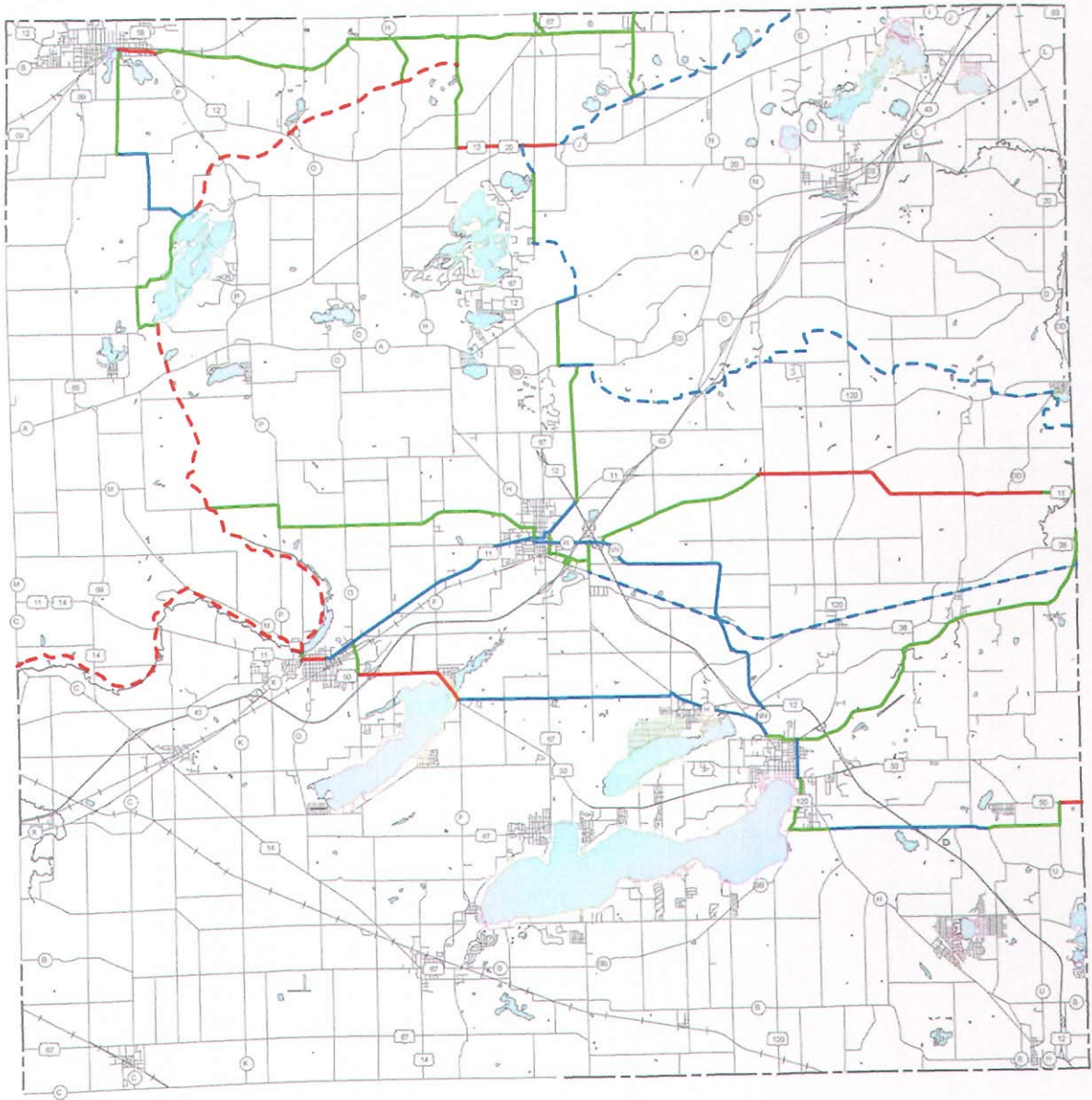


# RECOMMENDED BICYCLE-WAY SYSTEM PLAN FOR RACINE COUNTY: 2010



## Map 6

### RECOMMENDED BICYCLE-WAY SYSTEM PLAN FOR WALWORTH COUNTY: 2010



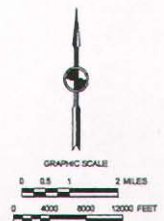
#### BICYCLE WAY IN UTILITY OR NATURAL RESOURCE CORRIDOR

- STATE
- COUNTY
- LOCAL

#### BICYCLE WAY IN STREET OR HIGHWAY RIGHT-OF-WAY

- STATE
- COUNTY
- LOCAL

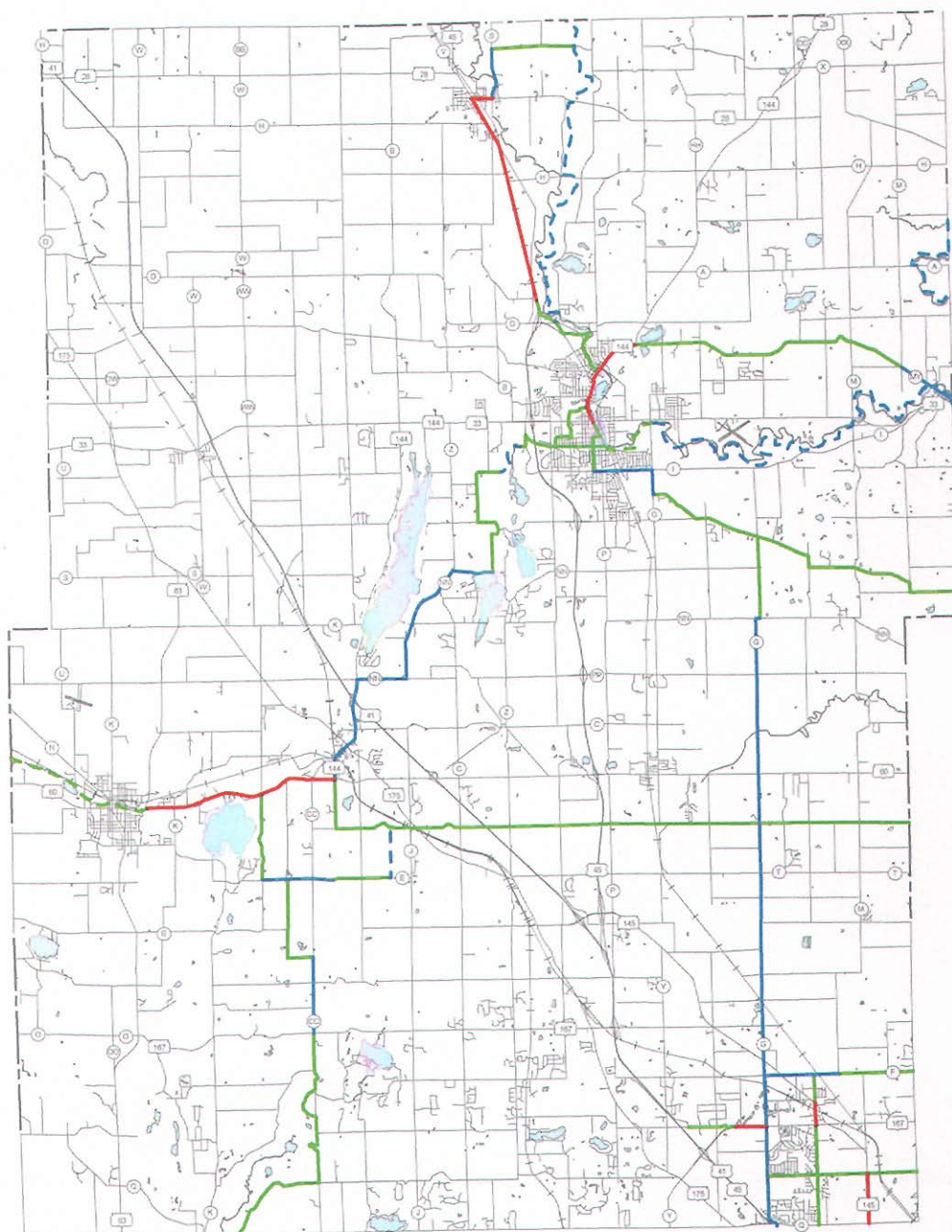
Source: SEWRPC.





# Map 7

## RECOMMENDED BICYCLE-WAY SYSTEM PLAN FOR WASHINGTON COUNTY: 2010



### BICYCLE WAY IN UTILITY OR NATURAL RESOURCE CORRIDOR

--- STATE

--- COUNTY

--- LOCAL

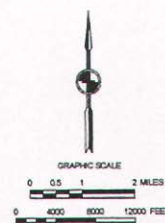
### BICYCLE WAY IN STREET OR HIGHWAY RIGHT-OF-WAY

— STATE

— COUNTY

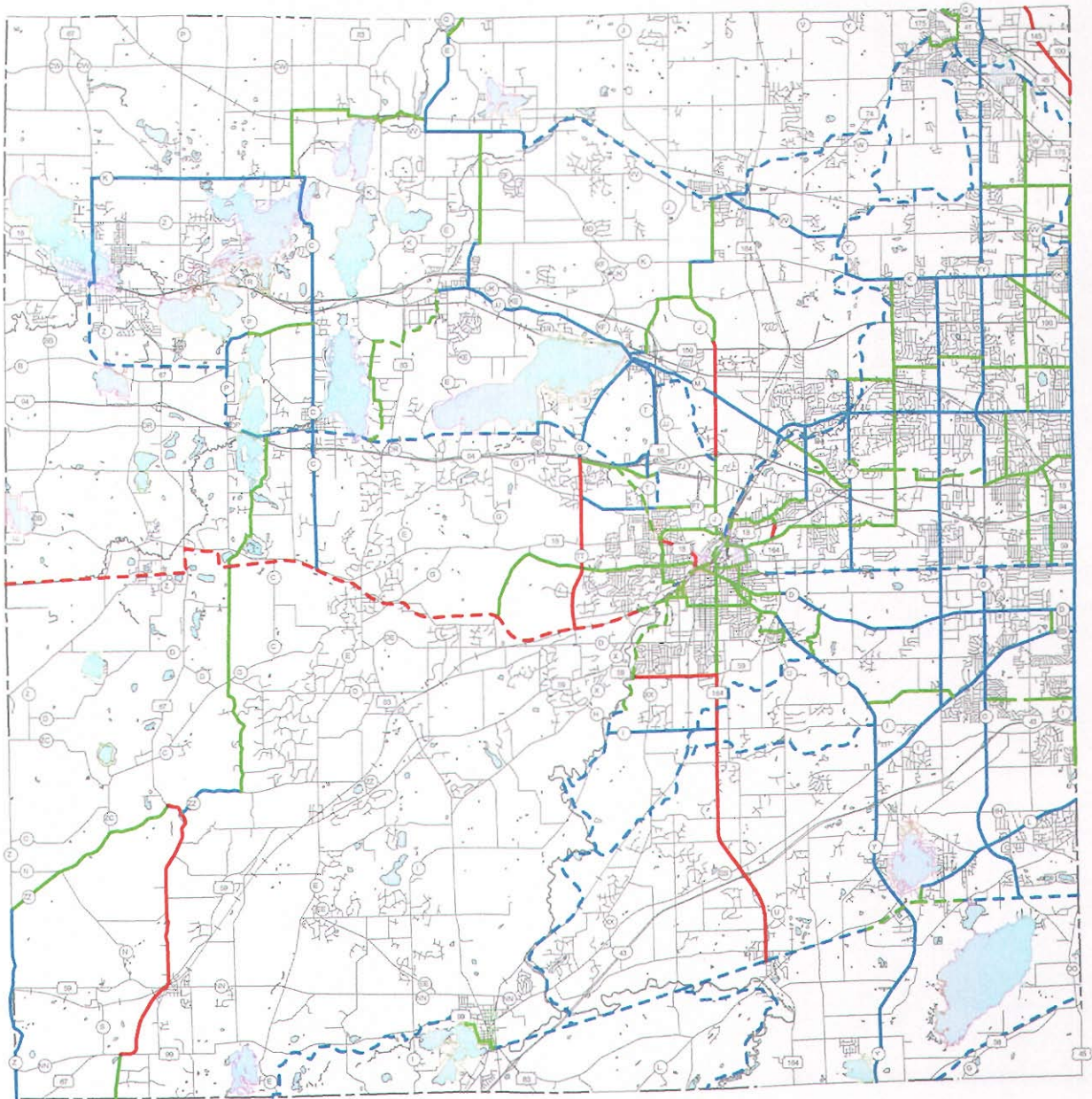
— LOCAL

Source: SEWRPC.



## Map 8

### RECOMMENDED BICYCLE-WAY SYSTEM PLAN FOR WAUKESHA COUNTY: 2010



#### BICYCLE WAY IN UTILITY OR NATURAL RESOURCE CORRIDOR

- STATE
- COUNTY
- LOCAL

#### BICYCLE WAY IN STREET OR HIGHWAY RIGHT-OF-WAY

- STATE
- COUNTY
- LOCAL

Source: SEWRPC.



Table 1

**MILES<sup>a</sup> OF 1993 EXISTING AND YEAR 2010 RECOMMENDED BICYCLE WAYS  
TO BE PROVIDED UNDER THE REGIONAL BICYCLE WAY SYSTEM PLAN**

Recommended Year 2010 Bicycle-Way Classification and Jurisdiction	Kenosha County			Milwaukee County			Ozaukee County			Racine County		
	Existing	Proposed	Total	Existing	Proposed	Total	Existing	Proposed	Total	Existing	Proposed	Total
<b>Arterial Streets and Highways</b>												
State Trunk Highway	0	17	17	10	26	36	0	25	25	0	8	8
County Trunk Highway	0	42	42	0	57	57	0	26	26	31	18	49
Local Trunk Highway	3	14	17	23	117	140	0	29	29	6	21	27
Subtotal	3	73	76	33	200	233	0	80	80	37	47	84
<b>Nonarterial Streets and Highways</b>												
State Jurisdiction	0	0	0	0	0	0	0	0	0	0	0	0
County Jurisdiction	0	0	0	1	0	1	0	0	0	0	0	0
Local Jurisdiction	5	24	29	7	58	65	0	30	30	24	18	42
Subtotal	5	24	29	8	58	66	0	30	30	24	18	42
<b>Off-Street</b>												
State Jurisdiction	0	6	6	0	5	5	0	0	0	0	2	2
County Jurisdiction	7	41	48	56	37	93	0	22	22	17	52	69
Local Jurisdiction	3	8	11	0	1	1	6	0	6	0	9	9
Subtotal	10	55	65	56	43	99	6	22	28	17	63	80
<b>Total</b>	<b>18</b>	<b>152</b>	<b>170</b>	<b>97</b>	<b>301</b>	<b>398</b>	<b>6</b>	<b>132</b>	<b>138</b>	<b>78</b>	<b>128</b>	<b>206</b>

Recommended Year 2010 Bicycle-Way Classification and Jurisdiction	Walworth County			Washington County			Waukesha County			Region		
	Existing	Proposed	Total	Existing	Proposed	Total	Existing	Proposed	Total	Existing	Proposed	Total
<b>Arterial Streets and Highways</b>												
State Trunk Highway	0	11	11	2	11	13	0	25	25	12	123	135
County Trunk Highway	0	30	30	0	23	23	12	98	110	43	294	337
Local Trunk Highway	0	2	2	0	7	7	2	37	39	34	227	261
Subtotal	0	43	43	2	41	43	14	160	174	89	644	733
<b>Nonarterial Streets and Highways</b>												
State Jurisdiction	0	0	0	0	0	0	0	0	0	0	0	0
County Jurisdiction	0	0	0	0	0	0	0	0	0	1	0	1
Local Jurisdiction	0	44	44	0	48	48	2	52	54	38	274	312
Subtotal	0	44	44	0	48	48	2	52	54	39	274	313
<b>Off-Street</b>												
State Jurisdiction	0	29	29	0	3	3	17	0	17	17	45	62
County Jurisdiction	0	37	37	0	11	11	18	80	98	98	280	378
Local Jurisdiction	0	0	0	1	3	4	5	5	10	15	26	41
Subtotal	0	66	66	1	17	18	40	85	125	130	351	481
<b>Total</b>	<b>0</b>	<b>153</b>	<b>153</b>	<b>3</b>	<b>106</b>	<b>109</b>	<b>56</b>	<b>297</b>	<b>353</b>	<b>258</b>	<b>1,269</b>	<b>1,527</b>

<sup>a</sup> The length of bicycle ways is given in route-miles. The number of bicycle-lane-miles will normally be approximately twice the number of bicycle-route-miles, as bicycle lanes and bicycle routes would be located along both sides of a street, and bicycle paths would generally accommodate two-way bicycle travel.

Source: SEWRPC.

***Bicycle Accommodation on Arterial Streets  
And Highways Not Designated as Bicycle Ways***

Bicyclists are permitted to operate on all streets and highways in the Region except expressways and freeways that have been posted with signs prohibiting bicycle use. The existing street system provides the most extensive network of direct travel routes, and serves virtually all destinations. Land access and collector streets, because of low traffic volumes and speeds, are capable of accommodating bicycle travel with no improvements. Arterial streets and highways, particularly those with high-speed traffic or heavy volumes of truck or transit-vehicle traffic, may require improvements such as extra-wide outside travel lanes, paved shoulders, or a separate bicycle path in order to safely accommodate bicycle travel.

Accordingly, the plan recommends that consideration be given to providing extra-wide outside travel lanes, paved shoulders, or separate bicycle paths along all arterial streets and highways which are not designated in the plan as bicycle ways but which are located in one of the three urbanized areas of the Region, or in one of the 11 incorporated areas of 5,000 or more residents located outside the three urbanized areas. Improvements to

accommodate bicycle travel, if feasible, would be made at the time a street or highway is constructed, reconstructed, or resurfaced. In all, approximately 1,160 miles of arterial streets and highways in the urbanized areas and the small urban areas are not designated as bicycle ways by the plan.

### **Pedestrian Facilities Plan Element**

The pedestrian facilities element of the adopted bicycle and pedestrian facilities system plan for Southeastern Wisconsin is a policy, rather than a system, plan. It recommends that the various units and agencies of government responsible for the construction and maintenance of pedestrian facilities in Southeastern Wisconsin adopt and follow certain recommended policies and guidelines with regard to the development of those facilities. These policies and guidelines are designed to facilitate safe and efficient pedestrian travel within the Region.

The policies and guidelines set forth in the plan include recommendations that sidewalks be provided along streets and highways in areas of existing or planned urban development based upon the criteria set forth in Table 2; that sidewalks be designed and constructed using widths and clearances appropriate for the levels of pedestrian and vehicular traffic in any given area; that landscaped terraces, curb lawns, or other buffer areas be provided between sidewalks and the roadways paralleling them to enhance the pedestrian environment; and that efforts be made to maximize pedestrian safety at street crossings, including the timing of the "walk" phases of traffic signals to provide for safe pedestrian crossings and the provision of pedestrian "islands" and medians in wide, heavily traveled, or otherwise hazardous roadways. The plan also emphasizes that all pedestrian facilities must be designed and constructed in accordance with the requirements of the Federal Americans with Disabilities Act and its implementing regulations.

### **Design And Construction Of Bicycle And Pedestrian Facilities**

For those bicycle and pedestrian facilities recommended in the plan to be provided within the right-of-way of a street or highway, the unit of government responsible for constructing and maintaining the street or highway should also have responsibility for constructing and maintaining the associated bicycle or pedestrian facility, or for entering into construction, operations, and/or maintenance agreements with local units or agencies of government. Accordingly, the Wisconsin Department of Transportation should assume responsibility for bicycle and pedestrian facilities within the right-of-way of State trunk highways and connecting streets; the respective county highway, transportation, or public works departments should assume responsibility for bicycle and pedestrian facilities located within the right-of-way of county trunk highways; and the various cities, villages, and towns should assume responsibility for bicycle and pedestrian facilities located within the right-of-way of streets and highways under their jurisdiction. Bicycle and pedestrian facilities should be provided at the time a street or highway is constructed, reconstructed, or resurfaced.

A more detailed evaluation of the proposed location of bicycle ways shown on Maps 1 through 8 was recommended to be conducted by the implementing agency before bicycle ways are designed and constructed. Factors to be considered during the detailed evaluation include the availability of right-of-way for street and highway widenings associated with a given bicycle facility; the number and type of structures and vegetation that may need to be removed or relocated to provide the bicycle facility; the effects of the bicycle way on environmentally sensitive areas, including wetlands; the cost of providing the bicycle facility on a specific street or highway in relation to providing the bicycle-related improvement on a parallel street or off-street corridor; and the quality of the alternative locations and the likelihood that bicyclists would use those alternatives. The location and design treatment of the proposed bicycle facility should also be coordinated with the location and design treatment of nearby bicycle facilities. The decision regarding the appropriate design treatment—bicycle lane, bicycle route, or separate bicycle path within the street right-of-way—to be used when providing a recommended bicycle way was to be determined during the preliminary engineering phase for street and highway projects.

If the detailed evaluation process indicated that the recommended bicycle way location is not feasible due to site constraints, excessive costs, the traffic and operating characteristics of the roadway, or other factors, the implementing agency was to identify an alternative location and evaluate the feasibility of providing a bicycle way on the alternative route. The evaluation of the recommended bicycle way location, and, if necessary, the identification and evaluation of alternative locations, was to be conducted during the preliminary engineering

Table 2

**RECOMMENDATIONS FOR PROVISION OF SIDEWALKS IN AREAS OF  
EXISTING OR PLANNED URBAN DEVELOPMENT**

Roadway Functional Classification	Land Use	New Streets <sup>a</sup>	Existing Streets <sup>a</sup>
Arterial Streets <sup>b</sup>	Industrial Commercial Residential	Both Sides Both Sides Both Sides	Both Sides Both Sides Both Sides
Collector Streets	Industrial Commercial Residential	Both Sides Both Sides Both Sides	Both Sides Both Sides At least one side
Land Access Streets <sup>c</sup>	Industrial Commercial Residential (medium-and high-density) Residential (low-density)	Both Sides Both Sides Both Sides At least one side	Both Sides Both Sides At least one side At least one side

<sup>a</sup> Sidewalks may be omitted on one side of streets where there are no existing or anticipated uses that would generate pedestrian trips on that side.

<sup>b</sup> Where there are marginal access control or service roads, the sidewalk along the main road may be eliminated and replaced by a sidewalk along the service road on the side away from the main road.

<sup>c</sup> Sidewalks need not be provided along court and cul-de-sac streets less than 600 feet in length, unless such streets serve multi-family development; or along streets served by parallel off-street walkways.

Source: SEWRPC.

phase of project design. On those streets and highways recommended as locations for bicycle ways, and as well on all arterial streets and highways within the Region's urbanized and small urban areas, preliminary engineering for rehabilitation, reconstruction, and new construction should consider the provision of the recommended bicycle way or bicycle accommodation with the bicycle way as part of the project design, or a commitment to provide an alternative bicycle way on a parallel street or off-street corridor.

### **Community Bicycle and Pedestrian Plans**

The plan further recommends that local units of government prepare community bicycle and pedestrian plans to supplement the regional plan. The local plans should provide for facilities to accommodate bicycle and pedestrian travel within neighborhoods, providing for convenient travel between residential areas and shopping centers, schools, parks, and transit stops within or adjacent to the neighborhood. The standards, guidelines, and system plans set forth in the regional plan should be used as the basis for the preparation of community and neighborhood plans. Federal Highway Administration Surface Transportation Program-Discretionary funds administered by the Wisconsin Department of Transportation are available for preparation of local bicycle plans. It was also recommended that local units of government consider the preparation and implementation of land use plans that encourage more compact and dense development patterns, in order to facilitate pedestrian and bicycle travel.



### **PROGRESS TOWARDS IMPLEMENTATION AND AMENDMENT OF YEAR 2010 PLAN**

Map 9 presents for the Region, and Maps 10 through 16 present for the seven counties, the progress made in implementation since the plan was adopted in 1995. Since 1995, seven miles of on-street facilities have been completed and are open to bicycle traffic, and 29 miles of off-street facilities have been completed and are open to bicycle traffic. Another nine miles of on-street facilities, and 41 miles of off-street facilities, have been programmed for implementation, or are under construction.



Map 9

**PROGRESS TOWARDS IMPLEMENTATION AND AMENDMENT  
OF THE YEAR 2010 REGIONAL BICYCLE AND PEDESTRIAN PLAN**

**BICYCLE-WAY IN UTILITY OR  
NATURAL RESOURCE CORRIDOR**

- - PLANNED
- - EXISTING
- - ADDITIONS TO 2010 PLAN
- - DELETIONS FROM 2010 PLAN
-  BUILT SINCE 2010 PLAN ADOPTION
-  PROGRAMMED OR UNDER CONSTRUCTION

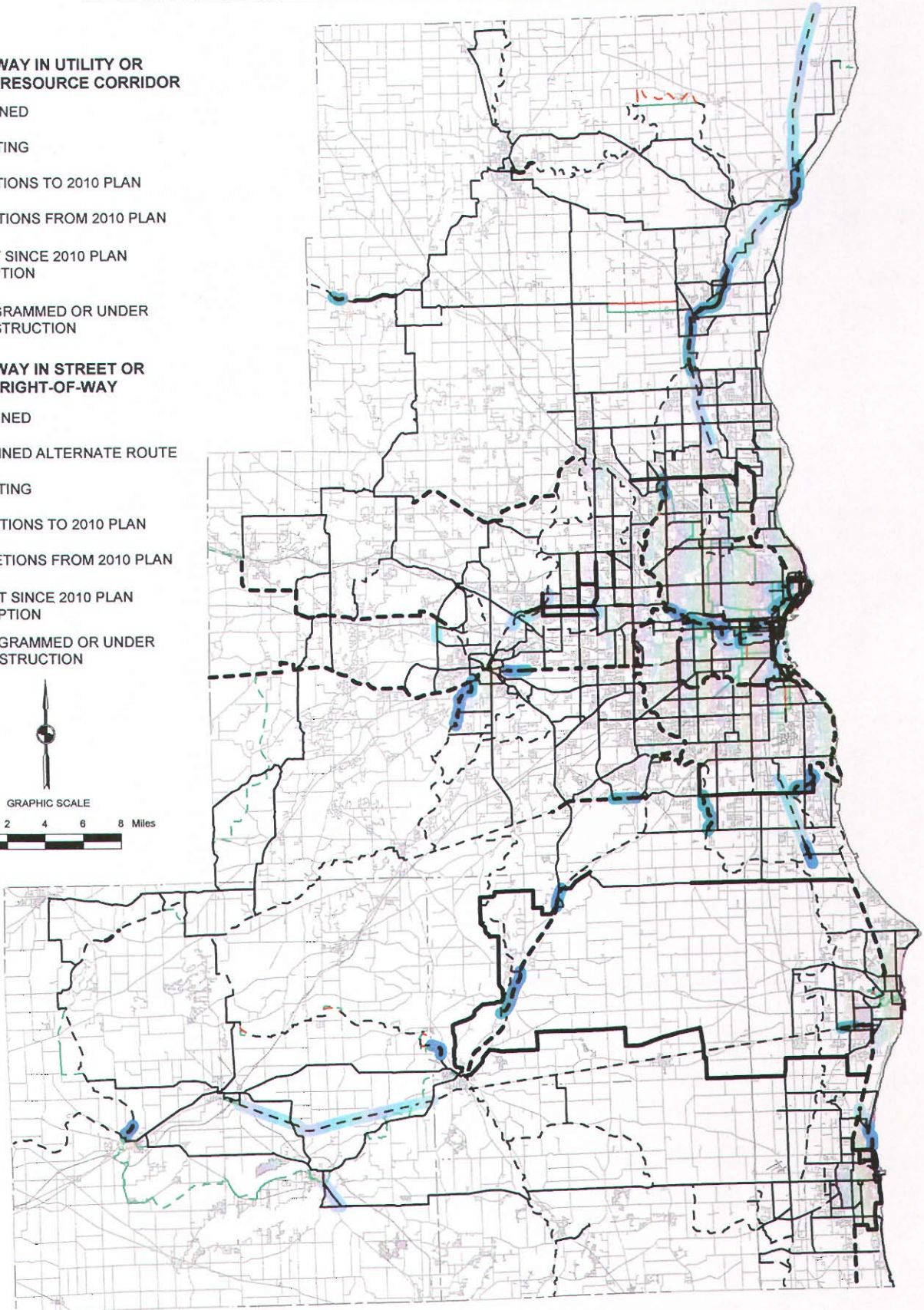
**BICYCLE-WAY IN STREET OR  
HIGHWAY RIGHT-OF-WAY**

- PLANNED
- ..... PLANNED ALTERNATE ROUTE
- EXISTING
- - ADDITIONS TO 2010 PLAN
- - DELETIONS FROM 2010 PLAN
-  BUILT SINCE 2010 PLAN ADOPTION
-  PROGRAMMED OR UNDER CONSTRUCTION



GRAPHIC SCALE

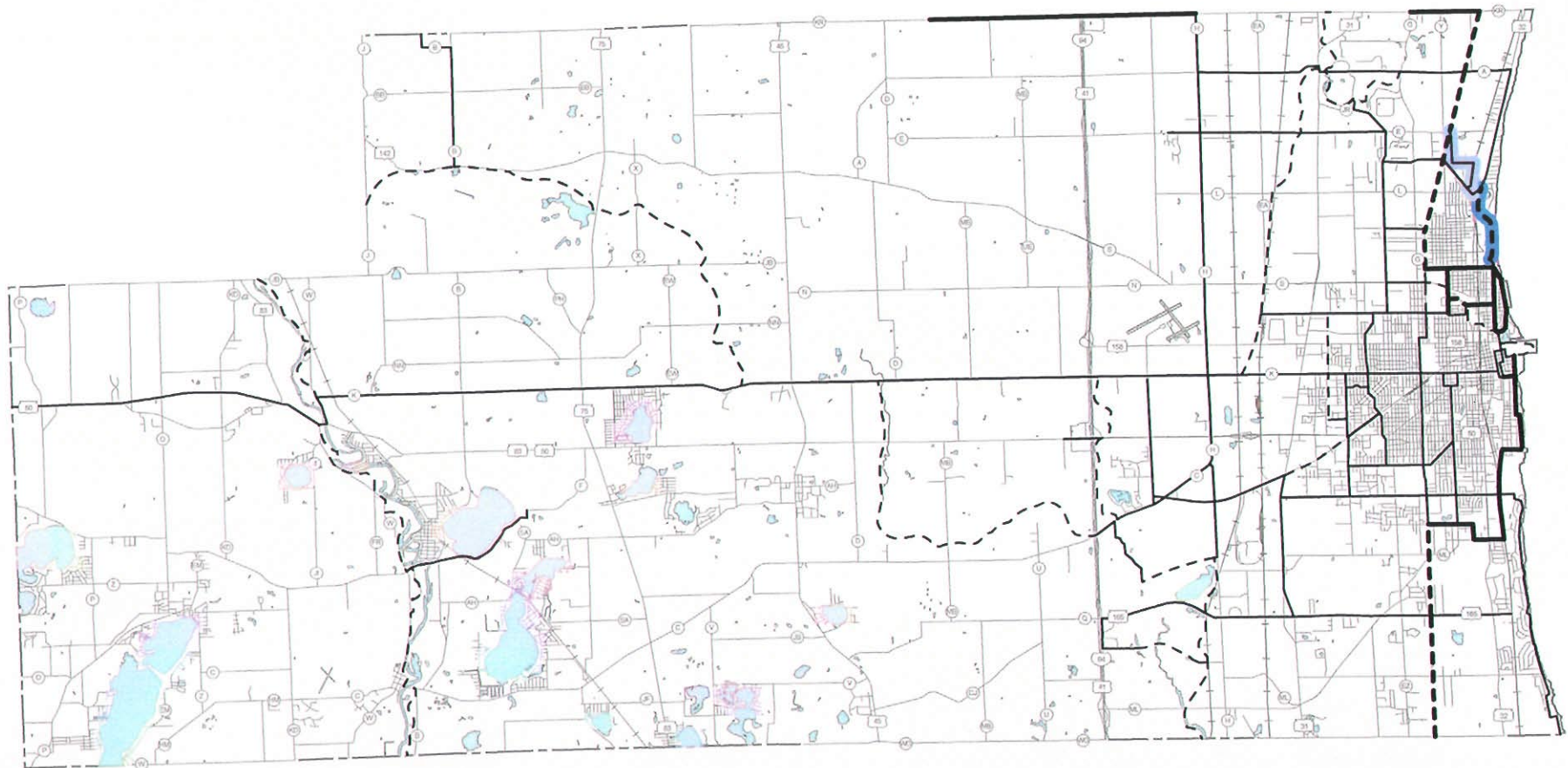
0 1 2 4 6 8 Miles



Source: SEWRPC.



# PROGRESS TOWARDS IMPLEMENTATION AND AMENDMENT OF THE BICYCLE AND PEDESTRIAN PLAN: KENOSHA COUNTY

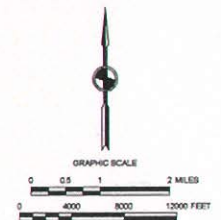


## BICYCLE-WAY IN UTILITY OR NATURAL RESOURCE CORRIDOR

- PLANNED
- EXISTING
- ADDITIONS TO 2010 PLAN
- DELETIONS FROM 2010 PLAN
- BUILT SINCE 2010 PLAN ADOPTION
- PROGRAMMED OR UNDER CONSTRUCTION

## BICYCLE-WAY IN STREET OR HIGHWAY RIGHT-OF-WAY

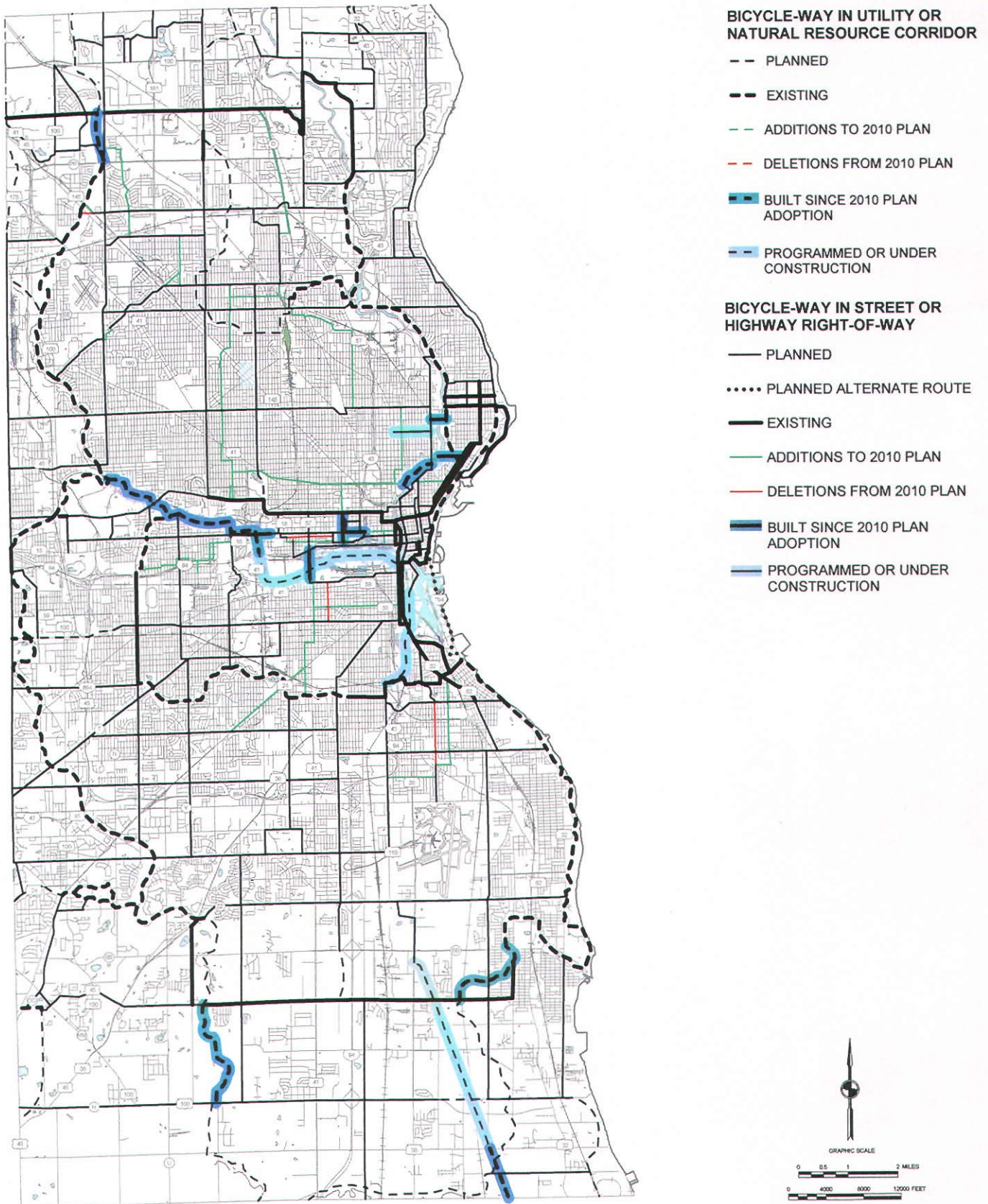
- PLANNED
- EXISTING
- ADDITIONS TO 2010 PLAN
- DELETIONS FROM 2010 PLAN
- BUILT SINCE 2010 PLAN ADOPTION
- PROGRAMMED OR UNDER CONSTRUCTION





# Map 11

## PROGRESS TOWARDS IMPLEMENTATION AND AMENDMENT OF THE BICYCLE AND PEDESTRIAN PLAN: MILWAUKEE COUNTY

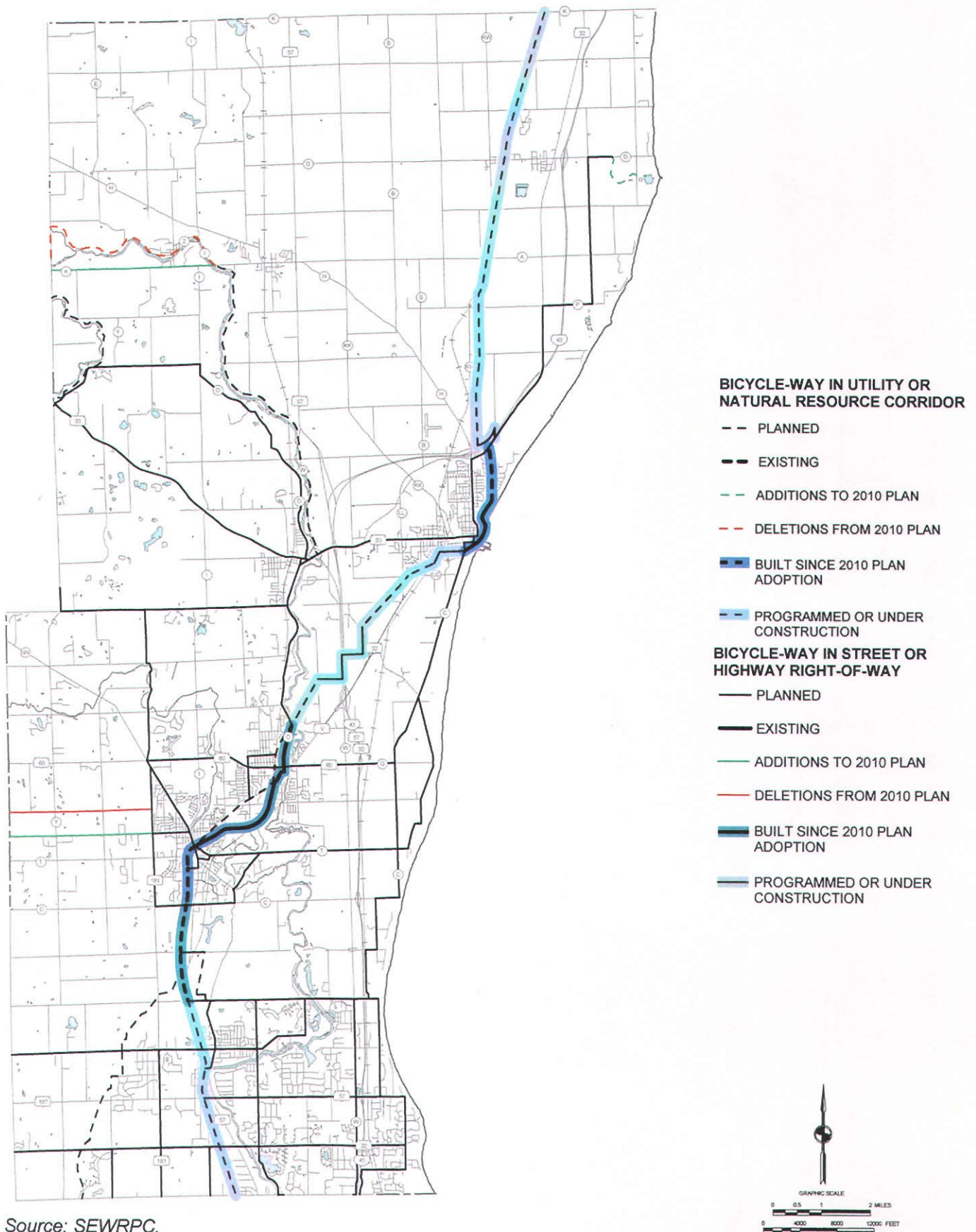


Source: SEWRPC.



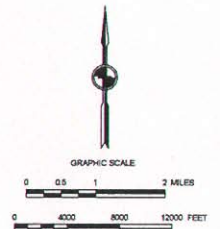
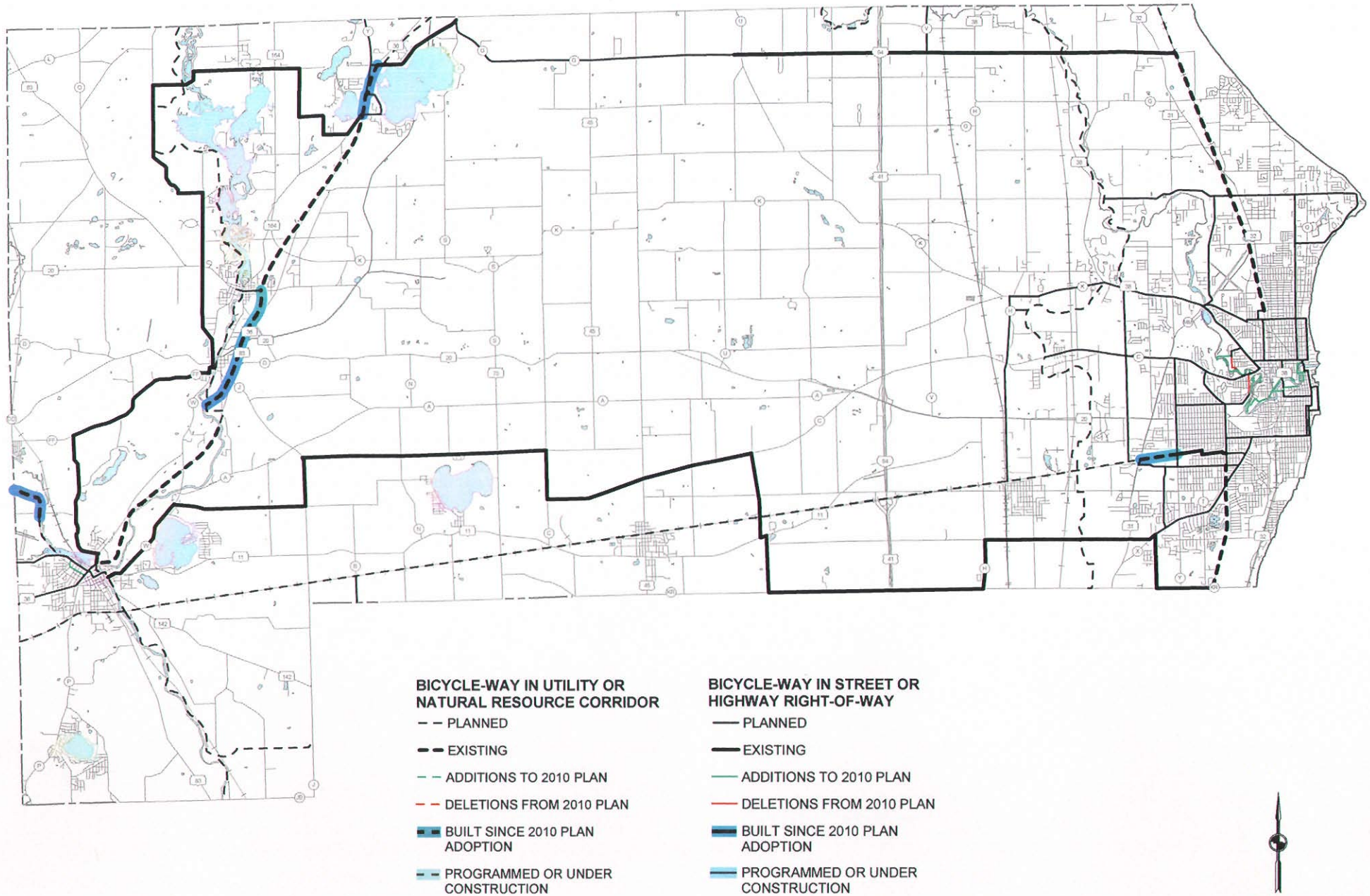
# Map 12

## PROGRESS TOWARDS IMPLEMENTATION AND AMENDMENT OF THE BICYCLE AND PEDESTRIAN PLAN: OZAUKEE COUNTY



Source: SEWRPC.

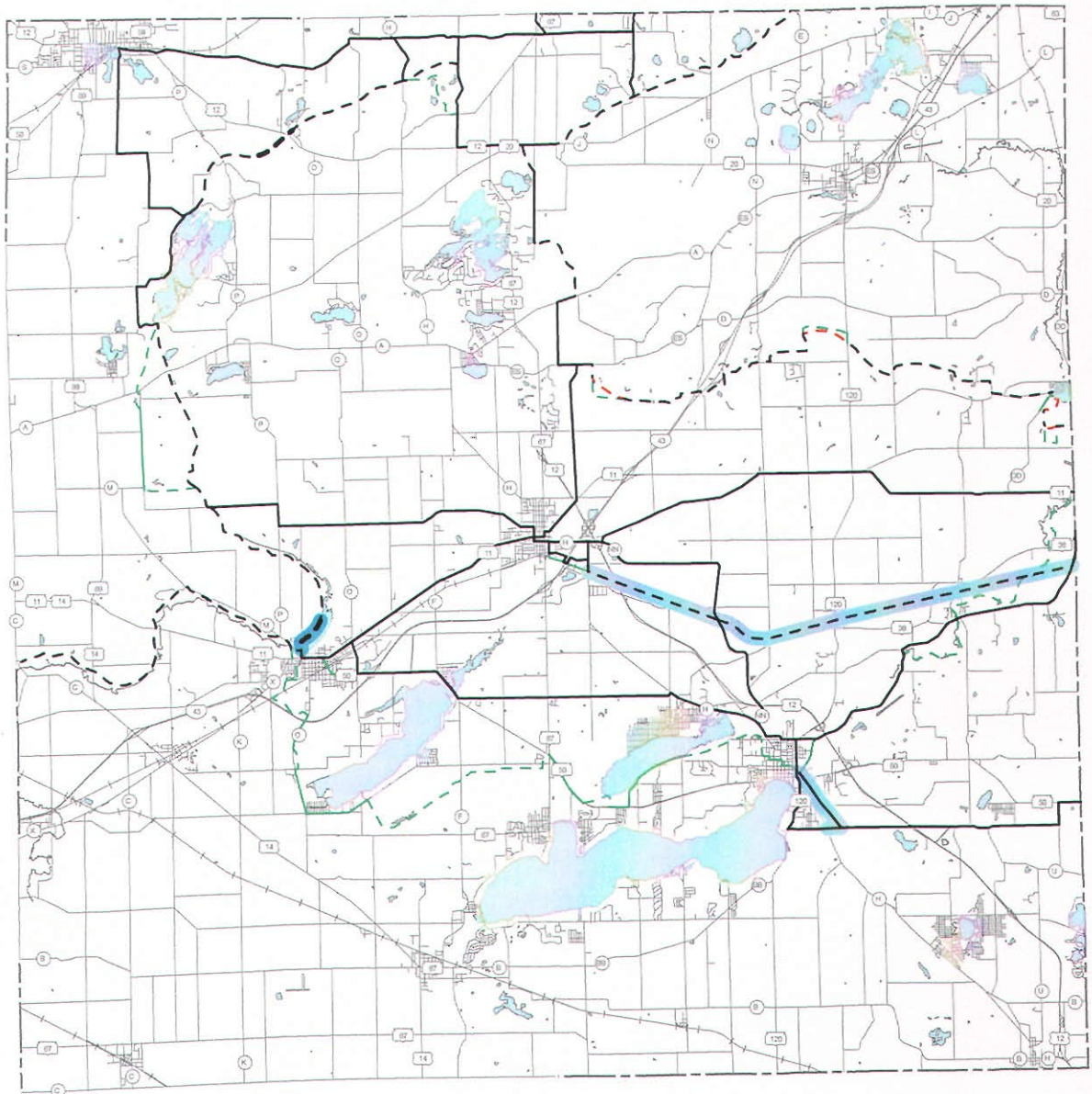
# PROGRESS TOWARDS IMPLEMENTATION AND AMENDMENT OF THE BICYCLE AND PEDESTRIAN PLAN: RACINE COUNTY





## Map 14

### PROGRESS TOWARDS IMPLEMENTATION AND AMENDMENT OF THE BICYCLE AND PEDESTRIAN PLAN: WALWORTH COUNTY



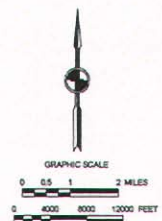
#### BICYCLE-WAY IN UTILITY OR NATURAL RESOURCE CORRIDOR

- PLANNED
- EXISTING
- ADDITIONS TO 2010 PLAN
- DELETIONS FROM 2010 PLAN
- BUILT SINCE 2010 PLAN ADOPTION
- - PROGRAMMED OR UNDER CONSTRUCTION

#### BICYCLE-WAY IN STREET OR HIGHWAY RIGHT-OF-WAY

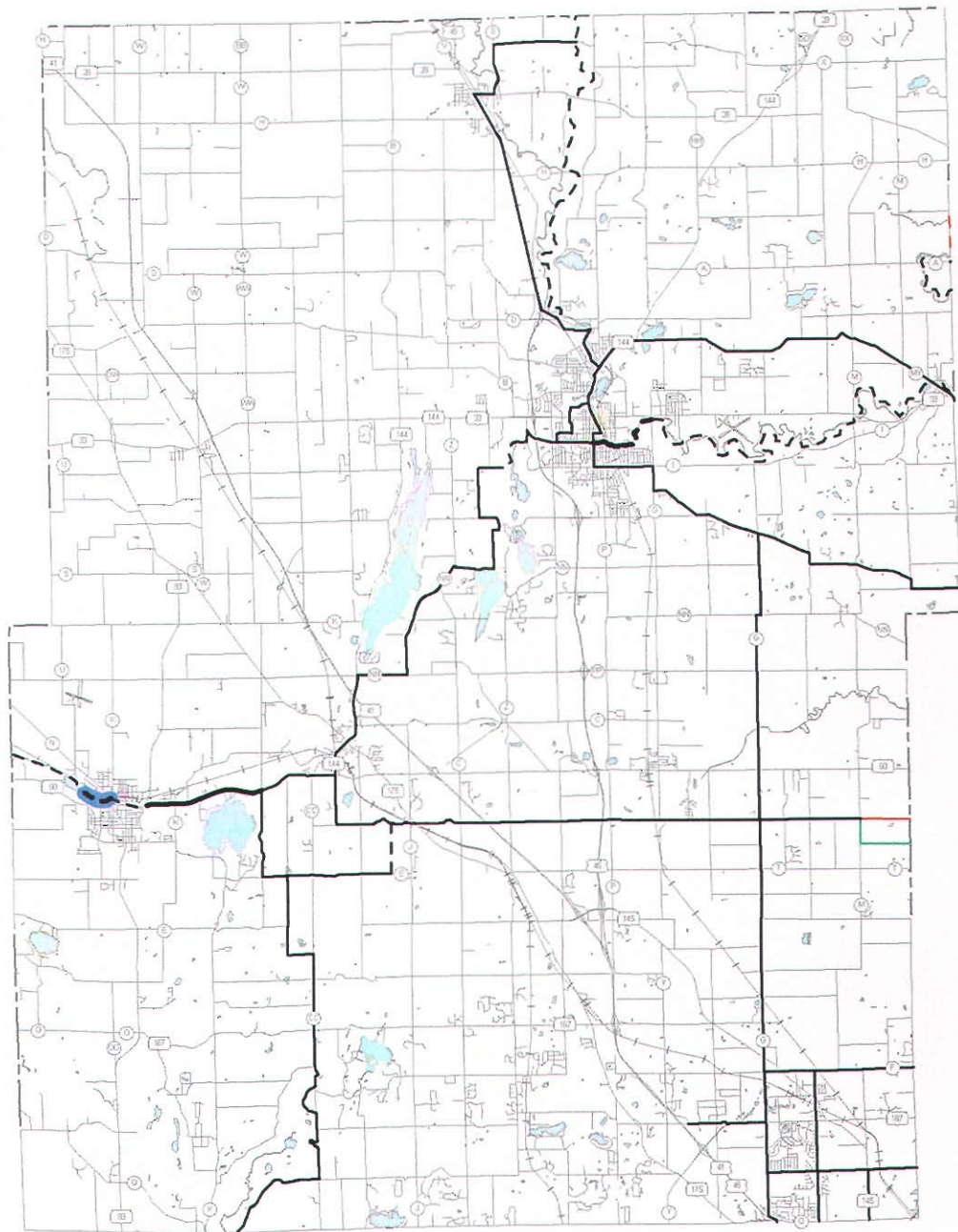
- PLANNED
- EXISTING
- ADDITIONS TO 2010 PLAN
- DELETIONS FROM 2010 PLAN
- BUILT SINCE 2010 PLAN ADOPTION
- - PROGRAMMED OR UNDER CONSTRUCTION

Source: SEWRPC.



Map 15

**PROGRESS TOWARDS IMPLEMENTATION AND AMENDMENT  
OF THE BICYCLE AND PEDESTRIAN PLAN: WASHINGTON COUNTY**



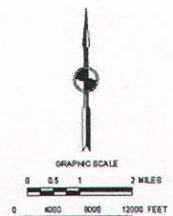
**BICYCLE-WAY IN UTILITY OR  
NATURAL RESOURCE CORRIDOR**

- PLANNED
- - - EXISTING
- - - ADDITIONS TO 2010 PLAN
- - - DELETIONS FROM 2010 PLAN
- BUILT SINCE 2010 PLAN ADOPTION
- PROGRAMMED OR UNDER CONSTRUCTION

**BICYCLE-WAY IN STREET OR  
HIGHWAY RIGHT-OF-WAY**

- PLANNED
- EXISTING
- ADDITIONS TO 2010 PLAN
- DELETIONS FROM 2010 PLAN
- BUILT SINCE 2010 PLAN ADOPTION
- PROGRAMMED OR UNDER CONSTRUCTION

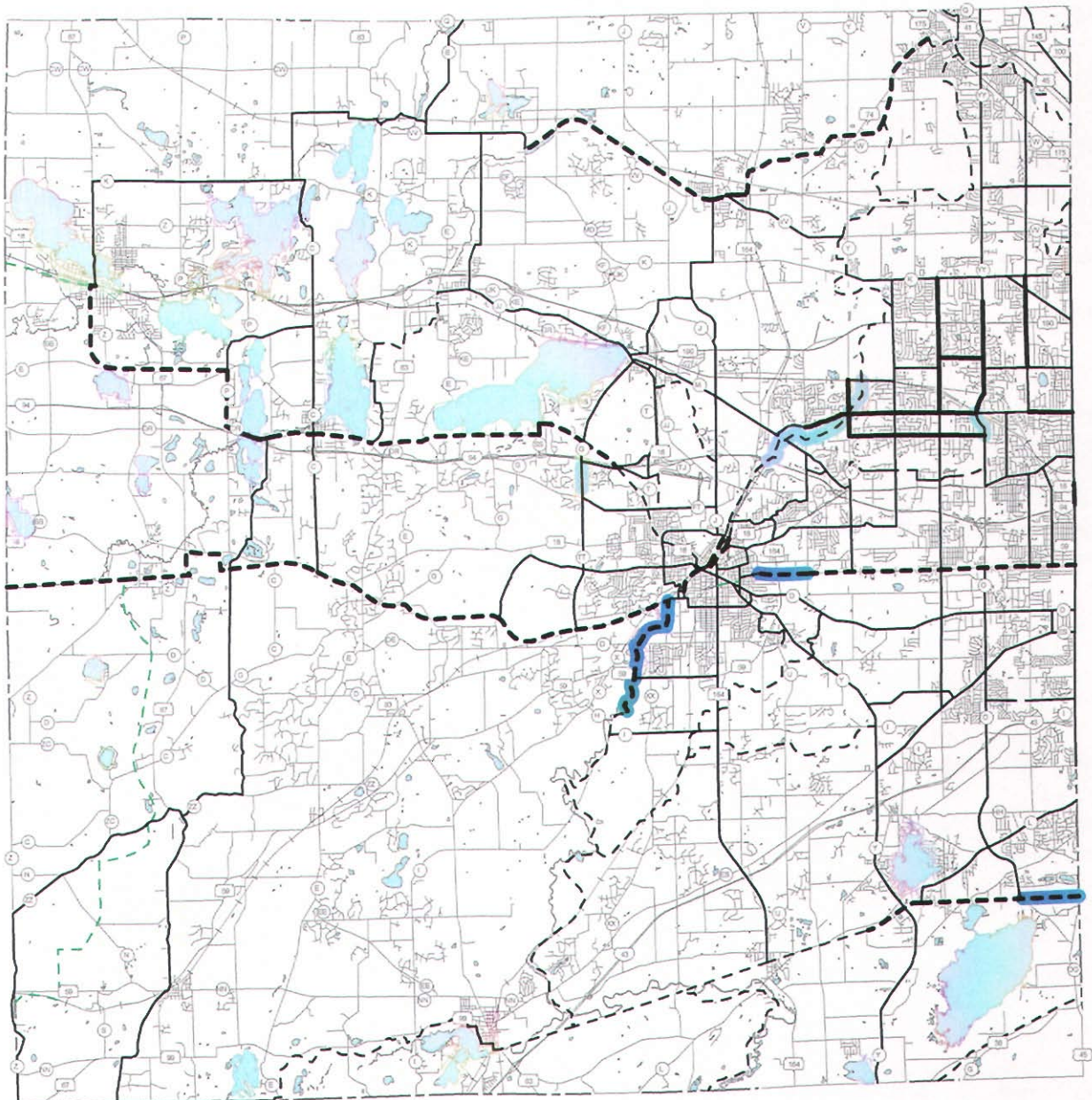
Source: SEWRPC.





# Map 16

## PROGRESS TOWARDS IMPLEMENTATION AND AMENDMENT OF THE BICYCLE AND PEDESTRIAN PLAN: WAUKESHA COUNTY



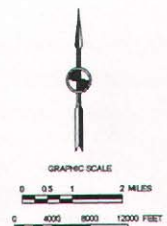
### BICYCLE-WAY IN UTILITY OR NATURAL RESOURCE CORRIDOR

- PLANNED
- EXISTING
- ADDITIONS TO 2010 PLAN
- DELETIONS FROM 2010 PLAN
- BUILT SINCE 2010 PLAN ADOPTION
- PROGRAMMED OR UNDER CONSTRUCTION

### BICYCLE-WAY IN STREET OR HIGHWAY RIGHT-OF-WAY

- PLANNED
- EXISTING
- ADDITIONS TO 2010 PLAN
- DELETIONS FROM 2010 PLAN
- BUILT SINCE 2010 PLAN ADOPTION
- PROGRAMMED OR UNDER CONSTRUCTION

Source: SEWRPC.



Since the original Regional Bicycle and Pedestrian plan was completed and adopted by the Commission in late 1994, it has been endorsed by the Wisconsin Department of Transportation and Department of Natural Resources, the Counties of Milwaukee, Racine and Walworth, the Cities of Cedarburg, Franklin, Milwaukee, Racine and West Bend, the Villages of Grafton, Kewaskum, Nashotah, Newberg, Pleasant Prairie, and West Milwaukee, and the Towns of Brookfield, Delafield, Dover, Kewaskum, Mt. Pleasant, Randall and Whitewater. In addition, the Wisconsin Department of Transportation has completed statewide bicycle and pedestrian plans, which serve to further endorse the Regional Bicycle and Pedestrian plan.

Also shown on these maps are recommended plan amendments to add bicycle way facilities to the plan, or to modify the alignment of facilities recommended in the plan. These amendments are a result of local planning efforts, including county park and open space plans. (Kenosha, Ozaukee, Racine, Walworth, Washington, and Waukesha Counties).

## **YEAR 2020 PLAN**

It is recommended that the year 2010 Regional Bicycle and Pedestrian plan be reaffirmed and its design year extended to the year 2020. It is further recommended that the plan be amended to incorporate the bicycle way implementation to date and local planning efforts amending the regional plan, as presented in the previous section of this report.

In reaffirming, extending, and amending this plan, it is recognized that in the years 2003 through 2005, the regional transportation system plan, including the bicycle and pedestrian element, will undergo a major review and re-evaluation.

The recommended year 2020 regional bicycle and pedestrian plan is shown on Map 17 for the Region, and on Maps 18 through 24 for each county, and is further summarized in Table 3.

### **Bicycle Way Element**

The plan recommends that bicycle way connections be provided between the Kenosha, Milwaukee, and Racine urbanized areas and between cities and villages with a population of 5,000 or more located outside the three urbanized areas, such cities and villages being termed “small urban areas”; and to provide bicycle access to major activity centers and transit stations located outside an urbanized or small urban area. Existing bicycle ways and bicycle ways proposed under adopted county park and open space plans, which are primarily off-street bicycle ways located in natural resource and utility corridors, serve as the basis for the design of this regional bicycle way system. Supplemental on-street bicycle ways are recommended where necessary to provide direct connections to urban areas or activity centers not served by off-street bicycle facilities.

In addition to this regionwide network of bicycle ways, a network of bicycle ways at appropriate spacing is recommended for the Kenosha, Milwaukee, and Racine urbanized areas to provide convenient bicycle access to transit stations and to major activity centers identified in the adopted regional land use plan. The network of bicycle ways recommended within the three urbanized areas is more dense than the regionwide network in recognition of the greater potential for utilitarian bicycle travel in the urbanized areas due to the concentration of population and activity centers in such areas.

The adopted bicycle way system plan envisions the development of a total of approximately 1,805 miles of recommended bicycle ways within the Region. (Table 3 and Maps 17 through 24 present this year 2020 plan element.) The proposed bicycle ways depict recommended locations for bicycle ways and, in the case of bicycle ways located along existing streets and highways, do not necessarily indicate streets and highways that are currently suitable for bicycle travel. Many of the streets and highways designated as planned bicycle ways will require improvements such as widened shoulders, widened outside travel lanes, or the provision of bicycle lanes or separate bicycle paths to make them more suitable for bicycle travel. These improvements would be considered for implementation at the time the street or highway is constructed, reconstructed, or resurfaced.



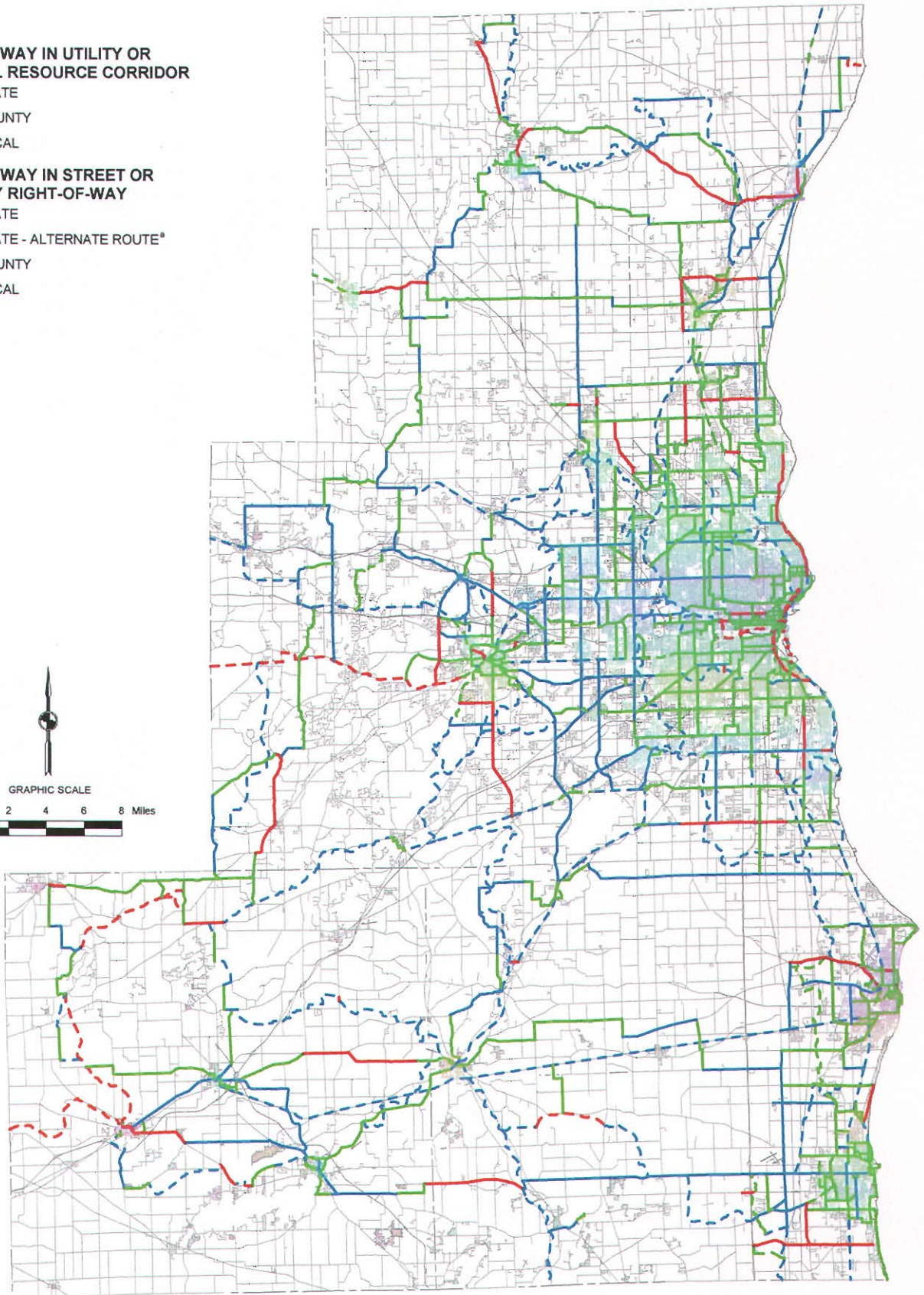
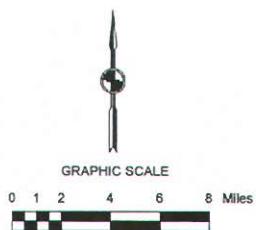
## RECOMMENDED BICYCLE WAY SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN: 2020

BICYCLE WAY IN UTILITY OR  
NATURAL RESOURCE CORRIDOR

- STATE
- COUNTY
- LOCAL

BICYCLE WAY IN STREET OR  
HIGHWAY RIGHT-OF-WAY

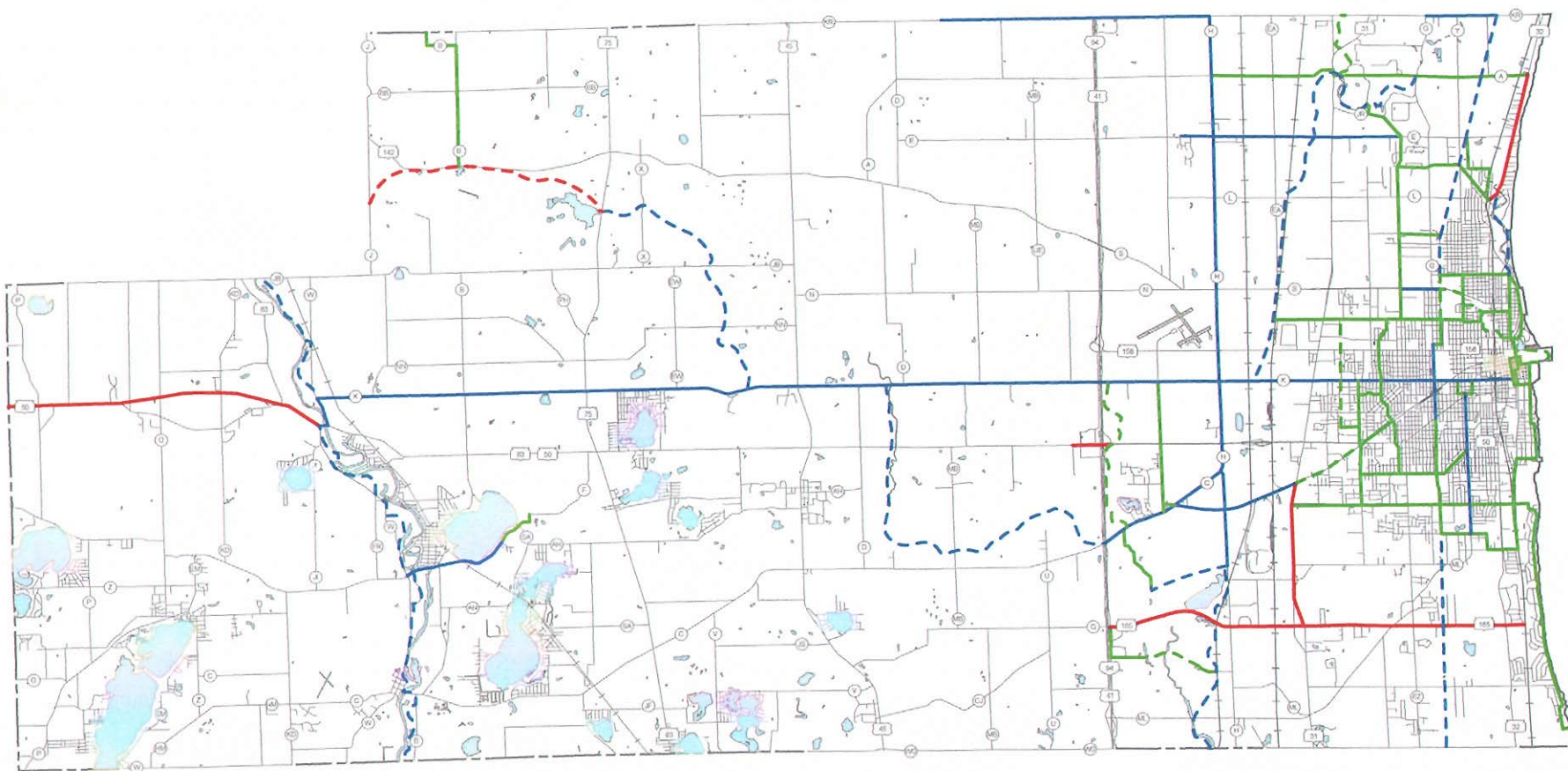
- STATE
- ..... STATE - ALTERNATE ROUTE\*
- COUNTY
- LOCAL



\*Wisconsin Department of Transportation study to determine whether bicycle way to be provided over Hoan Bridge alternative or other on-street and off-street alternative routes.

Source: SEWRPC.

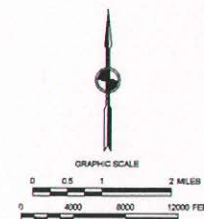
## RECOMMENDED BICYCLE-WAY SYSTEM PLAN FOR KENOSHA COUNTY: 2020

BICYCLE WAY IN UTILITY OR  
NATURAL RESOURCE CORRIDOR

- STATE
- COUNTY
- LOCAL

BICYCLE WAY IN STREET OR  
HIGHWAY RIGHT-OF-WAY

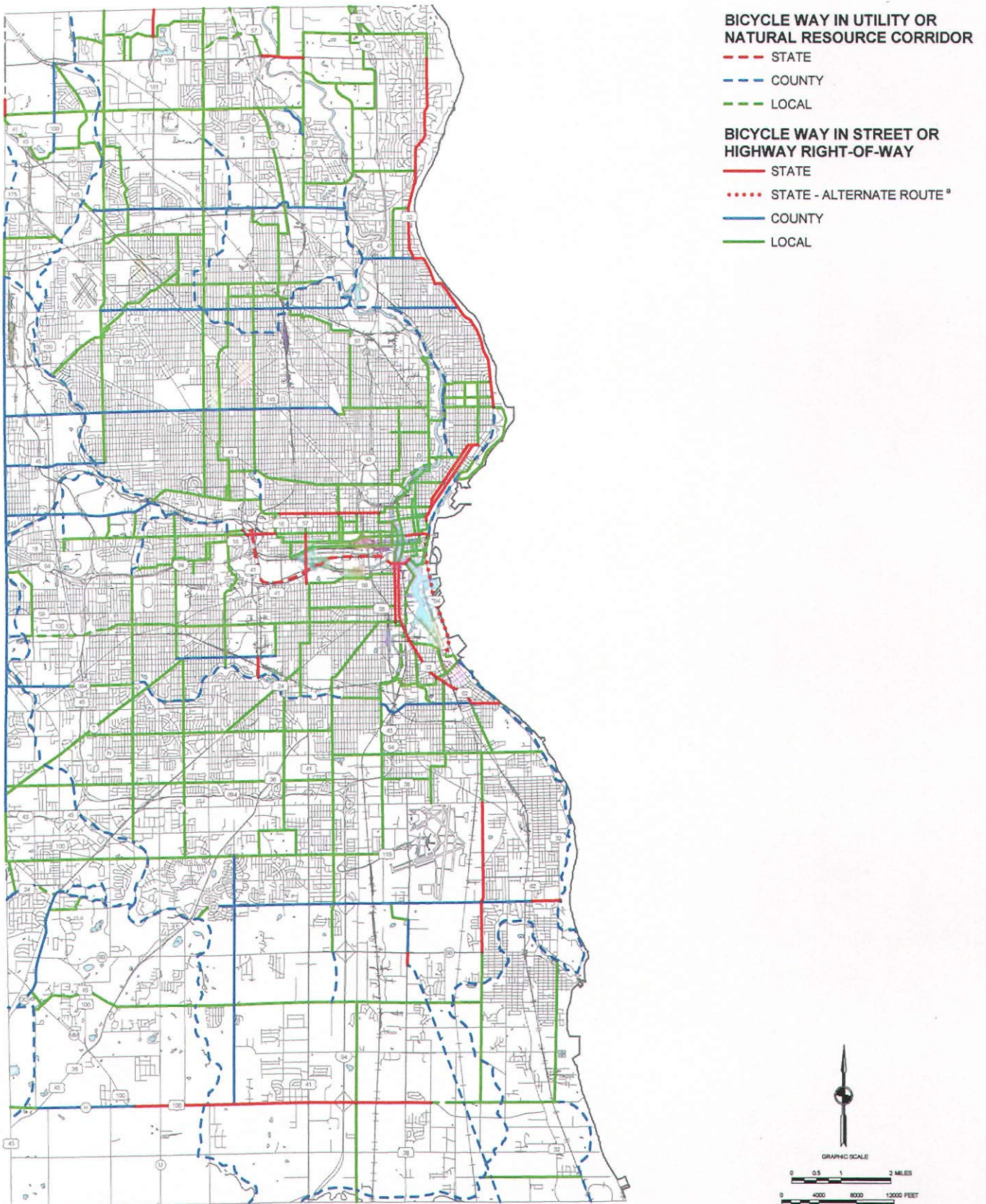
- STATE
- COUNTY
- LOCAL





# Map 19

## RECOMMENDED BICYCLE-WAY SYSTEM PLAN FOR MILWAUKEE COUNTY: 2020

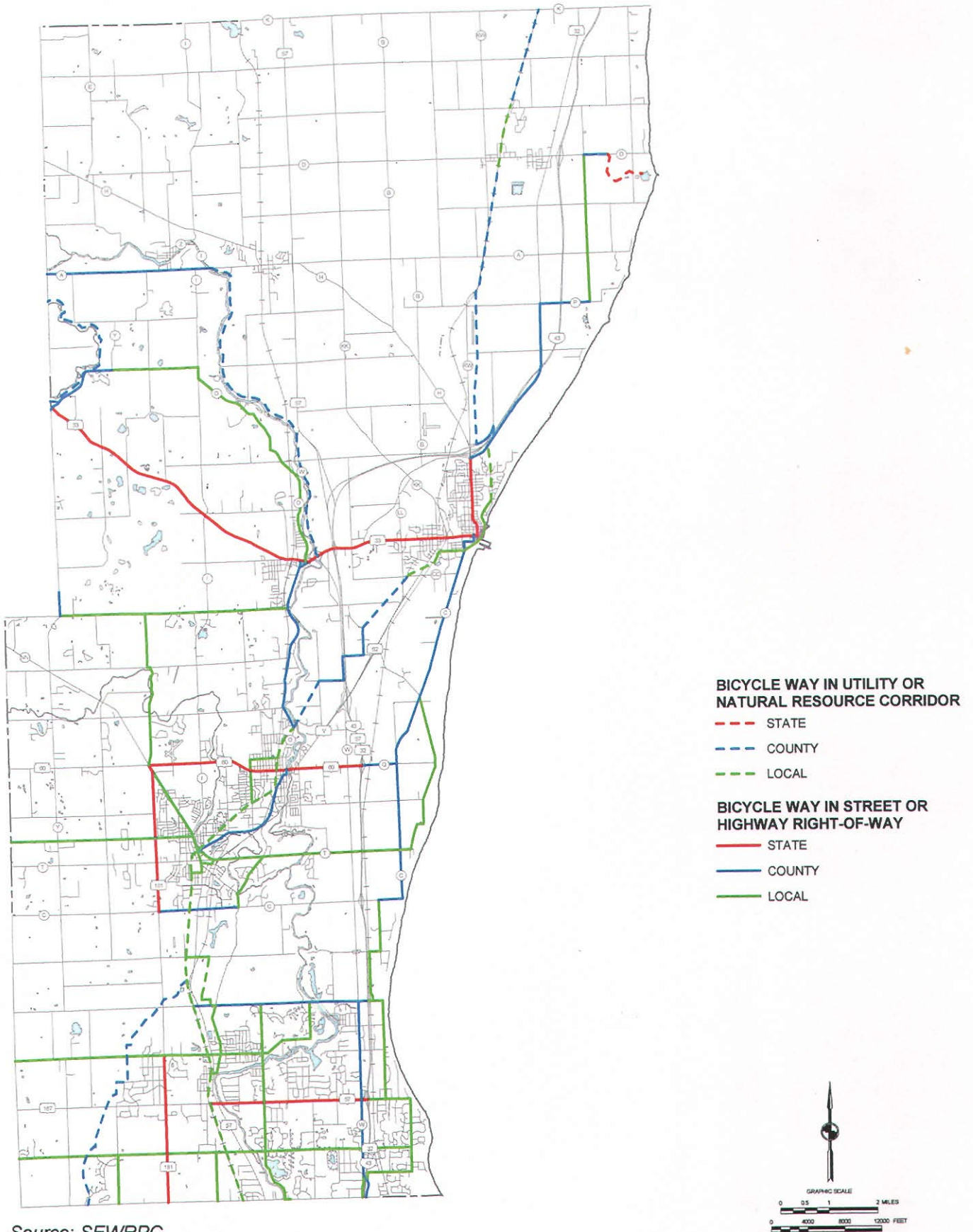


\* Wisconsin Department of Transportation study to determine whether bicycle way to be provided over Hoan Bridge alternative or other on-street and off-street alternative routes.

Source: SEWRPC.

## Map 20

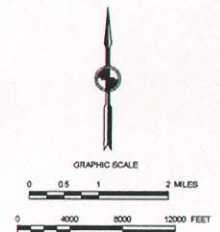
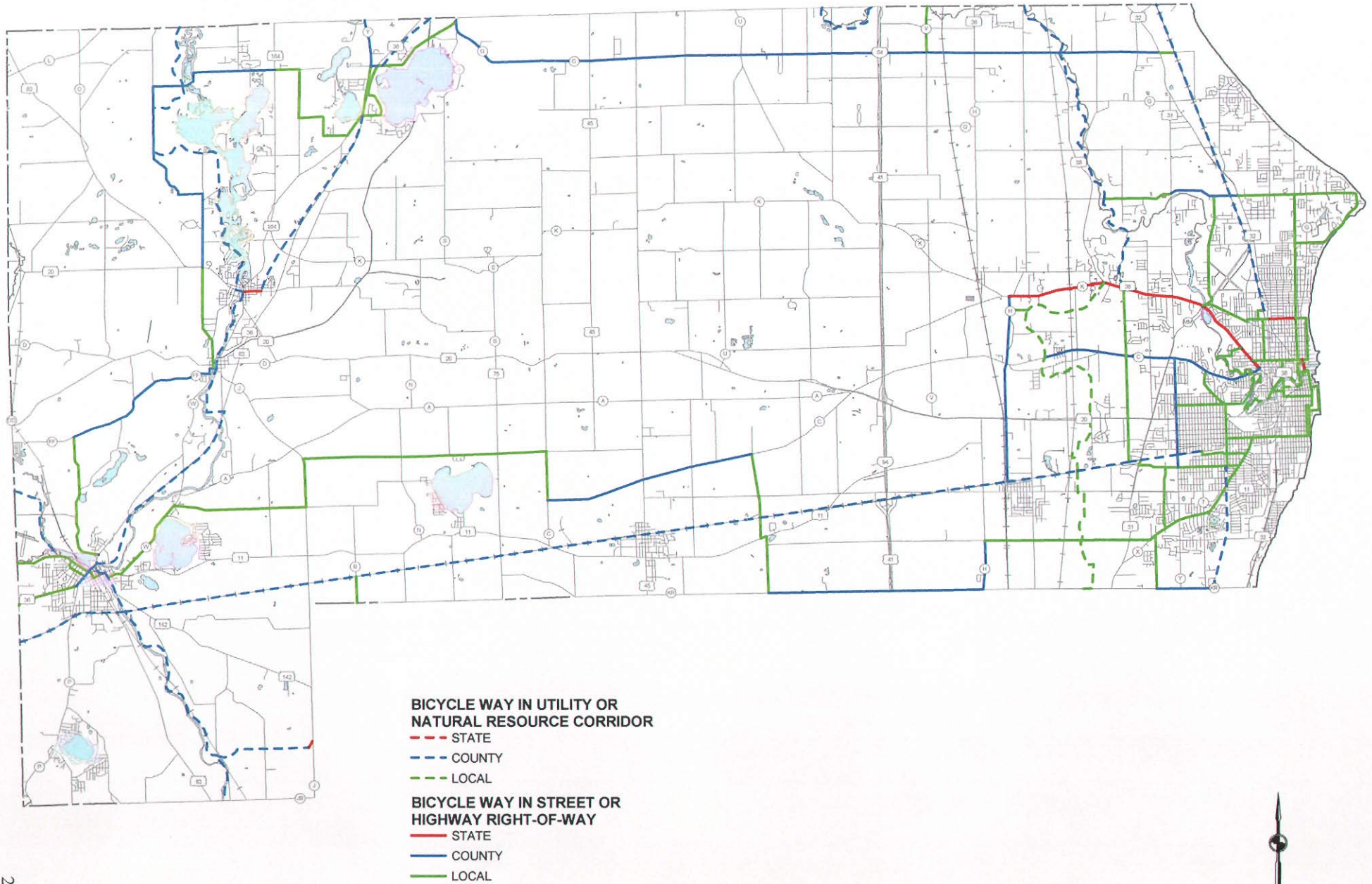
### RECOMMENDED BICYCLE WAY SYSTEM PLAN FOR OZAUKEE COUNTY: 2020



Source: SEWRPC.

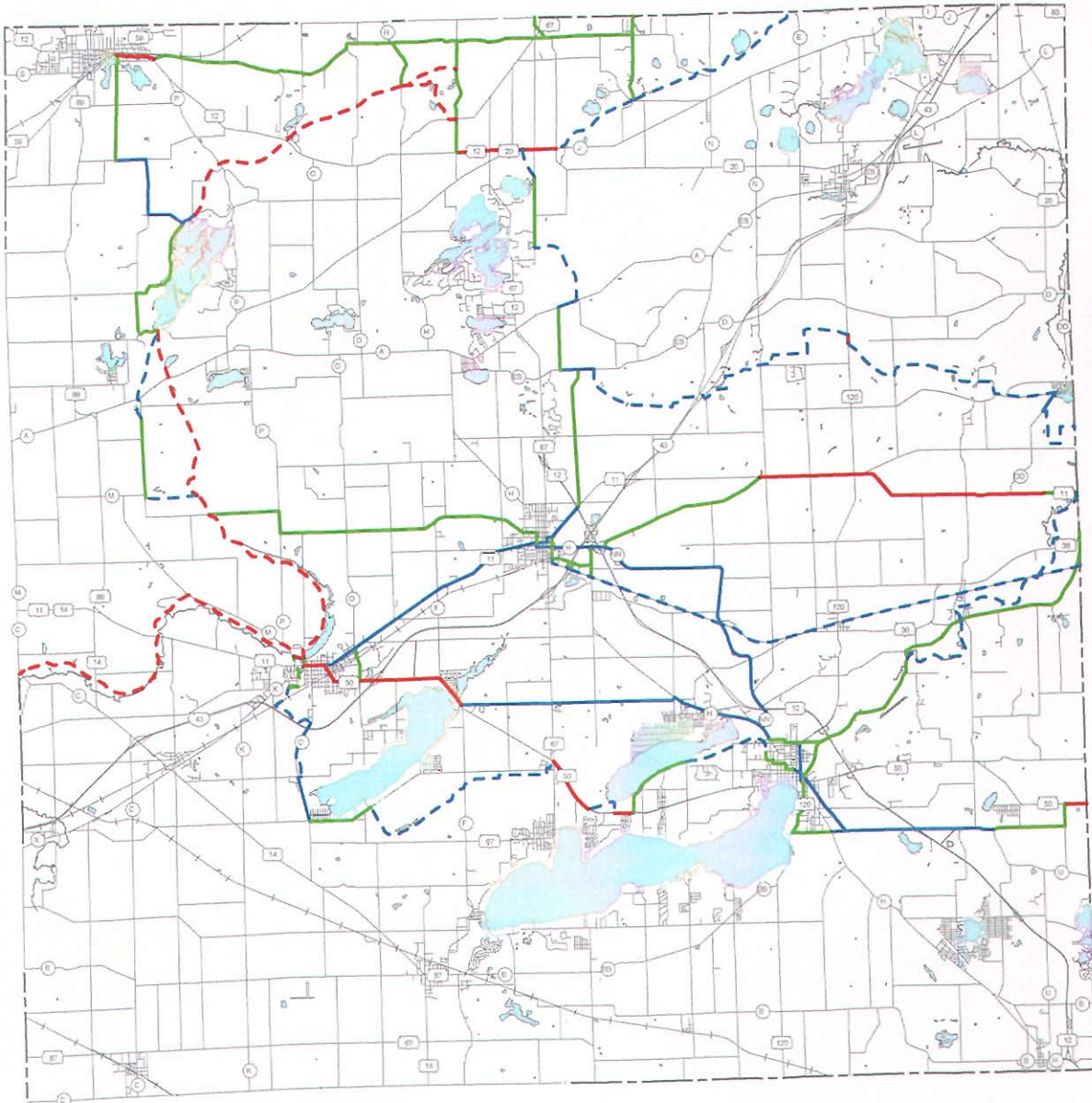


## RECOMMENDED BICYCLE-WAY SYSTEM PLAN FOR RACINE COUNTY: 2020



## Map 22

### RECOMMENDED BICYCLE-WAY SYSTEM PLAN FOR WALWORTH COUNTY: 2020



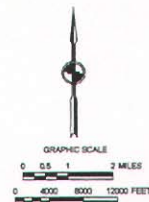
#### BICYCLE WAY IN UTILITY OR NATURAL RESOURCE CORRIDOR

- STATE
- COUNTY
- LOCAL

#### BICYCLE WAY IN STREET OR HIGHWAY RIGHT-OF-WAY

- STATE
- COUNTY
- LOCAL

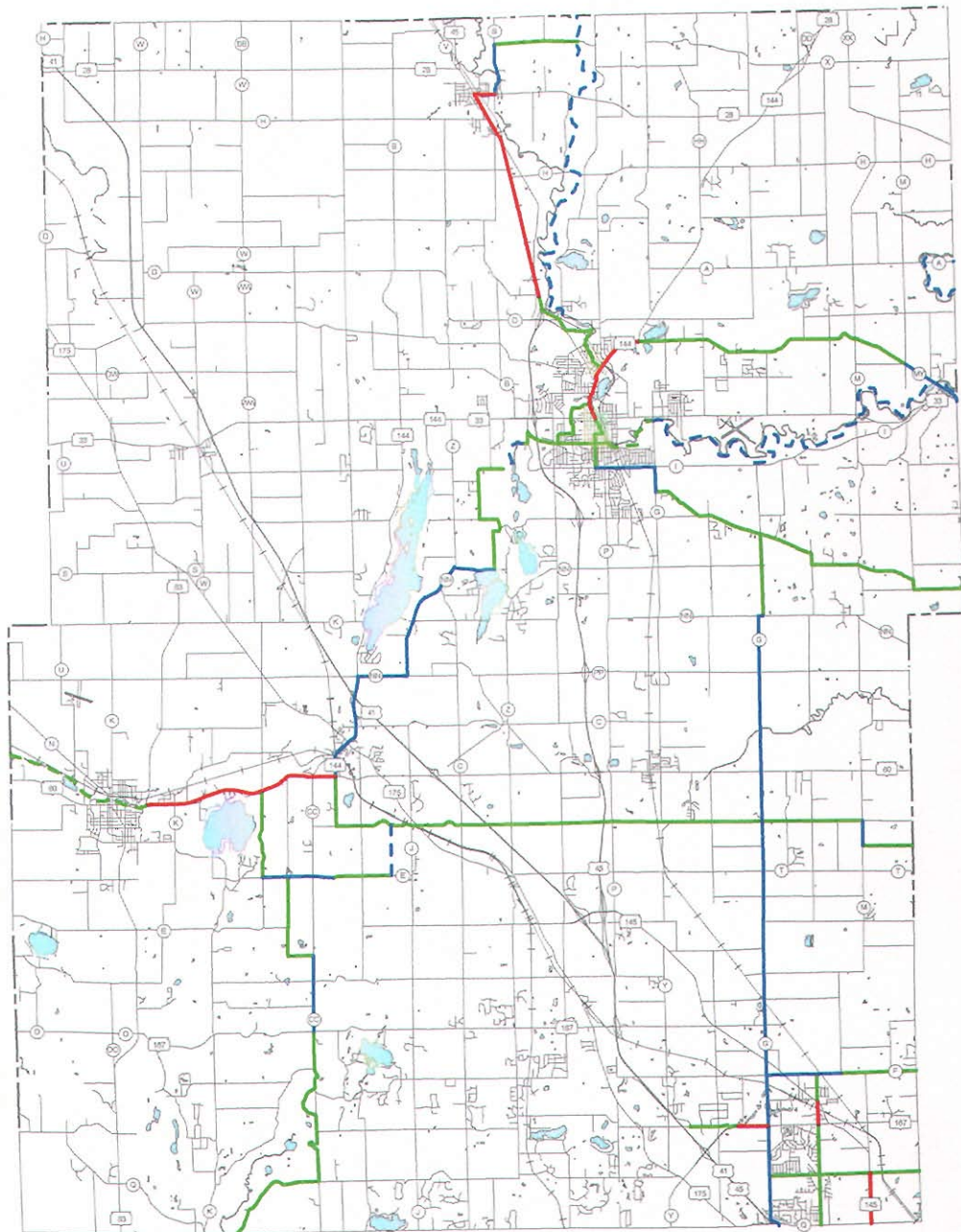
Source: SEWRPC.





## Map 23

### RECOMMENDED BICYCLE-WAY SYSTEM PLAN FOR WASHINGTON COUNTY: 2020



#### BICYCLE WAY IN UTILITY OR NATURAL RESOURCE CORRIDOR<sup>a</sup>

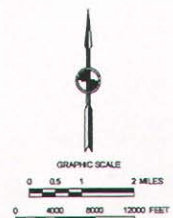
- STATE
- COUNTY
- LOCAL

#### BICYCLE WAY IN STREET OR HIGHWAY RIGHT-OF-WAY

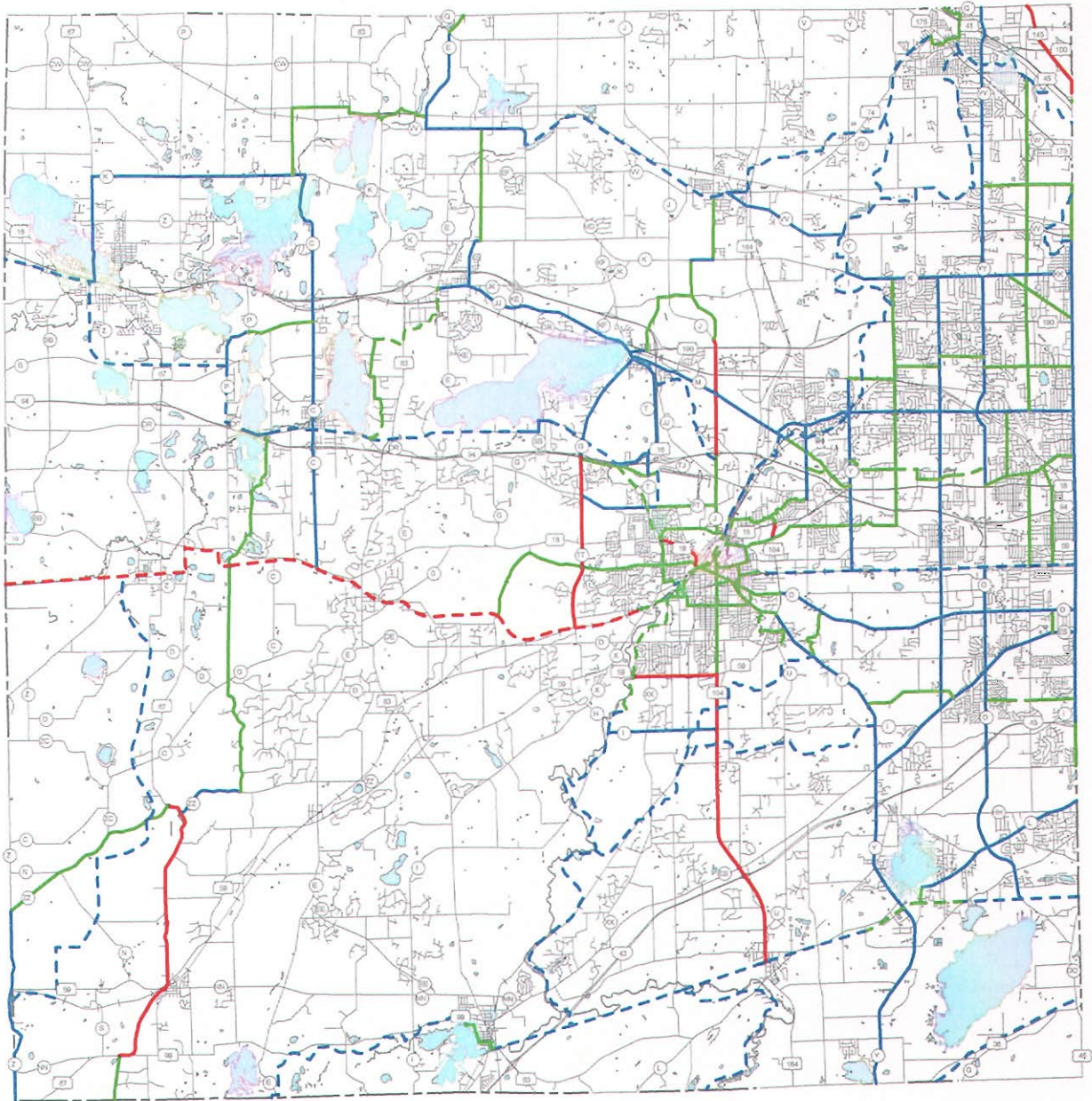
- STATE
- COUNTY
- LOCAL

<sup>a</sup> The Canadian National (formerly Wisconsin Central) Railroad right-of-way from the City of West Bend north to the Village of Eden has been identified by the Department of Natural Resources as a future bicycle and pedestrian path and the Wisconsin Department of Transportation has identified the corridor for future high speed rail.

Source: SEWRPC.



**RECOMMENDED BICYCLE-WAY SYSTEM PLAN FOR WAUKESHA COUNTY: 2020**



**BICYCLE WAY IN UTILITY OR  
NATURAL RESOURCE CORRIDOR**

- STATE
- COUNTY
- LOCAL

**BICYCLE WAY IN STREET OR  
HIGHWAY RIGHT-OF-WAY**

- STATE
- COUNTY
- LOCAL

Source: SEWRPC.

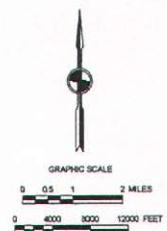




Table 3

**MILES<sup>a</sup> OF 2001 EXISTING AND YEAR 2020 RECOMMENDED BICYCLE WAYS  
TO BE PROVIDED UNDER THE REGIONAL BICYCLE WAY SYSTEM PLAN**

Recommended Year 2020 Bicycle-Way Classification and Jurisdiction	Kenosha County			Milwaukee County			Ozaukee County			Racine County		
	Existing	Proposed	Total	Existing	Proposed	Total	Existing	Proposed	Total	Existing	Proposed	Total
<b>Arterial Streets and Highways</b>												
State Trunk Highway	0	17	17	13	22	35	0	25	25	0	7	7
County Trunk Highway	3	46	49	1	59	60	4	33	37	31	19	50
Local Trunk Highway	8	10	18	27	139	166	0	33	33	10	28	38
Subtotal	11	73	84	41	220	261	4	91	95	41	54	95
<b>Nonarterial Streets and Highways</b>												
State Jurisdiction	0	0	0	0	0	0	0	0	0	0	0	0
County Jurisdiction	0	0	0	1	0	1	0	1	1	0	0	0
Local Jurisdiction	2	35	37	8	81	89	1	35	36	22	18	40
Subtotal	2	35	37	9	81	90	1	36	37	22	18	40
<b>Off-Street</b>												
State Jurisdiction	0	4	4	1	3	4	0	1	1	0	0	0
County Jurisdiction	9	34	43	65	36	101	0	27	27	22	51	73
Local Jurisdiction	0	12	12	0	7	7	4	11	15	0	14	14
Subtotal	9	50	59	66	46	112	4	39	43	22	65	87
<b>Total</b>	<b>22</b>	<b>158</b>	<b>180</b>	<b>116</b>	<b>347</b>	<b>463</b>	<b>9</b>	<b>166</b>	<b>175</b>	<b>85</b>	<b>137</b>	<b>222</b>

Recommended Year 2020 Bicycle-Way Classification and Jurisdiction	Walworth County			Washington County			Waukesha County			Region		
	Existing	Proposed	Total	Existing	Proposed	Total	Existing	Proposed	Total	Existing	Proposed	Total
<b>Arterial Streets and Highways</b>												
State Trunk Highway	0	16	16	2	11	13	0	25	25	15	123	138
County Trunk Highway	0	35	35	0	29	29	14	126	140	53	347	400
Local Trunk Highway	0	5	5	1	12	13	3	40	43	49	267	316
Subtotal	0	56	56	3	52	55	17	191	208	117	737	854
<b>Nonarterial Streets and Highways</b>												
State Jurisdiction	0	0	0	0	0	0	0	0	0	0	0	0
County Jurisdiction	0	1	1	0	0	0	0	0	0	1	2	3
Local Jurisdiction	0	62	62	0	45	45	3	61	64	36	337	373
Subtotal	0	63	63	0	45	45	3	61	64	37	339	376
<b>Off-Street</b>												
State Jurisdiction	1	27	28	0	0	0	16	0	16	18	35	53
County Jurisdiction	0	58	58	0	22	22	35	92	127	131	320	451
Local Jurisdiction	0	1	1	2	2	4	8	10	18	14	57	71
Subtotal	0	86	87	2	24	26	59	102	161	163	412	575
<b>Total</b>	<b>1</b>	<b>205</b>	<b>206</b>	<b>5</b>	<b>121</b>	<b>126</b>	<b>79</b>	<b>354</b>	<b>433</b>	<b>317</b>	<b>1,488</b>	<b>1,805</b>

<sup>a</sup> The length of bicycle ways is given in route-miles. The number of bicycle-lane-miles will normally be approximately twice the number of bicycle-route-miles, as bicycle lanes and bicycle routes would be located along both sides of a street, and bicycle paths would generally accommodate two-way bicycle travel.

Source: SEWRPC.

The provision of the bicycle and pedestrian facilities as recommended is an important means of enhancing bicycle and pedestrian safety; however, education and enforcement measures intended to avoid bicycle and pedestrian collisions are also important. The plan further recommends that local, county, and State agencies work to develop and carry out educational programs for all street and highway users, including motor-vehicle operators, relating to the rights and responsibilities of bicyclists and pedestrians, and that where necessary, such programs be supplemented with enforcement programs designed to improve the safety of bicyclists and pedestrians.

### Plan Costs And Revenues

The estimated cost of constructing the recommended bicycle way system recommended by the adopted plan over the 20-year implementation period from 2001 to 2020 expressed in constant year 2001 dollars, is estimated at \$4.4 million annually in construction costs for bicycle ways located on or within street rights-of-way and about \$2.3 million annually in constructions costs for off-street bicycle ways as shown on Table 4. Bicycle ways included as part of this regional bicycle way system plan are eligible to receive Federal funding for construction. Almost all of these capital costs for the bicycle system plan have been accounted for in other plans prepared by the

Table 4

**COST ESTIMATE FOR CONSTRUCTING THE RECOMMENDED  
BICYCLE WAY SYSTEM IN SOUTHEASTERN WISCONSIN: YEAR 2020**

County	Costs for Constructing On-Street Bicycle Ways on Arterial Streets (thousands of dollars)	Costs for Constructing On-Street Bicycle Ways on Nonarterial Streets (thousands of dollars)	Costs for Constructing Off-Street Bicycle Ways (thousands of dollars)	Total (thousands of dollars)
Kenosha	\$ 8,760	\$ 21	\$ 5,500	\$ 14,281
Milwaukee	26,400	49	5,060	31,509
Ozaukee	10,920	22	4,290	15,232
Racine	6,480	11	7,150	13,641
Walworth	6,720	38	9,460	16,218
Washington	6,240	27	2,640	8,907
Waukesha	22,920	37	11,220	34,177
Total	\$ 88,440	\$ 205	\$ 45,320	\$ 133,965

<sup>a</sup>All figures are expressed in constant dollars. It is assumed that provision of an on-street bicycle way on an arterial street would have an average construction cost, including right-of-way acquisition if necessary, of \$120,000 per mile. This would represent the cost of constructing within existing right-of-way 4-foot-wide bicycle lanes along both sides of an urban arterial or 4-foot-wide paved shoulders along both sides of a two lane rural arterial, or the construction of a separate 10-foot-wide asphalt path along a four-lane rural arterial on 30 feet of additional right-of-way (assuming approximately \$20,000 per acre). The provision of an off-street asphalt bicycle path with a width of 10 feet and a right-of-way of 20 feet has an estimated cost of \$110,000 per mile, including \$60,000 for construction (assuming \$20,000 per acre of right-of-way). The provision of a bicycle way on a non-arterial street is assumed to require only signing to establish a bicycle route at an estimated cost of \$600 per mile.

Source: SEWRPC.

Commission. The cost of providing bicycle ways on arterial streets and highways has been accounted for in the cost of the highway element of the regional transportation system plan. The cost of the off-street bicycle and pedestrian ways recommended in the bicycle and pedestrian plan have nearly all been accounted for in the costs of county park and open space plans.

The implementation of the plan over the 20 year plan design period is feasible, given available U. S. Department of Transportation, Federal Highway Administration Congestion Mitigation and Air Quality Improvement Program funds (CMAQ) and Surface Transportation Program-Transportation Enhancement funds. Fully implementing the plan has an estimated annual cost of \$6.7 million, of which 80 percent, or \$5.4 million annually, could be funded with Federal CMAQ or Enhancement funds. The provision of bicycle ways is among the highest Commission priorities for use of CMAQ funds, and the highest priority for use of Enhancement funds. Sufficient CMAQ and Enhancement funds should be available annually to fully implement the plan by the year 2020.

***Bicycle Accommodation on Arterial Streets  
And Highways Not Designated as Bicycle Ways***

Bicyclists are permitted to operate on all streets and highways in the Region except expressways and freeways that have been posted with signs prohibiting bicycle use. The existing street system provides the most extensive network of direct travel routes, and serves virtually all destinations. Land access and collector streets, because of low traffic volumes and speeds, are capable of accommodating bicycle travel with no improvements. Arterial streets and highways, particularly those with high-speed traffic or heavy volumes of truck or transit-vehicle traffic, may require improvements such as extra-wide outside travel lanes, paved shoulders, or a separate bicycle path in order to safely accommodate bicycle travel.

Accordingly, the plan recommends that consideration be given to providing extra-wide outside travel lanes, paved shoulders, or separate bicycle paths along all arterial streets and highways which are not designated in the plan as bicycle ways but which are located in one of the three urbanized areas of the Region, or in one of the 11 incorporated areas of 5,000 or more residents located outside the three urbanized areas. Improvements to

accommodate bicycle travel, if feasible, would be made at the time a street or highway is constructed, reconstructed, or resurfaced. In all, approximately 1,160 miles of arterial streets and highways in the urbanized areas and small urban areas are not designated as bicycle ways by the plan.

### **Pedestrian Facilities Plan Element**

The pedestrian facilities element of the bicycle and pedestrian facilities system plan for Southeastern Wisconsin is a policy, rather than a system, plan. It recommends that the various units and agencies of government responsible for the construction and maintenance of pedestrian facilities in Southeastern Wisconsin adopt and follow certain recommended policies and guidelines with regard to the development of those facilities. These policies and guidelines are designed to facilitate safe and efficient pedestrian travel within the Region and are presented in Appendix A of this report.

The policies and guidelines include recommendations that sidewalks be provided along streets and highways in areas of existing or planned urban development based upon the criteria set forth in Table 2; that sidewalks be designed and constructed using widths and clearances appropriate for the levels of pedestrian and vehicular traffic in any given area; that landscaped terraces, curb lawns, or other buffer areas be provided between sidewalks and the roadways paralleling them to enhance the pedestrian environment; and that efforts be made to maximize pedestrian safety at street crossings, including the timing of the "walk" phases of traffic signals to provide for safe pedestrian crossings and the provision of pedestrian "islands" and medians in wide, heavily traveled, or otherwise hazardous roadways. The plan also emphasizes that all pedestrian facilities must be designed and constructed in accordance with the requirements of the Federal Americans with Disabilities Act and its implementing regulations.

### **Design And Construction Of Bicycle And Pedestrian Facilities**

For those bicycle and pedestrian facilities recommended in the plan to be provided within the right-of-way of a street or highway, the unit of government responsible for constructing and maintaining the street or highway should also have responsibility for constructing and maintaining the associated bicycle or pedestrian facility, or for entering into construction, operations, and/or maintenance agreements with local units or agencies of government. Accordingly, the Wisconsin Department of Transportation should assume responsibility for bicycle and pedestrian facilities within the right-of-way of State trunk highways and connecting streets; the respective county highway, transportation, or public works departments should assume responsibility for bicycle and pedestrian facilities located within the right-of-way of county trunk highways; and the various cities, villages, and towns should assume responsibility for bicycle and pedestrian facilities located within the right-of-way of streets and highways under their jurisdiction. Bicycle and pedestrian facilities should be considered for provision at the time a street or highway is constructed, reconstructed, or resurfaced.

A more detailed evaluation of the proposed location of recommended bicycle ways will necessarily be conducted by the implementing agency before bicycle ways are designed and constructed. Factors to be considered during the detailed evaluation include the availability of right-of-way for street and highway widenings associated with a given bicycle facility; the number and type of structures and vegetation that may need to be removed or relocated to provide the bicycle facility; the effects of the bicycle way on environmentally sensitive areas, including wetlands; the cost of providing the bicycle facility on a specific street or highway in relation to providing the bicycle-related improvement on a parallel street or off-street corridor; and the quality of the alternative locations and the likelihood that bicyclists would use those alternatives. The location and design treatment of the proposed bicycle facility should also be coordinated with the location and design treatment of nearby bicycle facilities.

If the detailed evaluation process indicates that the recommended bicycle way location is not feasible due to site constraints, excessive costs, the traffic and operating characteristics of the roadway, or other factors, the implementing agency should identify an alternative location and evaluate the feasibility of providing a bicycle way on the alternative route. The evaluation of the recommended bicycle way location, and, if necessary, the identification and evaluation of alternative locations, should be conducted during the preliminary engineering phase of project design. On those streets and highways recommended as locations for bicycle ways, and as well

on all arterial streets and highways within the Region's urbanized and small urban areas, preliminary engineering for rehabilitation, reconstruction, or new construction should consider the provision of the recommended bicycle way or bicycle accommodation, with the bicycle way included as part of the project design, or a commitment to provide an alternative bicycle way on a parallel street or off-street corridor.

### **Community Bicycle and Pedestrian Plans**

The plan further recommends that local units of government prepare community bicycle and pedestrian plans to supplement the regional plan. The local plans should provide for facilities to accommodate bicycle and pedestrian travel within neighborhoods, providing for convenient travel between residential areas and shopping centers, schools, parks, and transit stops within or adjacent to the neighborhood. The standards, guidelines, and system plans set forth in the regional plan should be the basis for the preparation of community and neighborhood plans. Federal Highway Administration Surface Transportation Program-Discretionary funds administered by the Wisconsin Department of Transportation are available for preparation of local bicycle system plans. It is also recommended that local units of government consider the preparation and implementation of land use plans that encourage more compact and dense development patterns, in order to facilitate pedestrian and bicycle travel.

### **SUMMARY**

This report documents the review, reaffirmation, amendment, and extension of design year from the year 2010 to the year 2020 of the regional bicycle and pedestrian plan. This report summarizes the recommendations of the year 2010 regional bicycle and pedestrian system plan, including its recommendations for the development of a regionwide network of bicycle ways and attendant improvement of each arterial street within the urban areas of southeastern Wisconsin to accommodate bicycles. Recommended policies and guidelines under the year 2010 plan are also summarized with respect to the development of pedestrian facilities and also bicycle facilities.

The report also documents progress which has been made towards implementation of the year 2010 plan since that plan was adopted in 1995. Since 1995, seven miles of on-street facilities have been completed and are open to bicycle traffic, and 29 miles of off-street facilities have been completed and opened to bicycle traffic. Another nine miles of on-street facilities and 41 miles of off-street facilities have been programmed for implementation, or are under construction. Also documented are amendments to the year 2010 plan to add bicycle way facilities to the plan and to modify the alignment of facilities which were recommended in the year 2010 plan which are a result of local planning efforts completed since 1995, including county park and open space plans.

The new recommended year 2020 regional bicycle and pedestrian plan is also presented. This plan represents the reaffirmation, amendment, and extension of design year to the year 2020 of the 2010 plan. In reaffirming, extending, and amending this plan, it is recognized that in the years 2003 through 2005, the regional transportation system plan, including the bicycle and pedestrian element, will undergo a major review and re-evaluation. The year 2020 plan includes all amendments to date resulting from county planning efforts and all bicycle way facilities which have been completed and open to traffic as well as those programmed for implementation or under construction.

The bicycle way element of the year 2020 plan, like the year 2010 plan, recommends that bicycle way connections be provided between the Kenosha, Milwaukee, and Racine urbanized areas and between cities and villages with populations of 5,000 or more located outside these three urbanized areas. Existing bicycle ways and bicycle ways proposed under adopted park and open space plans, which are primarily off-street bicycle ways located in natural resource and utility corridors, serve as a basis for the design of this regional bicycle way system. In addition to this regionwide network of bicycle ways, a network of bicycle ways at appropriate spacing is recommended in the plan for the Kenosha, Milwaukee, and Racine urbanized areas. The year 2020 bicycle way system plan envisions the development of approximately 1,805 miles of recommended bicycle ways within the Region. Improvements necessary to implement bicycle ways for those bicycle ways to be located on arterial streets and highways would be considered at the time the street or highway is constructed, reconstructed, or resurfaced.



The plan further recommends that consideration be given to providing extra-wide outside travel lanes, paved shoulders, or separate bicycle paths along all arterial streets and highways within the Region's three urbanized areas and the incorporated areas of 5,000 or more residents located outside the three urbanized areas to accommodate bicycle travel. The year 2020 plan also includes a pedestrian facilities element which presents policies and guidelines recommended to be implemented to facilitate safe and efficient pedestrian travel within the Region along with bicycle travel. The implementation of this recommended plan is intended to encourage increased bicycle and pedestrian travel, including such travel as alternatives to travel by automobile within the Region.

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## **APPENDIX**

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## APPENDIX A

# REGIONAL BICYCLE AND PEDESTRIAN SYSTEM PLAN OBJECTIVES, PRINCIPLES, STANDARDS, AND PLANNING DESIGN GUIDELINE

### OBJECTIVES, PRINCIPLES, AND STANDARDS

#### OBJECTIVE NO. 1

Bicycle and pedestrian facilities which, through their location and design, will encourage increased levels of utilitarian bicycle and pedestrian travel.

#### PRINCIPLE

A transportation system that provides for reasonably fast, convenient travel is essential to support the everyday economic and social activities of the Region. Personal automotive vehicle travel, while offering a high degree of personal mobility, comfort, and convenience, can result in traffic congestion, excessive air pollutant emissions, and fuel consumption, especially in corridors with high travel demand. Effective and attractive bicycle and pedestrian facilities have the potential to reduce automotive vehicle use and reduce traffic congestion and associated personal delay, energy consumption, and air pollution, and to encourage a healthy lifestyle through daily walking or bicycle trips.

#### STANDARDS

1. Bicycle and pedestrian ways intended for utilitarian travel should provide direct and continuous routes which minimize delay and maximize safety.
2. Bicycle ways should be provided to interconnect the Kenosha, Milwaukee, and Racine urbanized areas with each other and with urban areas having a resident population of 5,000 or more persons.
3. Bicycle ways<sup>1</sup> should be provided to connect medium- and high-density residential areas with public transit stations<sup>2</sup>, park-and-pool lots, and major activity centers located within five miles of such residential areas. Pedestrian ways should be provided to connect medium- and high-density residential areas with public transit stations, park-and-pool lots, and major activity centers located within one mile of such residential areas. Major activity centers include:

<sup>1</sup>A "bicycle way" has been defined for regional planning purposes as any roadway, pathway, or other way that is specifically designated for bicycle travel, including facilities that are designated for exclusive or preferential bicycle travel and facilities that are shared with other travel modes. Facilities intended for exclusive or preferential use by bicycles include bicycle paths and bicycle lanes. Bicycle paths are physically separated from motorized vehicular traffic by open space or barriers, and are typically located within the right-of-way of a street or highway or in an independent right-of-way or easement such as one along a river or utility corridor. Bicycle lanes are portions of roadways that are designated by striping, signing, and pavement markings for bicycle use. A "bicycle route" is a bicycle way designated with directional and informational markers, and may consist of a combination of bicycle paths, bicycle lanes, and shared roadways; however, the term "bicycle route" is used in this report to describe a shared roadway signed for bicycle use.

<sup>2</sup>A "transit station" is a facility located on a rapid or express transit route which is designed to serve passengers boarding, alighting, or transferring between rapid, express, or local feeder transit routes serving the location. Transit stations vary in size and design depending upon their intended purpose and passenger volume served, but generally provide for more passenger amenities than would be found at a local transit stop. Passenger amenities typically provided at transit stations include passenger loading platforms, passenger shelters, telephone service, posted route maps and timetables, and, where sufficient land is available, parking for passengers transferring between auto and transit. Where the station serves very high passenger volumes or bus and rail routes or depending upon their intended purpose and passenger volume served, but generally provide for more passenger amenities than would be found at a local transit stop. Passenger amenities typically provided at transit stations include passenger loading platforms, passenger shelters, telephone service, posted route maps and timetables, and, where sufficient land is available, parking for passengers transferring between auto and transit. Where the station serves very high passenger volumes or bus and rail routes providing intercity service, an enclosed terminal with rest rooms may also be provided. In the future, such stations may provide facilities enabling transit users to access advanced transit information systems which will, among other things, provide real-time transit-vehicle location providing and scheduling information.



- Major office and retail centers, including the Kenosha, Milwaukee, and Racine central business districts;
- Major industrial centers;
- Major parks and recreational facilities;
- Major governmental and institutional centers, including libraries, government administrative centers, medical centers, universities, and technical and vocational schools.

4. On-street bicycle ways needed to provide access between residential areas and the major activity centers listed in Standard No. 3 under Objective No. 1 should be located on streets and highways meeting the following criteria:

- a. No more than four travel lanes for motor vehicles;
- b. The average weekday motor-vehicle traffic includes no more than 10 percent commercial vehicles;<sup>3</sup>
- c. No grades in excess of 5 percent for segments of more than 500 feet in length;
- d. No more than 30 public street intersections or commercial driveways per mile;
- e. Adequate separation can be provided between bicycles and vehicles parked along the street or highway to avoid bicyclists being obstructed by opening car doors, or on-street parking is prohibited or restricted during peak travel periods;
- f. There is an outside travel lane of at least 14 feet in width or a paved shoulder at least four feet in width;
- g. Motor-vehicle operating speeds do not exceed 35 miles per hour; and
- h. The number of motor vehicles per average weekday does not exceed the design capacity of the street. Design capacities for various street cross-sections are set forth in Table A-1.

The construction of bicycle paths, or the designation of bicycle routes on collector or land access streets, should be considered as parallel facilities to serve freeway or other arterial corridors which do not meet the above criteria.

5. All bridges and underpasses, except bridges and underpasses carrying freeway and expressway facilities, should be designed to safely accommodate bicycle and pedestrian movements.
6. Consideration should be given to locating bicycle and pedestrian ways in off-street corridors where suitable alternatives to on-street locations exist. Off-street corridors should offer adequate separation from motor-vehicle traffic and provide reasonably direct as well as safe and aesthetically attractive routes.
7. Off-street bicycle and pedestrian ways should be used to provide connections between and within residential areas and activity centers.
8. A regional system of off-street bicycle paths and hiking trails should be provided in accordance with the recommendations set forth in the adopted park and open space plans for each of the seven counties in the Region<sup>4</sup>.
9. Support facilities such as rest rooms, drinking fountains, and information kiosks should be provided along off-street bicycle paths and hiking trails at intervals of no more than 15 miles.

<sup>3</sup> "Commercial vehicles" include heavy trucks and transit vehicles.

<sup>4</sup> The seven county park and open space plans are documented in SEWRPC Community Assistance Planning Report No. 131, A Park and Open Space Plan for Kenosha County, November 1987; SEWRPC Community Assistance Planning Report No. 132, A Park and Open Space Plan for Milwaukee County, November 1991; SEWRPC Community Assistance Planning Report No. 133, A Park and Open Space Plan for Ozaukee County, July 1987; SEWRPC Community Assistance Planning Report No. 134, A Park and Open Space Plan for Racine County, September 1988; SEWRPC Community Assistance Planning Report No. 135, A Park and Open Space Plan for Walworth County, February 1991; SEWRPC Community Assistance Planning Report No. 136, A Park and Open Space Plan for Washington County, March 1989; SEWRPC Community Assistance Planning Report No. 137, A Park and Open Space Plan for Waukesha County, December 1989.

**Table A-1**

**DESIGN CAPACITIES FOR SELECTED STREET CROSS-SECTIONS**

Type of Facility	Average Weekday Traffic Volume	
	Urban	Rural
Two Lane Arterials Undivided	13,000	7,000
Four-Lane Arterials Undivided .....	17,000	--
Divided	25,000	22,000

Source: SEWRPC

**OBJECTIVE NO. 2**

Bicycle and pedestrian ways that reduce accident exposure and provide for increased travel safety and personal security.

**PRINCIPLE**

Collisions take a heavy toll in life, property damage, and human suffering; contribute substantially to overall transportation costs; and increase public costs for police, emergency rescue services, and other social services. Therefore, every attempt should be made to reduce both the incidence and severity of collisions. At the same time, it is important to underscore the relative safety of bicycling and walking to avoid perpetuating the view that these are inherently dangerous activities. The real and perceived risk of exposure to criminal activity hampers the mobility of those who must travel by bicycle or walk within or through areas deemed unsafe. Therefore, every attempt should be made to reduce the incidence of crime where it hampers mobility and access to the transportation system and to increase actual and perceived personal security in the operation of the transportation system.

**STANDARDS**

1. All arterial streets and highways in areas of existing or planned urban industrial, commercial, and residential development, except freeways and expressways, should provide accommodation for bicyclists whenever a street or highway is constructed, reconstructed, or—for arterial facilities having a rural cross-section—resurfaced. On two-lane streets and highways having a rural cross-section, a paved shoulder with a minimum width of four feet should be provided. On four-or-more-lane streets and highways with a rural cross-section, a paved shoulder with a minimum width of eight feet should be provided. On streets and highways having an urban cross-section, the outside travel lane should have a minimum usable width of 14 feet. On streets and highways without parking lanes, the usable lane width should be measured from the inside edge of the lane to the edge of the gutter section. Consideration should be given to prohibiting on-street parking where bicycle ways are to be provided.
2. Sidewalks should be provided in areas of existing or planned urban industrial, commercial, and residential development in accordance with the criteria set forth in Table A-2.
3. Sidewalks should not be designated as bicycle ways except in those circumstances where there is a need to provide bicycle-way continuity and there are no reasonable alternatives to the sidewalk location.

**OBJECTIVE NO. 3**

Bicycle and pedestrian facilities that facilitate intermodal travel, particularly among bicycle, pedestrian, and transit modes.

**PRINCIPLE**

An intermodal transportation system provides for efficient interchange among appropriate modes of transportation to facilitate effective passenger movement. Bicycle-transit and pedestrian-transit connections serve to combine the advantages of bicycle and pedestrian travel, which offers flexibility and mobility for shorter-distance trips, with the advantages of access to public transit facilities for longer-distance trips.

**Table A-2**

**RECOMMENDATIONS FOR PROVISION OF SIDEWALKS IN AREAS OF  
EXISTING OR PLANNED URBAN DEVELOPMENT**

Roadway Functional Classification	Land Use	New Streets <sup>a</sup>	Existing Streets <sup>a</sup>
Arterial Streets <sup>b</sup>	Industrial Commercial Residential	Both Sides Both Sides Both Sides	Both Sides Both Sides Both Sides
Collector Streets	Industrial Commercial Residential	Both Sides Both Sides Both Sides	Both Sides Both Sides At least one side
Land Access Streets <sup>c</sup>	Industrial Commercial Residential (medium-and high-density) Residential (low-density)	Both Sides Both Sides Both Sides At least one side	Both Sides Both Sides At least one side At least one side

<sup>a</sup> Sidewalks may be omitted on one side of streets where there are no existing or anticipated uses that would generate pedestrian trips on that side.

<sup>b</sup> Where there are marginal access control or service roads, the sidewalk along the main road may be eliminated and replaced by a sidewalk along the service road on the side away from the main road.

<sup>c</sup> Sidewalks need not be provided along court and cul-de-sac streets less than 600 feet in length, unless such streets serve multi-family development; or along streets served by parallel off-street walkways.

Source: SEWRPC.

**STANDARDS**

1. All transit stations should be readily accessible by bicyclists and pedestrians. All transit stops<sup>5</sup> should be served by sidewalks or walkways.
2. Secure bicycle parking and storage facilities should be provided at all transit stations and park-and-pool lots.
3. Provision should be made for transporting bicycles on transit vehicles.

**DESIGN GUIDELINES**

This chapter also sets forth a number of design guidelines intended to provide guidance to State, county, and local officials for the location, design, and maintenance of bicycle, pedestrian, and shared bicycle and pedestrian facilities. Because the level of bicycle and pedestrian activity is dependent in part on the density and design of land use and transportation facilities, this chapter also sets forth guidelines related to the design of streets, residential areas, and activity centers which may be expected to enhance opportunities for bicycle and pedestrian travel.

<sup>5</sup>A "transit stop" is an area usually designated by distinctive signs or by curb or pavement markings at which passengers wait for, and board or alight from, public transit vehicles.



## **GUIDELINES FOR BICYCLE FACILITIES<sup>6</sup>**

### **Planning Guidelines**

#### ***Introduction***

The type of bicycle facility that should be provided in a specific location is dependent upon a number of factors. For bicycle ways proposed to be located within a street or highway right-of-way, factors that should be considered include motor-vehicle speeds and volumes; the number of trucks and buses using the roadway; the presence and duration of onstreet parking; the number of intersections and commercial driveways; pavement and right-of-way width; and shoulder width and surfacing. The type of facility that should be provided will also depend on the type of roadway cross-section. Shared roadways, wide outside travel lanes, and bicycle lanes are generally appropriate for roadways with curb and gutter, while shoulder bicycle ways are appropriate for roadways without curb and gutter. It is also important to provide continuity and consistency in the type of bicycle way provided.

#### ***Arterial Streets and Highways***

Arterial streets are designed to carry high volumes of through traffic at relatively high speeds. Arterial streets are attractive for use by longer-distance utilitarian bicyclists because they are continuous, generally direct in alignment, and allow the bicyclist to maintain momentum because traffic control devices generally give priority to the arterial street over intersecting streets. In addition, activity centers such as shopping and office centers are often located on arterial streets.

Because of the high volumes and speeds of motor vehicles operating on arterial streets and highways, it will generally be necessary to provide a wide outside travel lane, a bicycle lane, or a paved shoulder to accommodate bicyclists on arterial facilities. In some cases, a separate bicycle path within a highway right-of-way may be needed to safely accommodate bicyclists.

#### ***Land Access and Collector Streets***

Land access streets are intended to provide access to individual building sites. Land access streets generally have low traffic volumes and operating speeds, and can safely accommodate bicyclists of all ages and skill levels, except young children, without widening of the roadway. Such streets may provide an alternative to bicycle travel on nearby arterial streets, particularly for children and adult bicyclists who are uncomfortable operating on busy streets.

Collector streets connect to arterial streets, serving to collect traffic from and distribute traffic to land access streets. Such streets are not intended to serve high-speed or long-distance through traffic and can generally accommodate bicycle travel without special roadway geometries.

#### ***Bicycle Access within and between Neighborhoods***

Land access and collector streets without bicycle lanes or wide outside travel lanes are generally adequate to accommodate bicycle travel within residential neighborhoods and major activity centers. Off-street bicycle ways should be provided to connect adjacent subdivisions that lack direct street access, or to connect cul-de-sac streets within subdivision. Off-street bicycle ways within a neighborhood should also be considered to provide access from residences to a school, park, or neighborhood shopping center.

Safe bicycle access should be provided between residential neighborhoods, between residential neighborhoods and major activity centers, and across barriers such as arterial streets, streams, and railway rights-of-way. Such

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<sup>6</sup>The design guidelines set forth in this chapter are not intended to serve as a comprehensive guide to the design of streets and highways to accommodate bicycles, but are intended to suggest the general type of design treatments that may be appropriate in certain situations. Design specifications should be determined during engineering studies for specific street and highway projects, and should be based upon recommendations contained in the *Guide for the Development of Bicycle Facilities*, published by the American Association of State Highway and Transportation Officials (AASHTO) and referred to hereafter in this chapter as the "AASHTO Bicycle Guide."

access may require the provision of crosswalks or traffic control devices or the construction of bicycle underpasses or overpasses.

## **Bicycle-Way Types and Roadway Improvements to Accommodate Bicycle Travel**

### ***Shared Roadways***

On a shared roadway, bicyclists and motorists share a travel lane. Standard travel lane widths of 10 to 12 feet on arterial streets are generally inadequate to accommodate bicycles and motor vehicles side by side in the same lane, and motor vehicles must cross the centerline or move into another travel lane to safely pass a bicyclist. Shared lanes are generally adequate to accommodate bicyclists on streets with low motor-vehicle traffic volumes and speeds and little truck traffic, such as collector and land access streets. On streets with higher volumes of motor-vehicle traffic, such as arterial streets, or with significant truck traffic, shared-lane bicycle travel may decrease the capacity of the roadway and create a hazardous situation for bicyclists.

Outside travel lanes wider than the standard 10 to 12 feet are desirable to accommodate bicyclists on arterial streets. Wider lanes allow a motorist overtaking a bicyclist to pass the bicyclist without changing lanes or encroaching into an adjacent motor-vehicle lane. Wider lanes also accommodate shared bicycle and motor-vehicle use without reducing the roadway capacity for motor-vehicle traffic.

Outside travel lanes should provide a minimum usable width of 14 feet, with usable width measured from the inside edge of the travel lane to the longitudinal joint between the pavement and gutter section on streets without onstreet parking. On streets that allow parking, an outside travel lane of at least 14 feet should be provided. The parking lane should be striped to ensure that parked vehicles do not encroach into the bicycle travel path.

Lane widths of more than 16 feet should be used with caution because they may encourage the unsafe operation of two motor vehicles in one lane. If lanes wider than 16 feet from lane stripe to curb face are provided, a bicycle lane or an edge stripe should be provided. Desirable cross-sections for roadways having wide outside travel or curb lanes are shown in Figure A-1.

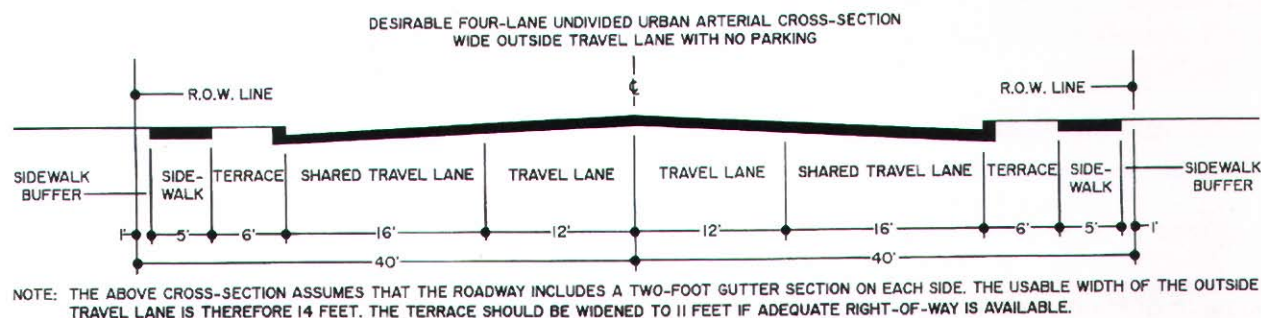
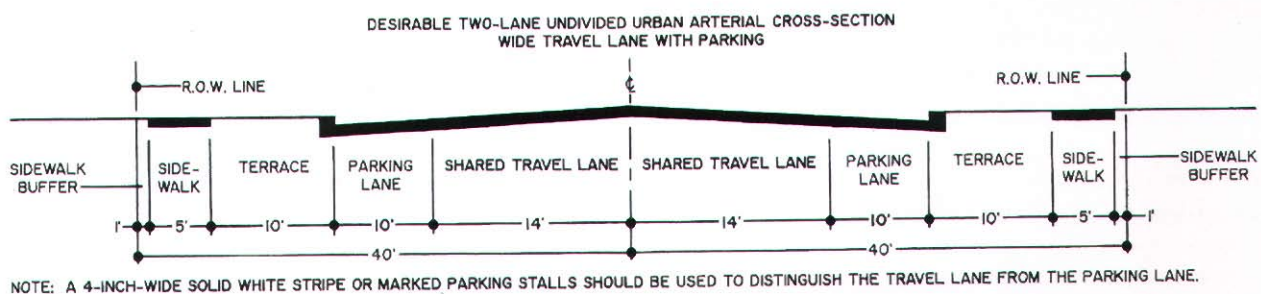
### ***Bicycle Lanes***

A bicycle lane is a portion of a roadway designated for the exclusive or preferential use of bicyclists by signing and pavement markings. Recommendations for signing and pavement markings for bicycle lanes are set forth in the Manual on Uniform Traffic Control Devices. Bicycle lanes should always be one-way facilities carrying traffic in the same direction as adjacent motor-vehicle traffic. Desirable cross-sections for streets and highways with bicycle lanes are shown in Figure A-2.

On streets where parking is prohibited, a minimum bicycle-lane width of five feet should be provided, with at least four feet located to the left of the longitudinal joint between the pavement and gutter section. The width of the bicycle lane should be increased to six feet on streets where motor-vehicle operating speeds exceed 35 miles per hour and on streets carrying significant numbers of transit vehicles or trucks. A pavement stripe is generally not necessary on the curb side of the bicycle lane if street parking is not permitted.

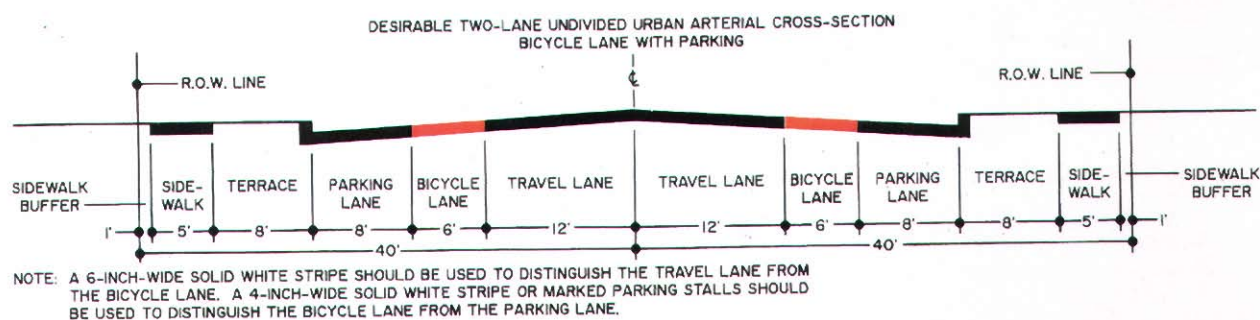
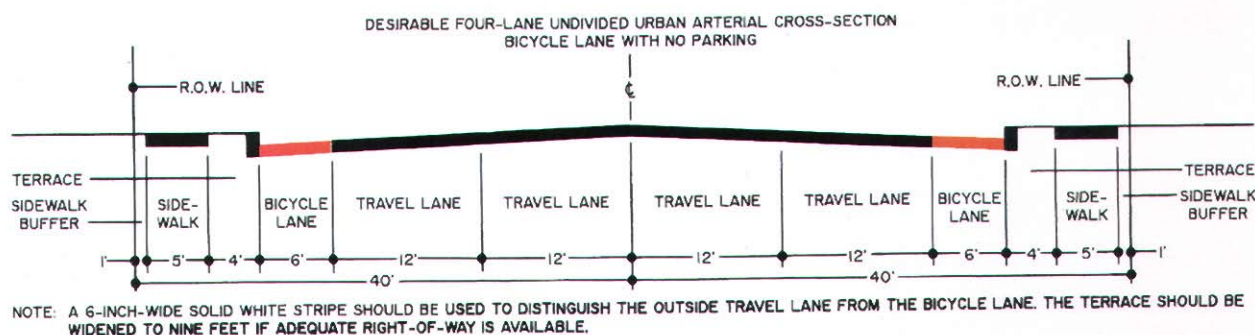
On streets where parking is permitted, bicycle lanes should be located between the outside motor-vehicle travel lane and the parking lane. Both sides of the bicycle lane should be marked. A left-hand pavement stripe should be used to differentiate the motor-vehicle travel lane from the bicycle lane and a right-hand pavement stripe should be used to separate the bicycle lane from the parking lane. A minimum bicycle-way width of five feet should be provided; however, a bicycle-lane width of six feet is recommended in order to provide bicyclists with additional separation from parked motor vehicles and the danger presented by opening vehicle doors. Bicycle lanes should not be located between the curb and the parking lane. Such a location reduces the visibility of bicyclists at intersections and increases the potential for bicycle-motor vehicle conflicts and collisions.

**Figure A-1**



Source: SEWRPC.

**Figure A-2**



Source: SEWRPC.

Bicycle lanes should not be separated from motor-vehicle travel lanes by curbing or other barriers. Such barriers prevent motor-vehicle drivers and bicyclists from executing proper merging maneuvers in advance of intersections and limit the ability of bicyclists to take evasive action at driveways. The construction of lane barriers along arterial streets would, moreover, create significant operational problems relating to snow removal, street maintenance, and utility construction and maintenance.



Bicycle lanes can complicate turning movements at intersections because they encourage bicyclists to keep right and motorists to keep left, regardless of their turning intentions. Bicyclists turning left from a bicycle lane and motorists turning right from the left of the bicycle lane are both maneuvering contrary to the generally accepted rules of the road. Design guidelines for intersection treatments intended to encourage proper merging maneuvers are included in a later section of this chapter.

### ***Transit/Bicycle Lanes***

A travel lane on an arterial street or highway intended to be shared by bicycles and transit vehicles should be 16 feet wide. Where bicycle traffic is significant, consideration should be given to delineating a 12-foot lane for transit vehicles adjacent to the curb and a four-foot lane for bicycles between the transit-vehicle lane and the motor-vehicle travel lane. The bicycle lane should not be placed between the transit-vehicle lane and the curb because doing so puts embarking and disembarking transit passengers at risk of being hit by a bicyclist and puts bicyclists at risk of being caught between the curb and a transit vehicle pulling over to a bus stop.

### ***Shoulder Bicycle Ways***

A shoulder is that portion of a roadway contiguous to the traveled way on streets and highways. Shoulders are generally constructed on streets and highways without curbs and gutters. The shoulder is intended for emergency use and also provides support for the traveled portion of the roadway.

Adding or improving shoulders can be a cost-effective way to accommodate bicyclists on streets and highways having a rural cross-section. In such cases, shoulders should be paved to a minimum width of four feet on two-lane streets and highways and eight feet on four-or-more-lane streets and highways. If shoulders wider than eight feet are needed, the additional area should not be paved. This is to discourage motor-vehicle operators from using the shoulders for passing. A pavement stripe should be used to visually separate the motor-vehicle travel way from the shoulder. Figure A-3 shows a desirable cross-section for a shoulder bicycle way on a two-lane rural arterial.

### ***Bicycle Paths***

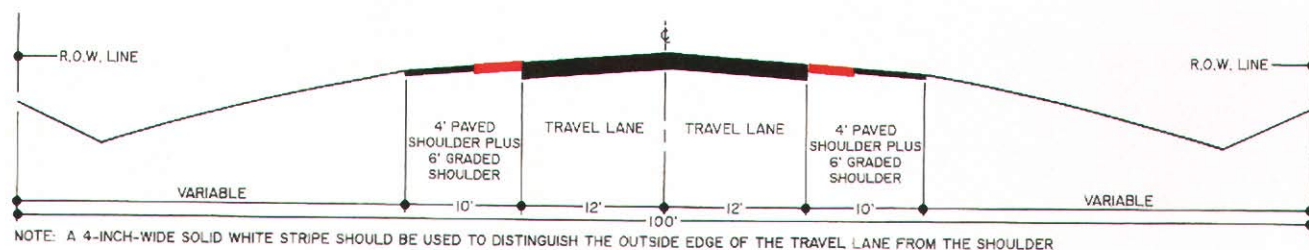
A bicycle path is a bicycle way that is physically separated from motor-vehicle traffic by distance or a barrier. A bicycle path may be located within a highway right-of-way or within a separate corridor such as a parkway, an abandoned railway corridor, or a utility right-of-way. Bicycle paths are normally two-way facilities, and often accommodate pedestrians as well as bicyclists.

Bicycle paths should not be located immediately adjacent to a roadway. The AASHTO Bicycle Guide lists the following problems commonly encountered with such a location:

- Unless paired, bicycle paths require one direction of bicycle traffic to ride against motor-vehicle traffic, contrary to the rules of the road.
- When the bicycle path ends, bicyclists going against traffic will tend to continue traveling on the wrong side of the street. Likewise, bicyclists approaching a bicycle path often travel on the wrong side of the street to access the path. Wrong-way travel by bicyclists is a major cause of bicycle-motor vehicle accidents and should be discouraged at every opportunity.
- At intersections, motorists entering or crossing the roadway often will not notice bicyclists coming from their right, as they are not expecting contraflow vehicles.
- Many bicyclists will use the roadway instead of the bicycle path because they find the roadway to be safer, more convenient, or better maintained. Bicyclists using the roadway are often harassed by motorists who feel that bicyclists should be using the path.

Figure A-3

**DESIRABLE TWO-LANE ARTERIAL CROSS-SECTION: SHOULDER BICYCLE WAY**



Source: SEWRPC.

- Bicyclists using the bicycle path generally are required to stop or yield at all cross-streets and driveways, while bicyclists using the roadway usually have priority over cross-traffic, because they have the same right-of-way as motorists.
- Because of the proximity of motor-vehicle traffic to opposing bicycle traffic, barriers are often necessary to keep motor vehicles out of bicycle paths and bicyclists out of traffic lanes. These barriers can represent an obstruction to bicyclists and motorists, and complicate maintenance of the bicycle path.

The construction of bicycle paths as parallel facilities to serve freeway or other arterial corridors should be considered where it is not feasible to locate a bicycle way on the arterial due to high posted motor-vehicle speeds or high volumes. Generally, bicycle ways should not be provided on streets and highways with vehicle operating speeds of more than 35 miles per hour or with traffic volumes in excess of those set forth in Standard No. 4 under Objective No. 1. Bicycle paths can be a valuable addition to the bicycle-way system in situations where the bicycle path offers good separation between bicycles and motor vehicles and where there are few at-grade intersections. Bicycle paths can also serve as important links between cul-de-sac streets or subdivisions.

Bicycle paths are commonly used to provide recreational opportunities through parks and natural resource corridors. Bicycle paths can also serve utilitarian bicyclists if they offer a more pleasant route than onstreet bicycle ways without compromising speed, directness, or safety.

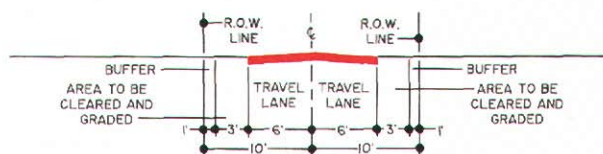
Figure A-4 shows a desirable cross-section for bicycle paths in rights-of-way independent from street and highway rights-of-way. A one-way bicycle path should be a minimum of five feet wide if built of concrete and six feet wide if built of asphalt concrete. The minimum six-foot-width requirement for an asphalt concrete path is based on the economics of paving. The smallest width a standard asphalt paving machine can pave is six feet. A path smaller in size is more expensive to build due to equipment and labor costs. With either a concrete or asphalt path, a stone base with a minimum width of 10 feet should be provided. The 10-foot width is necessary to accommodate and prevent damage due to construction equipment and maintenance vehicles.

Two-way bicycle paths should be a minimum of 10 feet wide with a minimum two-foot clearance on each side; however, a minimum width of eight feet may be adequate when the amount of bicycle and pedestrian traffic is expected to be low, there will be good horizontal and vertical alignment providing safe and frequent passing opportunities, and the path will not be subjected to maintenance-vehicle loading conditions that would cause pavement edge damage. In areas where higher volumes of pedestrian and bicycle use are anticipated—generally more than 25 pedestrians and 25 bicyclists per peak hour—consideration should be given to providing a 12-foot-wide path or separate paths for pedestrians and bicyclists. A centerline stripe and stripes indicating areas intended for bicyclists and those intended for pedestrians should be used to keep bicycles from straying outside the proper lane on sharp curves or in other areas with poor sight distance where it is not possible to reconstruct the curve or improve sight distance.



Figure A-4

**DESIRABLE TWO-WAY BICYCLE-PATH CROSS-SECTION  
PAVED SURFACE OUTSIDE STREET RIGHT-OF-WAY**



NOTE: CENTERLINES ARE NOT NORMALLY REQUIRED ON BICYCLE PATHS. WHERE CONDITIONS—SUCH AS LIMITED SIGHT DISTANCE—MAKE IT DESIRABLE TO SEPARATE TWO DIRECTIONS OF TRAVEL, A DOUBLE SOLID YELLOW LINE SHOULD BE USED TO INDICATE NO PASSING OR NO TRAVELING TO THE LEFT OF THE CENTERLINE.

Source: SEWRPC.

Desirable cross-sections for bicycle paths located within a street or highway right-of-way are shown in Figure A-5. A minimum separation of five feet is recommended between the bicycle path and the edge of the pavement in such situations. Use of a fence or concrete divider should be considered to offer additional protection to bicyclists from motor-vehicle traffic. The barrier should be no less than 4.5 feet in height to avoid the possibility of bicyclists falling over the barrier and into motor-vehicle traffic.

A barrier should be provided wherever a bicycle path intersects a roadway to prevent unauthorized motor-vehicle use of the bicycle path. A removable post that prevents unauthorized entry but allows access by maintenance and emergency vehicles is commonly used. The post should be brightly painted to improve its visibility for both motorists and bicyclists. Separating the path at the street intersection and installing low landscaping that can be crossed by maintenance and emergency vehicles also serve to discourage motor-vehicle use of the bicycle path.

## Intersections

### Introduction

A high percentage of bicycle-motor vehicle collisions occur at intersections. The presence of bicycle lanes and shoulder bicycle ways tends to further complicate turning movements at intersections because the bicycle ways separate bicycle and motor-vehicle traffic and tend to discourage merging and lane changes that should occur in advance of the intersection. Proper bicycle turning maneuvers are illustrated in Figure A-6. Wisconsin law provides bicyclists with the option of making either a pedestrian-style or a vehicle-style left turn, both of which are illustrated in Figure A-6.

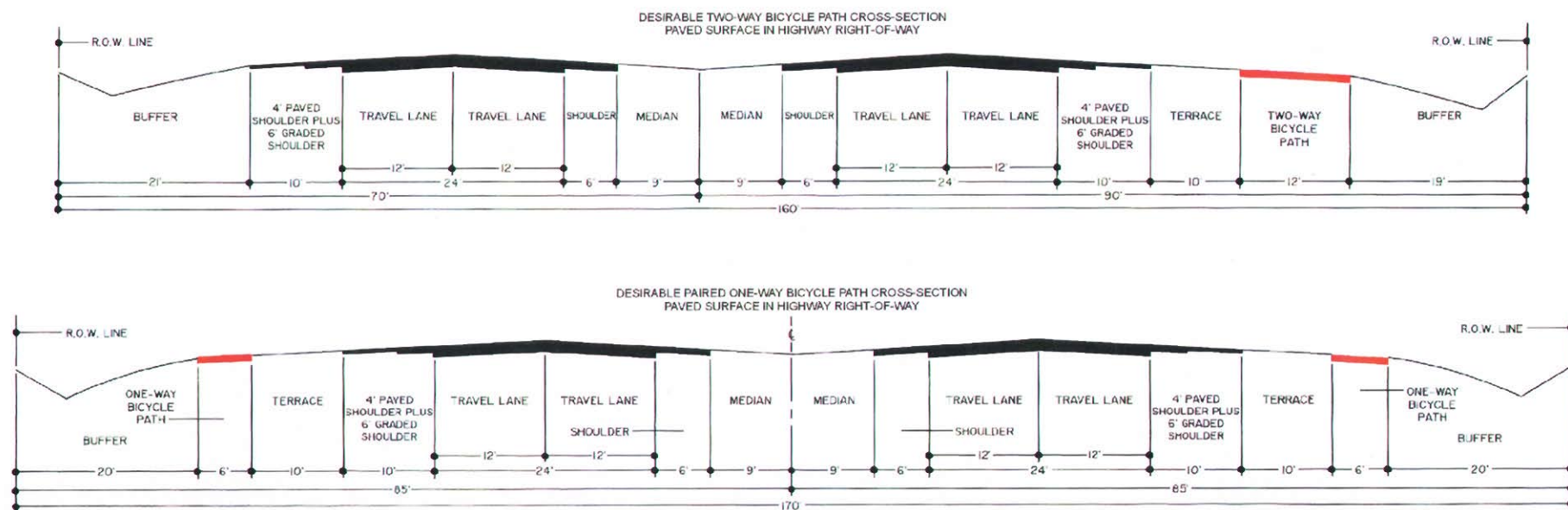
### Signing and Pavement Markings

The AASHTO Bicycle Guide recommends that signing and striping configurations, in accordance with recommendations contained in the Manual on Uniform Traffic Control Devices, be used to encourage and guide bicycle and motor-vehicle crossings in advance of an intersection. The clear demarcation of lanes and lane destinations can assist both bicyclists and motorists in choosing the proper lane.

Figure A-7 illustrates typical pavement markings at intersections on streets having bicycle lanes but no exclusive turning lanes. The Manual on Uniform Traffic Control Devices recommends that the solid stripes delineating the bicycle lane end at least 50 feet before the intersection. Dashed lines that delineate the bicycle lane for through bicyclists, but allow turning motor vehicles to merge across the bicycle lane, may be provided across the intersection. Another accepted option is to discontinue all bicycle-lane markings in the vicinity of the intersection.



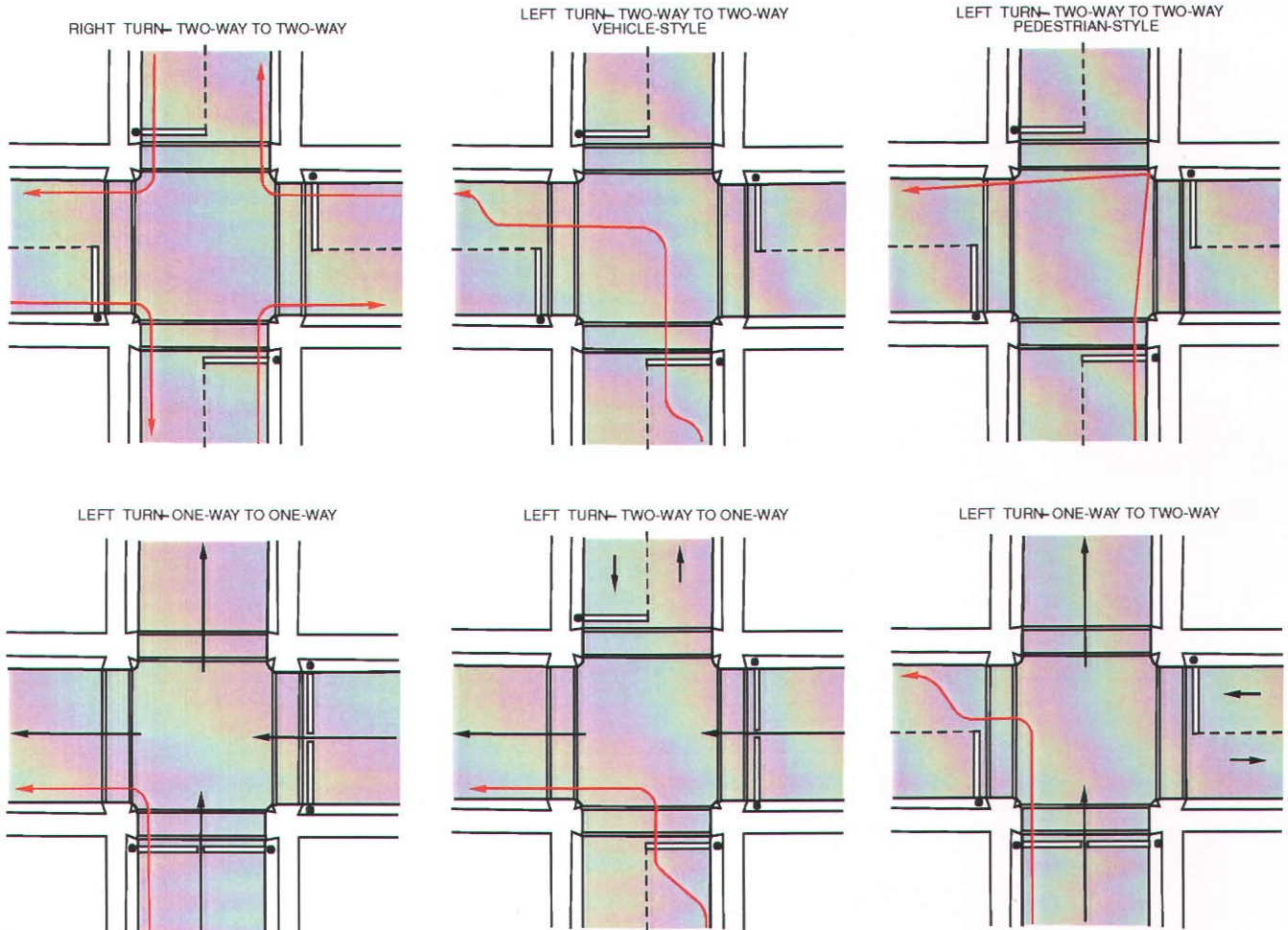
Figure A-5



Source: SEWRPC.

Figure A-6

## BICYCLE TURNING MOVEMENTS <sup>a</sup>



<sup>a</sup> Bicyclist should use proper hand signals to indicate their intended direction of travel to motorist, other bicyclists, and pedestrians.  
Source: Wisconsin Department of Transportation and SEWRPC.

### Intersections Involving Exclusive Right-Turn Lanes

On a street having both a bicycle lane and an exclusive right-turn lane, care must be taken to channelize through bicycle traffic to the left of the right-turn lane. The bicycle-lane stripe should be dashed or ended before the intersection to allow motor-vehicle and bicycle traffic to cross paths prior to the intersection. The striped bicycle lane may be resumed to the left of the right-turn lane at the intersection. In cases where an optional right-turn/through lane is provided, a bicyclist traveling straight ahead must be positioned in the center of the lane to avoid colliding with motorists turning right. Figure A-8 presents examples of pavement markings for bicycle lanes approaching motorist right-turn-only lanes.

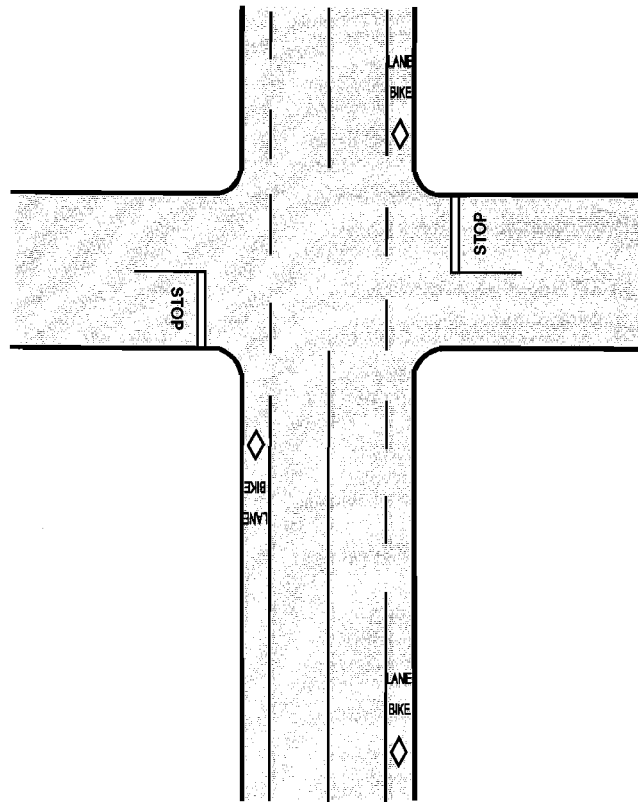
On streets having exclusive right-turn lanes and no bicycle lanes, efforts should be made to encourage bicyclists traveling straight through an intersection to position themselves in a through travel lane, rather than remaining on the right side of an exclusive right-turn lane. If possible, the right-turn lane should be designed so that the through bicyclist continues straight ahead, and the motorist turning right must merge to the right.

### Bicycle-Path-and-Roadway Intersections

Bicycle-path intersections and approaches should be on relatively flat grades. Stopping sight distances should be adequate to allow bicyclists to stop before reaching the intersection. Formulas for calculating stopping sight

**Figure A-7**

**TYPICAL PAVEMENT MARKINGS FOR STREETS  
HAVING BICYCLE LANES AND NO TURNING LANES**



*Source: U. S. Department of Transportation and SEWRPC.*

distances are provided in the most recent edition of the AASHTO Bicycle Guide. Traffic control devices, including signage on both the roadway and the bicycle path, should be provided in accordance with the Manual on Uniform Traffic Control Devices. Where a bicycle path crosses a high-volume, multi-lane arterial and signals or grade separations are not warranted, consideration should be given to providing a median refuge area for bicyclists. Such areas should have a minimum width of 10 feet.

***Signal Timing***

Signalized intersections should provide an adequate green phase and/or a longer all-red phase to allow bicyclists sufficient time to clear the intersection. To check the clearance interval, the most current (1991) edition of the AASHTO Bicycle Guide recommends that a bicyclist speed of 10 miles per hour and a perception-reaction-braking time of 2.5 seconds be used.

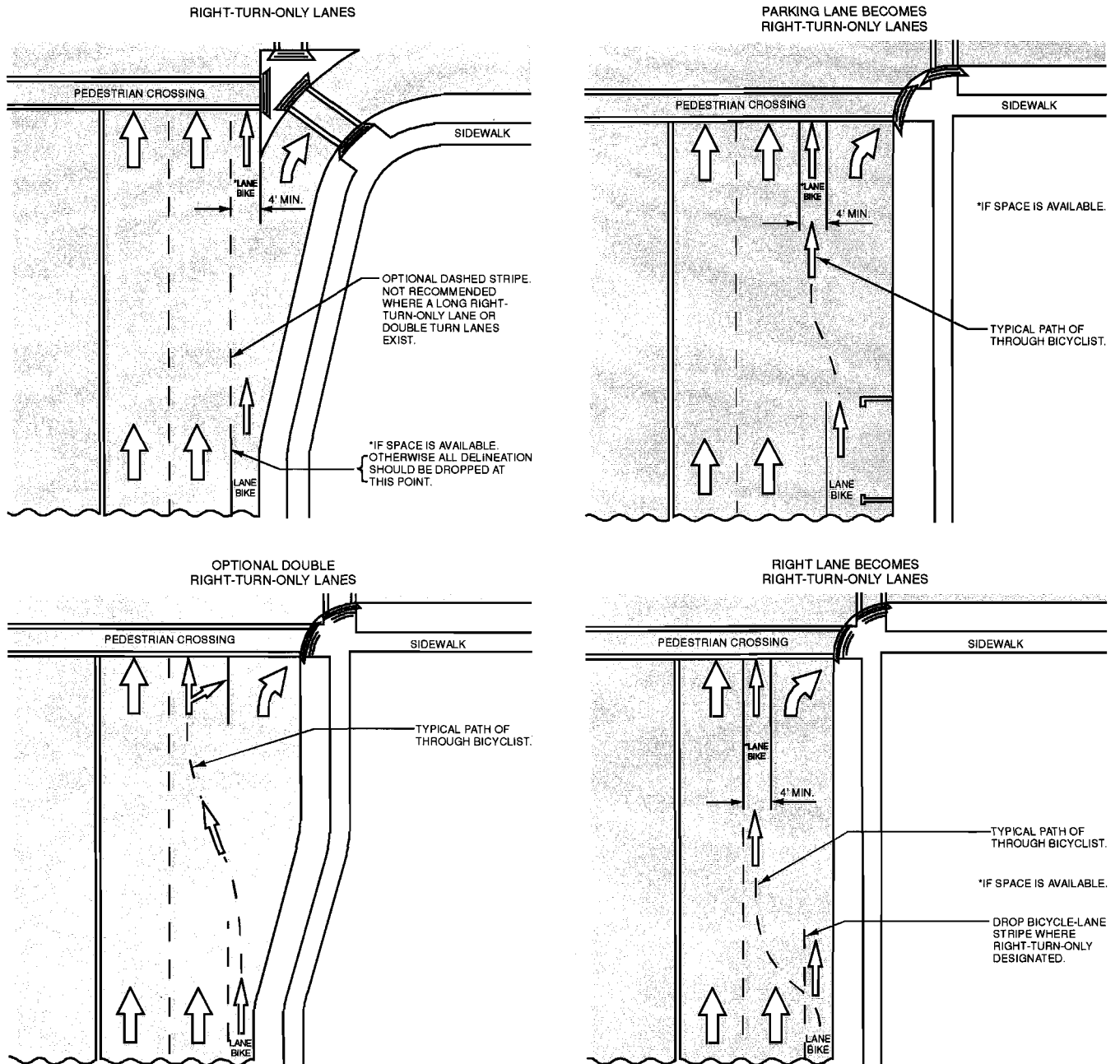
***Traffic Detectors***

Both bicycle-sensitive loop detectors and push-button controls that can be accessed by bicyclists without their having to dismount or make unsafe maneuvers should be provided at signal-light intersections located on bicycle ways. The detector should be located in the expected bicycle travel path. In some cases, it may be necessary to provide a mark on the pavement to indicate the area where the bicyclist must be positioned to trip the signal.



**Figure A-8**

**TYPICAL PAVEMENT MARKINGS FOR STREETS HAVING BICYCLE LANES AND RIGHT-TURN LANES**



Source: American Association of State Highway and Transportation Officials and SEWRPC.

## Surfacing

### Pavement Surface

Bicycle-way pavement surfaces should be maintained in good condition. Pavement irregularities such as cracks, holes, or bumps can cause a bicyclist to lose control of the bicycle and either fall or swerve into motor-vehicle traffic. Cracks and holes should be filled promptly and utility manhole and handhole covers should be maintained flush with the pavement surface.

### ***Drainage Grates and Utility Covers***

Wherever possible, drainage grates and utility manhole and handhole covers should be located outside the travel path of bicyclists. Grates and utility covers should be flush with the pavement surface. Bicycle-safe drainage grates should be used on all streets and highways where bicycles are legally permitted to operate.

### ***Rumble Strips***

Rumble strips present a hazard to bicyclists. As such, they should be used only as a specific counter measure to an identified safety problem. If rumble strips are needed, they should either be located outside the travel path of bicyclists, or perpendicular openings wide enough for bicycles to pass through should be provided. Rumble strips should not be located near intersections or driveways, because bicyclists may need to merge into the motor-vehicle travel lanes at these locations to begin their turning movements.

### ***Raised Pavement Markings***

Pavement reflectors or other raised pavement markings present a hazard to bicyclists because they can deflect a wheel and cause a fall or a turn into motor-vehicle traffic or another obstacle. Raised pavement markings should be avoided as much as possible. In cases where they must be used, they should be located outside the travel path of bicyclists.

### ***Bicycle-Path Surfacing***

A smooth riding surface should be constructed and maintained on bicycle-path surfaces. The type of surface should be chosen based on the anticipated number and type of users. Bituminous or portland cement concrete surfaces provide a higher level of service than crushed-rock surfaces, and are, therefore, more appropriate for bicycle paths expected to receive heavy use or use by utilitarian bicyclists. Bicycle-path surfaces and structures should be of adequate width and strength to support emergency, patrol, maintenance, and other motor vehicles that may be expected to use or cross the path.

## **Design Guidelines**

### ***Design Speed***

Bicycle facilities should be designed to accommodate speeds attained by experienced bicyclists. In level or gently rolling terrain, a design speed of at least 20 miles per hour should be used. The design speed should be increased to 30 miles per hour when a descending grade exceeds 3 percent for a distance of 500 feet or more.

### ***Grade***

Grades on bicycle facilities should be kept to a minimum. The maximum desirable grade should be 5 percent on paved surfaces and 3 percent on crushed-stone surfaces. Steeper grades are acceptable for short distances; however, grades should not exceed 5 percent for more than 500 feet. The width of the bicycle facility should be increased on steep slopes to compensate for bicycle sway on the uphill side and to accommodate faster speeds on the downhill side.

### ***Sight Distance***

Bicycle facilities must be designed to provide adequate sight distance for bicyclists to avoid striking an unexpected object or person in their travel path. Formulas for calculating stopping sight distances for horizontal and vertical curves for various design speeds are provided in the AASHTO Bicycle Guide.

### ***Horizontal and Vertical Clearances***

Guardrails, signposts, utility posts, and similar obstructions should be set back a minimum of two feet, and preferably three feet, from the edge of a bicycle way to allow a clear zone for bicyclists. Clearance to overhead obstructions should be a minimum of eight feet, with 10 feet preferred.

Tree and shrub trimming should provide a minimum vertical clearance of eight feet and a minimum horizontal clearance of two feet on both sides of a bicycle way at all times. Additional horizontal clearances should be provided in secluded areas to minimize places where would-be attackers could conceal themselves.

### ***Horizontal Curves***

Radii of horizontal curvature for streets with bicycle ways, which streets are designed for higher-speed motor vehicles, may be expected to be adequate for bicycles. The AASHTO Bicycle Guide provides a formula for determining minimum radii of horizontal curvature on bicycle paths on the basis of design speed and other factors. Where existing substandard-radius curves cannot be reconstructed because of right-of-way or other factors, curve-warning signs and pavement markings, including a centerline stripe, should be used. The width of the bicycle path should be increased through the curve.

### ***Horizontal Alignment***

The AASHTO Bicycle Guide provides a formula for determining superelevations on bicycle paths on the basis of design speed and other factors. A 2 percent cross-slope is recommended on tangent sections.

### ***Bridges***

Bridges often present obstacles to bicyclists because of high traffic volumes, narrow widths, open grate decking, and expansion joints. It is often necessary to accommodate bicycles on such structures to provide access across major barriers and to assure bicycle-way continuity. When designing or retrofitting bridges and similar structures for bicycle use, bicycle-safe decking and expansion joints should be used. In some cases, it may be necessary to direct bicycle traffic to use sidewalks when crossing the bridge. In such cases, the sidewalk should be widened to a minimum of eight feet, with 10 feet preferred, to accommodate joint bicycle and pedestrian use. A wider bicycle-pedestrian way should be provided if the bridge or its approaches have a gradient of 6 percent or more for more than 500 feet, if needed to match the width of the bicycle way providing access to the bridge, or if bicycle and pedestrian use is expected to be high. Railings or other barriers with a minimum height of 4.5 feet should be provided on the outside of the bicycle way. If a separate bicycle path or sidewalk bicycle way is provided, a minimum 4.5-foot-high barrier should be provided to separate motor-vehicle and bicycle traffic.

### ***Bicycle Bridges***

Where separate bicycle or bicycle-pedestrian bridges are provided, the bridge should be at least as wide as the approaching bicycle way, but no less than eight feet wide, with an additional minimum two-foot clear zone on each side. Ramp grades should not exceed a rise-to-run ratio of 1:12. A railing or fence with a minimum height of 4.5 feet should be provided along both sides of the bridge. A smooth rub rail should also be provided at handlebar height (3.5 feet).

### ***At-Grade Railway Crossings***

Where possible, a bicycle way should cross railway tracks 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 approximately 45 degrees, consideration should be given to widening the outside lane, shoulder, or bicycle lane to improve the angle of approach, as illustrated in Figure A-9. It is also important that the roadway surface be at the same elevation as the rails. Rubberized railway crossing mats, which offer a good combination of smoothness and traction, should be used where bicycle ways cross railway tracks.

### ***Lighting***

The needs of bicyclists should be considered when designing lighting for streets and highways. Adequate lighting should be provided for onstreet bicycle ways, bicycle paths, and at bicycle-path-and-street intersections.

### ***Overpasses***

Bicycle-way overpasses are preferred to underpasses where personal security may be a concern. The greater visibility provided by an overpass will offer better security to bicyclists than underpasses. Where underpasses must be used, they should be well lit and designed so bicyclists can see potential hazards before entering the underpass.

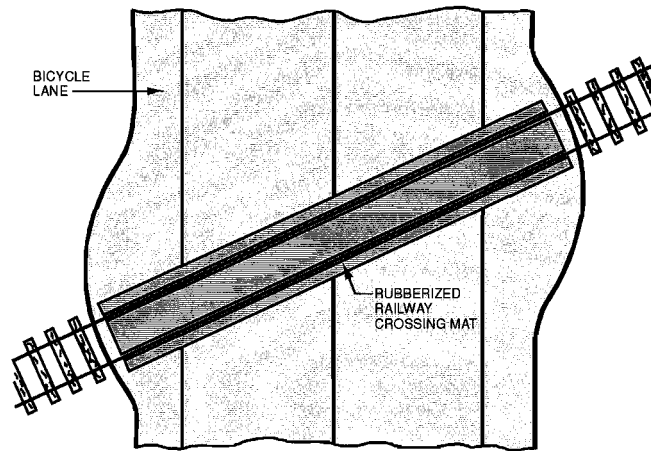
### ***Driveway Approaches***

Where possible, gravel driveway approaches should be paved a distance of 10 feet back from the edge of the pavement to decrease the amount of loose gravel that migrates into the bicyclists' travel path.



**Figure A-9**

**WIDENING OF SHOULDERS TO ACCOMMODATE  
RIGHT-ANGLE CROSSING OF RAILWAY TRACKS**



Source: Wisconsin Department of Transportation and SEWRPC.

***Signing and Marking***

Bicycle ways should be signed and marked in accordance with the Manual on Uniform Traffic Control Devices.

***Bicycle-Way Identification***

Signs spaced at appropriate intervals should be used to identify bicycle routes, lanes, and paths.

**Maintenance**

***Pavement Surfaces***

Street and bicycle-way surfaces should be smooth and free from irregularities. Cracks and potholes, particularly in the bicycle travel path, should be promptly repaired.

***Removal of Debris***

Routine maintenance programs should be established to remove sand, gravel, glass, and other debris from streets and bicycle ways. Particular attention should be given to sweeping and maintaining streets signed as bicycle ways.

***Snow and Ice Removal***

Bicycle ways intended to serve primarily utilitarian travel should be kept clear of snow and ice.

**Bicycle Parking**

***Location***

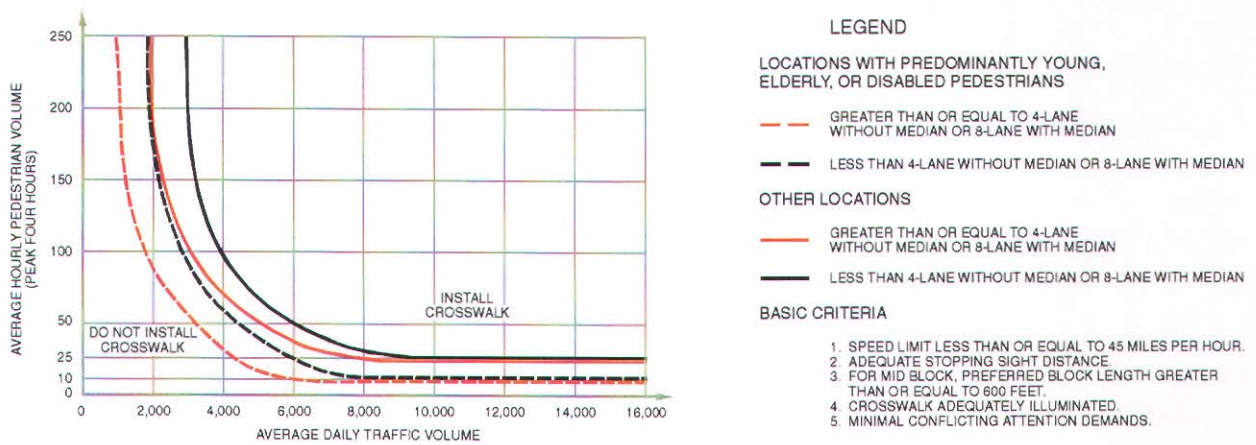
Bicycle parking areas should be located close to bicyclists' destinations. Where possible, bicycle parking areas should be located near building entrances. In addition to offering convenience, such a location provides added security due to higher visibility.

***Accessibility***

Bicycle parking and storage areas should be accessible from driveways or ramps designed to accommodate bicycle travel.

**Figure A-10**

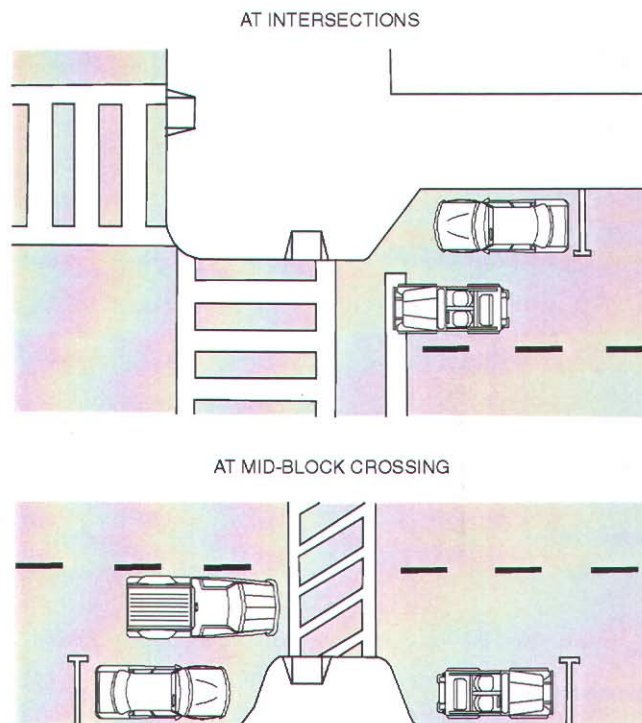
# **GUIDELINES FOR CROSSWALK INSTALLATION AT UNCONTROLLED INTERSECTIONS AND MID-BLOCK CROSSINGS**



Source: Federal Highway Administration.

**Figure A-11**

# **EXAMPLES OF SIDEWALK EXTENSIONS TO IMPROVE PEDESTRIAN VISIBILITY**



Source: Federal Highway Administration

***Security***

Bicycle parking devices should be designed so that bicyclists can lock the frame and front wheel, at a minimum, to a stable, upright structure that does not damage the bicycle frame, components, or finish; and designed so that the bicycle cannot twist or be knocked over.

***Bicycle Lockers***

Both bicycle racks and bicycle lockers should be provided at places where long-term, secure bicycle parking is needed, such as major employment centers, transit stations, and park-and-pool lots.

***Usability***

Bicycle parking devices should accommodate all types of bicycle frames and bicycle locks, including the high-security "U" locks.

***Ease of Operation***

Bicycle parking devices should be easy to operate and understandable to both children and adults. Bicycle parking devices should be spaced so that bicycles can be easily secured.

***Protection from Motor Vehicles***

Bicycle and motor-vehicle parking areas should be separated by distance or by a physical barrier to prevent bicycles from being damaged by motor vehicles.

***Lighting***

Bicycle parking areas should be well lit for security and safety purposes.

**GUIDELINES FOR PEDESTRIAN FACILITIES****The Americans with Disabilities Act**

Facilities intended to facilitate the access of disabled persons to public and commercial buildings and services are required as part of the Federal Americans with Disabilities Act of 1990. The Act requires commercial and public buildings, such as office buildings, passenger terminals and stations, stores, and restaurants to be accessible by persons with disabilities. This necessitates that exterior routes leading from streets, transit stops, and accessible parking areas to such buildings be designed and constructed to accommodate persons with disabilities.

The U. S. Department of Justice promulgated regulations in July 1991 to implement those portions of the Act that apply to public and commercial buildings and sites. Regulations implementing requirements related to transportation facilities were promulgated in September 1991. Regulations are pending which would set forth requirements related to public rights-of-way, such as the use of audible pedestrian crossing signals and requirements for the construction and location of sidewalks.

Americans with Disabilities Act requirements are referenced or included in the following guidelines where appropriate. Due to the extent of the regulations, it is not possible to include all relevant requirements in this report. The Americans with Disabilities Act regulations should be consulted before designing or reconstructing public or commercial facilities.

**Sidewalk Installation Guidelines**

Sidewalks should be provided in areas of existing or planned urban industrial, commercial, and residential development in accordance with the criteria set forth in Table A-2 earlier in this chapter.

**Width**

The width of sidewalks along streets in a central business district should be based upon pedestrian volumes and the desired level of service in accordance with the procedures set forth in the most recent edition of the Transportation Research Board's Highway Capacity Manual. Sidewalks should be a minimum of five feet in



width along all streets in commercial and industrial areas outside the central business district, and along arterial and collector streets in residential areas. Sidewalks along land access streets should be a minimum of five feet in width in areas of medium- or high-density residential development, and a minimum of four feet in width in areas of low- or suburban-density residential development.

An unobstructed sidewalk width of no less than three feet should be provided. The Americans with Disabilities Act requires that passing areas at least five feet in width and five feet in length be provided at intervals of no more than 200 feet where sidewalks are less than five feet in width.

### **Separation from Motor-Vehicle Traffic**

Sidewalks located immediately adjacent to motor-vehicle travel lanes discourage pedestrian travel because of noise and the perception of hazard. A landscaped or surfaced area, referred to as a “terrace” in this report, should be provided between the curb or edge of pavement and the inside edge of the sidewalk to provide additional separation between motor-vehicle and pedestrian traffic. Terraces provide a more pleasant pedestrian environment by providing an area off the sidewalk for signposts, streetlights, utility poles, trash cans, and other street furniture; provide an area for street trees and other landscaping; allow driveway aprons to be located outside of the sidewalk area; provide additional area for snow storage; and reduce splashing of pedestrians by passing motor vehicles operating on wet pavements. A desirable terrace width of 10 feet is recommended in commercial and industrial areas, and of six to nine feet in residential areas.

### **Curb Ramps**

Curb ramps should be provided in accordance with the requirements of the Americans with Disabilities Act and with Section 66.616 of the Wisconsin Statutes.

### **Surfacing**

Walking surfaces should be skid-resistant, sloped for proper drainage, and offer a level and mud-free surface.

### **Longitudinal Slope and Cross-Slope**

The longitudinal slope of a sidewalk should not exceed the grade of the adjacent street. The grade of a pedestrian way outside a street right-of-way should not exceed 12 percent unless steps are provided. The cross-slope of sidewalks and other pedestrian ways should not exceed 2 percent.

The maximum longitudinal slope and cross-slope of an accessible route permitted by the Americans with Disabilities Act are 5 percent and 2 percent, respectively. An accessible route with a longitudinal slope greater than 5 percent is considered a ramp. The longitudinal slope of the ramp must not exceed a rise-to-run ratio of 1:12, and the maximum permitted rise between landings is 30 inches. Landings must be provided at the bottom and top of each ramp. The landing must be at least as wide as the ramp leading to it, but no less than three feet in width, and a minimum of five feet in length. Handrails must be provided along both sides of any ramp which rises more than 0.5 feet or runs more than six feet.

### **Horizontal and Vertical Clearances**

Signs, utility posts, and similar obstructions should be set back a minimum of two feet from the edge of a pedestrian way. Clearance to overhead obstructions should be a minimum of seven feet. Tree and shrub trimming should also provide a minimum vertical clearance of seven feet and a minimum horizontal clearance of two feet. Additional horizontal clearances should be provided in secluded areas to minimize places where would-be attackers could conceal themselves.

### **Amenities**

Street trees and other landscaping should be provided in street rights-of-way to enhance the pedestrian environment. Street furniture and other amenities such as benches, waste receptacles, and drinking fountains should be provided in terraces adjacent to sidewalks in commercial areas to serve pedestrian needs and add visual interest. Street vending machines and mailboxes should be placed in the terrace or in another location that does not interfere with pedestrian movement along the sidewalk.

### **Lighting**

The needs of pedestrians should be considered when designing lighting for streets and highways. Adequate lighting should be provided for sidewalks and other pedestrian ways, and at street intersections.

### **Street Crossings**

#### ***Signal Timing***

The timing of pedestrian phases for traffic signals should incorporate safe crossing intervals based upon an average walking speed of four feet per second. This speed may need to be modified at busy intersections where pedestrian crowding and vehicle turning movements may lengthen crossing time, and at crossings commonly used by elderly or disabled pedestrians who may require additional time to cross the street.

#### ***Crossing Orientation***

Pedestrian ways should be oriented toward intersection crossings rather than mid-block crossings.

#### ***Right Turns on Red:***

Although the right-turn-on-red rule has generally resulted in time and fuel savings for motorists, it presents a hazard to pedestrians due to motorists who fail to notice or yield the right-of-way to pedestrians crossing the street in front of them. It may be necessary to prohibit right turns on red at intersections that present substantial conflicts between pedestrians and right-turning motorists, or to prohibit right turns on red during those times of the day when large numbers of schoolchildren or other pedestrians are present.

#### ***Refuge Islands and Medians***

A raised refuge island or median should be provided where the roadway to be crossed is 65 feet or more in width or has five or more traffic lanes; at signalized intersections where the street cannot be crossed within the walk cycle using a walking speed of four feet per second and the signal timing cannot be lengthened; and at complex or irregularly shaped intersections where pedestrians may need a safe place to stop and orient themselves. A raised refuge island or median should also be provided in roadways having four traffic lanes where such roadways are located adjacent to or near activity centers or in areas frequented by elderly, disabled, or child pedestrians. Refuge islands should be a minimum of six feet wide and 12 feet long, and easily recognizable by motorists to minimize the hazard to both motorists and pedestrians. Design criteria for refuge islands are contained in the American Association of State Highway and Transportation Officials' Policy on Geometric Design of Highways and Streets.

Raised median islands should have curb ramps at both sides leading to a level area at least four feet long. A level area is needed to provide a safe place for wheelchair users to wait for traffic to clear without fear of rolling down into the traffic lane. If the refuge island is too narrow to provide a four-foot-long level area, the crosswalk should continue through the island at street level.

#### ***Pedestrian-Actuated Controls***

Pedestrian-actuated controls to activate "walk" signals—generally push buttons—should be located in areas that can be conveniently accessed by pedestrians, and such areas should be kept clear of snow and stormwater. Push-button controls should be easy to understand and use. Where two crosswalks, oriented in different directions, end at or near the same location, push buttons should be positioned to clearly indicate which crosswalk signal is actuated by each push button. Additional push-button activators may be required on islands or medians where a pedestrian might become stranded, and should always be provided when a street cannot be crossed within one walk cycle based on an average walking speed of four feet per second. The provision of push-button activators to extend the crossing interval should be considered at intersections which are frequently used by pedestrians with slower-than-average walking speeds.

### **Crosswalks**

Marked crosswalks are intended to alert motorists to the possible presence of pedestrians and to mark a preferred location for pedestrians to cross the street. However, unwarranted marked crosswalks and advance pedestrian crossing signs may increase motorist noncompliance with these traffic control devices. Marked crosswalks may

also give pedestrians a false sense of security, particularly when they are provided at unsignalized crossings. Marked crosswalks should therefore be used judiciously.

Crosswalk markings should be installed at all signalized intersections with pedestrian signal indicators; where needed to delineate the preferred crossing location at a confusing intersection or to channelize multiple crossings; at all locations where a school crossing guard is normally stationed; and at intersections and mid-block crossings meeting the minimum pedestrian and motor-vehicle volume criteria shown in Figure A-10.

#### ***Crosswalk Width***

Crosswalks should be a minimum of six feet in width, with eight feet desirable. The width of the crosswalk should be increased beyond eight feet if necessary to equal that of the approaching sidewalk or walkway; or if needed to provide an acceptable level of service in accordance with the procedures set forth in the most recent edition of the Transportation Research Board's Highway Capacity Manual.

#### ***Crosswalk Markings***

Crosswalk markings should be provided in accordance with the recommendations set forth in the Manual on Uniform Traffic Control Devices.

#### ***Sight Distance***

Crosswalks should be located where they are in clear view of approaching motorists and where motorists have adequate stopping sight distance. Visual obstructions such as vegetation and street furniture between motorists and pedestrians using or entering the crosswalk should be removed or relocated. Curb parking should be prohibited near the crosswalk to provide adequate sight distance for pedestrians using the crosswalk and for motorists approaching the crosswalk, with parking prohibited within a minimum of 15 feet of a crosswalk. Extending the sidewalk at crosswalk locations, as illustrated in Figure A-11, can improve pedestrian visibility and prevent parked vehicles from blocking the crosswalk.

#### ***Stop Lines***

The installation of stop lines at crosswalk locations controlled by signals or stop signs is effective in reducing vehicle encroachment into the crosswalk. Such encroachments may create a physical barrier for pedestrians and reduce the ability of adjacent motor-vehicle operators to see crossing pedestrians. Stop lines should be placed four feet in advance of and parallel to the crosswalk.

#### ***Mid-Block Crossings***

Proper design of mid-block crossings requires that special consideration be given to providing adequate sight distance for both pedestrians and motorists and providing advance notice to motorists of the presence of a mid-block crossing. Advance crossing signs should be provided as set forth in the Manual on Uniform Traffic Control Devices. The width of the crosswalk lines may be increased up to two feet and the area within the crosswalk may be painted with diagonal or longitudinal lines on streets and highways with vehicle operating speeds of 35 miles per hour or more or where safety concerns warrant the added visibility.

#### ***Traffic Control Devices***

Traffic control devices such as traffic signals, signs, and pavement markings have been designed to enhance the safety and mobility of both pedestrians and motorists. Such devices should be provided in accordance with the recommendations set forth in the Manual on Uniform Traffic Control Devices.

#### ***Traffic Controls for School Areas***

Traffic controls for school areas should be provided in accordance with the recommendations set forth in the most recent edition of the Manual on Uniform Traffic Control Devices. The development of a school route plan for each school serving elementary-school and kindergarten students is useful for identifying and evaluating safe walking routes to school and safe and effective traffic control in school areas. The publication entitled School Trip Safety Program Guidelines, published by the Institute of Traffic Engineers (ITE) in 1984, sets forth a process for identifying safe school routes and related traffic control measures. The process relies on a committee of



parents, schoolteachers and school administrators, traffic engineers, and police officers to prepare and distribute maps showing recommended school routes and school crossings. The committee also identifies areas and issues of concern and evaluates potential corrective measures. The planning process facilitates the orderly review of school-area traffic needs and provides a means of coordinating school pedestrian-safety education with engineering studies and improvements. It is recommended that the ITE process or a similar process be instituted in locations where safe routes to school are a concern.

### **Maintenance**

Well-maintained pedestrian facilities encourage pedestrian use, reduce the potential for injury, enjoy prolonged facility life-spans, and enhance community image. Special attention should be given to keeping pedestrian facilities free of snow, ice, mud, and water; repairing cracks in sidewalks and other pedestrian ways; and maintaining signs, pavement markings, and other traffic control devices intended to assist pedestrians.

## **GUIDELINES FOR SHARED BICYCLE AND PEDESTRIAN FACILITIES**

### **Joint Sidewalk Use**

Sidewalks generally should not be designated as bicycle ways due to the potential for conflicts between bicyclists and pedestrians. The conflicts can be attributed primarily to the difference in speed between the two modes. The average pedestrian may be expected to travel at approximately three miles per hour, while average and experienced adult bicyclists may be expected to travel at approximately 10 and 20 miles per hour, respectively. The difference in travel speeds can lead to bicycle-pedestrian collisions. Pedestrians may also misjudge a bicyclist's speed and braking or maneuvering ability, increasing the potential for collisions. Providing wider sidewalks with the intention of decreasing pedestrian-bicycle conflicts may encourage bicyclists to increase their travel speed and inadvertently lead to more serious conflicts than those that existed prior to the sidewalk widening.

In addition to pedestrian-bicycle conflicts, sidewalks designated as bicycle ways may present bicyclists with danger related to fixed objects such as signposts, fire hydrants, and mailboxes located on or along the sidewalk, and with motor-vehicle operators who may not expect to encounter a relatively fast-moving bicyclist at driveways and intersections. Sight distances along the sidewalk may be inadequate to allow the bicyclist adequate time to stop before encountering a motor vehicle or other hazard.

In spite of the potential for conflicts inherent with bicycle use of sidewalks, there may be certain situations, such as bridge crossings or narrow street rights-of-way, where there is no reasonable alternative to routing bicycle traffic onto a sidewalk. In such situations, use of signs and pavement markings should be considered to warn bicyclists and pedestrians that the facility is open to both types of users, and to direct bicyclists to yield to pedestrians. Provision must also be made at each end of the sidewalk to safely route bicycle traffic to and from the sidewalk.

Although sidewalk bicycling by adults should be strongly discouraged, young children should be allowed to bicycle on the sidewalks near their homes until they develop the knowledge and skills needed to operate on the street.

### **Shared Use of Bicycle and Pedestrian Paths**

Some off-street bicycle and pedestrian paths within the Region have been designed for shared use by bicyclists and pedestrians. Other users, such as joggers and in-line skaters, may also use off-street bicycle and pedestrian paths, although such uses may not have been anticipated at the time the path was designed and constructed. Shared use may be acceptable provided the path is wide enough to safely accommodate all users.

Bicycle and pedestrian paths intended for shared use should be a minimum of 12 feet in width if more than 50 users are expected during the peak-use hour. A minimum 10-foot-wide path should be provided for shared use

where fewer users are anticipated. A right-of-way width of 20 feet is recommended for off-street bicycle and pedestrian paths.

Consideration should be given to providing separate bicycle and pedestrian paths in areas that receive heavy use by both bicyclists and pedestrians. If separate paths cannot be provided, existing shared facilities could be striped to delineate separate areas for pedestrians and bicyclists. Where separate paths are provided, activities with comparable speeds and maneuverabilities should be combined, such as in-line skating with bicycling and jogging with walking. Equestrians and bicyclists should not be accommodated on the same facility.

Off-street paths intended to accommodate bicycle travel should be developed in accordance with the most recent edition of the AASHTO Bicycle Guide. Facilities that do not meet AASHTO guidelines should be signed as recreational trails rather than as bicycle paths.

## **GUIDELINES FOR STREET AND SITE DESIGN MEASURES TO FACILITATE BICYCLE AND PEDESTRIAN TRAVEL**

### **Street Design**

Many bicyclists and pedestrians choose to travel on nonarterial streets because it is more convenient or more pleasant than travel along arterial streets. In some cases, a bicycle way may be designated on a nonarterial street paralleling an arterial street where right-of-way or other limitations or conditions make it impractical to provide a bicycle way on the arterial street. Conditions may be improved for bicyclists and pedestrians on nonarterial streets by slowing motor-vehicle traffic and preventing such streets from being used by through motor-vehicle traffic.

The term “traffic-calming” has been applied to a variety of measures intended to slow motor-vehicle speeds, to discourage through motor-vehicle traffic on nonarterial streets, and to make such streets more pleasant for both motorized and nonmotorized travel. Traffic-calming measures include the use of median strips, traffic diverters or semi-diverters, widened sidewalks at intersections, textured pavements, reduced speed limits, narrowed traffic lanes, limitation of vehicle turning movements, traffic circles, cul-de-sacs, and street closings. Selected traffic-calming techniques are illustrated in Figure A-12. Implementation of such measures requires the preparation of a traffic engineering study to identify traffic problems and evaluate the effectiveness of potential traffic control measures, as well as the potential effects on other streets in the area, the effect on bicycle and pedestrian travel, the potential increase in circuitous travel, and the implications for the provision of emergency and maintenance services.

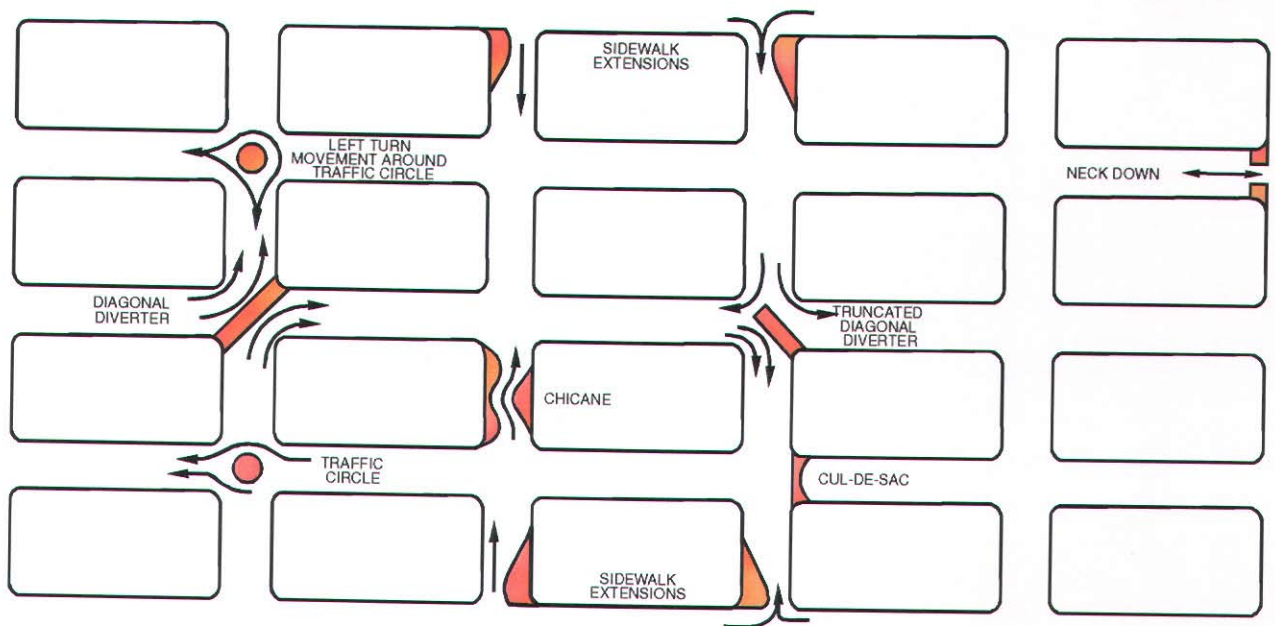
### **Site Design**

Typical routes in residential neighborhoods often require a bicyclist or pedestrian to travel along the arterial street system or to follow a circuitous route to reach a desired destination. Bicycle and pedestrian access through residential blocks and across subdivision boundaries can provide more direct connections between homes and activity centers, and may encourage more people to bicycle or walk by decreasing distances and providing a longer portion of the trip along quieter nonarterial streets or off-street bicycle and pedestrian ways. Off-street bicycle and pedestrian ways should be provided to connect cul-de-sac streets and adjacent streets across blocks of 900 feet or longer, and should be provided to connect adjacent subdivisions and subdivisions and activity centers where alternative onstreet routes are unduly circuitous.

Compact and mixed-use forms of development serve to encourage bicycle and pedestrian travel by decreasing the distance between residential areas, employment centers, and other activity centers. For example, restaurants, banks, and convenience shopping centers should be located on a common site or within walking distance of major employment centers, and bicycle and pedestrian facilities should be provided to accommodate bicycling and walking trips between activity and employment centers. Local governments should promote a neighborhood unit concept of development where homes are located within bicycling or walking distance of such facilities as schools, parks, shopping centers, and transit stops, and should encourage the location of high-density residential areas near activity centers and transit stops and stations.

Figure A-12

### SELECTED TRAFFIC-CALMING TECHNIQUES



Source: Federal Highway Administration and SEWRPC.

Activity centers should be designed to encourage bicycle and pedestrian travel within and to the center. Internal circulation and design should maintain ease of access for bicyclists and pedestrians from adjoining streets and transit stops. Where possible, buildings should be located close to the street with automobile parking lots located behind the buildings. Where this is not possible, designated bicycle and pedestrian routes should be provided between buildings and adjoining streets.

Openings should be provided in walls, berms, and landscaping around subdivisions and activity centers to provide convenient bicycle and pedestrian access to adjacent streets and transit stops.

Examples of site designs which facilitate bicycle and pedestrian travel are illustrated in Figure A-13.

## GUIDELINES FOR BICYCLE AND PEDESTRIAN ACCESS TO PUBLIC TRANSIT

### Pedestrian Access to Transit

Sidewalks should be constructed on both sides of streets within 0.25 mile of existing or planned transit routes, and along at least one side of streets within 0.50 mile of existing or planned transit routes.

### Bicycle Access to Transit

Bicycle accommodation should be provided on streets within one mile of existing or planned transit routes. The provision of bicycle parking facilities at transit stops should be considered where the stop has a boarding-passenger volume of 50 or more passengers per day or where the stop is a major passenger transfer point between transit routes. Bicycle parking facilities should also be provided adjacent to transit-passenger shelters.

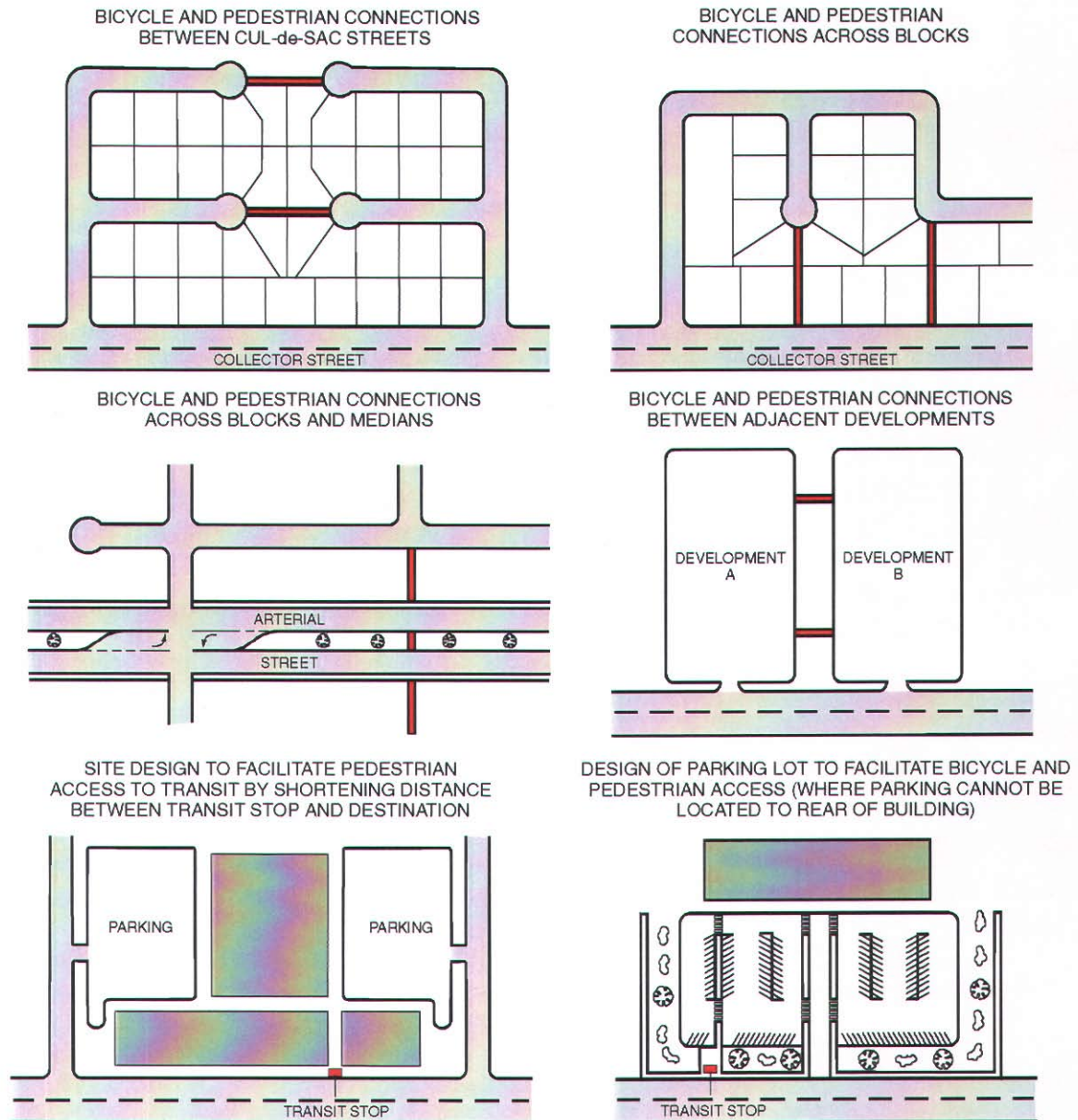
### Building Location and Orientation

Buildings should be clustered around and entrances oriented toward existing or planned transit stops, and building entrances should be located to minimize the distance between the entrance and a transit stop. Automobile parking



**Figure A-13**

**EXAMPLES OF SITE DESIGNS WHICH FACILITATE BICYCLE AND PEDESTRIAN TRAVEL**



Source: Oregon Department of Transportation and SEWRPC.

lots should not be located between building entrances and transit stops. In keeping with the requirements of the Americans with Disabilities Act, at least one accessible route must be provided between a building entrance and a transit stop on an adjoining street.

### Passenger Shelters

The construction of passenger shelters at transit stops should be considered where one or more of the following conditions exist: the stop is designed specifically for the use of, or is frequently used by, elderly or disabled persons; the stop has a boarding-passenger volume of 50 or more passengers per day; the stop is a major passenger transfer point between transit routes; or the location of the stop affords no protection to waiting passengers from harsh weather conditions.